## ENVIRONMENTAL IMPACT STUDY

# PORT CREDIT WEST VILLAGE MISSISSAUGA, ON

AUGUST 2017 AMENDED MARCH 2018



### **Environmental Impact Study**

Port Credit West Village Mississauga, ON

**Report Prepared for:** 

Port Credit West Village Partners L.P. 30 Adelaide Street East Suite 301 Toronto, ON M5C 3H1

#### **Report Prepared by:**

Savanta Inc. 37 Bellevue Terrace St. Catharines, ON L2S 1P4

August 2017 Amended March 2018

Savanta File: 7684



#### **Table of Contents**

EXECUTIVE SUMMARY			
1.0 1.1	INTRODUCTION PURPOSE OF THE REPORT	<b>7</b> 7	
2.0 2.1 2.2 2.3 2.4 2.5 2.6	NATURAL HERITAGE PLANNING CONSIDERATIONS REGION OF PEEL OFFICIAL PLAN. CITY OF MISSISSAUGA OFFICIAL PLAN. CREDIT VALLEY CONSERVATION PROVINCIAL POLICY STATEMENT AND ASSOCIATED GUIDELINE DOCUMENTS ONTARIO ENDANGERED SPECIES ACT (ESA), 2007 FEDERAL FISHERIES ACT.		
3.0 3.1 3. 3. 3. 3. 3. 3.2 3.2	DATA COLLECTION APPROACH & METHODS BACKGROUND REFERENCES 1.1 Land Information Ontario Natural Features Summary 1.2 Natural Heritage Information Centre Database 1.3 Ontario Breeding Bird Atlas 1.4 Ontario Reptile and Amphibian Atlas 1.5 Ontario Butterfly Atlas 1.5 Ontario Butterfly Atlas 1.6 Fisheries and Oceans Canada Aquatic Species at Risk Distribution TECHNICAL METHODS AND FIELD STUDIES. 2.1 Vegetation and ELC Methods		
3. 3.	2.2 Wildlife Survey Methods 2.3 Aquatic Habitat Assessment	17 22	
3. 3. 4.0	2.2 Wildlife Survey Methods 2.3 Aquatic Habitat Assessment BIO-PHYSICAL CHARACTERIZATION		
3. 3. 4.0 4.1 4.2 4.3	2.2 Wildlife Survey Methods 2.3 Aquatic Habitat Assessment BIO-PHYSICAL CHARACTERIZATION PHYSIOGRAPHY AND TOPOGRAPHY LANDSCAPE ECOLOGY VEGETATION		
3. 3. 4.0 4.1 4.2 4.3 <i>4</i> .3	<ul> <li>2.2 Wildlife Survey Methods</li> <li>2.3 Aquatic Habitat Assessment</li> <li>BIO-PHYSICAL CHARACTERIZATION</li> <li>PHYSIOGRAPHY AND TOPOGRAPHY</li> <li>LANDSCAPE ECOLOGY</li> <li>VEGETATION</li> <li>3.1 Ecological Land Classification</li></ul>		
3. 3. 4.0 4.1 4.2 4.3 4. 4. 4.	<ul> <li>2.2 Wildlife Survey Methods</li></ul>		
3. 3. 4.0 4.1 4.2 4.3 4. 4. 4. 4. 4.4	<ul> <li>2.2 Wildlife Survey Methods</li></ul>		
3. 3. 4.0 4.1 4.2 4.3 4. 4. 4.4 4.4	<ul> <li>2.2 Wildlife Survey Methods</li></ul>		
3. 3. 4.0 4.1 4.2 4.3 4. 4. 4. 4.4 4.4 4.	<ul> <li>2.2 Wildlife Survey Methods</li></ul>		
3. 3. 4.0 4.1 4.2 4.3 4. 4. 4. 4. 4. 4. 4. 4. 4.	<ul> <li>2.2 Wildlife Survey Methods</li></ul>		
3. 3. 4.0 4.1 4.2 4.3 4. 4.4 4.4 4.4 4.4 4.4	<ul> <li>2.2 Wildlife Survey Methods</li></ul>		
3. 3. 4.0 4.1 4.2 4.3 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4.	<ul> <li>2.2 Wildlife Survey Methods.</li> <li>2.3 Aquatic Habitat Assessment.</li> <li>BIO-PHYSICAL CHARACTERIZATION.</li> <li>PHYSIOGRAPHY AND TOPOGRAPHY</li> <li>LANDSCAPE ECOLOGY.</li> <li>VEGETATION</li> <li>3.1 Ecological Land Classification</li> <li>3.2 Vascular Plants.</li> <li>3.3 Evaluated Wetlands / Other Wetlands.</li> <li>WILDLIFE</li> <li>4.1 Birds.</li> <li>4.2 Mammals.</li> <li>4.3 Amphibians.</li> <li>4.4 Reptiles</li> <li>4.5 Insects.</li> </ul>		
3. 3. 4.0 4.1 4.2 4.3 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4.	<ul> <li>2.2 Wildlife Survey Methods</li></ul>		
3. 3. 4.0 4.1 4.2 4.3 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 5 4.5	<ul> <li>2.2 Wildlife Survey Methods</li></ul>		
3. 3. 4.0 4.1 4.2 4.3 4. 4.4 4.4 4. 4. 4. 4.5 4.5 4.6	<ul> <li>2.2 Wildlife Survey Methods</li></ul>		
3. 3. 4.0 4.1 4.2 4.3 4. 4.3 4. 4.4 4.4 4.5 4.5 4.6 4.6 4.6	<ul> <li>2.2 Wildlife Survey Methods</li></ul>		
3. 3. 4.0 4.1 4.2 4.3 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 5 4.6 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4.	<ul> <li>2.2 Wildlife Survey Methods</li></ul>		

5.0 ANALYSIS OF ECOLOGICAL AND NATURAL HERITAGE SIGNIFICANCE	34		
5.1 SIGNIFICANT NATURAL AREAS	34		
5.1.1 Provincially or Regionally Significant ANSIs	34		
5.1.2 Environmentally Sensitive or Significant Areas	35		
5.1.3 Habitat of Endangered and Threatened Species	35		
5.1.4 Fish Habitat	35		
5.1.5 Significant Wildlife Habitat	36		
5.1.6 Significant Woodlands	40		
5.1.7 Significant Wetlands	40		
5.1.8 Significant Valleylands	41		
5.2 NATURAL GREEN SPACES	41		
5.2.1 Woodlands >0.5 ha Not Meeting Criteria for Significance	41		
5.2.2 Wetlands Not Meeting Criteria for Significance	41		
5.2.3 Watercourses Not Considered to be Significant Valleylands	42		
5.2.4 Natural Areas >0.5 ha With Uncommon Vegetation	42		
5.3 SPECIAL MANAGEMENT AREAS	43		
5.4 RESIDENTIAL WOODLANDS	43		
5.5 LINKAGES	44		
5.6 SUMMARY OF NATURAL HERITAGE SYSTEM COMPONENTS SUBJECT TO IMPACT			
ASSESSMENT	44		
6.0 DESCRIPTION OF DEVELOPMENT PROPOSAL	46		
7.0 IMPACT ASSESSMENT, MITIGATION, AND ENHANCEMENT OPPORTUNITIES	48		
7.1 FISH НАВІТАТ	48		
7.1.1 Fish Habitat in the Shale Pond	48		
7.1.2 Fish Habitat in Lake Ontario	49		
7.2 NATURAL GREEN SPACES	51		
7.2.1 NON-SIGNIFICANT WETLANDS	51		
7.3 LINKAGES	53		
REFERENCES	59		
APPENDICES			

#### **Document Revision History**

Version	Date	Modifications
1	August 29, 2017	N/A
2	March 6, 2018	Revised to address comments on Version 1 provided by the City of Mississauga and Credit Valley Conservation on December 19, 2017

#### Executive Summary

Port Credit West Village Partners Inc. is proposing to redevelop the former Imperial Oil refinery lands at 70 Mississauga Road South (referred to as the Subject Lands), in the City of Mississauga. The proposed development, referred to as the Port Credit West Village, will be mixed-use with a variety of residential, commercial, institutional and open space land uses. The Subject Lands are a brownfield with a long history of heavy industrial use. They were formerly occupied by the Imperial Oil refinery, which operated from 1932 to 1985, before being decommissioned in 1987. Currently, the site is vacant with some remnant refinery infrastructure (e.g., internal facility roads, one building, water management infrastructure and an oil-water separator) and open space areas, dominated by cultural meadows and thickets, undergoing vegetation succession. Prior to commencement of development on the Subject Lands, an extensive environmental remediation program is underway to ensure the site meets current environmental quality standards for the proposed land uses.

This Environmental Impact Study (EIS) has been prepared to assess the potential impacts of the proposed development on the natural heritage features and associated functions on and adjacent to the Subject Lands. This EIS addresses the City of Mississauga Natural Heritage System, as outlined in the City's Official Plan (City of Mississauga 2011). It also addresses Significant natural features and associated functions defined by the Provincial Policy Statement (PPS) (MAH 2014) and supporting technical guidelines. Also addressed are other features defined in the City's Official Plan, including Natural Green Spaces, Special Management Areas, Residential Woodlands and Linkages.

This current version of the EIS (March 2018) is a revised version of the original EIS from August 2017, that has been amended to address comments provided by the City of Mississauga and Credit Valley Conservation (CVC) in December 2017.

Existing background information related to the natural heritage features on and adjacent to the Subject Lands was reviewed to identify known features, values and functions. An ecological field investigation program was developed in consultation with the City of Mississauga, Credit Valley Conservation (CVC) and the Ontario Ministry of Natural Resources and Forestry (MNRF) to fill data gaps related to natural heritage features and functions on the Subject Lands. Ecological investigations completed on the Subject Lands in 2017/2018 included:

- Bird surveys (wintering waterfowl, general spring migration, spring shorebird surveys and breeding bird surveys);
- Insect surveys (random areas searches, Monarch habitat assessment and migratory surveys and incidental observations during other studies);
- Amphibian surveys (amphibian call surveys, egg mass surveys);
- Reptile surveys (snake transect surveys, turtle basking and nesting surveys);
- Bat surveys (habitat assessment and acoustic monitoring);
- Fish and fish habitat assessments (fish community studies, visual spawning surveys, habitat assessment);
- Vegetation assessment (botanical inventory and Ecological Land Classification mapping); and
- Incidental wildlife observations.

The results of the background studies and ecological surveys were analyzed to determine if any of the components of the City of Mississauga Natural Heritage System (Significant Natural Areas, Natural Green Spaces, Special Management Areas, Residential Woodlots or Linkages) were present on or adjacent to the Subject Lands. This analysis concluded that the following features were present on or adjacent to the Subject Lands:

- Fish Habitat within the Shale Pond and Lake Ontario;
- Natural Green Spaces small, isolated wetlands not considered Significant Natural Features and locally rare vegetation species; and
- Linkage along the Lake Ontario shoreline, primarily supporting migratory birds and butterflies.

The proposed development will result in the removal of the fish habitat associated with the isolated Shale Pond on the Subject Lands. The pond, which exhibits evidence of contamination, (e.g., oily surface sheen) is not directly hydraulically connected to Lake Ontario and will be drained to enable the excavation of contaminated sediments. Fish in the pond, which consists of a population of tolerant common Fathead Minnow (*Pimephales promelas*) will be removed in accordance with the conditions of a License to Collect Fish for Scientific Purposes that will be obtained from the MNRF. A water feature may be re-established within the proposed open space in the development if the City determines a desire for it. A pond is not required for stormwater management nor habitat compensation purposes. This water feature may provide suitable habitat for fish, and a fish population may become established over time. As an anthropogenic, isolated feature, activities associated with the existing Shale Pond are not subject to review under the federal *Fisheries Act*.

Lake Ontario adjacent to the Subject Lands provides habitat for a wide range of resident and transient fish species. Much of the habitat along the shoreline fronting the Subject Lands is an open-coast environment, with limited habitat diversity associated with the armoured shoreline (rip rap and armour stone). No direct in-water work within fish habitat in Lake Ontario will be required for the proposed development. However, site alteration activities, including grading and filling, installation of public use trails and landscaping, will be conducted near the shoreline. This work could potentially result in indirect impacts to fish habitat in Lake Ontario due to erosion and sedimentation, stormwater runoff or accidental spills. With appropriate mitigation (e.g., sediment and erosion control measures, spill prevention and response measures), no negative impacts on fish habitat in Lake Ontario are anticipated as a result of the proposed development. The team is incorporating these measures into any proposed construction and remediation activities.

Eighteen small, isolated wetland communities on the Subject Lands, ranging in size from 50 m<sup>2</sup> ha to 0.10 ha (for a total wetland area of 0.80 ha) will be removed to facilitate the proposed environmental remediation process and/or the proposed development. These wetlands are of cultural origin (created by grading during the oil refinery decommissioning process or within the man-made shale pond). With the exception of the Shale Pond, these wetlands provide limited ecological function, due to their small size, isolated nature, lack of hydrological connection to watercourses, lack of floristic diversity and dominance by invasive species including European Reed (*Phragmites australis* ssp. *australis*). Removal of these small, isolated, low sensitivity wetlands, will result in the loss of 0.80 ha of low functioning wetland habitat. The Shale Pond, although man-made and historically used for stormwater management for the refinery, has naturalized since decommissioning of the facility and provides habitat for a number of bird and amphibian species, although it does not meet the requirements to be considered Significant

Wildlife Habitat. Removal of the wetlands on the Subject Lands will not negatively impact the City's Natural Heritage System, given that these wetlands:

- Are of cultural origin;
- Were created through compaction and grading of the decommissioned oil refinery, or in the case of the Shale Pond through excavation for brick-making and later use as an industrial stormwater management facility;
- Do not meet the requirements of any significant natural features under the PPS; and
- Occur in contaminated soil conditions.

Removal of the wetlands will remove a source of contamination and invasive species. The proposed water feature, if desired by the City (a pond is not required for stormwater management purposes and no specific wetland compensation is required), may develop wetland characteristics over time and may provide similar wildlife habitat functions with improved environmental quality due to site remediation.

The Lake Ontario shoreline, including the lake and adjacent terrestrial lands on and adjacent to the Subject Lands boundary has been identified as an important Linkage habitat, primarily for migratory birds and butterflies migrating along the north shore of Lake Ontario. A temporary and localized decrease in the function of the migratory linkage will occur as the development is constructed. To maintain the linkage function post-development, a green corridor will be maintained along the waterfront and the area will be planted with a variety of trees, shrubs and meadow species to provide beneficial stopover and foraging functions for migratory species. No net negative impacts on the Linkage function of the shoreline are anticipated to occur. Maintaining the linkage function does not require the incorporation of those lands to the south of the Subject Lands that are not part of this application in order to maintain the linkage function post-development.

A construction and post-construction monitoring program is recommended to verify that mitigation is having the intended effects (e.g., erosion and sediment control measures during construction) and that ecological enhancements measures (e.g., Lake Ontario shoreline vegetation plantings) have established and are successfully establishing.

In summary, this EIS, which has been revised to address City of Mississauga and CVC comments, concludes that the development on the Subject Lands can be completed without net negative impacts on the identified natural heritage features and associated functions, provided the recommended mitigation and enhancement measures are undertaken. Further, remediation of the existing contamination on the property (occurring through decades of heavy industrial use), is anticipated to result in substantial improvements to the overall environmental quality on the Subject Lands and neighboring areas.

#### 1.0 INTRODUCTION

Savanta Inc. (Savanta) was retained by Port Credit West Village Partners Inc. (PCWVP) to complete an Environmental Impact Study (EIS) for their lands at 70 Mississauga Road South (herein referred to as the Subject Lands), within the City of Mississauga, Ontario (**Figure 1**, **Appendix A**). The proposed mixed-use development, referred to as the Port Credit West Village, is generally bound by Mississauga Road South to the east, Lakeshore Road to the north, Lake Ontario to the south and private residential properties to the west. The Subject Lands are approximately 29.2 ha (72.04 acres) in area and are legally described as Lot 10 and Part of Lots 9 and 11, Broken Front Range, Credit Indian Reserve.

The Subject Lands were formerly occupied by the Imperial Oil refinery, which operated from 1932 to 1985, before being decommissioned in 1987. Currently, the site is a vacant brownfield with some remnant infrastructure (e.g., internal facility roads, one small building and an oil-water separator) and open space areas undergoing vegetation succession. The open spaces are dominated by cultural meadow and cultural thicket communities. There is an isolated man-made pond on the Subject Lands (referred to as the Shale Pond) which was originally created by the excavation of shale for brickmaking prior to 1932 and was later used as a stormwater management pond for the refinery.

The EIS was originally submitted in support of municipal planning applications for the proposed development in August 2017. Comments on the August 2017 EIS were received from the City of Mississauga and CVC in December 2017. This current version of the EIS (March 2018) has been revised to address the comments provided by the City of Mississauga and CVC.

#### **1.1** Purpose of the Report

An EIS is required to assess the potential impacts of the proposed development on the natural heritage features and associated functions on the Subject Lands. This work considers applicable provincial and municipal requirements and policies including reference to the natural heritage policies of the Province of Ontario's Provincial Policy Statement (PPS; MMAH, 2014), associated provincial implementation guidance contained in the Natural Heritage Reference Manual (NHRM; MNR 2010), and the City of Mississauga's Official Plan (City of Mississauga 2011).

The EIS is a requirement of the municipal planning process and is intended to address the policies of the Regional Municipality of Peel, the City of Mississauga and Credit Valley Conservation (CVC).

The study components included:

- A review of existing natural heritage background information, policies and legislation applicable to the Subject Lands in its regional context;
- A field review of the natural heritage features on and immediately adjacent to the Subject Lands through the completion of various ecological surveys and inventories;
- An evaluation of the sensitivity of the natural heritage features and their functions on the Subject Lands;
- An assessment of whether any of the existing natural heritage features within the Subject Lands meet the test of 'significance' as identified by the PPS, or the requirements to be

part of the City's Natural Heritage System, as identified in the Official Plan (City of Mississauga 2011);

- A description of the proposed undertaking and development proposal;
- Identification and discussion of the potential impacts that could occur to the natural heritage features as a result of the proposed development;
- Recommendations for mitigation to avoid or minimize impacts; and,
- Opportunities for the enhancement or restoration of natural features.

#### 2.0 NATURAL HERITAGE PLANNING CONSIDERATIONS

An assessment of the quality and extent of natural heritage features found on, and adjacent to, the Subject Lands and the potential impacts to these features from the proposed development application was completed to address the natural heritage components of the following regulatory agencies, local and regional municipalities, and/or legislation:

- Region of Peel Official Plan (2016);
- City of Mississauga Official Plan (2011);
- Credit Valley Conservation policies;
- Provincial Policy Statement (PPS) 2014;
- Provincial Endangered Species Act, 2007 (ESA); and
- Federal Fisheries Act.

The relevant portions of each of these, as they apply to the Subject Lands and the proposed development, are discussed in the following sections.

#### 2.1 Region of Peel Official Plan

The Region of Peel Official Plan (Region of Peel 2014) identifies a Greenlands System, made up of Core Areas, Natural Areas and Corridors and Potential Natural Areas and Corridors. The Greenlands system generally consists of the following types of features:

- ANSIs;
- Environmentally Sensitive or Significant Areas;
- Escarpment Natural Areas;
- Escarpment Protection Areas;
- Fish and wildlife habitat;
- Habitats of threatened and endangered species;
- Wetlands;
- Woodlands, valley and stream corridors;
- Shorelines;
- Natural lakes;
- Natural corridors;
- Groundwater recharge and discharge areas;
- Open space portions of the Parkway Belt West Plan; and
- Other natural features and functional areas.

The Region of Peel Official Plan (Region of Peel 2014) indicates that "core areas represent provincially and regionally significant features and areas and are considered a sub-set of what would be significant under the PPS" and includes:

- Significant Wetlands;
- Significant Coastal Wetlands;
- Core Woodlands;
- Environmentally Sensitive or Significant Areas;
- Provincial Life Science ANSIs;

- Significant habitats of Threatened or Endangered Species;
- Escarpment Natural Areas of the Niagara Escarpment Plan; and
- Core Valley and Stream Corridors, which includes major watercourses such as the Credit River as well as other tributaries that contain habitat of aquatic endangered or threatened species.

The Region of Peel Official Plan (Region of Peel 2014), Schedule A (Core Areas of the Greenlands System in Peel) does not identify any Core Areas of the Peel Greenlands System on or immediately adjacent to the Subject Lands.

Section 2.3.2.6 of the Region of Peel Official Plan prohibits development and site alteration within Core Areas of the Greenlands System with the exception of forest, fish and wildlife management, conservation and flood or erosion control projects, essential infrastructure, passive recreation, minor development and minor site alteration, existing uses, buildings or structures, expansions to existing buildings or structures, accessory uses, building or structures or new single family residential dwellings on an existing lot of record. Minor development and minor Site alteration are defined as development or 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".

#### 2.2 City of Mississauga Official Plan

Section 6.3.9 of the City of Mississauga Official Plan (City of Mississauga 2011) identifies the following natural heritage features as being part of the Natural Heritage System (NHS):

- Significant Natural Areas;
- Natural Green Spaces;
- Special Management Areas;
- Residential Woodlands; and,
- Linkages.

The extent of the NHS within an area is identified through completion of a site-specific EIS.

The Official Plan (City of Mississauga 2011) identifies Significant Natural Areas as areas that meet one or more of the following criteria:

- Provincially or regionally significant ANSIs;
- Environmentally sensitive or significant areas;
- Habitat of endangered or threatened species;
- Fish habitat;
- Significant wildlife habitat;
- Significant woodlands;
- Significant wetlands; and,
- Significant valleylands.

Section 6.3.29 of the Official Plan (City of Mississauga 2011) states that an EIS will be required should any development or site alteration occur adjacent to provincially significant wetlands,

provincially significant coastal wetlands, habitats of endangered or threatened species, or other Significant Natural Areas to demonstrate no negative impact to the features and their associated functions. Should they be required, setbacks and vegetated buffer zones from these natural heritage features will be determined at the EIS planning stage.

Natural Green Spaces are identified based on criteria that do not fulfil the requirements of significance (i.e., should a wetland not be deemed significant, it is still considered a Natural Green Space). Special Management Areas are lands adjacent to, or within close proximity to, Significant Natural Areas or Natural Green Spaces. The purpose of these areas is to enhance and restore natural functions in support of the Significant Natural Area or Natural Green Space. Residential Woodlands are described as plots of land containing mature trees that form a "continuous canopy and minimal native understory due to maintenance of lawns and landscaping"; these are usually found within older residential neighbourhoods. Finally, Linkages are defined as areas that maintain the biodiversity and ecological functions of Significant Natural Areas and Natural Green Spaces but are not defined as one of these features.

Section 6.3.32 of the Official Plan (City of Mississauga 2011) notes that development and site alteration "will not be permitted within or adjacent to Natural Green Spaces, Linkages and Special Management Areas" unless demonstration of no negative impact to the features have been identified through an EIS.

As presented on Schedule 3 (Natural System) within the Official Plan (City of Mississauga 2011), no Natural Heritage System components are currently identified on or adjacent to the Subject Lands. Directly south of the Subject Lands, along the Lake Ontario shoreline, a Natural Hazard has been identified. Development is prohibited within these natural hazard areas due to naturally occurring processes (flooding, erosion). The proposed development is located outside the setback area associated with Lake Ontario natural hazards.

#### 2.3 Credit Valley Conservation

CVC conducts reviews of planning processes associated with future development of properties within its jurisdictional boundaries. In addition, CVC provides planning and technical advice to planning authorities to assist them in fulfilling their responsibilities regarding natural hazards, natural heritage and other relevant policy areas pursuant to the *Planning Act*. In addition to their regulatory responsibilities, CVC provides advice as both a watershed-based resource management agency and through planning advisory services.

CVC administers the *Development, Interference with Wetlands, Alterations to Shorelines and Watercourses Regulation*, (O. Reg.) 160/06, which defines the areas of interest that allow CVC to:

- Prohibit, regulate, or provide permission for straightening, changing, diverting or interfering in any way with the existing channel of a river, creek, stream, watercourse or changing or interfering with a wetland; and
- Prohibit, regulate, or provide permission for development if the control of flooding, erosion, dynamic beaches, pollution or the conservation of land may be affected by the development.

CVC implements its authority under O.Reg. 160/06 in accordance with the Watershed Planning and Regulation Policies (CVC 2010).

#### 2.4 Provincial Policy Statement and Associated Guideline Documents

The PPS provides direction on matters of provincial interest related to land use planning and development. It "...supports a comprehensive, integrated and long-term approach to planning..." The PPS is to be read in its entirety and land use planners and decision-makers need to consider all relevant policies and how they work together.

This report addresses those policies that are specific to Natural Heritage (section 2.1) with some reference to other policies with relevance to Natural Heritage and impact assessment considerations and areas of overlap (e.g., those related to Efficient and Resilient Development and Land Use Patterns, section 1.1; Sewage, Water and Stormwater, section 1.6.6; Water, section 2.2; Natural Hazards, section 3.1).

Eight types of significant natural heritage features are defined in the PPS, as follows:

- Significant wetlands;
- Significant coastal wetlands;
- Significant woodlands;
- Significant valleylands;
- Significant wildlife habitat;
- Fish habitat;
- Habitat of endangered and threatened species; and,
- Significant areas of natural and scientific interest (ANSIs).

Development and site alteration shall not be permitted in significant wetlands or significant coastal wetlands. Development and site alteration shall not be permitted in significant woodlands, significant valleylands, significant wildlife habitat or significant ANSIs, unless it is 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 the habitat of endangered and threatened species or in fish habitat, except in accordance with provincial and federal requirements. Development and site alteration may be permitted on lands adjacent to fish habitat provided it has been demonstrated that there will be no negative impacts on the natural feature or their ecological functions.

#### 2.5 Ontario Endangered Species Act (ESA), 2007

The provincial ESA was developed to:

- Identify species at risk, based upon best available science;
- Protect species at risk and their habitats and to promote the recovery of species at risk; and,
- Promote stewardship activities that would support those protection and recovery efforts.

The ESA protects all threatened, endangered and extirpated species listed on the Species at Risk in Ontario (SARO) list. These species are legally protected from harm or harassment and their associated habitats are legally protected from damage or destruction, as defined under the ESA.

#### 2.6 Federal *Fisheries Act*

Fisheries and Oceans Canada (DFO) administers the federal *Fisheries Act* which defines fish habitat as "spawning grounds and any other areas including nursery, rearing, food supply and migration areas on which fish depend directly or indirectly in order to carry out their life processes". Section 35.1 of the *Fisheries Act* prohibits serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish that support such a fishery.

Serious harm to fish is defined as:

- the death of fish;
- a permanent alteration to fish habitat of a spatial scale, duration or intensity that limits or diminishes the ability of fish to use such habitats as spawning grounds, or as nursery, rearing, or food supply areas, or as a migration corridor, or any other area in order to carry out one or more of their life processes;
- the destruction of fish habitat of a spatial scale, duration, or intensity that fish can no longer rely upon such habitats for use as spawning grounds, or as nursery, rearing, or food supply areas, or as a migration corridor, or any other area in order to carry out one or more of their life processes." (DFO 2013).

In terms of potential involvement of the DFO, the amended federal *Fisheries Act*, (November 25th, 2013) shifted the onus to the proponent to ensure that a project is in compliance with the federal *Fisheries Act*. The DFO website page "Self-Assessment: Does DFO need to review my project", lists project activities and criteria where DFO review is not required [http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html]. Projects not qualifying for self-assessment should be reviewed by DFO to determine if they have potential to cause serious harm to fish. Serious harm can be authorized by DFO under Paragraph 35(2)(*b*) of the *Fisheries Act*.

#### 3.0 DATA COLLECTION APPROACH & METHODS

#### 3.1 Background References

Savanta has relied, in part, upon supporting background information and previous site surveys/ investigations to provide additional insight into the overall character of these Subject Lands. Examples of these resources are:

- Ministry of Natural Resources and Forestry (MNRF) Land Information Ontario (LIO) Natural Features Mapping;
- Natural Heritage Information Centre (NHIC) database;
- Provincial wildlife atlases (i.e., Ontario Breeding Bird Atlas, etc.); and
- Fisheries and Oceans Canada (DFO) Aquatic Species at Risk Distribution Mapping.

The results of these background reviews are discussed in the following sections.

#### 3.1.1 Land Information Ontario Natural Features Summary

Based on a search of the MNRF LIO geographic database, the only mapped natural heritage on or adjacent to the Subject Lands is an isolated pond (the former Shale Pond originally excavated to obtain shale for brickmaking and later used as a stormwater management pond for the Imperial Oil refinery), as shown in **Figure 2** (**Appendix A**). There are no mapped woodlands on the Subject Lands, with the closest woodland being approximately 600 m northwest. There are no mapped wetlands on the Subject Lands, with the closest wetland being the Credit River Marshes Wetland Complex, a Provincially Significant Wetland (PSW), located approximately 550 m north of the Subject Lands, along the Credit River. The Credit River Marshes are also part of an Environmentally Sensitive Area (ESA) and the Credit River Coastal Marsh regionally significant ANSI. The Lorne Park Prairie regionally significant ANSI is located approximately 450 m northwest of the Subject Lands.

#### 3.1.2 Natural Heritage Information Centre Database

The NHIC database, maintained by the MNRF, was searched for records of provincially significant plants, vegetation communities and all forms of wildlife on, and in the vicinity of the Subject Lands. The database provides occurrence data by 1 km<sup>2</sup> area blocks, which overlap with areas outside of the Subject Lands. Four blocks contain information pertaining to the Subject Lands: 17PJ1422, 17PJ1322, 17PJ1221 and 17PJ1421. Within these blocks, the search revealed 26 records (**Table 1, Appendix B**), 20 of which had an element occurrence rank of 'Historical' (greater than 50 years old) or not ranked as Species of Conservation Concern or Species at Risk. These species are not addressed as current occurrences in this reporting.

Two species at risk were identified within the vicinity of the Subject Lands: Eastern Musk Turtle (*Sternotherus odoratus*) and Common Snapping Turtle (*Chelydra serpentina*), which are both designated as Special Concern in Ontario. Additionally, four vegetation species were documented within the vicinity of the Subject Lands that are Species of Conservation Concern: Cleland's Evening Primrose (*Oenothera clelandii*) and Fall Crabgrass (*Digitaria cognata*), which are both S1 ranked species in Ontario, Kansas Hawthorn (*Crataegus coccinioides*), which has a S2 rank in Ontario, and Sundial Lupine (*Lupinus perennis*), which has a S2S3 ranking in Ontario. This



information assisted in defining the search effort and target species for studies on and immediately adjacent to the Subject Lands.

#### 3.1.3 Ontario Breeding Bird Atlas

The Ontario Breeding Bird Atlas (OBBA) contains detailed information on the population and distribution status of Ontario birds (2005). The data is presented on 10 km x 10 km squares. The data square that overlaps with the Subject Lands was used to determine the potential bird species list for that area. It should be noted that the Subject Lands are a small component of the overall bird atlas square, and therefore it is unlikely that all bird species are found within the Subject Lands. Habitat type, availability and size are all contributing factors in bird species presence and use.

A total of 102 bird species were recorded in the atlas square (17PJ12) that overlaps with the Subject Lands. Of the species reported in the atlas square, five are Threatened in Ontario: Chimney Swift (*Chaetura pelagica*), Barn Swallow (*Hirundo rustica*), Bank Swallow (*Riparia riparia*), Bobolink (*Dolichonyx oryzivorus*), Eastern Meadowlark (*Sturnella magna*); and four are Special Concern in Ontario: Peregrine Falcon (*Falco peregrinus*), Common Nighthawk (*Chordeiles minor*), Eastern Wood-Pewee (*Contopus virens*) and Wood Thrush (*Hylocichla mustelina*). This information assisted in defining the search effort and target species for studies on, and immediately adjacent to, the Subject Lands.

#### 3.1.4 Ontario Reptile and Amphibian Atlas

The Ontario Herpetology Atlas contains detailed information on the population and distribution status of Ontario reptiles and amphibians (Ontario Nature 2016). The data are presented on 10 km x 10 km squares. The data square that overlaps with the Subject Lands was used to determine the potential herpetofauna species list for that area. It should be noted that the Subject Lands are a small component of the overall herpetofauna atlas square, and therefore it is unlikely that all herpetofauna species are found within the Subject Lands. Habitat type, availability and size are all contributing factors in herpetofauna species presence and use.

A total of 24 species were recorded in the atlas square (17PJ12) that overlaps with the Subject Lands. Of the 24 herpetofauna species reported in the atlas square, six are turtle species, six are snake species, five are salamander species and seven are frog and toad species. The atlas square search results show one is Endangered in Ontario: Jefferson Salamander (*Ambystoma jeffersonianum*); one is Threatened in Ontario: Blanding's Turtle (*Emydoidea blandingii*); two are Special Concern in Ontario: Snapping Turtle (*Chelydra serpentine*) and Northern Map Turtle (*Graptemys geographica*); and one is Special Concern in Canada: Milksnake (*Lampropeltis Triangulum*).

This information assisted in defining the search effort and target species for studies on and immediately adjacent to the Subject Lands.

#### 3.1.5 Ontario Butterfly Atlas

The Ontario Insect Atlas contains detailed information on the population and distribution status of Ontario insects. The data is presented on 10 km x 10 km squares. The data square that overlaps

with the Subject Lands was used to determine the potential insect species list for that area. Habitat type, availability and size are all contributing factors in insect species presence and use.

A total of 42 species and 351 records were recorded in the atlas square (17PJ12) that overlaps with the Subject Lands. Of the 42 species, one is considered Species at Risk: Monarch (*Danaus plexippus*), listed as a Special Concern species in Ontario.

#### 3.1.6 Fisheries and Oceans Canada Aquatic Species at Risk Distribution Mapping

A review was conducted of the DFO aquatic species at risk distribution mapping that illustrates the distribution and population status of Species at Risk fish and mussels in Ontario. The Subject Lands are located on Ontario South West, Map 11 (DFO 2017).

While no aquatic species at risk were identified on the mapping as being present within the Subject Lands, directly east of the Subject Lands along the Lake Ontario shoreline, two species ranked as Special Concern on the federal *Species at Risk Act* were identified: Deepwater Sculpin (*Myoxocephalus thompsonii*) and Upper Great Lakes Kiyi (*Coregonus kiyi*). Deepwater Sculpin are most often present between 60 m and 150 m deep (COSEWIC 2006) and would therefore not be expected to be present in the Lake Ontario shoreline area fronting the Subject Lands. The Lake Ontario population of Upper Great Lakes Kiyi is considered to have gone extinct in 1964 (DFO 2016) and therefore, is not expected to occur in Lake Ontario fronting the Subject Lands.

Additionally, the aquatic species at risk distribution mapping also identified three species that are identified as Extirpated, Endangered or Threatened on the federal *Species at Risk Act* as being potentially present in the Credit River north and east of the Subject Lands, although the mapping does not distinguish if all of these species were present in this area, or if they were present within other areas of the map space. Eastern Pondmussel (*Ligumia nasuta*) was noted on the DFO mapping (2017) as being present on the map space, but mapping prepared by NHIC (2012) does not indicate that this species is present in Lake Ontario or the Credit River, and therefore, this species is not anticipated to be present on or adjacent to the Subject Lands.

Shortnose Cisco (*Coregonus reighardi*), which is also identified as Endangered on the ESA, 2007, is known to be present in Lake Ontario, but typically at depths between 22 m to 110 m and was last seen in Lake Ontario in 1964 (MNRF 2017). Therefore, this species is not likely present in the portion of Lake Ontario fronting the Subject Lands. The DFO mapping also identified Redside Dace (*Clinostomus elongatus*) as being potentially present in the Credit River. This species was also identified during the NHIC review (section 3.1.2), but the observation was greater than 50 years old and therefore, considered to be an historical observation. Based on existing habitat conditions, it appears unlikely that this species remains present in the lower Credit River.

#### 3.2 Technical Methods and Field Studies

Savanta completed field surveys and natural environment inventories for the Subject Lands in 2017. The field investigations included seasonal botanical inventories (late spring and early summer), Ecological Land Classification (ELC) of vegetation communities, wintering waterfowl surveys, spring bird migration surveys, spring shorebird surveys, breeding bird surveys, targeted grassland SAR bird surveys, breeding amphibian surveys, reptile surveys, insect surveys, bat surveys, fish community surveys, fish habitat assessment and incidental wildlife observations.



Some additional commentary regarding ecological field methods are presented in the following sections, and **Table 2** (**Appendix B**) lists field dates and personnel engaged. Sampling locations associated with the field studies discussed below are shown in **Figure 3** (**Appendix A**).

#### 3.2.1 Vegetation and ELC Methods

Vegetation communities were first identified on aerial imagery and then verified in the field. Vegetation community types were confirmed, sampled and revised, if necessary, using the sampling protocol of the ELC for Southern Ontario (Lee et al. 1998). ELC was completed to the finest level of resolution (Vegetation Type) where feasible. Species names generally follow nomenclature from the Flora Ontario – Integrated Botanical Information System (FOIBIS; Newmaster and Ragupathy 2012).

The provincial status of all plant species and vegetation communities is based on NHIC (2013). Identification of potentially sensitive native plant species is based on their assigned coefficient of conservatism (CC) value, as determined by Oldham et al. (1995). This CC value, ranging from 0 (low) to 10 (high), is based on a species tolerance of disturbance and fidelity to a specific natural habitat. Species with a CC value of 9 or 10 generally exhibit a high degree of fidelity to a narrow range of habitat parameters. Results were also compared against lists of the local rarity of species in Peel (Varga 2005) and the Credit River watershed (CVC 2002).

#### 3.2.2 Wildlife Survey Methods

#### Bird Surveys

#### a) Wintering Waterfowl Surveys

All of the adjacent Lake Ontario shoreline to the south of the Subject Lands (**Figure 3**, **Appendix A**) was walked slowly with regular stops approximately every 50 m. Waterfowl and other waterbird species were recorded, avoiding double counting whenever possible. Observations were made with Ziess 10X50 Trinovid binoculars and a Swarovski HD 81 mm telescope. Individual birds were typically categorized as either within or beyond 250 m of the shoreline. This delineation was used to approximate near-shore use by the species recorded. Maximum distance of observation was used on every visit, and fly-past birds were also tallied. Four surveys were completed between March 2 to March 31, 2017 and three additional surveys were completed in January and February 2018. The results of these surveys are reported in this EIS. Two additional surveys will be completed in March 2018.

#### b) General Spring Migration Surveys

Area searches that covered the entire Subject Lands were employed during all surveys. This included walking the Winter Waterfowl Survey route. While no two surveys followed the same route, complete coverage was ensured during all visits. Observations were made with Ziess 10X50 Trinovid binoculars. All species of birds observed and heard were recorded, making an effort to avoid double counting (LPBO 2005). When visible diurnal migration was observed over the Subject Lands, it was noted for the particular species. Evidence of breeding was recorded during all visits. Each survey required 3 hrs to 3.5 hrs; surveys were conducted from March 21 to May 29, 2017, occurring approximately every 10 days.

#### c) Shorebird Surveys

One location was chosen to observe shorebird migration (**Figure 3**, **Appendix A**) along the Lake Ontario shoreline adjacent to the Subject Lands. Maximum field of view and proximity to flypast birds was best from this location, similar to protocols used at Col. Sam Smith Park in Etobicoke. Observations were made with Ziess 10X50 Trinovid binoculars and a Swarovski HD 81 mm telescope. Maximum distance of observation was used on every visit. Observations began on 21 April and continued through May, roughly every 10 days. Four surveys were completed every 2 days to 3 days from May 22 to May 29, 2017, to capture the main window of shorebird passage through the area.

#### d) Breeding Bird Surveys

Breeding bird surveys were conducted following protocols set forth by the Ontario Breeding Bird Atlas (Cadman et al. 2007), the Ontario Forest Bird Monitoring Program (Cadman et al. 1998) and the Marsh Monitoring Program (Bird Studies Canada 2014 and 2006).

Surveys were conducted between dawn and five hours after dawn with suitable wind conditions, no thick fog or precipitation (Cadman et al. 2007). Four point-count stations, shown in **Figure 3** (**Appendix A**) were located in various habitat types within the Subject Lands and combined with area searches to help determine the presence, variety and abundance of bird species. Each point-count station was surveyed for 10 minutes for birds within 100 m and outside 100 m. All species recorded on a point-count were mapped to provide specific spatial information and were observed for signs of breeding behaviour. Surveys were conducted on May 26, June 15 and July 4, 2017, meeting the criteria for surveys to be at least 10 days apart.

During breeding bird surveys, vegetation was assessed for potential presence of Species at Risk habitat. If suitable habitat was encountered or individuals were observed standard protocols were utilized.

Open grassland habitat was surveyed according to the MNR (2012) Guidelines for Bobolink and Eastern Meadowlark. Point count stations (discussed above) were located within open cultural meadows on the Subject Lands. Transects or area searches were also conducted in addition to the 10-minute point count stations.

Both the Natural Heritage Information Centre (NHIC 2016) database and the Species at Risk in Ontario (SARO) list (Ontario Regulation 230/08) were reviewed to determine the current provincial status for each bird species.

#### Amphibian Surveys

Four rounds of evening amphibian call-count surveys (AMC) and one round of daytime amphibian egg mass surveys (EMS) were conducted. Survey stations were identified using a preliminary review of aerial photography and/or during earlier site reconnaissance surveys. Stations were verified in the field to confirm the presence of suitable breeding habitat.

#### a) Amphibian Call-count Surveys (AMC)

These surveys followed standard protocols outlined in the Great Lakes Marsh Monitoring Program (BSC 2003). Surveys were conducted on warm nights with little wind. Surveys commenced one half hour before dusk and ended before midnight. Visits were at least 15 days apart and as per protocols. The first occurred with a minimum nighttime air temperature of 5°C, the second visit with a minimum of 10°C and the third visit with a minimum of 17°C. A fourth visit was conducted to confirm if Bullfrog (*Lithobates catesbeianus*) were present, after a surveyor thought they incidentally heard Bullfrog calling from the Subject Lands during completion of a breeding bird survey.

A total of five stations were selected for monitoring, as shown on **Figure 3** (**Appendix A**), based on the presence of potentially suitable habitat conditions during the first round. Each station was surveyed for six minutes and a three-level call category system was used to identify the level and type of frog activity. If noise from plane, road traffic and/or trains was present, monitoring was delayed and began during a quiet period.

The standard call levels are:

- 1) Individual calls do not overlap and calling individuals can be discreetly counted;
- 2) Calls of individuals sometimes overlap but number of individuals can still be estimated; and
- 3) Overlap among calls seems continuous (full chorus) and a count estimate is impossible.

Anurans were recorded as within the station if they were within 100 m. All other species were recorded as incidental records heard outside the station.

#### b) Amphibian Egg Mass Surveys (EMS)

These surveys were conducted for salamanders, frogs and toads during daylight hours in April 2017. EMSs were conducted at all AMC stations, except for AMC2 which was fenced off and access was not possible (**Figure 3**, **Appendix A**) and were observational/qualitative in nature, focusing on visual searches for tadpoles and egg masses. Area searches were conducted at all stations; these included walking the perimeter of the pond/wetland while scanning for egg masses and tadpoles. Any submerged sticks or shrubs standing in the water, to which eggs might be attached, were carefully checked with minimal intrusion into the pond/wetland. For each station, the survey was completed when a complete check of locations where egg masses or tadpoles may be attached had occurred, or within a 30-minute allotment, whichever was less.

If observed, the number of individuals of each amphibian species would have been recorded and the life stage would be noted (e.g., egg mass, tadpole or adult). Characteristics of the breeding habitat were also noted, including: pool shape, water depth, water temperature, canopy cover, infeature vegetation, presence of suitable egg attachment sites, and observations of predatory fish. Also, logs or debris in the vicinity of each area were checked for presence of adult salamanders (all such items were returned to their original location/position to maintain microhabitat conditions). Both the NHIC (2016) database and the SARO list (Ontario Regulation 230/08) were reviewed to determine the current provincial status for each amphibian species recorded on the Subject Lands.

#### <u>Reptile Surveys</u>

#### a) Turtle Surveys

These surveys identify the presence and abundance of turtle species in open water habitats, contributing to an understanding of habitat diversity and quality. Species at risk and/or significant wildlife habitat are also identified through these methods.

Potentially suitable aquatic habitat for turtles was identified using aerial photography (ponds, open wetlands, and riparian/lacustrine areas). Four surveys were conducted in the spring to search for basking turtles and one search were undertaken to screen potential nesting areas for evidence of use. Surveys occurred in spring/early summer and were conducted between 8:00 AM and 2:00 PM on sunny days with temperatures between 10°C and 25°C, or after a day of rain. Survey stations are identified on **Figure 3** (Appendix A).

Binoculars were used to scan the edges and surface of the Shale Pond (the only suitable habitat on the Subject Lands) and the pond in JC Saddington Park, for basking turtles, from a distance, for a 10-minute period. Data recorded included: water and air temperatures (basking prevalent when air is warmer than water), vegetation composition around the water body, and presence of basking features (logs, floating vegetation mats, floating / emergent debris like tires).

Candidate nesting areas included: shores/beaches of wetlands, lakes or rivers; trails and driveways; and farm field margins, etc., so long as suitable substrate and sun exposure are present.

In addition to basking surveys, turtle trapping, using a trap net, was undertaken in August 2017 to remove turtles from the Shale Pond in advance of remediation activities.

#### b) Snake Surveys

Preliminary aerial photography review was performed to identify suitable snake habitat (e.g. cultural meadow, disturbed meadow, wetland edges, cultural woodland, cultural savannah, remnant buildings). Transects, as shown on **Figure 3** (**Appendix A**) were walked for basking snakes or snake mortalities. Surveys focused on searching natural cover, like logs and debris (boards). All objects were replaced as they were found, to reduce disturbance. Data recorded during snake surveys included species observed and locations (UTM coordinates), air temperature, start and end time, and weather conditions.

#### Insect Surveys

Random area searches for insects, including Odonates (dragonflies and damselflies) and butterflies were conducted during the first and second round breeding bird surveys in mid-June and early July 2017. Incidental observations of insects were also noted during all general spring bird migration surveys conducted in March, April and May 2017.

The distribution and abundance of Milkweed (*Asclepias syriaca*), the host breeding plant for Monarch, on the Subject Lands was mapped and assessed during botanical surveys in 2017. Monarch migration surveys were completed on five occasions between August 29 and September 29, 2017. The surveys consisted of visual area searches throughout the Subject Lands and along the Lake Ontario shoreline on the adjacent lands to the south. Surveys were conducted under suitable weather conditions (i.e., no precipitation) within 2 hours of sunrise when roosting Monarchs would have still been present. Particular attention was paid to potential roosting trees at the southern end of the Subject Lands and on the adjacent lands to the south.

#### **Bat Surveys**

#### a) Habitat Assessment

The Subject Lands were assessed through aerial interpretation and ELC to identify whether any forest communities were present that would be suitable for bat maternity roosts. The habitat assessment was completed using criteria provided in "Survey Protocols for Species at Risk Bats within Treed Habitats: Little Brown Myotis, Northern Myotis, and Tri-Coloured Bat" (MNRF 2017), and as described in Province's Significant Wildlife Habitat Criterion Schedule for Ecoregion 7E (MNRF 2015). No forest communities exist on the property, and therefore the Subject Lands do not meet the habitat requirements for Bat Maternity Colonies.

Isolated trees, hedgerows, and trees over 10 cm Diameter at Breast Height (dbh) are present on the Subject Lands. These areas may provide roosting habitat for Species at Risk bats and were further assessed for presence of SAR bats through acoustic surveys.

#### b) Acoustic Surveys

Surveys to detect bat species by ultrasonic recording devices were carried out on the Subject Lands on June 5, June 13, and June 24, 2017, using Wildlife Acoustics Echo Meter Touch (EMT) and Pettersson M500-384 recording devices.

Survey sites, as shown in **Figure 3** (**Appendix A**), were selected based on aerial interpretation, ELC vegetation community types, and ground-truthing for suitable bat micro-habitat such as clusters of  $\geq$ 10 cm DBH trees with peeling bark, leaf clusters, and cavities, along the edges of hedgerows, and in areas where trees are proposed to be removed.

Surveys were conducted starting no earlier than sunset and ending no later than sunrise when temperatures were >10°C with low winds and no precipitation. In addition, the EMT and Pettersson microphones were elevated approximately 2 m above the ground to reduce background noise during transect walks and at point-count stations. **Table 3 (Appendix B)** summarizes the dates and times, and weather conditions encountered during bat acoustic surveys.

#### Fisheries Surveys

#### a) Shale Pond Fish Community Survey

A fish community survey was completed within the Shale Pond to confirm if fish were inhabiting the pond, and if so, what species and life stages were present. Accessible areas of the shallow shoreline of the pond were assessed using a backpack electrofisher (Halltech HT-2000) on June 21, 2017. The survey protocol consisted of electrofishing areas around the periphery that could be safely waded (e.g., shallow and suitable walking surface), as shown on **Figure 4** (**Appendix A**).

Eight minnow traps, baited with bread, were installed around the shoreline on June 21, 2017, in a variety of habitats including cattails and other emergent vegetation, boulders and steeper drop offs along the shoreline, as shown in **Figure 4** (**Appendix A**). Minnow traps were retrieved after approximately 24 hours, any fish and invertebrates were removed, and fish were identified to species and enumerated before being released back into the pond at the capture location. After the contents were removed, the traps were reset for an additional 24-hour period, before being removed on the afternoon of July 23, 2017. All fish and invertebrates captured during this set were identified, enumerated and released back to the pond.

Any incidental observations of fish in the pond during these surveys were recorded.

#### b) Bass and Sunfish Spawning Surveys

Visual spawning surveys were completed in the Shale Pond and along the Lake Ontario shoreline fronting the Subject Lands on May 15 and June 8, 2017 to identify if bass or sunfish species were nesting in the area. The surveys were conducted under calm, sunny conditions and observers used polarized sunglasses to enhance in-water viewing. Surveys consisted of walking the perimeter of the Shale Pond and Lake Ontario shoreline, viewing the bottom in accessible areas, as shown on **Figure 4** (**Appendix A**). The bed of the area was observed for presence of bass or sunfish and any observations of nesting (e.g., nest presence, fish on or defending nests). Any nests or nesting activity observed would have been documented and locations recorded with GPS. Any incidental observations of other fish in either area were also recorded during the survey.

#### 3.2.3 Aquatic Habitat Assessment

An Aquatic Habitat Assessment, consisting of a visual survey of existing instream and riparian habitat conditions within the Shale Pond and along the Lake Ontario shoreline fronting the Subject Lands, was completed on March 7, 2017 with supplemental observations on May 15, 2017. The following characteristics and features were noted during the assessment of each watercourse:

- Wetted width and depth of the Shale Pond (at time of survey);
- Bed and shoreline substrate;
- Instream habitat (e.g., woody debris, aquatic vegetation, undercut banks);
- Evidence of channel bed and bank erosion;
- Riparian habitat; and
- Presence of fish (based on visual observations).

A photographic record of habitat conditions on and adjacent to the Subject Lands was collected during the assessment.

#### 4.0 BIO-PHYSICAL CHARACTERIZATION

#### 4.1 Physiography and Topography

The Subject Lands are located in the Lower Credit River Watershed, within the Peel Plain physiographic region, which is dominated by clay soils (MNRF and CVC 2002). CVC (2008) describes the Peel Plain as "flat to undulating topography consisting of clay soils deposited when glacial melt water ponded on top of the low permeability Halton Till Plain". The Halton Till lies on top of Queenston Shale bedrock (Karrow 1991; cited in CVC 2008), which is exposed in some locations around the Shale Pond. This bedrock unit consists of thin to thickly-bedded red shale (CVC 2008).

The site is relatively flat, with some undulation created when buried infrastructure (e.g., oil tanks) was removed during the refinery decommissioning process. Numerous stockpiles of soil and debris are scattered throughout the area. The Shale Pond, situated at elevation 75.99 meters above sea level (masl) is the lowest point on the Subject Lands, being approximately 5 m lower than the adjacent tablelands to the east and north. The lands to the western side of the Shale Pond are also lower than the surrounding lands, a remnant of the topography associated with the operating refinery. The southeastern corner of the Subject Lands is also slightly lower than the majority of the site, since it was formerly the location of a boat slip that was filled during the refinery decommissioning process. A berm is present along much of the area adjacent to the Lake Ontario shoreline and waterfront trail. The tablelands adjacent to the shoreline range from approximately 3 m to 10 m above the lake water level.

#### 4.2 Landscape Ecology

The Subject Lands are in the Port Credit urban area of the City of Mississauga. The Subject Lands are in a process of natural regeneration following decommissioning of the Imperial Oil refinery in 1987. They are surrounded by mature, low density residential communities on the northeast and southwest sides, JC Saddington Park to the east and commercial developments associated with Lakeshore Road to the northwest. Lake Ontario borders the Subject Lands to the south and the waterfront trail runs across the southern end between the Subject Lands and the lake.

From a landscape ecology perspective, the Subject Lands are generally isolated from other terrestrial natural features, being surrounding on all three sides by heavily developed urban lands. However, connection to the shoreline and Lake Ontario results in the Subject Lands providing in important ecological linkage, particularly for birds and butterflies migrating along the lake shoreline in the spring and fall. However, given the adjacent residential areas, the shoreline does not provide a consistent migration corridor for land-based mammals. Migratory birds and insects were found to make periodic use of some portions of the Subject Lands during the spring migration period, as will be discussed in future sections of the report.

The Credit River mouth is located approximately 375 m northeast of the Subject Lands. The lands adjacent to the mouth of the river are generally developed with commercial and open space uses including JC Saddington Park, JJ Plaus Park, the Port Credit Marina, several commercial establishments and a residential apartment building. Regardless of the level of development, the Credit River provides an important ecological corridor from Lake Ontario to natural areas further upstream. This includes fish species that migrate into the Credit River for spawning purposes

(e.g., migratory salmon and trout) and birds and insects that migrate up and down the valley, to and from the lake.

#### 4.3 Vegetation

The results of the ELC mapping and botanical investigations on the Subject Lands are discussed in the following sections. These surveys documented vegetation communities and species on the Subject Lands and provide baseline information to allow a determination of sensitivity and provincial and/or regional significance.

#### 4.3.1 Ecological Land Classification

The Subject Lands consist predominantly of cultural meadow habitat on the lands of the former oil refinery, which was decommissioned in 1987. Due to this former land use, habitat is often influenced by degraded soil and mounds of debris (e.g., concrete). Areas where past soil removal or grading have occurred often exhibit poor drainage, which has created small wetland pockets scattered throughout the Subject Lands. These wetlands are typically less than 0.1 hectares and often consist of European Reed. Shallow surface water ( $\leq$ 15 cm) was observed in many of these wetlands in June but most were dry in July.

ELC mapping of the Subject Lands is shown on **Figure 5** (**Appendix A**). A detailed list and description of ELC units is provided in **Table 4** (**Appendix B**). No provincially rare vegetation communities were present on the Subject Lands (NHIC 2016).

#### 4.3.2 Vascular Plants

Botanical inventories completed on the Subject Lands identified a total of 129 species of vascular plants. Of these, 59 species are native, 67 are exotic, and three species are hybrid. No provincially rare, protected, or species having a co-efficient of conservation value of 9 or 10 were observed. Ten vegetation species rare to Peel Region and/or the CVC watershed (Varga 2005 and CVC 2002, respectively) were observed. A full species list, including global, provincial and local rarity rankings is included in **Table 5 (Appendix B)**.

#### 4.3.3 Evaluated Wetlands / Other Wetlands

The LIO database was accessed to determine if any wetlands known to the MNRF occur on or in the vicinity of the Subject Lands. Such wetlands could include PSWs, MNRF evaluated wetlands, unevaluated wetlands, or wetlands identified as "other". No LIO wetlands were shown to occur on or in close proximity to the Subject Lands. The Credit River Marshes Wetland PSW Complex occurs approximately 550 m north of the Subject Lands. However, wetlands on the Subject Lands are not considered suitable for complexing into this PSW (i.e., due to their small size, fragmented and disturbed landscape position, and a lack of hydrological and functional relationship with the PSW.

#### 4.4 Wildlife

The results from the wildlife field studies completed on the Subject Lands are summarized in the following sections. A list of all wildlife species recorded during the site investigations is provided in **Table 6 (Appendix B)**.

#### 4.4.1 Birds

#### Wintering Waterfowl

A total of 13 species of waterfowl were observed during wintering waterfowl surveys in March 2017, and 11 species of waterfowl were observed in winter 2018, along with a number of nonwaterfowl species observed during each survey. All birds observed during wintering waterfowl surveys are listed in **Table 7** (**Appendix A**), which also identifies the number and location in relation to the Lake Ontario shoreline, for observed waterfowl species. The most common waterfowl species observed in Lake Ontario on March 1, 2017 included Common Goldeneye (*Bucephala clangula*), Long-tailed Duck (*Clangula hyemalis*), and Bufflehead (*Bucephala albeola*), with the majority of individuals observed <200 m offshore, with some observed >500 m offshore. These three species were also the most common waterfowl species observed in Lake Ontario on March 12, 2017, with individual numbers being higher than on March 1, 2017. The highest numbers of each were observed >200 m but <500 m from shore.

The most common waterfowl species observed in winter 2018 was the Greater Scaup (*Aythya marila*), with most individuals observed within 250 m of the Lake Ontario shoreline. Substantially fewer Greater Scaup were observed in late winter/early spring 2017, which is likely indicative of this species leaving the area prior to March. Long-tailed Duck was the second most abundant species in winter 2018, with relatively even distribution between near shore and off-shore locations. This species was also common during winter waterfowl studies in 2017.

#### **General Spring Migration**

A total of 126 bird species were observed during the general spring migration surveys conducted between March 21 and May 29, 2017. All birds observed during these surveys are listed in **Table 7** (**Appendix A**). The most abundant species observed during the surveys was Double-crested Cormorant (*Phalacrocorax auritus*), with approximately 5800 birds being observed on May 2, 2017, all within 200 m offshore of the Lake Ontario shoreline. Long-tailed Duck had the second highest abundance, with most birds <500 m offshore. Many of the migratory species were only observed on single occasions, with some observations from the Subject Lands consisting of birds that were likely going to remain on the lands for breeding purposes. Migrant species on the Subject Lands were primarily using the southern end and the east and west borders where vegetation structure is denser.

#### Spring Shorebird Surveys

All shorebirds observed during the spring shorebird surveys are listed in **Table 7** (**Appendix A**). The most abundant shorebirds observed included Whimbrel (*Numenius paheopus*), with 210 birds observed on May 22, and Dunlin (*Calidris alpina*), with 43 observed on May 22. Species observed in lesser numbers (<10) included White-rumped Sandpiper (*Calidris fuscicollis*), Spotted

Sandpiper (*Actitus macularius*) and Solitary Sandpiper (*Tringa solitaria*). The flocks of Dunlin and Whimbrel observed were not using the Subject Lands directly. Whimbrel were observed flying along the lakeshore in an easterly direction at dawn and westerly direction before 6:00 AM. The Dunlin were primarily observed on rocks in the Port Credit harbour.

#### Breeding Bird Surveys

A total of 67 bird species were observed within the Subject Lands during the three rounds of breeding bird surveys. Of this total, 12 species are confirmed, 20 are probable and 17 are possible breeders on the Subject Lands. The remaining 18 bird species are considered non-breeders, flyovers or migrants. The observed breeding bird species are discussed in the sections below. All bird species observed on the Subject Lands during the breeding bird surveys are listed in **Table 8** (Appendix B).

A total of 49 (100%) of the confirmed, probable or possible breeders are provincially ranked S5 (common and secure), S4 (apparently common and secure) or SNA (species not native to Ontario). No bird species breeding on the Subject Lands are considered provincially rare (S1-S3; NHIC 2016).

The following Species at Risk were observed on the Subject Lands:

- Chimney Swift: Threatened in Ontario and Canada;
- Peregrine Falcon: Special Concern in Ontario and Canada;
- Bank Swallow: Threatened in Ontario and Canada;
- Barn Swallow: Threatened in Ontario and Canada; and
- Bobolink: Threatened in Ontario and Canada.

#### Chimney Swift:

This species was observed throughout the survey period foraging over the Subject Lands. The birds were followed to a presumed nesting structure on Lakeshore Road (Westedge Community Church, 175 Lakeshore Rd.) east of the Subject Lands. The population was estimated to contain approximately 45 to 50 birds.

#### Peregrine Falcon:

A single bird was observed in flight over the Subject Lands on the second round of surveys. This was most likely a foraging adult from one of the nesting locations in the Greater Toronto Area. No suitable nesting structures are present on the Subject Lands.

#### Bank Swallow:

Small numbers of adults were observed foraging over the Subject Lands on two survey dates. No suitable nesting substrate is present on the Subject Lands. The adjacent shoreline was inspected for use by this species (exposed shale slips) on several occasions in May and June but none were observed. These individuals were likely from nearby colonies along the shoreline.



#### Barn Swallow:

Regular observations were made of adults foraging over the Subject Lands in May and throughout the breeding period. Up to 15 adults were observed, including perched birds at the Shale Pond, using snags. Birds were also observed collecting mud 20 m from the abandoned outbuilding along the eastern border of the Subject Lands. Repeated inspection of the inside and outside of this building (the only suitable nesting structure on the lands) throughout the breeding surveys did not reveal any nests of this species. It is likely that these birds were taking the mud to structures at the Port Credit harbor, as several were observed flying with mud in that direction. Juveniles were observed foraging over the lands in early July.

#### Bobolink:

A single flyover was observed on July 4, 2017, identified as a juvenile of the year. This individual was a post-breeding dispersal, with the lakeshore acting as a concentrating barrier. The open grassy areas of the Subject Lands were surveyed for this species as it contained some suitable areas for Bobolink breeding. No observations were made during the breeding season, when this species is conspicuous and readily detected.

#### 4.4.2 Mammals

#### Bats

The results of bat surveys conducted on the Subject Lands are documented in **Table 9** (**Appendix B**). Bat species can be identified using sonographic characteristics from calls used by bats to echolocate. These ultrasonic calls can be detected, recorded, and analyzed by biologists trained in bat sonogram interpretation to reasonably predict the species of bats present. All ultrasonic recordings were filtered to eliminate recordings with high levels of noise or with no bat calls, and then further analyzed using SonoBat's auto-classification tool. Any calls with a positive identification were manually vetted by a wildlife ecologist with training in bat species identification by sonogram. All species of bats can make calls that range in frequencies and sonogram shape, depending on the behavior at the time of call recording. Echolocation calls are not unique to species and vary between social echolocation calls, and foraging calls, in addition to the search phase calls currently used to identify to species. Calls recorded during a bat's search phase are the most reliable for an accurate species identification.

During passive acoustic surveys, four bat species were confirmed to be present on the Subject Lands: Big Brown Bat (*Eptesicus fuscus*), Hoary Bat (*Lasiurus cinereus*), Silver-haired Bat (*Lasionycteris noctivagans*), and Eastern Red Bat (*Lasiurus borealis*). During three evenings of active acoustic surveys, a total of 49 low frequency calls and one high frequency call was recorded; with a cumulative total of 50 passes by all species. Of the low frequency calls, 28 calls were confirmed to be Big Brown Bat, four confirmed calls were Hoary Bat, two confirmed calls were Silver-haired Bat, and the remaining 15 low frequency calls were not identifiable to species (**Table 9**, **Appendix B**). The one high frequency call was confirmed by manual identification by a trained ecologist to be Eastern Red Bat. No Species at Risk bats were identified on the Subject Lands.

#### Other Mammals

Six mammal species were recorded during incidental wildlife surveys on the Subject Lands, as noted in **Table 6** (**Appendix B**). All species observed are provincially ranked S5 (common and secure), S4 (apparently common and secure) or SNA (species not native to Ontario). No species were identified that are Species at Risk (Special Concern, Threatened or Endangered) or are SWH indicator species (includes provincially rare species ranked S1-S3 in NHIC 2016; MNRF 2015).

#### 4.4.3 Amphibians

A cumulative total of two amphibian species were recorded within the Subject Lands during the amphibian call-count and egg mass surveys, with detailed results provided in **Table 10** and **Table 11** (**Appendix B**), respectively. One additional species was observed during amphibian call-count surveys in the off-site JC Saddington Park. All amphibian species recorded on the Subject Lands are listed in **Table 6** (**Appendix B**). All the amphibian species are provincially ranked S5 (common and secure). None of the species are listed on the SARO list.

#### 4.4.4 Reptiles

The only snake species observed during the field investigations was Eastern Gartersnake (*Thamnophis sirtalis*), with individuals observed on three occasions during the transect surveys (**Table 12**, **Appendix B**).

One Midland Painted Turtle (*Chrysemis picta*) was observed within the Shale Pond on two occasions during basking surveys in April and May 2017, as documented in **Table 13** (**Appendix B**). No evidence of turtle nesting or any suitable nesting habitat was observed on the Subject Lands in June 2017.

One Midland Painted Turtle was captured from the pond during trapping activities in August 2017 and this turtle was relocated to the Credit River Marshes.

#### 4.4.5 Insects

There were four butterfly and eight dragonfly species recorded on the Subject Lands during insect surveys in spring and early summer 2017 (**Table 6**, **Appendix B**). All species observed are provincially ranked S5 (common and secure), S4 (apparently common and secure) or SNA (species not native to Ontario). No species were identified that are Species at Risk (Special Concern, Threatened or Endangered) or are SWH indicator species (includes provincially rare species ranked S1-S3 in NHIC 2016; MNRF 2015).

Individual Monarch butterflies were observed incidentally on two occasions on the Subject Lands in spring and early summer 2017. No Monarch larva or chrysalis were observed on the Subject Lands. A survey of Milkweed populations was completed in July 2017 to assess the distribution and abundance of this species, which is the host breeding plant for Monarch. Clusters of Milkweed were observed in three disturbed, cultural meadow areas on the Subject Lands. The largest accumulation of Milkweed (with less than 100 plants observed within a 30-m radius) occurred along the northern boundary of the property, approximately 45 m from Lakeshore Road. The
second consisted of an observation of less than 10 Milkweed plants near the northwestern corner of the Subject Lands. The third area consisted of less than 20 Milkweed plants along the eastern boundary, approximately 30 m from the JC Saddington Park parking lot. Individual Milkweed plants are scattered in cultural meadow areas on the Subject Lands, but no other accumulations of this species were observed.

The following observations were made during Monarch surveys in August and September 2017:

- August 29 One Monarch was observed in the southwest corner of the Subject Lands;
- September 4 Four Monarchs were observed, predominantly along the western side of the Subject Lands;
- September 8 Six Monarchs were observed, three of which were migrating high over the site, with the remaining three in the southwest corner of the Subject Lands;
- September 15 Approximately 250 to 275 Monarchs observed migrating high over the Subject Lands, with 156 observed on the Subject Lands, predominantly in the poplar and cottonwood trees and associated ground cover along the southern boundary of the Subject Lands and on the adjacent lands. A small number were perched in the trees in these areas; and
- September 29 Six Monarchs were observed on the Subject Lands.

Given that Monarchs were observed perching in the trees on and adjacent to the southern end of the Subject Lands during the main migration push in mid-September, it is evident that this area is serving as a resting/feeding area for migrant Monarchs.

# 4.4.6 Terrestrial Crayfish

One terrestrial crayfish chimney was identified within a cultural meadow (CUM-1) community on the periphery of the Shale Pond adjacent to cattail mineral shallow marsh community. No terrestrial crayfish were observed.

# 4.5 Fisheries

# 4.5.1 Shale Pond Fish Community

One fish species, Fathead Minnow (*Pimephales promelas*), was captured during the fish community surveys in the Shale Pond in June 2017. Adults of the species were captured while young-of-the-year (YOY) were observed in shallow water along the shoreline but could not be captured due to their small size. The presence of YOY indicates that Fathead Minnow are successfully reproducing within the Shale Pond. Crayfish were also captured in relatively high numbers in the minnow traps (up to 15 captured in individual traps).

# 4.5.2 Bass and Sunfish Spawning Surveys

No bass or sunfish nest or nesting activities were observed along the accessible portions of the Shale Pond shoreline, nor along the Lake Ontario shoreline fronting the Subject Lands. Given that neither bass nor sunfish were captured in the Shale Pond during fish community surveys, it is unlikely that these species are present.

Bass and sunfish species are known to be present within the Lake Ontario, but they do not appear to be using the shoreline fronting the Subject Lands for spawning purposes. Bass and sunfish typically spawn by creating a small nest in gravelly and sandy substrates and there is limited gravelly spawning habitat in the area. Sand is present in protected portions of the Lake Ontario shoreline that promote deposition (i.e., in the corner of the pier and offshore areas beyond the wave zone), but small gravel is generally absent within shoreline areas, likely due to extensive wave action that moves this material within exposed areas.

During the May 15, 2017 spawning survey, fish species observed along the Lake Ontario shoreline included Round Goby (*neogobious melanostomus*) and Common Carp (*Cyprinus carpio*), both of which are not native to Ontario but are known to be present in Lake Ontario. During the June 8, 2017 spawning survey, Alewife (*Alosa pseudoharengus*), a non-native but important prey species, was observed in sheltered shoreline areas over sand substrate. Alewife are known to spawn in such areas around the Lake Ontario shoreline between late April and July (Scott and Crossman 1973), so the observed fish were likely spawning along the shoreline.

# 4.6 Fish Habitat

The following sections discuss the existing aquatic habitat conditions within the Shale Pond and along the Lake Ontario shoreline fronting the Subject Lands.

# 4.6.1 Shale Pond

The Shale Pond, originally excavated for brick extraction and later used at a stormwater management and settling pond for the oil refinery, is approximately 165 m long by 55 m wide (at its longest axes) with an overall surface area of 0.66 ha. The pond has been reported to have a maximum depth of approximately 2.4 m. The pond was originally excavated in shale, but surficial substrates include a mix of fine materials, – the fines have been deposited as a result of use of the pond as a settling basin – exposed shale and some rocky material. The majority of the pond consists of a narrow band of emergent vegetation around the periphery (e.g., cattail and arrowhead), while larger patches of cattail (mapped as MAS2-1 – mineral cattail shallow marsh) are present at the north and south ends of the pond.

A stormwater sewer discharge is present in the northeastern corner of the pond and a remnant gate system is present in the southwest end. It appears the pond historically discharged to the adjacent oil-water separator (still present on the Subject Lands), prior to being discharged to Lake Ontario. However, the discharge is no longer operated, and the pond is isolated with no discharge going to the lake. Remnant piping from the oil refinery is present within and along the shoreline of the pond.

During studies in 2017, a visible sheen, potentially from hydrocarbon contamination, was observed over much of the surface of the pond, with concentrations appearing higher in late spring/early summer. Potential hydrocarbon accumulation was also observed along several areas of the pond shoreline.

The pond is known to provide habitat for a population of Fathead Minnow, based on fish community studies completed in 2017.

# 4.6.2 Lake Ontario

The Subject Lands front onto Lake Ontario over a linear distance of approximately 525 m. This section of the Lake Ontario shoreline is considered to be an exposed coastal nearshore zone and open coast habitat type, although the existing pier on the eastern end of the area and a small concrete groyne do provide some protection. The entire shoreline interface is hardened with a mix of armour stone block and larger armour stone boulders and concrete debris to protect against erosion due to wave action. Open coast habitats in Lake Ontario have highly variable water temperatures and extensive wind and wave action that results in a relatively hostile environment for fish and the communities in these areas tend to be transitory (Conservation Halton et al., undated).

Beyond the armour stone, the shoreline generally slopes gradually deeper, with a depth of approximately 5 m observed off the end of the pier at the west end of the pier at the east end. Sand substrate is present in the protected area adjacent to the pier and adjacent shoreline, and gravel to small cobble sized, flat material is present on the inside of the groyne structure. Substrate along the remainder of the shoreline is predominantly a mix of larger boulders overlying sand. Other than the large shoreline boulders, there is relatively limited habitat structure along the shoreline, with no aquatic vegetation or large woody debris providing any form of cover. The area to the west of the pier appears to have been historically dredged to facilitate ship movements into and out of the former docking facility associated with the refinery, and this dredging is evident in current aerial imagery, up to approximately 480 m offshore.

A narrow band of vegetation, including meadow, trees and shrubs is present on the backshore above and adjacent to the armour stone protection. This band ranges from 5 m to 20 m in width and is bordered by the adjacent paved Lake Ontario Waterfront Trail.

The Urban Recreational Fisheries Strategy for the Lake Ontario Northwest Waterfront (Conservation Halton et al., undated) notes that artificial shorelines, such as the armoured shoreline of the Subject Lands, generally provide poor fish habitat. During monitoring conducted between 1998 and 2002 on open coast areas in Toronto, the fish community was numerically dominated by Alewife (*Alosa pseudoharengus*) which accounted for 62% of the catch, White Sucker (*Catostomus commersonii*) accounting for 13% of the catch and Emerald Shiner (*Notropis atherinoides*), accounting for 9% of the catch. White Sucker accounted for 46% of the biomass, following by Common Carp (*Cyprinus carpio*) (29% of the biomass) and Alewife (7% of the biomass). CVC noted that local fishermen have reported that Brown Trout (*Salmo trutta*) are often caught while angling offshore from the existing pier fronting the Subject Lands.

The Lake Ontario Fish Community Objectives (Stewart et. al. 2013) indicates that the goal for the nearshore zone is to "protect, restore and sustain the diversity of the nearshore fish community, with an emphasis on self-sustaining native fishes, including Walleye, Yellow Perch, Lake Sturgeon, Smallmouth Bass, Largemouth Bass, sunfish, Northern Pike, Muskellunge, Round Whitefish and American Eel". Specific objectives for the nearshore zone include:

- Maintaining healthy, diverse fisheries;
- Restoring Lake Sturgeon populations;
- Restoring American Eel abundance; and
- Maintaining and restoring native fish communities.

The Credit River, the main watershed within the Mississauga Area, drains into Lake Ontario approximately 300 m northeast of the Subject Lands. The River extends for approximately 60 km from its headwaters north of Orangeville to Lake Ontario, with the watershed covering an area of 871 km<sup>2</sup> (MNR & CVC, 2002). The River supports nearly 60 species of fish, including residents and migratory species (MNR & CVC 2002). The upper watershed supports a high quality cold water fishery for resident Brook Trout (Salvelinus fontinalis) and Brown Trout (Salmo trutta), while the lower watershed supports migratory runs of Chinook Salmon (Oncorhynchus tshawytscha), Coho Salmon (Oncorhynchus kisutch) and Rainbow Trout (Oncorhynchus mykiss) from Lake Ontario. The reach of the river adjacent to the Subject Lands is considered to be a warmwater reach, supporting a warmwater community of large fish species, with a diversity of common species and habitat specialists, as well as top predators. Conservation Halton et al. (undated), notes that significant numbers of Rainbow Trout and Chinook Salmon stage in the Lake Ontario nearshore zone prior to migrating into the Credit River to spawn. The Credit River Fisheries Management Plan (MNR & CVC 2002) was developed to provide a wide range of recommendations to protect, enhance and rehabilitate the Credit River watershed's aquatic ecosystem.

# 4.7 Natural Hazards

Portions of the Subject Lands adjacent to the Lake Ontario shoreline are regulated by CVC under Ontario Regulation (O.Reg.) 160/06 (*Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses*) as a result of the natural hazard created by the presence of the lake and associated potential for flooding, erosion or dynamic beach activity. O.Reg. 160/06 regulates the Lake Ontario shoreline to the furthest extent of the aggregate of the following distances:

- "The 100-year flood level, plus the appropriate allowance for wave uprush and other waterrelated hazards;
- The existing long term stable slope projected from the existing stable toe of the slope or from the predicted location of the toe of the slope as that location may have shifted as a result of shoreline erosion over a 100-year period;
- Where a dynamic beach is associated with the waterfront lands, an allowance of 30 m inland to accommodate dynamic beach movement; and
- An allowance of 15 m inland."

The proposed development will be located outside the regulated area associated with Lake Ontario natural hazards and has been designed in accordance with CVC's regulations.

# 5.0 ANALYSIS OF ECOLOGICAL AND NATURAL HERITAGE SIGNIFICANCE

The City of Mississauga Official Plan (City of Mississauga 2011) identifies the natural heritage features that form a component of the City's Natural Heritage System, including the following:

- Significant Natural Areas;
  - Provincial or regionally significant ANSIs;
  - Environmentally Sensitive or Significant Areas;
  - Habitat of endangered and threatened species;
  - Fish habitat;
  - Significant wildlife habitat;
  - Significant woodlands;
  - Significant wetlands;
  - Significant valleylands;
- Natural Green Spaces;
  - Woodlands >0.5 ha not meeting requirements for significance;
  - Wetlands not meeting requirements for significance;
  - Watercourses that are not part of a significant valleyland;
  - Natural Areas >0.5 ha with vegetation that is uncommon in the city;
- Special Management Areas;
- Residential woodlands; and
- Linkages.

The Significant Natural Areas defined in the City of Mississauga Official Plan include the eight types of significant natural heritage features defined in the PPS, as identified in section 2.4 of this EIS. In addition to the guidance provided in the City of Mississauga Official Plan, the MNRF's Natural Heritage Reference Manual (NHRM) (MNR 2010) provides technical guidance on the identification and definition of the significant natural heritage features defined in the PPS.

The following sections provide a detailed discussion regarding the designation as defined by the NHRM and City of Mississauga Official Plan and whether any of the above noted features are present on the Subject Lands. This section also includes an assessment of the other features identified by the City of Mississauga Official Plan as being part of the Natural Heritage System that are not covered by the PPS (Natural Green Spaces, Special Management Areas, Residential Woodlands and Linkages).

#### 5.1 Significant Natural Areas

# 5.1.1 Provincially or Regionally Significant ANSIs

An ANSI is identified by the MNRF as "areas of land and water containing natural landscapes or features that have been identified as having life science or earth science values related to protection, scientific study or education" (MNR 2010).

A review of mapping from MNRF's LIO and NHIC databases did not indicate the presence of any provincially or regionally significant ANSI's on or within 120 m of the Subject Lands.

# 5.1.2 Environmentally Sensitive or Significant Areas

The City of Mississauga Official Plan identifies Environmentally Sensitive or Significant Areas as "places where ecosystem functions or features warrant special protection" and further notes that "these may include but are not limited to rare or unique plant or animal populations or habitats, plant or animal communities or concentrations of ecological functions". The Official Plan also notes that "in the City, Environmentally Sensitive or Significant Areas are inventoried and designated by Conservation Authorities and the Provincial Government".

No areas on or within 120 m of the Subject Lands are known to have been designated as Environmentally Sensitive or Significant Areas.

# 5.1.3 Habitat of Endangered and Threatened Species

Endangered and threatened species are those identified on the SARO list. No endangered or threatened species were confirmed as breeding on the Subject Lands during the ecological investigations.

Several threatened bird species were observed on the Subject Lands during the course of the bird survey work in spring and early summer 2017. These observations included:

- Barn Swallow (Threatened) Species was present on the Subject Lands throughout spring, but it does not appear to be nesting in the remnant building on the property. Individuals may be obtaining mud from the property and building nests at nearby marina buildings, since over 50 active Barn Swallow nests were observed in the marina buildings in 2012 (CVC 2014);
- Chimney Swift (Threatened) appear to be nesting in an adjacent church chimney and foraging over the Subject Lands;
- Bobolink (Threatened) One individual was observed flying over the Subject Lands during the breeding bird survey in early July, but no observations of breeding on the Subject Lands were made; and
- Bank Swallow (Threatened) observed on site during spring migration and incidentally during first breeding bird survey (May 26) but no evidence of breeding was observed. Exposed shorelines around the pond and along the lake were examined.

Therefore, although the Subject Lands were used to some degree by several threatened species, the property was not providing any significant habitat function and use was mostly incidental. Therefore, habitat of endangered and threatened species is not considered to be present.

# 5.1.4 Fish Habitat

Fish habitat, as defined in the federal *Fisheries Act*, c. F-14, means, "spawning grounds and any other areas including nursery, rearing, food supply, and migration areas on which fish depend directly or indirectly in order to carry out their life processes". Fish, as defined in S.2 of the *Fisheries Act*, c. F-14, includes "parts of fish, shellfish, crustaceans, marine animals and any parts of shellfish, crustaceans or marine animals, and the eggs, sperm, spawn, larvae, spat and juvenile stages of fish, shellfish, crustaceans and marine animals".

Fish habitat is present within the Shale Pond on the Subject Lands, based on the presence of various life stages of naturally reproducing population of a single species (Fathead Minnow) within the pond. Given that that Shale Pond is an artificial body of water and is not connected to any other waterbody containing fish (e.g., Lake Ontario), development or site alteration activities occurring within the Shale Pond are not subject to review by DFO under the *Fisheries Act*, as per the self-assessment criteria on the DFO website. However, for the purposes of this EIS, the Shale Pond is identified as fish habitat.

Fish habitat is also present within Lake Ontario fronting the Subject Lands, as the area is known to provide a range of habitat functions, including spawning, nursery and foraging habitat for a wide range of commercial and recreational fish species.

Fish habitat on and adjacent to the Subject Lands is shown in **Figure 6** (Appendix A).

# 5.1.5 Significant Wildlife Habitat

Significant wildlife habitat (SWH) is one of the more complex natural heritage features to identify and evaluate. There are several provincial documents that provide guidance for identifying and evaluating SWH: the NHRM, the Significant Wildlife Habitat Technical Guide (MNR 2000), and the SWH Ecoregion 7E Criterion Schedule (MNRF 2015).

There are four general types of SWH: seasonal concentration areas, migration corridors, rare or specialized habitat, and species of conservation concern. All types of SWH that could be potentially be present on the Subject Lands, based on the types of habitat found, are discussed in detail below.

# 5.1.5.1 Seasonal Concentration Areas of Animals

Seasonal concentration areas are those sites where large numbers of a species gather together at one time of the year, or where several species congregate. Examples include deer yards, snake and bat hibernacula, waterfowl staging areas, raptor wintering areas, bird nesting colonies, shorebird stopover areas, and colonial nesting bird habitats. Areas that support a species at risk, or if a large proportion of the population may be lost if the habitat is destroyed, are examples of seasonal concentration areas which should be designated as significant.

Of the types of seasonal concentration areas that could potentially be present, based on the habitat types and vegetation communities present, additional information is provided in respect of the following features:

- Waterfowl Stopover and Staging Areas (Aquatic) As a man-made feature previously used for stormwater management, the Shale Pond does not qualify as a potential candidate for this type of SWH. The Lake Ontario shoreline fronting the Subject Lands does not have any wetlands that would provide this type of habitat. Therefore, this type of SWH is absent from the Subject Lands and adjacent lands;
- Shorebird Migratory Stopover Area None of the ELC codes identified as being candidate habitat for Shorebird Migratory Stopover Area SWH are present on the Lake Ontario shoreline (e.g. open beaches, beach bars, meadow marshes), but the shoreline does have armour rock present, which is identified in the SWH Criteria Schedule as being important



for shorebird stopover. Dunlin, Whimbrel, Spotted Sandpiper and Solitary Sandpiper (observed in the area) are indicator species for the *Shorebird Migratory Stopover Area SWH*. Sufficient numbers of indicator species may be present during spring migration (including >100 Whimbrel), but actual stopover on the shoreline is limited due to general lack of suitable stopover habitat and level of disturbance with trail adjacent to shoreline. Areas in the Port Credit harbour were being used by Dunlin as stopover points. Therefore, the Lake Ontario shoreline fronting the Subject Lands is not considered to be *Shorebird Migratory Stopover Area SWH*. As a man-made pond used for stormwater management, the Shale Pond is not eligible to be considered a candidate for this type of SWH;

- Bat Maternity Colonies Although Big Brown Bat and Silver-haired Bats were recorded on the Subject Lands, they were identified within the hedgerow and marsh communities on the Subject Lands. Since hedgerows and marsh communities do not meet the minimum habitat requirements for candidate maternity colonies, Bat Maternity Colonies SWH is not present on the Subject Lands;
- *Turtle Wintering Area* The Shale Pond on the Subject Lands was assessed for the presence of turtle wintering areas, given that one Midland Painted Turtle was observed basking in the pond in May 2017. However, as the Shale Pond is man-made, it is not considered to be SWH;
- *Reptile Hibernaculum* Rock piles are present on the Subject Lands although there is no evidence they go below the frost line to provide suitable hibernacula. There is also no evidence that the building on the site could provide suitable overwintering habitat (e.g., crumbling foundations). Eastern Gartersnake was observed during transect surveys on the Subject Lands, although the number of individuals observed did not exceed the threshold for this type of SWH and therefore, it is absent from the Subject Lands;
- Colonially Nesting Bird Breeding Habitat (Bank and Cliff) Cliff Swallow and Northern Rough-winged Swallow, which are both indicator species for this type of SWH, were observed breeding in the remnant building on the Subject Lands. However, buildings are not to be considered SWH, therefore, this type of habitat is not present; and
- Migratory Butterfly Stopover Areas As noted in the SWH Criteria Schedule, this type of SWH typically consists of a combination of generally undisturbed fields and forests. However, the Subject Lands are highly disturbed and do not have any forest communities present, and therefore, do not meet the habitat criteria to be considered SWH. As noted in the Criteria Schedule, 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". Habitat on the Subject Lands does not appear to be suitable for consideration as this type of SWH. Monarch surveys completed in fall 2017 showed that treed areas at the southern end of the Subject Lands and on the adjacent lands next to Lake Ontario were providing resting and foraging functions for Monarchs. Therefore, regardless of the fact that the habitat does not meet criteria for consideration as SWH, the migratory stopover function of the southern portion of the Subject Lands and adjacent lands next to Lake Ontario is considered in this EIS, since the area meets the requirements to be considered a Linkage area, per the City of Mississauga Official Plan. Therefore, the linkage functions, primarily for birds and butterflies will be addressed in section 7 (Impact Assessment).

# 5.1.5.2 Rare Vegetation Communities or Specialized Habitat for Wildlife

Rare or specialized habitat, are two separate components. Rare habitats are those with vegetation communities that are considered rare in the province. SRANKS are rarity rankings applied to species at the 'state', or in Canada at the provincial level, and are part of a system developed under the auspices of the Nature Conservancy (Arlington, VA). Generally, community types with SRANKS of S1 to S3 (extremely rare to rare-uncommon in Ontario), as defined by the NHIC, could qualify. It is assumed that these habitats are at risk and that they are also likely to support additional wildlife species that are considered significant. As previously identified, there are no rare vegetation communities on or adjacent to the Subject Lands.

Specialized habitats are microhabitats that are critical to some wildlife species. The NHRM (MNR 2010) defines specialized habitats as those that provide for species with highly specific habitat requirements; areas with exceptionally high species diversity or community diversity; and areas that provide habitat that greatly enhances species' survival.

Of the types of specialized habitats for wildlife that may be present, additional information is provided in respect of the following features:

- Waterfowl Nesting Areas Mallard (Anas platyrhychus), Hooded Merganser (Lophodytes cucullatus) and Wood Duck (Aix sponsa), which are indicator species for this type of SWH, were observed nesting within the Shale Pond. However, the criteria for this SWH type are not met due to insufficient numbers of nesting pairs being present;
- Turtle Nesting Areas Midland Painted Turtle, an indicator species for this type of SWH was observed in the Shale Pond. However, habitat on the site is generally not suitable for turtle nesting and no evidence of turtle nesting was observed during the field investigations. Further, based on the results of basking surveys, the number of turtles within the pond does not appear to be sufficient to meet the SWH criteria. Therefore, this type of SWH is absent; and
- Amphibian Breeding Habitat (Wetlands) Amphibian breeding surveys, consisting of both call count and egg mass surveys, determined that insufficient numbers of amphibians were breeding within the Shale Pond, the oil-water separator or the pond in the adjacent JC Saddington Park to qualify as this type of SWH. Therefore, this type of SWH is absent.

# 5.1.5.3 Habitat for Species of Conservation Concern

According to the Significant Wildlife Habitat Ecoregion Criterion Schedule (MNRF, 2015), habitat for species of conservation concern includes five types of habitats:

- a) Marsh bird breeding habitat;
- b) Open country bird breeding habitat;
- c) Shrub/early successional bird breeding habitat;
- d) Terrestrial crayfish; and
- e) Special concern and rare wildlife species.

Habitats of species of conservation concern do not include habitats of Endangered or Threatened species, as identified by the *Endangered Species Act, 2007*. These are discussed in section 5.1.3.

Of the types of habitat for species of conservation concern that may be present, additional information is provided in respect of the following features:

- Marsh Breeding Bird Habitat Sedge Wren, Marsh Wren and Virginia Rail, all of which are indicator species of this type of SWH, were observed breeding in the marsh habitat in the Shale Pond. However, insufficient numbers of breeding pairs and indicator species were observed to meet the criteria for this type of SWH;
- Open Country Bird Breeding Habitat Savannah Sparrow, an indicator of this type of habitat, was observed in the cultural meadow on the Subject Lands. However, the numbers and diversity of species were insufficient to meet the criteria for this type of SWH;
- Shrub/Early Successional Bird Breeding Habitat Willow Flycatcher and Brown Thrasher, both of which are indicator species for this type of SWH, were observed on the Subject Lands. However, an insufficient number of indicator species was observed to meet the criteria for SWH;
- Terrestrial Crayfish one terrestrial crayfish chimney was observed on the Subject Lands within the cultural meadow ELC community adjacent to the Shale Pond. The SWH Criteria Schedule indicates that the presence of one or more chimneys in suitable meadow marsh, swamp or moist terrestrial sites should be considered SWH. However, the chimney observation on the Subject Lands was observed in marginal habitat (i.e., heavily disturbed, culturally influenced environment) in a hydrocarbon contaminated area. Based on these characteristics, the habitat is not considered to be *Terrestrial Crayfish* SWH; and
- Special Concern and Rare Wildlife Species Individual Monarch butterflies were • observed incidentally on two occasions on the Subject Lands in spring and early summer 2017, with additional observations occurring during fall migration surveys. No Monarch larva or chrysalis were observed on the Subject Lands. A survey of Milkweed populations was completed in July 2017 to assess the distribution and abundance of this species, which is the host breeding plant for Monarch. Clusters of Milkweed were observed in three disturbed, cultural meadow areas on the Subject Lands. The largest accumulation of Milkweed (with less than 100 plants observed within a 30-m radius) occurred along the northern boundary of the property, approximately 45 m from Lakeshore Road. The second consisted of an observation of less than 10 Milkweed plants near the northwest corner of the Subject Lands. The third area consisted of less than 20 Milkweed plants along the eastern boundary, approximately 30 m from the JC Saddington Park parking lot. Individual Milkweed plants are scattered in cultural meadow areas on the Subject Lands, but no other accumulations of this species were observed. Given that very low numbers of Monarchs were observed on the Subject Lands in spring/early summer (outside the fall migration period), no evidence of life cycle completion was observed (e.g., early life stages) and that Milkweed is not abundant on the Subject Lands, this is not considered to be SWH for Monarch. However, Monarch is also being considered as part of the Linkage function being provided by the shoreline and habitat for Monarch (e.g.,



Milkweed and other pollinator plants) will be included in the open space landscaping (as discussed further in section 7.3).

# 5.1.5.4 Animal Movement Corridors

Animal movement corridors are areas that are traditionally used by wildlife to move from one habitat to another. This is usually in response to different seasonal habitat requirements. There are two types of animal movement corridors that must be considered: trails used by deer to move to wintering areas, and areas used by amphibians between breeding and summering habitat. Animal movement corridors are only identified as SWH where a confirmed or candidate significant wildlife habitat has been identified by MNRF or the planning authority.

As neither deer wintering areas nor significant amphibian breeding habitats were identified on or adjacent to the Subject Lands, there is no requirement to assess the occurrence of animal movement corridors.

# 5.1.6 Significant Woodlands

The PPS notes that, significant woodlands should be defined and designated by the planning authority using criteria established by the MNRF. The City of Mississauga Official Plan indicates that significant woodlands are those that meet one or more of the following criteria:

- woodlands, excluding cultural savannahs, great than or equal to four hectares;
- woodlands, excluding cultural woodlands and cultural savannahs, greater than or equal to two hectares and less than four hectares;
- any woodland great than 0.5 hectares that:
  - supports old growth trees (greater than or equal to 100 years old);
  - supports a significant linkage function as determined through an Environmental Impact Study approved by the City in consultation with the appropriate conservation authority;
  - is located within 100 meters of another Significant Natural Area supporting a significant relationship between the two features; or
  - supports significant species or communities.

No woodland communities had been previously identified on the Subject Lands by MNRF, CVC or the municipality and no woodland communities were mapped as part of the ELC by Savanta. Further, no woodlands are present within 120 m of the Subject Lands. Therefore, there are no significant woodlands on or within 120 m of the Subject Lands.

# 5.1.7 Significant Wetlands

Within Ontario, significant wetlands are identified by the MNRF or by their designates. Other evaluated or unevaluated wetlands may be identified for conservation by the municipality or the conservation authority. The City of Mississauga Official Plan indicates that for the purposes of the plan, significant wetlands include:

- Provincially significant coastal wetlands;
- Provincially significant wetlands;
- Coastal wetlands; and
- Other wetlands greater than 0.5 ha.

There are no significant wetlands located on or within 120 m of the Subject Lands. There are several unevaluated wetlands on the Subject Lands, but these isolated, disturbance origin communities are small (i.e., < 0.5 ha in size) and are not considered to be significant wetlands, per the definition in the City's Official Plan.

# 5.1.8 Significant Valleylands

There are no valleylands on the Subject Lands and therefore, no significant valleylands. The Credit River, which is considered to be a significant valleyland by the City of Mississauga, is located approximately 300 m north east of the Subject Lands. The Credit River corridor from Lake Ontario to its headwaters is identified as a High Functioning Valleyland in the Credit River Watershed Natural Heritage System (CVC 2015).

# 5.2 Natural Green Spaces

# 5.2.1 Woodlands >0.5 ha Not Meeting Criteria for Significance

There are no woodlands communities greater than 0.5 ha in size on or adjacent to the Subject Lands and therefore, this type of Natural Green Space is absent.

# 5.2.2 Wetlands Not Meeting Criteria for Significance

Wetlands that do not fulfil the criteria to be a significant wetland (as identified in Section 5.1.10) are considered to be Natural Green Spaces in the City's Natural Heritage System. There were two wetland communities identified in the ELC mapping (**Figure 5**, **Appendix A**) and 16 other small wetlands (<0.1 ha) that would be considered inclusions in the ELC mapping. These wetlands, as shown in **Figure 6** (**Appendix A**), are therefore considered to be Natural Green Spaces under the City's Official Plan and they will be treated as such in this EIS.

However, all of these wetlands (outside the Shale Pond) are the product of the Imperial Oil Refinery decommissioning process which created these low-lying areas scattered throughout the Subject Lands. These sites typically receive and sustain sufficient surface water (due to snow melt and precipitation events) that wetland characteristics have developed, including hydric soils and wetland vegetation species. The wetlands are generally hydrologically isolated, since there are no watercourses on the Subject Lands. Water present in these features either infiltrates into the ground or evaporates and there is no surface hydrological linkage from any of these features to a larger waterbody (e.g., Lake Ontario or the Credit River). Therefore, they do not appear to provide an important hydrological function in the watershed. Further, these wetland areas do not provide important wildlife habitat, such as habitat for species at risk, or SWH, although they may provide limited habitat for common wildlife species.

The wetlands within the Shale Pond (which includes two shallow marsh areas located at the shallow north and south ends of the pond) are also of cultural origin, given that the Shale Pond

was man-made, originally for extraction of aggregate and then for use as an industrial stormwater management pond during refinery operation. The wetland communities appear to have developed since the refinery was decommissioned in the late 1980s. These wetlands are also hydrologically isolated from other wetland areas. They do not provide any Significant Wildlife Habitat, but do provide wildlife habitat functions, such as breeding bird habitat (including habitat for several species that are uncommon in the City of Mississauga including Virginia Rail, Marsh Wren and Sedge Wren) and amphibian breeding habitat (for relatively low numbers of the common Green Frog and American Toad).

The City of Mississauga indicated that the areas surrounding wetlands should also be considered for inclusion within the Natural Green Space criteria. Small wetland communities are supported by the adjacent lands, which provide functions associated with hydrological inputs (e.g., overland flow during precipitation events) and water quality buffering, which may support each wetland community. CVC's Regulation (O.Reg. 160/06) applies to areas within 30 m of non-provincially significant wetlands, therefore, this distance around each wetland community is also considered to be part of the Natural Green Space associated with wetlands on the Subject Lands.

The City of Mississauga also indicated that areas connecting wetlands required consideration for inclusion within the Natural Green Space designation. However, given that the wetland communities on the Subject Lands are the product of the refinery decommissioning process, are generally small (<0.1 ha), and isolated from one another, they do not currently function as a complex. Further, there is no obvious vegetation community connection between wetland units (e.g., forested corridors) and in many cases, individual wetlands are separated by remnant road infrastructure. Therefore, inclusion of connections between these wetland communities as Natural Green Space is not warranted, given that these communities are not proposed to be retained in a natural heritage system.

# 5.2.3 Watercourses Not Considered to be Significant Valleylands

There are no watercourses present on the Subject Lands, therefore, this type of Natural Green Space is absent.

# 5.2.4 Natural Areas >0.5 ha With Uncommon Vegetation

As noted in section 4.3.2 and **Table 5** (**Appendix B**), a total of 10 vegetation species that are considered rare in Peel Region and/or the CVC watershed, were observed on the Subject Lands. This included:

- Eastern Red Cedar infrequently observed within cultural thicket communities on the Subject Lands;
- Early Goldenrod infrequently observed in the ground cover layer within cultural thicket communities on the Subject Lands;
- Pale Dogwood infrequently observed within wetter areas within cultural thicket understories on the Subject Lands;

- Eastern Ninebark infrequently observed in cultural thicket understories on the Subject Lands;
- Peach-Leaved Willow immature individuals infrequently observed in the understory within cultural savannah communities on the Subject Lands;
- Sandbar Willow infrequently observed within the understory in cultural savannah habitat and meadow marsh areas;
- Broad-Fruited Bur-reed infrequently observed in wetter locations within the groundcover layer in cultural meadows and thickets on the Subject Lands;
- Pointed Broom Sedge infrequently observed within wetland inclusions in cultural meadow and cultural thicket areas on the Subject Lands;
- Blunt Spikerush infrequently observed within wetland inclusions within cultural meadows on the Subject Lands; and
- Strict Blue-Eyed Grass infrequently observed within cultural meadows on the Subject Lands.

The vegetated areas on the property, dominated by culturally influenced meadow and thicket communities that have formed since decommissioning of the oil refinery in 1987, are greater than 0.5 ha in size. Therefore, given the presence of locally rare vegetation species on the Subject Lands, within an overall area >0.5 ha, these areas are considered to be Natural Green Spaces by the City of Mississauga. Given the widely distributed nature of locally rare species on the Subject Lands, these types of Natural Green Spaces are not depicted on **Figure 6** (Appendix A).

# 5.3 Special Management Areas

The City of Mississauga Official Plan identifies Special Management Areas as lands adjacent to or near Significant Natural Areas or Natural Green Spaces that would be managed or restored to enhance and support the Significant Natural Area or Natural Green Space that they are associated with. Special Management Areas are identified in Schedule 3 of the City of the Mississauga Official Plan. No such areas are identified on or within 120 m of the Subject Lands. Further, given the lack of Significant Natural Areas and limited number, size and quality of wetlands being considered as Natural Green Spaces, no Special Management Areas are defined for the Subject Lands.

# 5.4 Residential Woodlands

These are defined by the City of Mississauga Official Plan as areas, generally in older residential areas, with large lots and mature trees forming a generally continuous canopy with minimal native understory due to lawn maintenance and landscaping. No Residential Woodlands are identified as being present on or adjacent to the Subject Lands in Schedule 3 of the City of the Mississauga Official Plan. Therefore, this component of the City's Natural Heritage System is considered to be absent from the Subject Lands.

# 5.5 Linkages

Linkages are defined by the City of Mississauga Official Plan as areas necessary to maintain biodiversity and support the ecological functions of Significant Natural Areas and Natural Green Spaces, but that do not fulfil any other criteria themselves. No Linkage areas are identified as being present on or adjacent to the Subject Lands in Schedule 3 of the City of the Mississauga Official Plan. However, the southern end of the Subject Lands and the adjacent lands fronting the Lake Ontario shoreline provide a linkage function for wildlife (e.g., birds and butterflies) migrating along the lake shoreline, including to and from the adjacent Credit River valley. Monarch migration surveys conducted in late summer 2017 found that the trees along the southern section of the Subject Lands, as well as on the adjacent lands fronting Lake Ontario were providing staging and foraging habitat for migratory butterflies. These trees are typically located within 25 m to 70 m of the shoreline. Similarly, migratory bird surveys in spring 2017 found that the majority of the migratory species that only periodically stopped in the area were using the same areas that provided vegetation structure. Some use of the treed western edge of the Subject Lands, as well as trees along Mississauga Road was also noted. Migratory bird use of the majority of the Subject Lands, which consist primarily of cultural meadow communities was minor compared to use of treed areas. Therefore, it is evident that migratory birds and butterflies are using the habitat on the Subject Lands and adjacent lands for migratory purposes, with the majority of use occurring in the treed areas within 70 m of the Lake Ontario shoreline.

Therefore, this component of the City's Natural Heritage System is considered to be present along the Lake Ontario shoreline fronting the Subject Lands. The general area providing this Linkage function is outlined in **Figure 6** (**Appendix A**). The primary linkage function use was focused around the trees along the southern portion of the Subject Lands and adjacent lands, typically within 70 m of the shoreline, although periodic use of other areas of the Subject Lands by migratory species was noted.

The area is generally disturbed, with vegetation communities only forming since the Imperial Oil refinery was decommissioned, but there are trees, shrubs and meadow areas within the existing shoreline corridor to provide migratory stopover functions, although the density of woody vegetation is relatively low, particularly along the immediate shoreline area, which includes the waterfront trail with adjacent manicured lawn.

# 5.6 Summary of Natural Heritage System Components Subject to Impact Assessment

An analysis of existing natural heritage features on the Subject Lands was completed, followed by an evaluation of their significance against criteria in the City of Mississauga Official Plan, the NHRM and Ecoregion 7E Criteria Schedule.

The results of this analysis determined that per the requirements of the City of Mississauga Official Plan and the PPS, the following significant natural features (as defined in the PPS) are present that will require assessment in section 7.0:

• Fish Habitat – with Shale Pond (on the Subject Lands) and Lake Ontario (within 120 m of the Subject Lands).

In addition, the impact assessment in section 7.0 also addresses potential impacts to the following non-significant features (not defined in the PPS but considered part of the City's Natural Heritage System):

- Natural Green Spaces wetlands not meeting the requirement for significance (including areas within 30 m of wetlands) and areas with locally rare vegetation species; and
- Linkage along the Lake Ontario shoreline.

# 6.0 DESCRIPTION OF DEVELOPMENT PROPOSAL

The proposed development will convert the brownfield former Imperial Oil refinery lands to a mixed-use community with a variety of residential, commercial and institutional uses, an open space system and a public road network. A conceptual site plan is shown in **Figure 7** (**Appendix A**) and the conceptual landscaping plan is provided in **Appendix C**. This landscaping plan is conceptual only. Final design details are to be confirmed through discussions with City staff.

The purpose of the proposed development is to provide a range of living areas, employment opportunities, commercial facilities, institutional uses and open space lands to benefit the residents that will move into the new community, the existing residents surrounding the proposed community and others who may travel to the new community to make use of the numerous amenities that will be built.

The lands were formerly owned by Imperial Oil but are now owned by the Port Credit West Village Partners Inc., who purchased the land from Imperial Oil following a competitive bidding process. The Subject Lands were formerly occupied by the Imperial Oil refinery which operated from 1932 to 1985, before being decommissioned in 1987. Currently, the site is a vacant brownfield with some remnant infrastructure (e.g., internal facility roads, one building and an oil-water separator) and open space areas undergoing vegetation succession. The lands are fenced, and public access is restricted.

The Subject Lands are currently designated as "Special Waterfront" in the City of Mississauga (2011) Official Plan, Schedule 10 (Land Use Designations), in recognition of the future development of the lands following decommissioning of the oil refinery. Adjacent land use designations include public open space (JC Saddington Park and the waterfront trail adjacent to Lake Ontario), residential low density 1 (to the east and west south of Lakeshore Road), motor vehicle commercial (associated with a former gas station at the corner of Lakeshore Road and Mississauga Road South) and mixed use (along Lakeshore Road). A church is present near the northeast corner of the Subject Lands.

The Subject Lands are currently zoned as Development (D). Zoning of adjacent lands includes:

- Open Space (OS2) Associated with JC Saddington Park;
- Residential (R15-1, R15-2 and R15-5) east of Mississauga Road South and west of the Subject Lands;
- Greenlands (G1) along the waterfront trail separating the Subject Lands from Lake Ontario; and
- Commercial (C4, C5, C4-22, C4-44, C4-66, C4-59 and C4-13) along Lakeshore Road.

Prior to the commencement of construction of the proposed development, environmental remediation activities will occur throughout the Subject Lands to address soil contamination. This will involve excavation and removal of contaminated soil from the property. The remediation process will require removal of most of the vegetation on the property, excluding some of the mature trees along the western property boundary, although trees whose root systems are within contaminated soil requiring removal, will have to be removed. Remediation will also require draining of the Shale Pond and excavation/removal of contaminated sediments. A portion of the pond will be reinstated as part of a water feature within the open space/parkland on the Subject

Lands. The remediation process is anticipated to take approximately 1.5 years to complete and commenced in late 2017.

Once the site is remediated, construction of the proposed development will commence in a phased manner. This will generally include:

- Site-wide grading;
- Installation of buried services (e.g. water and sewer lines);
- Installation of municipal roads;
- Construction of residential, commercial and institutional buildings; and
- Landscaping throughout the development, including open space and parkland areas.

Stormwater management for the development is being addressed separately by Urbantech Consulting. The stormwater management plan for the Subject Lands will provide quality control for all stormwater, but given the location adjacent to Lake Ontario, quantity control is not required. A variety of Low Impact Development (LID) techniques are proposed for use to manage stormwater on the Subject Lands.

# 7.0 IMPACT ASSESSMENT, MITIGATION, AND ENHANCEMENT OPPORTUNITIES

This section of the EIS assesses the potential effects on the previously identified ecological components that could occur over the short-term and long-term, following implementation of the development plan. It also suggests appropriate mitigation measures to avoid or minimize negative impacts and/or to enhance features and functions where practical.

Impacts from a proposed land development application can generally be considered in two broad categories, direct and indirect. Direct impacts are normally associated with the physical removal or alteration of natural features that could occur based upon a land use application, and indirect impacts may be changes or impacts to less visible functions or pathways that could cause negative impacts to natural heritage features over time.

Details of the impact assessment are provided within **Table 14** (following). Some key points are discussed in the following sections.

# 7.1 Fish Habitat

This section discusses the potential impacts of the proposed development on fish habitat in the Shale Pond and Lake Ontario during the construction and post-construction periods.

# 7.1.1 Fish Habitat in the Shale Pond

Given that a naturally reproducing population of fish (Fathead Minnow) is present within the Shale Pond, it is considered to be fish habitat, per the definition in the federal *Fisheries Act*. However, the fish population in the pond is isolated and not connected to any other fisheries waters. Fathead Minnow, the only species known to be present in the pond, is tolerant of a wide range of environmental conditions and can therefore persist within the poor quality, potentially contaminated, pond environment. While fish from the pond may be eaten by predators (e.g., piscivorous birds), there is a high probability that these fish may have elevated body burdens of hydrocarbons, resulting in potential negative effects along the food chain. Overall, the significance and sensitivity of this fish population and associated fish habitat is low.

Site remediation activities will require complete draining of the Shale Pond to excavate contaminated sediments. To mitigate potential impacts on fish in the Shale Pond, a fish salvage program will be implemented to ensure that fish are humanely removed from the pond prior to complete dewatering. The fish salvage will be implemented in accordance with the conditions of a License to Collect Fish for Scientific Purposes that will be obtained from the MNRF. It is anticipated that the License will contain conditions regarding the ultimate disposition of fish salvaged from the pond.

Compensation to address the loss of fish habitat in the pond due to site remediation activities and the redevelopment project is not considered to be warranted, given that the pond was originally man-made and used for industrial purposes and is not connected to any other fisheries waters. While fish are present in the pond, it is not a natural habitat and does not provide an important fisheries function in the context of the local environment.

However, following completion of remediation activities, a water feature may be established as part of the open space plan for the proposed development if the City determines it desires a water feature. It is not required for stormwater management purposes nor for habitat compensation. Similar to the existing Shale Pond, it is not anticipated that the feature, if established, will have a direct surface water connection to Lake Ontario or the Credit River and therefore, fish would not be able to move into the pond via a surface water pathway. However, over time, establishment of a fish population in the pond is likely via other pathways (e.g., through piscivorous bird activity). The naturalized water feature, if established, would likely provide suitable habitat for self-sustaining populations of a number of common fish species should they become established in the water feature. Environmental (e.g., sediment and water quality) conditions within the water feature will be significantly improved compared to existing conditions as a result of the remediation process, resulting in an ecologically more suitable environment for fish and elimination of potential food chain issues associated with the current potentially contaminated fish from the pond.

Therefore, site remediation activities will result in the removal of the existing low sensitivity population of Fathead Minnow from the man-made, industrial purposed Shale Pond. Specific compensation to address the loss of fish habitat due to site remediation activities in the pond is not warranted. However, a water feature may be created in the open space (if desired by the City) and if this occurs, over time, a fish population may establish in the water feature. Should this occur, the water feature would provide improved habitat for fish compared to the existing Shale Pond, and the feature will have significantly enhanced overall environmental quality of the aquatic habitat.

Given that that Shale Pond is an artificial body of water and is not connected to any other waterbody containing fish (e.g., Lake Ontario), development or site alteration activities occurring within the Shale Pond are not subject to review by DFO under the *Fisheries Act*, as per the self-assessment criteria on the DFO website. However, as noted previously, fish salvage from the pond will occur in accordance with the conditions of a License to Collect Fish for Scientific Purposes that will be obtained from the MNRF.

# 7.1.2 Fish Habitat in Lake Ontario

The Lake Ontario shoreline fronting the Subject Lands provides a variety of direct habitat functions for various species and life stages of fish. There will be no direct impact on fish habitat in Lake Ontario, since no work will occur within a minimum of approximately 10 m of the average annual high-water mark of the lake. Grading and landscaping associated with open space development activities may occur up to the edge of the existing armour stone areas. Further, other site alteration and development activities within 120 m could potentially result in indirect impacts on fish habitat as a result of:

- Erosion and sedimentation from the construction area; and
- Accidental spills (e.g., fuel or oil from machinery) with transport of spilled material to watercourses.

In addition, the presence of the proposed development could potentially impact water quality and associated fish habitat in Lake Ontario due to indirect effects associated with stormwater runoff from the development area over the long-term.

Each of these potential impacts is discussed in the following sections.

#### **Erosion and Sedimentation**

Erosion and sedimentation from the disturbed work area associated with the proposed development could potentially result in adverse effects to water quality (e.g., increased turbidity) or sedimentation and associated effects on fish (e.g., injury or mortality due to suspended sediments or altered habitat use) or fish habitat (e.g., loss of interstitial spaces in rocky areas, smothering of aquatic vegetation and/or incubating eggs).

It is recommended that the contractor prepare and implement an Erosion and Sedimentation Control (ESC) Plan to minimize the potential for erosion and sedimentation from the construction site. The ESC Plan should be developed based on the guidance provided in the *Erosion and Sediment Control Guideline for Urban Construction* (GGHCA 2006). Basic elements of the plan should include consideration of:

- Construction phasing to minimize the amount of time soils are barren and therefore, more susceptible to erosion;
- Requirements and timing for rehabilitation of disturbed areas;
- Stormwater management strategies during construction;
- Erosion prevention measures (e.g., hydroseeding, sodding, erosion control matting, tarping of stockpiles);
- Sedimentation control measures (e.g., silt fences); and
- Inspection and performance monitoring requirements and adaptive management considerations.

Implementation of an effective ESC Plan, incorporating both erosion and sediment controls, coupled with regular inspection and performance monitoring and implementation of any remedial actions necessary to ensure effective performance, is anticipated to be largely effective in preventing the movement of eroded soil particles off-site towards fish habitat in Lake Ontario.

Overall, no adverse effects to fish and fish habitat are predicted to occur as a result of erosion and sedimentation during construction, provided an effective ESC Plan, including monitoring and adaptive management, is implemented.

# Accidental Spills

Accidental spills of potentially hazardous materials (e.g., fuel and oil from heavy equipment), if transported to Lake Ontario, could cause stress or injury to fish and other aquatic biota (e.g., benthic invertebrates, zooplankton, phytoplankton).

In order to mitigate the potential for adverse effects on fish and fish habitat due to accidental spills during construction, it is recommended that the contractor prepare a spill prevention and response plan to outline the material handling and storage protocols, mitigation measures (e.g., spill kits on-site), monitoring measures and spill response plans (i.e., emergency contact procedures, including MOECC Spills Action Centre, and response measures including containment and clean-up). Implementation of an effective spill prevention and response plan is anticipated to be largely effective in preventing adverse effects on fish and fish habitat.

# Post-Construction Impacts on Water Quality

The proposed stormwater management system is anticipated to provide enhanced level quality control to mitigate potential effects on water quality in Lake Ontario due to suspended sediments and turbidity.

Some surface water on the Subject Lands will infiltrate through residential lawns and open spaces into the shallow groundwater flowing towards Lake Ontario on the Subject Lands or will flow directly as overland runoff from open space into Lake Ontario. This runoff or infiltration water could potentially be impaired due to use of potential contaminants (e.g., lawn fertilizers) or other land use activities (including accidental spills). However, given the relatively limited potential for this to occur, and the fact that all flow eventually would go to Lake Ontario, which has significant dilution capacity compared to the amount of runoff that could be anticipated from the adjacent open space, no impacts on fish habitat in the lake are anticipated to occur. It is recommended that the Lake Ontario shoreline riparian planting plans be developed as part of the overall open space for the development to enhance existing riparian functions.

# 7.2 Natural Green Spaces

# 7.2.1 Non-Significant Wetlands

This section discusses the potential impacts of the proposed development on the non-significant wetlands that are present within the Subject Lands that meet the requirements to be considered Natural Green Spaces under the City of Mississauga Official Plan.

Each of the small, isolated wetland communities on the Subject Lands will be removed to facilitate the proposed environmental remediation process and/or the proposed development. This includes 18 individual wetland pockets, ranging in size from approximately 50 m<sup>2</sup> to 0.10 ha, for a total wetland area of 0.80 ha. As noted previously, these wetlands are of cultural origin (created by grading during the oil refinery decommissioning process or within the man-made shale pond) and they provide limited ecological function, due to their small size, isolated nature, lack of hydrological connection to watercourses, lack of floristic diversity and presence of invasive species (e.g. *Phragmites*). The wetlands within the Shale Pond do provide breeding habitat for a more diverse range of bird species, including some indicators of Marsh Breeding Bird SWH, although the diversity and number of species present are not sufficient to meet SWH thresholds.

Removal of these small, isolated, low sensitivity wetlands, that do not meet the requirements to be considered Significant Natural Areas, will result in the loss of 0.80 ha of generally low functioning wetland habitat, although the wetlands associated with the Shale Pond do provide wildlife habitat. Many of these wetlands are in areas that have been identified as requiring remediation, due to contaminated soil and groundwater conditions. Given that these wetlands are of cultural origin, were only created due to the decommissioning of the oil refinery or for industrial use in the case of the Shale Pond, do not meet the requirements of any significant natural features under the PPS, contain invasive species (*Phragmites*) and generally provide relatively limited ecological functions (e.g., provision of wildlife habitat for relatively common species within the majority of the wetlands with some breeding habitat for locally uncommon bird species in the Shale Pond wetland), their removal is not expected to result in negative impacts to the City's Natural Heritage System.



Through discussions with CVC, no specific compensation measures are required to address the removal of these wetland communities, given that they are either the product of decommissioning the oil refinery (e.g., areas of low lying topography created by removal of infrastructure) or, in the case of the Shale Pond, were human-made features used for industrial purposes, with wetland communities that have only developed since decommissioning occurred. Through the remediation process, currently underway, all sediment and water from the Shale Pond will be removed, treated and/or disposed in accordance with provincial regulations. Groundwater and soil remediation across the Subject Lands will be substantially improved to meet MOECC standards to support redevelopment for more sensitive land uses, including residential and parkland, resulting in significant improvements to local environmental quality.

Port Credit West Village Partners Inc. is suggesting the creation of a water feature within the open public parkland dedication space of the proposed development, as shown in the conceptual open space landscaping plan (**Appendix C**). A water feature is not required for stormwater management purposes or any specific habitat compensation but may be desired by the City. Hydrologic opportunities and constraints to design this water feature (e.g., LID's) to support wildlife habitat will be considered at detailed design, if the feature is desired by the City. A water feature that provides wildlife habitat (e.g., Midland Painted Turtle, Red-wing Blackbirds, dragonflies) enhances natural environment education opportunities in the open space area.

# 7.2.2 Locally Rare Vegetation Species

Locally rare vegetation species in Peel Region and/or the CVC watershed were observed in areas throughout the Subject Lands. At the time of revisions to this EIS in winter 2018, a substantial portion of the Subject Lands had already been disturbed by ongoing site remediation activities, which commenced in late 2017 and therefore, some removal of locally rare vegetation species has occurred.

However, in order to mitigate further impacts on locally rare vegetation species, a vegetation salvage program will be implemented in fall 2018 on lands that have not been disturbed by site remediation (i.e., outside the silt fence demarcating the first phase of remediation). Within these areas, the salvage will consist of collecting seed for use in post-construction landscaping within the open space on the Subject Lands. Opportunities for transplanting of individuals of locally rare species will also be considered, where such transplants have potential for success (based on species and available habitat types) and where suitable transplant locations are available.

In addition, post-construction landscaping will incorporate native seed and/or individuals of these locally rare species, where such seed or planting stock are available from area nurseries.

Therefore, it is anticipated that many of the locally rare species observed on the Subject Lands will be able to persist in the post-construction environment through salvage or/or planting of native stock.

# 7.3 Linkages

# 7.3.1 Temporary Impacts During Construction

The Lake Ontario shoreline area provides an important linkage corridor for migratory birds and insects. That corridor function will be impacted through environmental remediation and construction activities that remove vegetation. The proposed public park and open space that will occupy the shoreline area post-construction will re-establish a connected, vegetated area and linkage function.

To mitigate the temporary impairment of the linkage function during construction, removal of vegetation will be staged/phased to maintain the existing functions for as long as possible. Once the vegetation is removed, creation of the public open space will proceed as quickly as possible to restore the linkage function of the area. During the intervening period (e.g., when construction is occurring and post-construction when the site is regenerating), the linkage function of the area will be temporarily reduced. However, existing vegetation structure on the adjacent lands south of the Subject Lands will persist to provide migratory functions. However, during this time, migratory birds and butterflies may rely more heavily upon other areas within the surroundings for migratory stopover purposes (e.g., JC Saddington Park). Temporary loss of the migratory functions provided by the Subject Lands is therefore not anticipated to have negative impacts on the overall function and suitability of the Lake Ontario shoreline corridor.

# 7.3.2 Post-Development Impacts and Enhancement Opportunities

Over the longer term, the public park and open space associated with the proposed development on the Subject Lands, will provide a contiguous green space corridor along this portion of the Lake Ontario shoreline, linking JC Saddington Park and the Credit River estuary to the residential areas with mature trees along the shoreline to the southwest of the Subject Lands. The green space corridor (incorporating the Subject Lands and adjacent shoreline crown lands) will range from approximately 50 m to 165 m in width, based on the conceptual site plan. The proposed open space within the Subject Lands offers an opportunity to incorporate ecological design principles and practices to benefit migratory birds and butterflies, subject to the City's final park programming direction.

It is recommended that the ultimate landscaping strategy for the open space at the southern end of the Subject Lands focus on enhancing the migratory function of the shoreline corridor. During both spring and fall migrations, birds and butterflies migrating along the north shore of Lake Ontario typically make use of natural areas containing native vegetation with structural complexity to provide short-term shelter and foraging opportunities along the migration route. This type of habitat and habitat use function will serve as the target for restoration opportunities on the Subject Lands. Maintaining the linkage function does not require the incorporation of those lands to the south of the Subject Lands that are not part of this application in order to maintain the linkage function post-development.

The City of Mississauga's Natural Heritage & Urban Forest Strategy (NH&UFS) (2014) recognizes the importance of linkage (corridor) areas for resting and feeding for migratory birds, including the Lake Ontario shoreline corridor between Toronto and Oakville. The City's NH &UHF Report also acknowledges that insects are of great value to the City's biodiversity, and to humans as

pollinators for agricultural crops. The creation of migratory bird and insect stopover habitat within the open public parkland dedication space along the southern portion of the Port Credit West Village Lands meets the City's NH & UHF objectives to create habitat linkage (corridors) and provide pollinator habitat. The creation of migratory stopover habitat for birds and butterflies on the Port Credit (West Village) lands is supported in the City's NH&UHS Report. It is recommended that the detailed design for the proposed open public parkland dedication space take into consideration the guidance below regarding suitable design to improve the function of the lands for migratory birds and butterflies.

The linkage function of the existing shoreline is driven by the location along Lake Ontario and adjacent to the Credit River mouth, both of which are known to be important areas for migrating birds and butterflies. As noted previously, providing a vegetated, open space corridor along the lake shore will maintain important linkage functions. The Credit River Estuary Species at Risk Research Project (2014) first identified the opportunity to plant migratory bird and butterfly habitat at the adjacent JC Saddington Park.

Pollinator meadows and fruit and cone bearing tree and shrub plantings along the West Village (Port Credit) open space at the southern end of the Subject Lands are recommended to provide migratory bird and butterfly stop over habitat in the public open space area. This will provide beneficial vegetation species along the linkage area fronting the lake to promote migratory bird and butterfly stopover in conjunction with existing stopover habitat in JC Saddington Park and the Credit River estuary.

Creating habitat for migratory birds and butterflies also supports pollinator species. Pollen provides protein with some species also providing nectar (sugar) that support the life cycle of many insects. It is recommended that flowering forbs, grasses, shrubs and trees that support bees, butterflies and moths be planted in the open space areas in accordance with CVC's "Native Plants for Pollinators" guide (2017). Tree and shrub plantings are recommended to be concentrated along the shoreline with pollinator meadows present between the shoreline tree and shrub plantings and the proposed development. Pollinator meadows should not be manicured (e.g., mowed), but maintenance should be conducted over the long-term to maintain these features as meadows. This could include selective removal of pioneering shrub and tree species that invade the planted meadow areas. The planted shrub and tree shoreline should be allowed to succeed and fill in.

CVC (2014) recommendations for creating migratory bird and butterfly stopover habitat for JC Saddington Park are relevant for creating this habitat at West Village (Port Credit). CVC (2014) recommended that the park's shoreline no longer be manicured to permit regeneration of meadow communities including species such as Milkweed, goldenrods (*Solidago sp.*) and asters (*Symphotrichum sp.*) that would benefit both migratory and breeding Monarchs. CVC (2014) also suggested that tree and shrub plantings be comprised of native fruit-bearing species such as dogwood (*Cornus sp.*), Mountain-ash (*Sorbus sp.*), Nannyberry (*Virburnum lentago*), Wild Raisin (*Virburnum nudum*), Highbush Cranberry (*Virburnum trilobum*), Winterberry (*Ilex verticllata*) and Staghorn sumac (*Rhus typhina*). Finally, CVC (2014) suggested that plantings of native conebearing coniferous trees, such as Eastern White Cedar (*Thuja occidentalis*) along the shoreline area would provide dense spring foliage to provide cover for non-biting midges, which are heavily predated by migratory birds. These recommendations should guide the detailed design of the



open space on the Subject Lands to ensure the important migratory corridor function is maintained and enhanced, subject to the City's final park programming direction.

Creating pollinator habitat along with educational programming in the open space areas supports Ontario's Pollinator Health Action Plan (2016) key goals including: "improved habitats and nutrition for pollinators, and increased awareness and knowledge about pollinators and ways to support them." Pollinator habitat creation also contributes to the plans aspirational goal "to restore, enhance and protect 1 million acres of pollinator habitat in Ontario".

Given that beneficial pollinator meadows, migratory bird and butterfly habitats are recommended to be incorporated into the open space landscaping plans, and that the open vegetation community would continue to function as a migration/stopover habitat for birds and butterflies by containing a mix of meadow and early successional communities, no long-term negative impacts on the linkage function of the shoreline are anticipated to occur provided these recommendations are implemented. The current diversity of structure, enhanced by restoration that focuses on a native species composition and the control of invasives, will promote and sustain the importance that the site already provides to these groups of organisms as a lakeshore natural corridor. Additional details associated with the restoration areas within the green corridor will be determined at the detailed design stage, in consideration of the City's final park programming direction.

# Table 14: Predicted Effects, Mitigation, Enhancement and Net Effects

NATURAL HERITAGE FEATURES AND ASSOCIATED FUNCTIONS	SIGNIFICANT CHARACTERISTICS AND SENSITIVITY	IMPACTOR	PREDICTED EFFECTS	AVOIDANCE, MITIGATION AND/OR RESTORATION	NET EFFECTS	MONITORING AND MANAGEMENT
Significant Natural A	reas					
Provincially or Regionally Significant Areas of Natural and Scientific Interest	Not Present	• N/A	• N/A	• N/A	• N/A	• N/A
Environmentally Sensitive or Significant Areas	Not Present	• N/A	• N/A	• N/A	• N/A	• N/A
Habitat of Endangered and Threatened Species	Not Present	• N/A	• N/A	• N/A	• N/A	• N/A
Fish Habitat	<ul> <li>Habitat is present in the man-made Shale Pond for an isolated community of tolerant Fathead Minnows. The pond is not connected via surface water to Lake Ontario or the Credit River. The pond provides low quality habitat given the contaminated nature of the sediments and surface water. As a man-made feature not connected to any other fisheries water, activities associated with the feature are not subject to review under the <i>Fisheries</i> <i>Act</i></li> <li>Lake Ontario provides habitat for a range of fish and life stages. The shoreline fronting the Subject Lands provides non-specific, open-coast habitat with relatively limited in-water habitat features. The fish habitat along the shoreline has relatively low sensitivity compared to other more</li> </ul>	<ul> <li>Remediation of the shale pond (dewatering, excavation of contaminated sediments) and subsequent restoration (grading, landscaping, water feature construction) will result in temporary disturbance and long-term changes</li> <li>Earthworks (e.g., grading, filling) and vegetation removal on the Subject Lands during remediation and construction of the development could potentially result in decreased quality of surface water runoff (due to increased suspended solids) from the Subject Lands to Lake Ontario</li> <li>During construction, spills can occur from equipment</li> </ul>	<ul> <li>Disruption and potential mortality of fish during Shale Pond dewatering</li> <li>Potential loss of fish habitat due to removal of fish from the Shale Pond</li> <li>Indirect effects on fish habitat in Lake Ontario could occur due to erosion and sedimentation from the disturbed work area during construction. Increased erosion from the Subject Lands could result in negative effects on fish habitat and mortality, health effects or altered behaviour of aquatic biota (benthic invertebrates and fish)</li> <li>During construction, water quality, aquatic biota (fish and benthic invertebrates) and vegetation could be negatively affected due to spills</li> </ul>	<ul> <li>A fish salvage program will be implemented to humanely remove fish from the Shale Pond prior to complete dewatering. Program will be implemented in accordance with the conditions of a License to Collect Fish for Scientific Purposes that will be obtained from the MNRF</li> <li>The water feature that is planned to be installed in the open space of the proposed development is anticipated to be suitable for fish, should a population become established (e.g., by bird transport from other fisheries waters)</li> <li>An Erosion and Sedimentation Control Plan will be developed prior to construction, the contractor will have spill kits on</li> </ul>	<ul> <li>Fish will be removed from the Shale Pond, although the resulting water feature may provide enhanced fish habitat conditions compared to the currently contaminated shale pond, should a fish population become established in the feature</li> <li>No net effect on fish habitat in Lake Ontario is anticipated to occur as a result of erosion and sediment, accidental spills or stormwater management on the Subject Lands during or following construction</li> </ul>	<ul> <li>Construction monitoring to ensure effectiveness and maintenance of the ESC and spill prevent and response measures throughout construction</li> <li>Construction monitoring to ensure that fish are removed from in-water work areas prior to complete dewatering</li> <li>Stormwater runoff quality monitoring is anticipated to be required as a condition of provincial approvals</li> </ul>

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NATURAL HERITAGE FEATURES AND ASSOCIATED FUNCTIONS		SIGNIFICANT CHARACTERISTICS AND SENSITIVITY		IMPACTOR		PREDICTED EFFECTS	A١	OIDANCE, MITIGATION AND/OR RESTORATION		NET EFFECTS		MONITORING AND MANAGEMENT
		complex habitats that would support various life stages and functions	•	and vehicles that could enter the Shale Pond or Lake Ontario Stormwater run-off from the proposed development into Lake Ontario	•	Stormwater runoff from the proposed development, if not properly treated, could potentially result in negative effects to water quality in Lake Ontario	•	site, manage spills accordingly, and report spills to the appropriate MOECC Spills Action Centre, if applicable Stormwater from the proposed development will be appropriately treated prior to discharge to Lake Ontario to prevent negative impacts on water quality				for the stormwater management system
Significant Wildlife Habitat	•	Not Present	•	N/A	•	N/A	•	N/A	•	N/A	•	N/A
Significant Woodlands	•	Not Present	•	N/A	•	N/A	•	N/A	•	N/A	•	N/A
Significant Wetlands	•	Not Present	•	N/A	•	N/A	•	N/A	•	N/A	•	N/A
Significant Coastal Wetlands	•	Not Present	•	N/A	•	N/A	•	N/A	•	N/A	•	N/A
Significant Valleylands	•	Not Present	•	N/A	•	N/A	•	N/A	•	N/A	•	N/A
Natural Green Space	<u>s</u>											
Woodlands >0.5 ha	•	Not Present	•	N/A	•	N/A	•	N/A	•	N/A	•	N/A
Other Wetlands	•	Eighteen isolated, small (<0.1 ha) wetland pockets were identified on the Subject Lands Wetland pockets created by poor drainage due to grading following decommissioning of the Oil Refinery	•	All wetland pockets will be removed for site remediation, site alteration or development purposes	•	Loss of a combined 0.8 ha of wetland communities. Wetland communities are comprised of common vegetation species providing relatively limited ecological function	•	A water feature is planned to be constructed in the open space of the development. Over time, the feature is anticipated to develop wetland characteristics and may provide habitat for tolerant wildlife	•	Removal of 0.8 ha of generally low-functioning wetland community from the Subject Lands, resulting in minor loss of non-significant wildlife	•	N/A

Woodlands >0.5 ha	•	Not Present	•	N/A	•	N/A	•	N/A	•	N/A	•	N/A
Other Wetlands	•	Eighteen isolated, small (<0.1 ha) wetland pockets were identified on the Subject Lands Wetland pockets created by poor drainage due to grading following decommissioning of the Oil Refinery Wetlands generally low functioning – not hydrologically connected via surface water drainage to Lake Ontario or Credit River Most wetlands only provide minor wildlife habitat for common species (e.g., Red-winged Blackbird) Marsh pockets in Shale Pond provide breeding habitat for marsh	•	All wetland pockets will be removed for site remediation, site alteration or development purposes	•	Loss of a combined 0.8 ha of wetland communities. Wetland communities are comprised of common vegetation species providing relatively limited ecological function As isolated features, these wetland communities do not provide any direct benefit to Lake Ontario or the Credit River Loss of minor wildlife habitat function (e.g., breeding bird habitat) Alternative marsh breeding habitat is present in the nearby	•	A water feature is planned to be constructed in the open space of the development. Over time, the feature is anticipated to develop wetland characteristics and may provide habitat for tolerant wildlife species. Pre-development remediation activities will ensure that the environmental quality of the water feature is substantially improved compared to current conditions Removal of wetlands will occur outside breeding periods to avoid disrupting wildlife during critical times	•	Removal of 0.8 ha of generally low-functioning wetland community from the Subject Lands, resulting in minor loss of non-significant wildlife habitat within a contaminated environment Over time, wetland development within the water feature may replace these functions on the Subject Lands. Opportunities for establishment of suitable turtle habitat within the	•	N/A

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NATURAL HERITAGE FEATURES AND ASSOCIATED FUNCTIONS	SIGNIFICANT CHARACTERISTICS AND SENSITIVITY		IMPACTOR		PREDICTED EFFECTS	A	VOIDANCE, MITIGATION AND/OR RESTORATION		NET EFFECTS		MONITORING AND MANAGEMENT
	bird species but do not meet SWH criteria				Credit River Marshes PSW, which provides similar emergent aquatic vegetation over a substantially larger area and is of better environmental quality compared to the currently contaminated wetlands on the Subject Lands				water feature on the Subject Land will be examined during detailed design		
Watercourses	Not Present	•	N/A	•	N/A	•	N/A	•	N/A	•	N/A
Natural Areas >0.5 ha with Uncommon Vegetation	• Ten vegetation species that are locally rare within Peel Region and/or the CVC watershed are found on the Subject Lands. These species were observed infrequently in several different habitat types, generally focused around cultural thickets and cultural savannahs, with some presence in meadow marsh wetland inclusions within cultural meadow areas	•	Vegetation will be removed throughout the Subject Lands to facilitate site remediation and/or the proposed development	•	These vegetation species will be removed from the Subject Lands due to implementation of the proposed development	•	Opportunities for salvage of these locally rare vegetation species within areas that will not be disturbed for site remediation by fall 2018 will be implemented. This may include collection of seeds with storage and eventual planting in open space areas to be landscaped, or relocation of individuals if relocation has a high probability of success (based on species and habitat type) and suitable relocation areas are present Locally rare species were seed and/or planted stock can be obtained from local nurseries will be included in open space landscaping planting plans	•	Existing individuals of locally rare species will be removed. Mitigation will ensure that at least some or all of these species persist on the Subject Lands (within the open space) post-development	•	Vegetation survival monitoring for any relocated or planted locally rare vegetation species will be completed during the post- development period
Other Natural Heritag	e System Areas										
Special Management Areas	Not Present	•	N/A	•	N/A	•	N/A	•	N/A	N/	Ά
Residential Woodlands	Not Present	•	N/A	•	N/A	•	N/A	•	N/A	N/	Ά

Special Management Areas	Not Present	• N/A	• N/A	• N/A	•
Residential Woodlands	Not Present	• N/A	• N/A	• N/A	•

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NATURAL HERITAGE FEATURES AND ASSOCIATED FUNCTIONS	SIGNIFICANT CHARACTERISTICS AND SENSITIVITY	IMPACTOR	PREDICTED EFFECTS	AVOIDANCE, MITIGATION AND/OR RESTORATION	NET EFFECTS	MONITORING AND MANAGEMENT
Linkages	Lake Ontario shoreline provides an important linkage function for migratory birds and butterflies	<ul> <li>Remediation, site alteration and development will result in removal of existing vegetation and grading within the linkage corridor along the Lake Ontario shoreline</li> <li>Development of residential, commercial, institutional and open space facilities on the Subject Lands</li> </ul>	<ul> <li>Temporary reductions in the functionality of the linkage corridor for migratory birds and butterflies' due to removal of vegetation and heavy equipment use, noise and human presence during construction</li> <li>Potential impacts on the function of the ecological linkage of the shoreline due to encroachment by residential, commercial or institutional land uses</li> </ul>	<ul> <li>Commercial, residential and institutional development will be set back from the Lake Ontario shoreline to maintain a green corridor along the lakeshore</li> <li>The area will be revegetated with beneficial vegetation forms and species (e.g., fruit and cone bearing trees and shrubs, and naturalized meadow communities) to benefit migratory birds and butterflies by providing migratory stopover roosting areas and food sources</li> </ul>	<ul> <li>Short-term reduction in the use of the area by migratory birds and butterflies during the construction process</li> <li>Long-term enhancement to functionality of the migratory linkage due to use of beneficial vegetation forms and species in the open space landscaping plan</li> </ul>	A monitoring plan will be developed to assess the success of shoreline linkage enhancement measures

# 8.0 CONCLUSIONS AND RECOMMENDATIONS

This EIS has been developed as part of the planning process for the proposed Port Credit West Village development at 70 Mississauga Road South, Mississauga, on the site of the former Imperial Oil refinery.

An assessment of impacts on natural features and their associated functions has been conducted, and discussed in relation to the PPS, related guidance documents and the City of Mississauga Official Plan. The existing natural environment on the Subject Lands has been heavily influenced by former use as an oil refinery, and the natural features present on the site are the direct result of regeneration that has occurred since the facility was decommissioned in 1987. The only Significant Natural Area on and adjacent to the Subject Lands is fish habitat, which is present within Lake Ontario and in the isolated Shale Pond, although habitat in the Shale Pond is highly degraded due to hydrocarbon contamination. There are wetlands on the Subject Lands that do not meet the requirement to be considered Significant Natural Areas, therefore, they are classed as Natural Green Spaces in accordance with the City Official Plan. Areas with locally rare vegetation species are also considered to be Natural Green Spaces. Finally, the Lake Ontario shoreline is an important wildlife linkage in the area, primarily for birds and butterflies migratory along the Lake Ontario shoreline.

The concept plan includes the following activities that will cause direct impacts on the identified natural heritage features:

- Site contamination remediation, grading and installation of proposed community buildings and infrastructure;
- Grading, vegetation restoration and creation of public open space/ecological gardens; and
- Grading, vegetation restoration and creation of public open space along the Lake Ontario shoreline;

Based upon the natural heritage feature inventories and analyses carried out, the following conclusions are provided:

- The results of the natural heritage assessment identified fish habitat, non-significant wetlands, locally rare vegetation species and linkages on and adjacent to the Subject Lands, as detailed below:
  - The Shale Pond and Lake Ontario fronting the Subject Lands provide fish habitat;
  - Two wetland units mapped under ELC were recorded on the Subject Lands, as well as 16 other small, isolated wetland inclusions;
  - Ten vegetation species that are rare in Peel Region and/or the CVC watershed were found on the Subject Lands; and
  - The Lake Ontario shoreline provides an important wildlife linkage.
- Fish will be removed from the Shale Pond prior to commencement of remediation activities in accordance with the conditions of a License to Collect Fish for Scientific Purposes that will be obtained from the MNRF;

- Removal of contaminated sediments within the Shale Pond will result in significant enhancements to local environmental quality;
- Fish habitat compensation to address removal of existing fish habitat Shale Pond is not warranted, given that the pond is anthropogenic and has a long history of industrial use. However, if a water feature in the open space on the Subject Lands is desired by the City (given that it is not required for stormwater management nor habitat compensation purposes) it may ultimately be colonized by fish. Should a fish population re-establish in the pond, habitat quality is anticipated to be improved compared to current conditions associated with the contaminated Shale Pond;
- Site alteration will be set back at least a minimum of 10 m from the average annual high water mark of Lake Ontario and no direct impacts on fish habitat in the lake will occur;
- An Erosion and Sedimentation Control Plan, Stormwater Management Plan and Accidental Spills Response Plan will be required as part of the detailed design to ensure no indirect impacts on fish habitat in Lake Ontario as a result of the proposed works;
- Removal of 0.80 ha of generally low functioning wetland (small, isolated communities created by grading during decommissioning of the oil refinery or within the anthropogenic shale pond) on the Subject Lands is not predicted to cause negative impacts on the Natural Green Space component of the City's Natural Heritage System;
- If a water feature is ultimately constructed on the Subject Lands (i.e., if desired by the City as part of the park programming) it may provide wildlife habitat functions. Potential ecological functions and design attributes should be considered at the detailed design station, subject to the City's final direction on park programming;
- Opportunities for salvage of locally rare vegetation species will be identified in fall 2018, with seed collection and/or transplant potential options. Landscaping will also use seed and/or planted stock of these locally rare species, provided suitable sources can be found in local nurseries; and
- The recommended landscaping and revegetation measures in the public open space along the southern portion of the Subject Lands, subject to the City's final park programming direction, will enhance the function of the area as a linkage for migratory birds and butterflies.

Considering the above, and as discussed within the accompanying Impact Assessment table, the development of the Subject Lands can be completed without negative impact on the natural heritage features and associated functions. Conceptual planning for opportunities to provide a net gain, or overall benefit to the local natural heritage have been presented.



Report Prepared by: **SAVANTA INC.** 

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Noel Boucher Project Manager 1-800-810-3281 Ext 1250 noelboucher@savanta.ca

hlitch

Tom Hilditch Project Director 1-800-810-3281 Ext 1010 tomhilditch@savanta.ca

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### APPENDICES

Port Credit West Village, Mississauga Environmental Impact Study

Appendix A – Figures



Path: S:\8942 - SAV 7684 Port Credit West Village\gis\mxd\2016 05 19 report figures\Figure 1 Location of Subject Lands.mxd Date Saved: August 15, 2017



Path: S:\8942 - SAV 7684 Port Credit West Village\gis\mxd\2017 08 15 report figures\Figure 2 Natural Heritage Features.mxd REVISED: August 15, 2017



Path: S:\8942 - SAV 7684 Port Credit West Village\gis\mxd\2017 08 15 report figures\Figure 3 Wildlife Survey Locations.mxd REVISED: August 15, 2017



Path: S:\8942 - SAV 7684 Port Credit West Village\gis\mxd\2017 08 15 report figures\Figure 4 Aquatic Monitoring Locations.mxd REVISED: August 15, 2017



Path: S:\8942 - SAV 7684 Port Credit West Village\gis\mxd\2017 08 15 report figures\Figure 5 Ecological Land Classification.mxd REVISED: August 16, 2017



Path: S:\8942 - SAV 7684 Port Credit West Village\gis\mxd\2018 02 15 report figures\Figure 6 Significant Natural Features and City NHS.mxd REVISED: March 1, 2018



Path: S:\8942 - SAV 7684 Port Credit West Village\gis\mxd\2018 02 15 report figures\Figure 7 Proposed Development Master Plan.mxd REVISED: February 15, 2018

Port Credit West Village, Mississauga Environmental Impact Study

Appendix B – Tables

### Table 1: Natural Heritage Information Centre (NHIC) Data

COMMON NAME	SCIENTIFIC NAME	S-RANK	G-RANK	COSSARO	COSWEIC	LAST OBSERVED	EXTIRPATED
Cleland's Evening Primrose	Oenothera clelandii	S1	G3G5	NR	NR	21-SEP-1985	Ν
Kansas Hawthorn	Crataegus coccinioides	S2	G4	NR	NR	30-AUG-1980	Ν
Eastern Musk Turtle	Sternotherus odoratus	S3	G5	SC	SC	1969-?	Ν
Snapping Turtle	Chelydra serpentina	S3	G5	SC	SC	1996-?	N
Fall Crabgrass	Digitaria cognata	S1?	G5T5	NR	NR	22-SEP-1971	N
Sundial Lupine	Lupinus perennis	S2S3	G5T4?	NR	NR	29-MAY-1980	N

Field Date	Nature of Investigation	Surveyor(s)
2017		
March 1	Winter Waterfowl Survey	P. Burke
March 7	Site Reconnaissance to complete a preliminary assessment of natural heritage features on the Subject Lands to help scope field studies and natural inventories	N. Boucher R. Lee J. Leslie
March 12	Winter Waterfowl Survey	P. Burke
March 21	General Spring Migration Survey	P. Burke
March 31	General Spring Migration Survey	P. Burke
April 10	General Spring Migration Survey	P. Burke
April 10	First Round Amphibian Call Survey	E. Lee L. Williamson
April 11	Amphibian Egg Mass Survey	R. Lee L. Williamson
April 17	<ul><li>Snake Transect Survey</li><li>Turtle Basking Survey</li></ul>	R. Lee L. Williamson
April 21	<ul><li>General Spring Migration Survey</li><li>Spring Shorebird Survey</li></ul>	P. Burke
April 28	<ul><li>Snake Transect Survey</li><li>Turtle Basking Survey</li></ul>	O. Park M. Green
May 2	<ul><li>General Spring Migration Survey</li><li>Spring Shorebird Survey</li></ul>	P. Burke
May 3	<ul><li>Snake Transect Survey</li><li>Turtle Basking Survey</li></ul>	O. Park L. Williamson
May 10	<ul><li>Snake Transect Survey</li><li>Turtle Basking Survey</li></ul>	O. Park L. Williamson
May 12	<ul><li>General Spring Migration Survey</li><li>Spring Shorebird Survey</li></ul>	P. Burke
May 15	<ul><li>Bass and Sunfish Visual Spawning Surveys</li><li>Aquatic Habitat Assessment</li></ul>	N. Boucher O. Park
May 17	Second Round Amphibian Call Survey	R. Lee

# Table 2: Field Studies and Natural Inventories (2017/2018)

Field Date	Nature of Investigation	Surveyor(s)
		M. Green
May 22	General Spring Migration Survey	P. Burke
	Spring Shorebird Survey	B. Charlton
May 24	Spring Shorebird Survey	P. Burke
May 26	First Round Breeding Bird Surveys	P. Burke
	Spring Shorebird Survey	
May 29	General Spring Migration Survey	B. Charlton
	Spring Shorebird Survey	
June 5	Bat Acoustic Monitoring Survey	O. Park
		M. Green
June 7	Turtle Nesting Survey and Nesting Habitat Assessment	O. Park
		L. Williamson
June 8	Preliminary Ecological Land Classification mapping	J. Leslie
June 8	Bass and Sunfish Visual Spawning Surveys	N. Boucher
June 13	Third Round Amphibian Call Survey	S. Lohnes
	Bat Acoustic Monitoring Survey	
June 21	Bat Acoustic Monitoring Survey	O. Park
		M. Green
June 21	Fish Community Surveys in Shale Pond (Backpack Electrofishing and Minney Tenning)	O. Park
		M. Green
June 22	Fish Community Surveys in Shale Pond (Minnow Trapping)	N. Boucher
June 23	Fish Community Surveys in Shale Pond (Minnow Trapping)	N. Boucher
June 28	Third Round Amphibian Call Survey (repeated)	O. Park
		M. Green
June 15	Second Round Breeding Bird Surveys	P. Burke
	Random Area Insect Surveys	
July 4	Third Round Breeding Bird Surveys	P. Burke
	Random Area Insect Surveys	
July 5	Botanical Inventory, Milkweed distribution assessment and Ecological Land Classification mapping refinement	J. Leslie
August 29	Monarch Migration Survey	B. Charlton

### Table 2: Field Studies and Natural Inventories (2017/2018)

Field Date	Nature of Investigation	Surveyor(s)
September 4	Monarch Migration Survey	B. Charlton
September 8	Monarch Migration Survey	B. Charlton
September 15	Monarch Migration Survey	B. Charlton
September 29	Monarch Migration Survey	P. Burke
2018		
January 9	Winter Waterfowl Survey	P. Burke
January 25	Winter Waterfowl Survey	B. Charlton
February 14	Winter Waterfowl Survey	P. Burke

# Table 2: Field Studies and Natural Inventories (2017/2018)

### **Table 3: Bat Acoustic Survey Dates and Conditions**

SURVEYORS	SURVEY	DATE	ТІМЕ		EQUIPMENT	AIR	HUMIDITY	CLOUD	BEAUFORT	PRECIPITATION	Moon
(SURNAME, INITIAL)	ROUND	<b>(</b> 2017)	START	END	USED	TEMP (°C)	(%)	COVER (%)	WIND SPEED		PHASE
Park, O. Green, M.	1	JU 5	21:08	21:57	EMT	16	71	80	1	None	Waxing Gibbous (89%)
Lohnes, S	2	JU 13	20:25	22:30	Petterson	21	73	0	1	None	Waning Gibbous (83%)
Park, O. Williamson, L.	3	JU 26	22:35	23:40	EMT	19	10	70	1	None	Waning Crescent (5%)

# Table 4: Ecological Land Classification (ELC) Community Descriptions

ELC TYPE	COMMUNITY DESCRIPTION	S-RANK / G-RANK
		(11110, 2013)
CULTURAL		
Cultural Mea	adow	
CUM1 Mineral Cultural Meadow	<ul> <li>Typically graminoid dominated but included areas dominated by forbs, or mixed</li> <li>Species composition commonly included Kentucky Bluegrass (<i>Poa pratensis</i>), Tall Fescue (<i>Lolium arundinaceum</i>), Redtop (<i>Agrostis gigantea</i>), Bird's-Foot Trefoil (<i>Lotus corniculatus</i>), Canada Thistle (<i>Cirsium arvense</i>), Wild Carrot (<i>Daucus carota</i>), Tall Goldenrod (S<i>olidago altissima</i>), and Bladder Campion (<i>Silene vulgaris</i>), among others</li> <li>This community consists of a complex of small pockets of Mineral Meadow Marsh (MAM2) and Mineral Cultural Thicket (CUT1)</li> </ul>	Not ranked
Cultural Thi	cket	
CUT1 Mineral Cultural Thicket	<ul> <li>Often composed of young, scattered tree regeneration but included shrub dominated stands</li> <li>Species most commonly represented include: young Manitoba Maple (<i>Acer negundo</i>) and Green Ash (<i>Fraxinus pennsylvanica</i>), with varying abundances of Staghorn Sumac (<i>Rhus typhina</i>), Showy Fly Honeysuckle (<i>Lonicera x bella</i>), and Red-osier Dogwood (<i>Cornus stolonifera</i>)</li> <li>Ground cover commonly consisted of Tall Goldenrod, New England Aster (<i>Symphyotrichum novae-angliae</i>), Bird's-Foot Trefoil, and Kentucky Bluegrass</li> </ul>	Not ranked
Cultural Sav	rannah	
CUS1 Mineral Cultural Savannah	<ul> <li>Mid-age treed communities present along the east edge of the Subject Lands</li> <li>Canopy species consisted of Eastern Cottonwood (<i>Populus deltoides ssp. deltoides</i>) (or a hybrid of this), Hybrid Crack Willow (<i>Salix x fragilis</i>), and Manitoba Maple</li> <li>Understory generally sparse, consisting most commonly of Staghorn Sumac and Manitoba Maple</li> <li>Ground cover consists of Tall Goldenrod, Kentucky Bluegrass, Tufted Vetch (<i>Vicia cracca</i>), Canada Thistle, and New England Aster</li> </ul>	Not ranked
SWAMP		
Thicket Swa	mp	
SWT2 Mineral Thicket Swamp	<ul> <li>Small (0.01 ha) thicket swamp inclusion with standing water in both June and July, depths ≤30 cm</li> <li>This was a sparsely vegetated thicket swamp, with shrub species composed of Red-osier Dogwood and associations of Cranberry Viburnum (<i>Viburnum opulus ssp. opulus</i>) and European Buckthorn (<i>Rhamnus cathartica</i>)</li> <li>Herbaceous cover was also sparse (&lt;10%), consisting of Purple Loosestrife and Bittersweet Nightshade (<i>Solanum dulcamara</i>)</li> </ul>	Not ranked



ELC TYPE	COMMUNITY DESCRIPTION	S-RANK / G-RANK (NHIC, 2013)
MARSH		
Meadow Ma	rsh	
MAM2 Mineral Meadow Marsh	<ul> <li>Typically, small inclusions within the Cultural Meadow community, the sizes of which ranged from 50 m² to 0.1 ha</li> <li>These communities most commonly dominated by European Reed (<i>Phragmites australis ssp. australis</i>). Associate species included Purple Loosestrife (<i>Lythrum salicaria</i>), White Panicled Aster (<i>Symphyotrichum lanceolatum</i>), Fox Sedge (<i>Carex vulpinoidea</i>), Red-stemmed Spikerush (Eleocharis erythropoda), and Dudley's Rush (<i>Juncus dudleyi</i>)</li> <li>Surface water was often observed in these communities in June (depth ≤15 cm) but most were completely dry in July</li> </ul>	Not ranked
Shallow Ma	rsh	
MAS2-1 Cattail Mineral Shallow Marsh	<ul> <li>Observed around perimeter of Open Aquatic SWM pond</li> <li>Broad-Leaved Cattail (<i>Typha latifolia</i>) was the dominant species, with associations of Broad-leaved Arrowhead (<i>Sagittaria latifolia</i>), Small Duckweed (<i>Lemna minor</i>), and Soft-stemmed Bulrush (<i>Schoenoplectus tabernaemontani</i>)</li> </ul>	S5

COMMON NAME	SCIENTIFIC NAME	SPECIES ORDER	SPECIES FAMILY	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS (S-RANK)	GLOBAL STATUS (G-RANK)	COSSARO (MNRF)	COSEWIC (FEDERAL)	LOCAL STATUS PEEL (VARGA 2005)
Eastern Red Cedar	Juniperus virginiana var. virginiana	CONIFERS (GYMNOSPERMS)	CYPRESS (CUPRESSACEAE)	4	3		S5	G5T			R5
Balsam Fir	Abies balsamea	CONIFERS (GYMNOSPERMS)	PINE (PINACEAE)	5	-3		S5	G5			х
Austrian Pine	Pinus nigra	CONIFERS (GYMNOSPERMS)	PINE (PINACEAE)		-5	-1	SNA	GNR			
Common Yarrow	Achillea millefolium	DICOTS (DICOTYLENDONS)	ASTER (ASTERACEAE)		3	-1	SNA	G5			х
Common Burdock	Arctium minus	DICOTS (DICOTYLENDONS)	ASTER (ASTERACEAE)		5	-2	SNA	G?T?			х
Nodding Thistle	Carduus nutans ssp. nutans	DICOTS (DICOTYLENDONS)	ASTER (ASTERACEAE)		5	-1	SNA	G?T?			х
Wild Chicory	Cichorium intybus	DICOTS (DICOTYLENDONS)	ASTER (ASTERACEAE)		5	-1	SNA	GNR			х
Canada Thistle	Cirsium arvense	DICOTS (DICOTYLENDONS)	ASTER (ASTERACEAE)		3	-1	SNA	GNR			х
Bull Thistle	Cirsium vulgare	DICOTS (DICOTYLENDONS)	ASTER (ASTERACEAE)		4	-1	SNA	G5			х
Rough Fleabane	Erigeron strigosus	DICOTS (DICOTYLENDONS)	ASTER (ASTERACEAE)		1		S5	G5			х
Oxeye Daisy	Leucanthemum vulgare	DICOTS (DICOTYLENDONS)	ASTER (ASTERACEAE)		5	-1	SNA	GNR			х
Meadow Hawkweed	Pilosella caespitosa	DICOTS (DICOTYLENDONS)	ASTER (ASTERACEAE)		5	-2	SNA	GNR			х
Tall Goldenrod	Solidago altissima var. altissima	DICOTS (DICOTYLENDONS)	ASTER (ASTERACEAE)	1	3		S5	GNR			х
Early Goldenrod	Solidago juncea	DICOTS (DICOTYLENDONS)	ASTER (ASTERACEAE)	3	5		S5	G5			U
White Heath Aster	Symphyotrichum ericoides var. ericoides	DICOTS (DICOTYLENDONS)	ASTER (ASTERACEAE)				S5	G5T5			х
White Panicled Aster	Symphyotrichum lanceolatum var. lanceolatum	DICOTS (DICOTYLENDONS)	ASTER (ASTERACEAE)	3	-3		S5	G5T5			х
New England Aster	Symphyotrichum novae-angliae	DICOTS (DICOTYLENDONS)	ASTER (ASTERACEAE)	2	-3		S5	G5			х
Common Dandelion	Taraxacum officinale	DICOTS (DICOTYLENDONS)	ASTER (ASTERACEAE)		3	-2	SNA	G5			х
Yellow Goatsbeard	Tragopogon dubius	DICOTS (DICOTYLENDONS)	ASTER (ASTERACEAE)		5	-1	SNA	GNR			х
Coltsfoot	Tussilago farfara	DICOTS (DICOTYLENDONS)	ASTER (ASTERACEAE)		3	-2	SNA	GNR			х
Creeping Bellflower	Campanula rapunculoides	DICOTS (DICOTYLENDONS)	BELLFLOWER (CAMPANULACEAE)		5	-2	SNA	GNR			х
Common Viper's Bugloss	Echium vulgare	DICOTS (DICOTYLENDONS)	BORAGE (BORAGINACEAE)		5	-2	SNA	GNR			х
European Buckthorn	Rhamnus cathartica	DICOTS (DICOTYLENDONS)	BUCKTHORN (RHAMNACEAE)		3	-3	SNA	GNR			х
Japanese Knotweed	Reynoutria japonica var. japonica	DICOTS (DICOTYLENDONS)	BUCKWHEAT (POLYGONACEAE)		3	-1	SNA	GNR			х
Curled Dock	Rumex crispus	DICOTS (DICOTYLENDONS)	BUCKWHEAT (POLYGONACEAE)		-1	-2	SNA	GNR			х
Common Buttercup	Ranunculus acris	DICOTS (DICOTYLENDONS)	BUTTERCUP (RANUNCULACEAE)			-2	SNA	G5			х
Wild Carrot	Daucus carota	DICOTS (DICOTYLENDONS)	CARROT (APIACEAE)		5	-2	SNA	GNR			х
Staghorn Sumac	Rhus typhina	DICOTS (DICOTYLENDONS)	CASHEW (ANACARDIACEAE)	1	5		S5	G5			Х
Western Poison Ivy	Toxicodendron radicans var. rydbergii	DICOTS (DICOTYLENDONS)	CASHEW (ANACARDIACEAE)				S5	G5			х

COMMON NAME	SCIENTIFIC NAME	SPECIES ORDER	SPECIES FAMILY	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS (S-RANK)	GLOBAL STATUS (G-RANK)	COSSARO (MNRF)	COSEWIC (FEDERAL)	LOCAL STATUS PEEL (VARGA 2005)
Pale Dogwood	Cornus obliqua	DICOTS (DICOTYLENDONS)	DOGWOOD (CORNACEAE)	5	-4		S5	G5T?			R5
Red-Osier Dogwood	Cornus stolonifera	DICOTS (DICOTYLENDONS)	DOGWOOD (CORNACEAE)	2	-3		S5	G5			х
Siberian Elm	Ulmus pumila	DICOTS (DICOTYLENDONS)	ELM (ULMACEAE)		5	-1	SNA	GNR			х
Common Mullein	Verbascum thapsus ssp. thapsus	DICOTS (DICOTYLENDONS)	FIGWORT (SCROPHULARIACEAE )		5	-2	SNA	GNR			х
Herb-Robert	Geranium robertianum	DICOTS (DICOTYLENDONS)	GERANIUM (GERANIACEAE)		5	-2	S5	G5			х
Thicket Creeper	Parthenocissus vitacea	DICOTS (DICOTYLENDONS)	GRAPE (VITACEAE)	3	3		S5	G5			х
Riverbank Grape	Vitis riparia	DICOTS (DICOTYLENDONS)	GRAPE (VITACEAE)		-2		S5	G5			х
Showy Fly Honeysuckle	Lonicera x bella	DICOTS (DICOTYLENDONS)	HONEYSUCKLE (CAPRIFOLIACEAE)		5	-3	HYB	GNR			х
Garden Bird's-Foot Trefoil	Lotus corniculatus	DICOTS (DICOTYLENDONS)	LEGUME (FABACEAE)		1	-2	SNA	GNR			х
Black Medick	Medicago lupulina	DICOTS (DICOTYLENDONS)	LEGUME (FABACEAE)		1	-1	SNA	GNR			х
Yellow Sweet-Clover	Melilotus officinalis	DICOTS (DICOTYLENDONS)	LEGUME (FABACEAE)		3	-1	SNA	GNR			х
Purple Crown-Vetch	Securigera varia	DICOTS (DICOTYLENDONS)	LEGUME (FABACEAE)		5	-2	SNA	GNR			х
Alsike Clover	Trifolium hybridum	DICOTS (DICOTYLENDONS)	LEGUME (FABACEAE)		1	-1	SNA	GNR			х
Red Clover	Trifolium pratense	DICOTS (DICOTYLENDONS)	LEGUME (FABACEAE)		2	-2	SNA	GNR			х
Tufted Vetch	Vicia cracca	DICOTS (DICOTYLENDONS)	LEGUME (FABACEAE)		5	-1	SNA	GNR			х
Purple Loosestrife	Lythrum salicaria	DICOTS (DICOTYLENDONS)	LOOSESTRIFE (LYTHRACEAE)		-5	-3	SNA	G5			х
Manitoba Maple	Acer negundo	DICOTS (DICOTYLENDONS)	(APPLE (SAPINDACEAE)		-2		S5	G5			х
Norway Maple	Acer platanoides	DICOTS (DICOTYLENDONS)	MAPLE (SAPINDACEAE)		5	-3	SNA	GNR			х
Silver Maple	Acer saccharinum	DICOTS (DICOTYLENDONS)	(SAPINDACEAE)	5	-3		S5	G5			х
Freeman's Maple	Acer x freemanii	DICOTS	(SAPINDACEAE)				НҮВ	GNA			XSR
Common Milkweed	Asclepias syriaca	DICOTS			5		S5	G5			х
European Swallowwort	Cynanchum rossicum	DICOTS (DICOTYLENDONS)					SNA	GNR			х
Ground-Ivy	Glechoma hederacea	DICOTS (DICOTYLENDONS)	MINT (LAMIACEAE)		5	-2	SNA	GNR			х
American Water-Horehound	Lycopus americanus	DICOTS (DICOTYLENDONS)	MINT (LAMIACEAE)	4	-5		S5	G5			х
Northern Water-Horehound	Lycopus uniflorus	DICOTS (DICOTYLENDONS)	MINT (LAMIACEAE)	5	-5		S5	G5			х
Catnip	Nepeta cataria	DICOTS (DICOTYLENDONS)	MINT (LAMIACEAE)		1	-2	SNA	GNR			х
Cranberry Viburnum	Viburnum opulus ssp. opulus	DICOTS (DICOTYLENDONS)	MOSCHATEL (ADOXACEAE)			-1	SNA	G5			х
Garlic Mustard	Alliaria petiolata	DICOTS (DICOTYLENDONS)	MUSTARD (BRASSICAEAE)			-3	SNA	GNR			х
Bitter Wintercress	Barbarea vulgaris	DICOTS (DICOTYLENDONS)	MUSTARD (BRASSICAEAE)			-1	SNA	GNR			х

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Dame's Rocket	Hesperis matronalis	DICOTS (DICOTYLENDONS)	MUSTARD (BRASSICAEAE)		5	-3	SNA	G4G5			х
Field Peppergrass	Lepidium campestre	DICOTS (DICOTYLENDONS)	MUSTARD (BRASSICAEAE)		5	-1	SNA	GNR			х
Bittersweet Nightshade	Solanum dulcamara	DICOTS (DICOTYLENDONS)				-2	SNA	GNR			х
Russian Olive	Elaeagnus angustifolia				4	-1	SNA	GNR			х
Red Ash	Fraxinus pennsylvanica	DICOTS	OLIVE (OLEACEAE)	3	-3		S4	G5			х
Common Mouse-Ear Chickweed	Cerastium fontanum ssp. vulgare	DICOTS			3	-1	SNA	GNR			х
Deptford Pink	Dianthus armeria ssp. armeria	DICOTS			5	-1	SNA	GNR			х
Bladder Campion	Silene vulgaris	DICOTS (DICOTYLENDONS)	PINK (CARYOPHYLLACEAE)		5	-1	SNA	GNR			х
Butter-And-Eggs	Linaria vulgaris	DICOTS (DICOTYLENDONS)	PLANTAIN (PLANTAGINACEAE)		5	-1	SNA	GNR			х
English Plantain	Plantago lanceolata	DICOTS (DICOTYLENDONS)	PLANTAIN (PLANTAGINACEAE)			-1	SNA	G5			х
Common Plantain	Plantago major	DICOTS (DICOTYLENDONS)	PLANTAIN (PLANTAGINACEAE)		-1	-1	SNA	G5			х
Rugel's Plantain	Plantago rugelii	DICOTS (DICOTYLENDONS)	PLANTAIN (PLANTAGINACEAE)	1			S5	G5			х
Woodland Strawberry	Fragaria vesca	DICOTS (DICOTYLENDONS)	ROSE (ROSACEAE)	4	4		S5	G5			х
Yellow Avens	Geum aleppicum	DICOTS (DICOTYLENDONS)	ROSE (ROSACEAE)	2	-1		S5	G5			х
White Avens	Geum canadense	DICOTS (DICOTYLENDONS)	ROSE (ROSACEAE)	3			S5	G5			х
Siberian Crabapple	Malus baccata	DICOTS (DICOTYLENDONS)	ROSE (ROSACEAE)				SNA	GNR			х
Eastern Ninebark	Physocarpus opulifolius	DICOTS (DICOTYLENDONS)	ROSE (ROSACEAE)	5	-2		S5	G5			R1
Sulphur Cinquefoil	Potentilla recta	DICOTS (DICOTYLENDONS)	ROSE (ROSACEAE)		5	-2	SNA	GNR			х
Chokecherry	Prunus virginiana var. virginiana	DICOTS (DICOTYLENDONS)	ROSE (ROSACEAE)	2	1		S5	G5T?			х
Smooth Rose	Rosa blanda	DICOTS (DICOTYLENDONS)	ROSE (ROSACEAE)	3	3		S5	G5			х
Multiflora Rose	Rosa multiflora	DICOTS (DICOTYLENDONS)	ROSE (ROSACEAE)		3	-3	SNA	GNR			х
North American Red Raspberry	Rubus idaeus ssp. strigosus	DICOTS (DICOTYLENDONS)	ROSE (ROSACEAE)		-2		S5	G5T5			х
European Mountain-Ash	Sorbus aucuparia	DICOTS (DICOTYLENDONS)	ROSE (ROSACEAE)		5	-2	SNA	G5			х
Common St. John's-Wort	Hypericum perforatum ssp. perforatum	DICOTS (DICOTYLENDONS)	ST. JOHN'S-WORT (HYPERICACEAE)		5	-3	SNA	GNR			х
Fuller's Teasel	Dipsacus fullonum	DICOTS (DICOTYLENDONS)	TEASEL (DIPSACACEAE)		5	-1	SNA	GNR			х
Tree-Of-Heaven	Ailanthus altissima	DICOTS (DICOTYLENDONS)	TREE-OF-HEAVEN (SIMAROUBACEAE)		5	-1	SNA	GNR			х
Black Walnut	Juglans nigra	DICOTS (DICOTYLENDONS)	WALNUT (JUGLANDACEAE)	5	3		S4?	G5			х
White Poplar	Populus alba	DICOTS (DICOTYLENDONS)	WILLOW (SALICACEAE)		5	-3	SNA	G5			х
Eastern Cottonwood	Populus deltoides ssp. deltoides	DICOTS (DICOTYLENDONS)	(SALICACEAE)	4	-1		S5	G5T5			Х

COMMON NAME	SCIENTIFIC NAME	SPECIES ORDER	SPECIES FAMILY	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS (S-RANK)	GLOBAL STATUS (G-RANK)	COSSARO (MNRF)	COSEWIC (FEDERAL)	LOCAL STATUS PEEL (VARGA 2005)
Trembling Aspen	Populus tremuloides	DICOTS (DICOTYLENDONS)	WILLOW (SALICACEAE)				S5	G5			х
White Willow	Salix alba	DICOTS (DICOTYLENDONS)				-2	SNA	G5			х
Peach-Leaved Willow	Salix amygdaloides		WILLOW	6	-3		S5	G5			R6
Pussy Willow	Salix discolor	DICOTS	WILLOW	3	-3		S5	G5			х
Cottony Willow	Salix eriocephala	(DICOTYLENDONS) DICOTS	(SALICACEAE) WILLOW	4	-3		85	G5			×
Sandbar Willow	Salix interior	(DICOTYLENDONS) DICOTS	(SALICACEAE) WILLOW	3	-5		S5	65			R5
Maadaw Willow	Salix Interior	(DICOTYLENDONS) DICOTS	(SALICACEAE) WILLOW	3	4		00	60			×
	Salix petiolaris	(DICOTYLENDONS) DICOTS	(SALICACEAE) WILLOW	3	-4		55	G4			~
Hybrid Crack Willow	Salix x fragilis	(DICOTYLENDONS)	(SALICACEAE)		-1	-3	HYB	GNR			XSR
Small Duckweed	Lemna minor	(MONOCOTYLEDONS)	ARUM (ARACEAE)	2	-5		S5	G5			Х
Broad-Fruited Burreed	Sparganium eurycarpum	(MONOCOTS (MONOCOTYLEDONS)	(TYPHACEAE)	3	-5		S5	G5			R6
Narrow-Leaved Cattail	Typha angustifolia	MONOCOTS (MONOCOTYLEDONS)	CATTAIL (TYPHACEAE)	3	-5		SNA	G5			х
Broad-Leaved Cattail	Typha latifolia	MONOCOTS (MONOCOTYLEDONS)	CATTAIL (TYPHACEAE)	3	-5		S5	G5			х
Redtop	Agrostis gigantea	MONOCOTS (MONOCOTYLEDONS)	GRASS (POACEAE)			-2	SNA	G4G5			х
Smooth Brome	Bromus inermis	MONOCOTS (MONOCOTYLEDONS)	GRASS (POACEAE)		5	-3	SNA	G4G5T?			х
Rye Brome	Bromus secalinus	MONOCOTS (MONOCOTYLEDONS)	GRASS (POACEAE)		5	-1	SNA				х
Orchard Grass	Dactylis glomerata	MONOCOTS (MONOCOTYLEDONS)	GRASS (POACEAE)		3	-1	SNA	GNR			х
Foxtail Barley	Hordeum jubatum ssp. jubatum	MONOCOTS (MONOCOTYLEDONS)	GRASS (POACEAE)		-1		S5?	G5T5			х
Rice Cutgrass	Leersia oryzoides	MONOCOTS (MONOCOTYLEDONS)	GRASS (POACEAE)	3	-5		S5	G5			х
Tall Fescue	Lolium arundinaceum	MONOCOTS (MONOCOTYLEDONS)	GRASS (POACEAE)		2	-1	SNA	GNR			х
Reed Canary Grass	Phalaris arundinacea var. arundinacea	MONOCOTS (MONOCOTYLEDONS)	GRASS (POACEAE)		-4		S5	G5TNR			х
Common Timothy	Phleum pratense ssp. pratense	MONOCOTS (MONOCOTYLEDONS)	GRASS (POACEAE)		3	-1	SNA	GNR			х
European Reed	Phragmites australis ssp. australis	MONOCOTS (MONOCOTYLEDONS)	GRASS (POACEAE)				SNA	G5T5			х
Canada Bluegrass	Poa compressa	MONOCOTS (MONOCOTYLEDONS)	GRASS (POACEAE)		2		SNA	GNR			х
Fowl Bluegrass	Poa palustris	MONOCOTS (MONOCOTYLEDONS)	GRASS (POACEAE)	5	-4		S5	G5			х
Kentucky Bluegrass	Poa pratensis ssp. pratensis	MONOCOTS (MONOCOTYLEDONS)	GRASS (POACEAE)		1		SNA	G5T5			х
Jointed Rush	Juncus articulatus	MONOCOTS (MONOCOTYLEDONS)	RUSH (JUNCACEAE)	5	-5		S5	G5			х
Dudley's Rush	Juncus dudleyi	MONOCOTS (MONOCOTYLEDONS)	RUSH (JUNCACEAE)	1			S5	G5			х
Soft Rush	Juncus effusus ssp. solutus	MONOCOTS (MONOCOTYLEDONS)	RUSH (JUNCACEAE)	4	-5		S5?	G5T5			х
Blackgrass Rush	Juncus gerardii ssp. gerardii	MONOCOTS (MONOCOTYLEDONS)	RUSH (JUNCACEAE)		-5	-1	SNA	G5			

COMMON NAME	SCIENTIFIC NAME	SPECIES ORDER	SPECIES FAMILY	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS (S-RANK)	GLOBAL STATUS (G-RANK)	COSSARO (MNRF)	COSEWIC (FEDERAL)	LOCAL STATUS PEEL (VARGA 2005)
Bebb's Sedge	Carex bebbii	MONOCOTS (MONOCOTYLEDONS)	SEDGE (CYPERACEAE)	3	-5		S5	G5			Х
Crested Sedge	Carex cristatella	MONOCOTS (MONOCOTYLEDONS)	SEDGE (CYPERACEAE)	3	-4		S5	G5			х
Pointed Broom Sedge	Carex scoparia	MONOCOTS (MONOCOTYLEDONS)	SEDGE (CYPERACEAE)	5	-3		S5	G5			R5
Spiked Sedge	Carex spicata	MONOCOTS (MONOCOTYLEDONS)	SEDGE (CYPERACEAE)		5	-1	SNA	GNR			х
Tender Sedge	Carex tenera	MONOCOTS (MONOCOTYLEDONS)	SEDGE (CYPERACEAE)	4	-1		S5	G5			х
Fox Sedge	Carex vulpinoidea	MONOCOTS (MONOCOTYLEDONS)	SEDGE (CYPERACEAE)	3	-5		S5	G5			х
Red-Stemmed Spikerush	Eleocharis erythropoda	MONOCOTS (MONOCOTYLEDONS)	SEDGE (CYPERACEAE)	4	-5		S5	G5			х
Blunt Spikerush	Eleocharis obtusa	MONOCOTS (MONOCOTYLEDONS)	SEDGE (CYPERACEAE)	5	-5		S5	G5			U
Common Three-Square Bulrush	Schoenoplectus pungens var. pungens	MONOCOTS (MONOCOTYLEDONS)	SEDGE (CYPERACEAE)				SU	G5T5			
Soft-Stemmed Bulrush	Schoenoplectus tabernaemontani	MONOCOTS (MONOCOTYLEDONS)	SEDGE (CYPERACEAE)	5	-5		S5	G5			х
Strict Blue-Eyed Grass	Sisyrinchium montanum var. montanum	MONOCOTS (MONOCOTYLEDONS)	SEDGE (CYPERACEAE)				S5	G5T4T5			
Southern Water-Plantain	Alisma subcordatum	MONOCOTS (MONOCOTYLEDONS)	WATER-PLANTAIN (ALISMATACEAE)		-5		S4?	G4G5			
Field Horsetail	Equisetum arvense	PTERIDOPHYTES	HORSETAIL (EQUISETACEAE)				S5	G5			х

BOTANY LIST: EXPLANATION OF TERMS		
Botanical and Common Name	From Newmaster and Ragupathy (2012). Species requiring confirmation noted (cf)	
Co-efficient of Conservatism	This value, ranging from 0 (low) to 10 (high), is based on a species tolerance to disturbance and fidelity to a specific habitat	
Wetness Index	This value, ranging from -5 (obligate wetland) to 5 (upland) provides the probability of a species occurring in wetland or upland habitats	
Weediness Index	This value, ranging from -1 (low) to -3 (high) quantifies the potential invasiveness of non-native plants. In combination with the percentage of non-native plants, it can be used as an indicator of disturbance	
Provincial Status	Provincial ranks are used by the NHIC to set protection priorities for rare species and natural communities. These ranks are not legal designations. S4 and S5 species are generally uncommon to common in the province. Species ranked S1-S3 are considered to be rare in Ontario	
Local Status	X:	Native species present (collection-based) and all exotic species
	R:	Native species locally rare (number of sites): Hamilton-Wentworth (<6 sites), Durham (<10 sites), GTA (<40 sites), Site District 6E7 (<20 sites), Oak Ridges Moraine (20 or fewer sites), Halton (<5 sites); Peterborough (suspected of being rare, 5 or fewer occurrences); CVC/Peel Region (<11 sites)
	U:	Native species locally uncommon Hamilton-Wentworth (6-10 sites), Durham (11-20 sites), GTA (41-80 sites), Site District6E7 (21-40 sites), Halton (5-15 sites)
	E:	Presumed Extirpated
	?:	More work required to determine status
	H:	Historic record
	0:	Only old (>20 years) records known (Peterborough)
Record Type	SR: -	Sight record

BOTANY LIST: EXPLANATION OF TERMS		
	SRP	Sight record with photograph
VARGA 2005 Rankings	+	Introduced species
	Х+	Native species that is introduced in that municipality
	(+)	Possibly introduced species or a native species that is introduced in some municipalities
	X	Common native species or an introduced species that is present
	R	Rare native species
	E	Extirpated native species that has not been re-found at its known locations or its habitat is gone
	SR	Species record based on a sight record (all other species records based on herbaria collections)
	LR	Species record based on a literature record
	U	Uncommon native species
	R6	Number of stations for a rare native species
	Н	Historical species not seen since 1950, however its habitat is still present
	<u>x</u>	Species that occur only in the portion of site district 6E7 outside of the Greater Toronto Area
TRCA Rankings	L5	Able to withstand high levels of disturbance; generally secure throughout the jurisdiction, including the urban matrix. May be of very localized concern in highly degraded areas
	L4	Able to withstand some disturbance; generally secure in rural matrix; of concern in urban matrix
	L3	Able to withstand minor disturbance; generally secure in natural matrix; considered to be of regional concern

		BOTANY LIST: EXPLANATION OF TERMS	
TRCA Rankings (Cont'd)	L2	Unable to withstand disturbance; some criteria are very limiting factors; generally occur in high-quality natural areas, in natural matrix; probably rare in the TRCA jurisdiction; of concern regionally	
	L1	Unable to withstand disturbance; many criteria are limiting factors; generally, occur in high-quality natural areas in natural matrix; almost certainly rare in the TRCA jurisdiction; of concern regionally	
	LX	Extirpated from our region with remote chance of rediscovery. Presumably highly sensitive	
	LH	Hybrid between two native species. Usually not scored unless highly stable and behaves like a species (e.g. <i>Equisetum x nelsonii</i> )	
	L+	Exotic. Not native to TRCA jurisdiction. Includes hybrids between a native species and an exotic	
	L+?	Origin uncertain or disputed, i.e., may or may not be native	
	pL	Found in natural cover, but only as planted, not regenerating	
Status in Region of	* Signific	cant but with the expectation that additional research may prove otherwise	
Waterloo	+ Significant only if demonstrably indigenous - most populations in Region of Waterloo are thought to be of non-indigenous origin		
	# Significant but known Region of Waterloo reports are treated as hypothetical		
	The sensitivity of natural areas can be assessed through application of the Weediness Index. The Weediness Index quantifies the potential invasiveness of non-native plants, and, in combination with the percentage of non-native plants can be used as an indicator of disturbance. Values (ranging from -1 to -3) have been assigned to most non-native species based on the potential impact each species can have in natural areas:		
	-1: little o	or no impact on natural areas (most non-native plants are in this category)	
	-2: occas	sional impacts on natural areas, generally infrequent or localized	
	-3: majoi	r potential impacts on natural areas	

BOTANY LIST: EXPLANATION OF TERMS		
Status in Regional Municipality of Niagara (Oldham 2010)	R:	Rare, 10 or fewer post 1980 records
	RH:	Rare Historic, no records post 1980
	U:	Uncommon, 11-20 post 1980 records
	C:	Common, more than 20 post 1980 records
	DD:	Data deficient, further work needed to determine status
	I:	Introduced
	hyb:	Hybrid, no Niagara status assigned
Status in County Haldimand-Norfolk	R	Rare, 1-5 sites, number of sites indicated
	VU	Very Uncommon, 6-8 sites
	U	Uncommon, 9-15 sites
	С	Common, more than 15 sites
	I	Introduced, not native
	Х	Present in Haldimand-Norfolk, no status assigned
	?	Status uncertain
Status in	R1	1-3 sites
Wellington County (Frank and	R2	4-6 sites
Anderson 2009)	R3	7-10 sites
	FACW	(Facultative Wetland): usually occurs in wetlands, but occasionally found in non-wetlands (estimated 67-99% probability)
	FAC	(Facultative): equally likely to occur in wetlands or non-wetlands (estimated 34-66% probability)
	FACU	(Facultative Upland): occasionally occurs in wetlands, but usually occurs in non-wetlands (estimated 1-33% probability)
	UPL	(Upland): occurs almost never in wetlands under natural conditions (estimated <1% probability)

		BOTANY LIST: EXPLANATION OF TERMS	
Status in Wellington County (Cont'd)		Further refinement of the Facultative categories is denoted by a "+" or "-" to express exaggerated tendencies for those species. The "+" denotes a greater estimated probability occurring in wetlands than species in the general indicator category, but a lesser probability than species occurring in the next higher category. The "-" denotes a lesser estimated probability of occurring in wetlands than species in the general indicator category, but a greater probability than species occurring in the next lower general category.	
		Each wetland category has been assigned a numerical value to facilitate the quantification of the wetness index. The wetland categories and their corresponding values are as follows:	
		OBL: -5	
		FACW+: -4	
		FACW: -3	
		FACW-: -2	
		FAC+: -1	
		FAC: 0	
		FAC-: 1	
		FACU+: 2	
		FACU: 3	
		FACU-: 4	
		UPL: 5	
Provincial Status	Provincial ranks are used by the NHIC to set protection priorities for rare species and natural communities. These rankings are based on the total number of extant Ontario populations and the degree to which they are potentially or actively threatened with destruction. The ranks are as follows:		
	S1	<b>Critically Imperiled</b> 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.	

		BOTANY LIST: EXPLANATION OF TERMS
Provincial Status (Cont'd)	S2	<b>Imperiled</b> - 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.
	<b>S</b> 3	<b>Vulnerable -</b> 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
	S4	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
	SH	<b>Possibly Extirpated (Historical) -</b> 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.
	SR	Reported in Ontario, but without persuasive documentation.
	SX	<b>Presumed Extirpated</b> - 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.
	SE	Exotic; not believed to be a native component of Ontario's flora. Numerical rankings after SE follow designations described above
	SNA	Status not assigned.
	SU	Nation or state/province conservation status not yet assessed.
	Rank ran	ges (e.g., S2S3) indicate that the rank is either S2 or S3, but that current information is insufficient to differentiate.
	"?" follov	ving a rank indicates uncertainty about the assigned rank.

		BOTANY LIST: EXPLANATION OF TERMS
	Q	<b>Questionable Taxonomy</b> - Taxonomic distinctiveness of this entity is questionable; resolution of this uncertainty may result in change from a species to a subspecies or hybrid, or the inclusion of this taxon in another taxon, with the resulting taxon having a lower-priority conservation status
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	Frank. R., Anderson A. 2009. The Flora of Wellington County. Wellington County Historical Society. Fergus, Ontario. 145 pp.										
COMMON NAME	SCIENTIFIC NAME	SPECIES GROUPS	PROVINCIAL STATUS (S RANK)	GLOBAL STATUS (G RANK)	COSSARO (MNRF)	COSEWIC (FEDERAL)	LOCAL STATUS (HALTON)	LOCAL STATUS (HAMILTON)	LOCAL STATUS (TRCA)	REGIONAL STATUS (REGION OF WATERLOO)	LOCAL STATUS (CVC)
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Slender Spreadwing	Lestes rectangularis	ODONATA	S5	G5							
Spotted Spreadwing	Lestes congener	ODONATA	S5	G5			HU				
Lyre-tipped Spreadwing	Lestes unguiculatus	ODONATA	S5	G5			HU				
Familiar Bluet	Enallagma civile	ODONATA	55	G5							
Eastern Forktall	Ischnura verticalis	ODONATA	55	G5 G5		-					
Blue Dasher	Pachydinlay longinennis	ODONATA		G5							
Twelve-Spotted Skimmer	Libellula pulchella	ODONATA	S5	G5							
European Skipper	Thymelicus lineola	BUTTERFLIE	SNA	G5							
		S	011/1	00							
Cabbage White	Pieris rapae	S	SNA	G5							
Overetien Mark	Pak sanja interne nationia	BUTTERFLIE	CF.	05							
Question Mark	Polygonia interrogationis	S	- 35	65							
Common Ringlet	Coenonympha tullia	BUTTERFLIE	S5	G5							
	L.	Ŭ									
Diagon Crowfish	Falliaamhanua fadiana	NON-INSECT	64	C.F.					1.2		
Digger Craylish	Failicambarus iodiens	ANTHROPOD	54	65					LZ		
			-		1			-			1
American Toad	Anaxyrus americanus	AMPHIBIAN	S5	G5					L4	X	
Northern Green Frog	Lithobates clamitans	AMPHIBIAN	S5	G5		NAD			L4	X	
Northern Leopard Frog	Litnobates pipiens	AMPHIBIAN	55	65		NAR			L3	X	
Eastern Gartersnake	Thamnophis sirtalis	REPTIL F	S5	G5					L4		
Midland Painted Turtle	Chrvsemvs picta marginata	REPTILE	S5	G5T5							
Brant	Branta bernicla	BIRD	S4N	G5							
Canada Goose	Branta canadensis	BIRD	S5	G5					L5		
Mute Swan	Cygnus olor	BIRD	SNA	G5							
Trumpeter Swan	Cygnus buccinator	BIRD	S4	G4							
Tundra Swan	Cygnus columbianus	BIRD	S4	G5							
Wood Duck	Aix sponsa	BIRD	S5	G5			m		L4	X	
American Black Duck	Anas strepera	BIRD	54	G5 G5			ΠU		L4	^	
Mallard	Anas platyrhynchos	BIRD	55 55	G5					L5		
Blue-winged Teal	Anas discors	BIRD	S4	G5				HU			
Green-winged Teal	Anas crecca	BIRD	SNA	G5							
Ring-necked Duck	Aythya collaris	BIRD	S4	G5							
Greater Scaup	Aythya marila	BIRD	S4	G5							
Lesser Scaup	Aythya affinis	BIRD	S4	G5							
White-winged Scoter	Melanitta fusca	BIRD	S4B,S4N	G5							
Black Scoter	Melanitta americana	BIRD	54D,54IN \$3B	G5							
Bufflehead	Bucephala albeola	BIRD	53D S4	G5							
Common Goldeneve	Bucephala clangula	BIRD	S5	G5							
Hooded Merganser	Lophodytes cucullatus	BIRD	S5B,S5N	G5			HU	HU	L3	Х	
Common Merganser	Mergus merganser	BIRD	S5B,S5N	G5					L3		
Red-breasted Merganser	Mergus serrator	BIRD	S4B,S5N	G5			HU				
Ruddy Duck	Oxyura jamaicensis	BIRD	S4B,S4N	G5							
Rock Pigeon	Columba livia	BIRD	SNA	G5					1.5		
Chimney Cwift	Chaotura polosias	BIRD	SO CAD CAN	G5	TUD	TUD			LS		
Virginia Rail	Rallus limicola	BIRD	S4B, 34N	G5	IIIN	IIIN	HU		13	x	
Killdeer	Charadrius vociferus	BIRD	S5B, S5N	G5					L0 L4	~	
American Woodcock	Scolopax minor	BIRD	S4B	G5					L3		
Whimbrel	Numenius phaeopus	BIRD	S3B, S4N	G5							
Dunlin	Calidris alpina	BIRD	S4B, S5N	G5							
White-rumped Sandpiper	Calidris fuscicollis	BIRD	S5N	G5							
Solitary Sandpiper	Actitus macularius	BIRD	S5	G5							
Spotted Sandpiper	Actitus macularius	BIRD	55	G5					1.4		
Ring-billed Gull	Larus argentatus	BIRD	55B,54N	G5 G5		-			L4		
Bonaparte's Gull	Chroicocephalus nhiladelnhia	BIRD	S4B.S4N	G5					L.7		
Iceland Gull	Larus glaucoides	BIRD	S4N	G5							
Great Black-backed Gull	Larus marinus	BIRD	S2B	G5				EXT	LX		
Caspian Tern	Hydroprogne caspia	BIRD	S3B	G5					L3		
Common Tern	Sterna hirundo	BIRD	S4B	G5					L3		
Common Loon	Gavia immer	BIRD	S5B,S5N	G5						Х	
Pied-billed Grebe	Podilymbus podiceps	BIRD	S4B,S4N	G5	00	0.0	HU	HU	L3	Х	
Horned Grebe	Podiceps auritus	BIRD	S1B, S4N	G5	SC	SC			1.0		
Western/Clark's Grebe	Aechmonhorus occidentalis	BIRD	33D,34N	G5			ΠU		LJ		
Double-crested Cormorant	Phalacrocorax auritus	BIRD	S5B	G5					L2		
Black-crowned Night-Heron	Nycticorax nycticorax	BIRD	S3B,S3N	G5			HU		L3	Х	l
Black-bellied Plover	Pluvialis squatarola	BIRD	S4N	G5							
Great Blue Heron	Ardea herodias	BIRD	S4	G5				m	L3	Х	
Great Egret	Ardea alba	BIRD	S2B	G5					L3		
Cooper's Hawk	Accipiter cooperii	BIRD	S4	G5			HU		L4	Х	
Red-tailed Hawk	Buteo jamaicensis	BIRD	S5	G5					L5	V	
Delled Kinglisher	weyaceryle alcyon Picoides pubescens	BIRD	54B 95	G5 G5					L4	X	
Hairy Woodpecker	Picoides villosus	BIRD	S5	G5					L3	х	
Northern Flicker	Colaptes auratus	BIRD	S4B	G5					 L4		1
American Kestrel	Falco sparverius	BIRD	S4	G5				m	L4		
Peregrine Falcon	Falco peregrinus	BIRD	S3B	G4	SC	SC			14		I

COMMON NAME	SCIENTIFIC NAME	SPECIES	PROVINCIAL STATUS	GLOBAL STATUS	COSSARO	COSEWIC	LOCAL STATUS	LOCAL STATUS	LOCAL STATUS	REGIONAL STATUS	LOCAL STATUS
		GROUPS	(SRANK)	(G RANK)	(MNRF)	(FEDERAL)	(HALTON)	(HAMILTON)	(TRCA)	(REGION OF WATERLOO)	(CVC)
Eastern Wood-Pewee	Contopus virens	BIRD	S4B	G5	SC	SC			L4		
Willow Flycatcher	Empidonax traillii	BIRD	S5B	G5			HU		L4	Х	
Least Flycatcher	Empidonax minimus	BIRD	S4B	G5			HU		L3	Х	
Great Crested Flycatcher	Myiarchus crinitus	BIRD	S4B	G5		-			L4		
Eastern Kingbird	Sayornis proebe	BIRD	S2B S4B	G5 G5		ł			L5		
Northern Shrike	Lanius excubitor	BIRD	SNA	G5					L4		
Warbling Vireo	Vireo ailvus	BIRD	S5B	G5					L5	х	
Red-eyed Vireo	Vireo olivaceus	BIRD	S5B	G5					L4		
Blue-headed Vireo	Vireo solitarius	BIRD	S5B	G5			HU	HU	L3	Х	
Philadelphia Vireo	Vireo philadelphicus	BIRD	S5B	G5							
Blue Jay	Cyanocitta cristata	BIRD	S5	G5					L5		
American Crow	Corvus brachyrhynchos	BIRD	S5B	G5					L5		
Fish Crow	Corvus ossifragus	BIRD	SNA	G5		-					
Purple Martin	Progne subis	BIRD	S4B	G5			HU	m	L4	X	
Northern Rough-winged Swallow	Stelaidonterux serrinennis	BIRD	54B	G5			HU		L4 14		
Bank Swallow	Riparia riparia	BIRD	S4B	G5	THR	THR	110		L4 L3		
Barn Swallow	Hirundo rustica	BIRD	S4B	G5	THR	THR			L4		
Cliff Swallow	Petrochelidon pyrrhonota	BIRD	S4B	G5					L5		
Black-capped Chickadee	Poecile atricapillus	BIRD	S5	G5					L5		
Red-breasted Nuthatch	Sitta canadensis	BIRD	S5	G5			HU		L4	х	
White-breasted Nuthatch	Sitta carolinensis	BIRD	S5	G5					L4		
Brown Creeper	Certhia americana	BIRD	S5B	G5		1	HU	m	L3	х	
House Wren	Troglodytes aedon	BIRD	S5B	G5				L	L5	~	
Iviaish Wren Blue-gray Gratestabor	Disiotnorus paiustris	BIRD	54B 94D	G5			HU	m	L2	×	
Golden-crowned Kinglet	Regulus satrapa	BIRD	S5B	G5		<u> </u>	HR	н	13	x	
Ruby-crowned Kinglet	Regulus calendula	BIRD	S4B	G5		-	1110		20	X	
Swainson's Thrush	Catharus ustulatus	BIRD	S4B	G5						X	
American Robin	Turdus migratorius	BIRD	S5B	G5					L5		
Gray Catbird	Dumetella carolinensis	BIRD	S4B	G5					L4		
Brown Thrasher	Toxostoma rufum	BIRD	S4B	G5					L3	х	
Northern Mockingbird	Mimus polyglottos	BIRD	S4	G5			HU		L5	Х	
European Starling	Sturnus vulgaris	BIRD	SNA	G5		-		-	L+		
Cedar Waxwing	Bombycilla cedrorum	BIRD	S5B	G5					L5		
House Sparrow	Passer domesticus	BIRD	SNA	G5 G5		ł			L+		
American Goldfinch	Spinus tristis	BIRD	S5B	G5					15		
Ovenbird	Seiurus aurocapilla	BIRD	S4B	G5					12	x	
Tennessee Warbler	Oreothlypis peregrina	BIRD	S5B	G5							
Nashville Warbler	Oreothlypis ruficapilla	BIRD	S5B	G5			HR	m	L3	Х	
Mourning Warbler	Geothlypis philadelphia	BIRD	S4B	G5			HU	m	L3	Х	
Hooded Warbler	Setophaga citrina	BIRD	S4B	G5	NAR	NAR	HR	н	L2	х	
Northern Parula	Setophaga americana	BIRD	S4B	G5					L2		
Magnolia Warbler	Setophaga magnolia	BIRD	S5B	G5			HR	Н	L3	X	
Bay-breasted Warbler	Setophaga castanea	BIRD	SOB	G5 CF			пр	ц	12	×	
Black-and-white Warbler	Mniotilta varia	BIRD	S5B	G5			HU		12	X	
Common Yellowthroat	Geothlypis trichas	BIRD	S5B	G5		-	110		14	~	
Yellow Warbler	Setophaga petechia	BIRD	S5B	G5					L5		
Chestnut-sided Warbler	Setophaga pensylvanica	BIRD	S5B	G5			HU	m	L3	Х	
Blackpoll Warbler	Setophaga striata	BIRD	S4B	G5							
Wilson's Warbler	Cardellina pusilla	BIRD	S4B	G5				m			
Palm Warbler	Setophaga palmarum	BIRD	S5B	G5							
Yellow-rumped Warbler	Setophaga coronata	BIRD	S5B	G5			HR	H	L3	X	
Black-throated Green Warbler	Setophaga virens	BIRD	\$5B	G5	80	тыр	HU	H U	L3	×	
Grassbopper Sparrow	Ammodramus savannarum	BIRD	54D \$4B	G5 G5	3C SC	I TIK		<u>п</u>	L2	×	
American Tree Sparrow	Spizella arborea	BIRD	S4B	G5			110		<u> </u>	^	
Chipping Sparrow	Spizella passerina	BIRD	S5B	G5					L5		
Vesper Sparrow	Pooecetes gramineus	BIRD	S4B	G5			HU	m	L3	х	
Savannah Sparrow	Passerculus sandwichensis	BIRD	S4B	G5					L4		
Song Sparrow	Melospiza melodia	BIRD	S5B	G5					L5		
Swamp Sparrow	Melospiza georgiana	BIRD	S5B	G5					L4	Х	
White-throated Sparrow	Zonotrichia albicollis	BIRD	S5B	G5			HU	m	L3	Х	
Dark-eyed Junco	Junco hyemalis	BIRD	S5B	G5							
Lincoln's Sparrow	Meiospiza Incolnii	BIRD	55B	G5 C5					1.5		
Bobolink	Dolichonyx oryzivorus	BIRD	30 S/R	G5 C5	THP	тнр			12		
Red-winged Blackbird	Agelaius phoeniceus	BIRD	54D S4	G5	TUTE	TULE			1.5		
Common Grackle	Quiscalus quiscula	BIRD	S5B	G5		1			L5	1	1
Brown-headed Cowbird	Molothrus ater	BIRD	S4B	G5		İ			L5	l	İ
Orchard Oriole	Icterus spurius	BIRD	S4B	G5			HR		L5	x	
Baltimore Oriole	Icterus galbula	BIRD	S4B	G5					L5		
Eastern Gray Squirrel	Sciurus carolinensis	MAMMAL	S5	G5					L5		
Eastern Chipmunk	Tamias striatus	MAMMAL	S5	G5					L4		ļ
Coyote	Canis latrans	MAMMAL	S5	G5				L	L4		
American Mink	Procyon lotor Mustela vison	MAMMAL	55	G5					L5		
White-tailed Deer	Odocoileus virainianus	MAMMAL	- 54 - 55	G5					14		
	s asoonous virginanus		55			1			L.4		

Common Name	Scientific Name	Provincial Status (S Rank)	Global Status (G Rank)	COSSARO (MNRF)	COSEWIC (Federal)	Location	1-Mar-17	12-Mar-17	21-Mar-17	31-Mar-17	10-Apr-17	21-Apr-17	2-May-17	12-May-17	22-May-17	29-May-17	9-Jan-18	25-Jan-18	14-Feb-18
Brant	Branta bernicla	S4N	G5													1			
Canada Goose	Branta canadensis	S5	G5				32	6	66	13	8	9	2	2	4	25	7	16	18
Mute Swan	Cvanus olor	SNA	G5				2	2	1	1	5	12	4	3	9	9	2	1	
Trumpeter Swan	Cyanus buccinator	S4	G4					1	_					-	-	-			
Tundra Swan	Cyanus columbianus	S4	G5			Flyover												4	
Wood Duck	Aix sponsa	S5	G5			Shale Pond					4								
Hood Buok	/ lix oponed	00				<250 m	8				1	2				1	1		
Gadwall	Anas stronora	54	C5			>250 m	Ū				1	2					1		
Gauwaii	Anas suepera	- 34	65			-200 III Shala Dand				2							4		
		-				Shale Fund	10	2	4	5									
American Black Duck	Anas rubripes	S4	G5			<250 m	10	2	4										
		-				Shale Pond	6	_	2	2			_		-	_	_		
Mallard	Anas platyrhynchos	S5B	G5			<200 m	10	5	4	6	14	11	/	4	3	6	2		
						Shale Pond	4		2						1				
Blue-winged Teal	Anas discors	S4	G5			>200 m					5								
Green-winged Teal	Anas crecca	S4	G5			>200 m					2								
Ring-necked Duck	Aythya collaris	S5	G5			<200 m				2		2							
						<200 m	3				2								
Creater Requir	Authura marila	84	05			>200 m		2			205								
Greater Scaup	Ayunya mania	- 34	65			>250 m											508	42	
						<250 m											1232	800	1180
Lesser Scaup	Aythya affinis	S4	G5			>200 m					1	1		1					
						<200 m	19	36	35		2		2	1	7				35
White-winged Scoter	Melanitta fusca	S4B S4N	G5			>200 m		9				7					38	6	
Tinko Wilgod Coolor	molanita rabba	0.15,0.11	00			>500 m	17					,					50	0	
Black Scotor	Molanitta amoricana	SAB SAN	C5			>200 m						2							
Diack Scoler	ivicianina americana	34D,34N	35			<200 m	51	111	120	22	0	2	22	474	22		122	90	210
Long toiled Duck	Clangula huamalia	C2B	05			~200 m	51	220	130	33	350	165	22	4/4	22		140	90	210 F0
Long-tailed Duck	Clangula nyemails	330	65			>200 m	20	250	120	5	250	105	110				140	80	50
						>500 m	29		45	65		0.5	118				-		
						<200 m	45	23	45	65	27	35	6				/	14	2
Buttlehead	Bucephala albeola	S4	G5			>200 m		52			30	5		_					
						Shale Pond						2		2					
						<200 m	75	37	340	45	27						110	39	45
Common Goldeneye	Bucephala clangula	S5	G5			>200 m		394	85		40	135					21	20	
						>500 m	30												
Hooded Merganser	Lophodytes cucultatus	S58 S5N	G5			<200 m		2							1				
neodod morganeon	20phodytoo ododiiatao	005,0011	00			Shale Pond	2			2	4								
Common Merganser	Mergus merganser	S5B,S5N	G5			<200 m			2										
Red Broasted Morganson	Morgue corretor	SAR SEN	C5			<200 m	4	6	35		7		75	60	17	11		5	1
ited-bieasted merganser	mergus serrator	34D,33N	35			>200 m		3	50		40						2	4	
Ruddy Duck	Oxyura jamaicensis	S4B,S4N	G5			>200 m					8								
Rock Pigeon	Columba livia	SNA	G5						17		5	8	2	4	2				
Mourning Dove	Zenaida macroura	S5	G5				1	1	5		4	2	1	1	1				1
Chimney Swift	Chaetura pelagica	S4B, S4N	G5	THR	THR								1	3	15	1			
Killdeer	Charadrius vociferus	S5B, S5N	G5							4	4	6	1	8	5				
Whimbrel	Numenius phaeopus	S3B, S4N	G5												210				
Dunlin	Calidris alpina	S4B, S5N	G5	1	1		1	1			1		1	1	43	1			
White-rumped Sandniner	Calidris fuscicollis	S5N	G5													1			
Spotted Sandhiper	Actitus macularius	\$5	G5										1	1	3	-			
Solitary Sandniner	Tringa solitaria	54B	G5										1	÷	1	1			
American Weedeeek	Coolonov minor	54D	65								1				1				
Cullian	Scolopax minor	34D	65				15				1	c							
Guil sp.	Obasissashaha ahiladahhis	040.041	05				15					0		2		2			
Bonaparte's Guil	Chroicocephaius philadelphia	54B,54N	G5				50	25	45	26	65	76		3	25	3			6
Ring-billed Gull	Larus delawarensis	S5B,S4N	G5				50	35	15	26	65	76	9	25	35	35		-	6
Herring Gull	Larus argentatus	S5B,S5N	G5					1	1	5		2	4	8	9		3	/	9
Iceland Gull	Larus glaucoides	S4N	G5										1						
Great Black-backed Gull	Larus marinus	S2B	G5								1					2			
Caspian Tern	Hydroprogne caspia	S3B	G5									1	5	1	2	6			
Common Tern	Sterna hirundo	S4B	G5										45	75	50	65			
Common Loon	Gavia immer	S5B,S5N	G5							2			7	3		1			
Pied-billed Grebe	Podilymbus podiceps	S4B,S4N	G5			Shale Pond				1									
Horpod Grobo	Podicops puritus	SIR CAN	65	80	80	<200 m					3	2							
Homed Grebe	r oudeps auritus	31D, 34N	60	36	30	>200 m					6	1							
Red peaked Crobe	Padiaana griaagana	COD CAN				<200 m			110				3	6	3				
Reu-necked Grebe	Foulceps grisegena	33B,54N	G5			>200 m			35		23	15							
Western/Clark's Grebe	Aechmophorus occidentalis		G5			>200 m			1										
Double-crested Cormorant	Phalacrocorax auritus	S5B	G5			<200 m				1	380	376	5800	550	450	85			
Black-crowned Night-Heron	Nycticoray nycticoray	S3B S3N	G5	1		1	1	1			1			1	2	1			

Common Name	Scientific Name	Provincial Status (S Rank)	Global Status (G Rank)	COSSARO (MNRF)	COSEWIC (Federal)	Location	1-Mar-17	12-Mar-17	21-Mar-17	31-Mar-17	10-Apr-17	21-Apr-17	2-May-17	12-May-17	22-May-17	29-May-17	9-Jan-18	25-Jan-18	14-Feb-18
Black-bellied Plover	Pluvialis squatarola	S4N	G5												1				
Great Blue Heron	Ardea herodias	S4	G5										2	1	1	1			
Great Egret	Ardea alba	S2B	G5									1	1						
Red-tailed Hawk	Buteo jamaicensis	S5	G5							1				1				1	
Belted Kingfisher	Megaceryle alcyon	S4B	G5												1				
Downy Woodpecker	Picoides pubescens	S5	G5				1	1	1			1	2	1	1	1			
Hairy Woodpecker	Picoides villosus	S5	G5									1			1				
Northern Flicker	Colaptes auratus	S4B	G5								11	3	1		2				
American Kestrel	Falco sparverius	S4	G5				1				1								
Eastern Wood-Pewee	Contopus virens	S4B	G5	SC	SC										1				
Willow Flycatcher	Empidonax traillii	S5B	G5												3				
Least Flycatcher	Empidonax minimus	S4B	G5												8				
Great Crested Flycatcher	Myiarchus crinitus	S4B	G5												1				
Eastern Phoebe	Sayornis phoebe	S5B	G5								1								
Eastern Kingbird	Tyrannus tyrannus	S4B	G5										1	2	2				
Northern Shrike	Lanius excubitor	SNA	G5															1	
Warbling Vireo	Vireo gilvus	S5B	G5										2	1	4	2			
Red-eyed Vireo	Vireo olivaceus	S5B	G5												2				
Blue-headed Vireo	Vireo solitarius	S5B	G5										1						
Philadelphia Vireo	Vireo philadelphicus	S5B	G5												2				
Blue Jay	Cyanocitta cristata	S5	G5						2	1	1		35	103	4				
American Crow	Corvus brachyrhynchos	S5B	G5				1		67	3	9								
Fish Crow	Corvus ossifragus	SNA	G5										1						
Purple Martin	Progne subis	S4B	G5										1		2				
Swallow sp.												50							
Tree Swallow	Tachycineta bicolor	S4B	G5								7	16		3	2	2			
Northern Rough-winged Swallow	Stelgidopteryx serripennis	S4B	G5								2	9	2	6	5				
Bank Swallow	Riparia riparia	S4B	G5	THR	THR							2		6	2				
Barn Swallow	Hirundo rustica	S4B	G5	THR	THR							45	10	8	7	35			
Cliff Swallow	Petrochelidon pyrrhonota	S4B	G5									4		1	2				
Black-capped Chickadee	Poecile atricapillus	S5	G5				4	2	4		16	1	1	1	3			3	
Red-breasted Nuthatch	Sitta canadensis	S5	G5										2						
White-breasted Nuthatch	Sitta carolinensis	S5	G5						1		2	1	1						
Brown Creeper	Certhia americana	S5B	G5								2								
House Wren	Troglodytes aedon	S5B	G5									1	1	2	1				
Blue-gray Gnatcatcher	Polioptila caerulea	S4B	G5										1						
Golden-crowned Kinglet	Regulus satrapa	S5B	G5								3								
Ruby-crowned Kinglet	Regulus calendula	S4B	G5									2	3		2				
Swainson's Inrush	Catharus ustulatus	S4B	G5												2				
Hermit Inrush	Catharus guttatus	S5B	G5				7		12	7	1	r	6	F	7		2		
American Robin	Turdus migratorius	55B	G5				/		12	/	27	5	б	5	/		2		
Gray Catolid	Dumetella carolinensis	54B	G5									2	1	1	4				
Brown I nrasher	1 0x0stoma rutum	54B	G5									2	1	2	1				
Fureneen Sterling	Sturpus underris	SNA SNA	65				-		16	0	135	2	2		2				
Codar Waxwing	Bombucilla codrorum	SINA	65				5		10	9	155	4	2	0	3				
House Sparrow	Bornbychia cedrorum	SNA	G5 G5				1		4	2		6	2	2	5				
House Sparrow	Carpodacus movicanus	SNA	G5						4	2	2	2	1	1	5				
American Goldfinch	Spinus tristis	S5B	G5						9	1	8	5	7	65	7	3			
Ovenbird	Seiurus aurocapilla	S4B	G5	1	t	1			5	-			,	05	1	5			
Tennessee Warbler	Oreothlynis peregrina	S5B	G5												3				
Nashville Warbler	Oreothlypis ruficapilla	S5B	G5											2	5				
Mourning Warbler	Geothlypis nhiladelnhia	S4B	G5											-	1				
Hooded Warbler	Setophaga citrina	S4B	G5	NAR	NAR									1	-				
Northern Parula	Setophaga americana	S4B	G5												1				
Magnolia Warbler	Setophaga magnolia	S5B	G5												3				
Bay-breasted Warbler	Setophaga castanea	S5B	G5												2				
Blackburnian Warbler	Setophaga fusca	S5B	G5											1	1				
Black-and-white Warbler	Mniotilta varia	S5B	G5										1	-	2				
Common Yellowthroat	Geothlypis trichas	S5B	G5												1				
Yellow Warbler	Setophaga petechia	S5B	G5										4		7	1			
Chestnut-sided Warbler	Setophaga pensvlvanica	S5B	G5	1	1	1	1	1		1	1				4				
Blackpoll Warbler	Setophaga striata	S4B	G5											9					
Palm Warbler	Setophaga palmarum	S5B	G5										1						
Yellow-rumped Warbler	Setophaga coronata	S5B	G5										6	2	1				
Black-throated Green Warbler	Setophaga virens	S5B	G5												1				
Canada Warbler	Cardellina canadensis	S4B	G5												1				

Common Name	Scientific Name	Provincial Status (S Rank)	Global Status (G Rank)	COSSARO (MNRF)	COSEWIC (Federal)	Location	1-Mar-17	12-Mar-17	21-Mar-17	31-Mar-17	10-Apr-17	21-Apr-17	2-May-17	12-May-17	22-May-17	29-May-17	9-Jan-18	25-Jan-18	14-Feb-18
Grasshopper Sparrow	Ammodramus savannarum	S4B	G5	SC	SC										1				
American Tree Sparrow	Spizella arborea	S4B	G5				1		6										
Chipping Sparrow	Spizella passerina	S5B	G5									1							
Vesper Sparrow	Pooecetes gramineus	S4B	G5								1								
Savannah Sparrow	Passerculus sandwichensis	S4B	G5								1	7	1	1	2				
Song Sparrow	Melospiza melodia	S5B	G5						3		22	15	7	7	6	2			
Swamp Sparrow	Melospiza georgiana	S5B	G5									1							
White-throated Sparrow	Zonotrichia albicollis	S5B	G5									2	4	1					
Dark-eyed Junco	Junco hyemalis	S5B	G5						3		2								
Northern Cardinal	Cardinalis cardinalis	S5	G5				1	1	3		5	3	2	4	4	1			
Vesper Sparrow	Pooecetes gramineus	S4B	G5											1					
Bobolink	Dolichonyx oryzivorus	S4B	G5	THR	THR									1					
Red-winged Blackbird	Agelaius phoeniceus	S4	G5				3	3	68	11	62	26		45	15				
Common Grackle	Quiscalus quiscula	S5B	G5						151		24	9	6	6		4			
Brown-headed Cowbird	Molothrus ater	S4B	G5						10			16	5	4	6				
Orchard Oriole	Icterus spurius	S4B	G5										1			1			
Baltimore Oriole	Icterus galbula	S4B	G5										2	5					

Note: General Spring Migration and Shorebird Surveys also completed on May 26, 2017 - resulted reported on Breeding Bird Study table

Species Code: consistent with the American Ornithologists' Union. 2012. Species 4-Letter-Codes. Accessed May 25, 2012. Available online: www.birdsontario.org/atlas/codes.jsp?lang=en&pg=species/

Location: refers to the location of the observation with respect to offshore distance from the Lake Ontario shoreline. Use of the Shale Pond on the Subject Lands is also noted where appropriate

S ranks: Provincial ranks are from the Natural Heritage Information Centre; S1 (critically imperiled), S2 (imperiled), S3 (vulnerable), S4 (apparently secure), S5 (secure); ranks were updated using NHIC species list October 2013

G ranks: National ranks are from the Natural Heritage Information Centre; G1 (extremely rare), G2 (very rare), G3 (rare to uncommon), G4 (common), G5 (very common); ranks were updated using NHIC species list October 2013

COSSARO (MNRF): Ontario Species at Risk as listed by the Committee on the Status of Species at Risk in Ontario (from NHIC Table October 2013); END - Endangered, THR - Threatened, SC - Special Concern, NAR - Not at Risk; Candidate Species at Risk to be assessed by COSSARO are listed online:

www.mrr.gov.on.ca/en/Business/Species/2ColumnSubPage/STDPROD\_068707.html/. COSEWIC: Assessed Species at Risk at the national level as listed by the Committee on the Status of Endangered Wildlife in Canada (from NHIC Table October 2013); END - Endangered, THR - Threatened, SC - Special Concern, NAR - Not at Risk; Candidate Species at Risk to be assessed by COSEWIC are listed online: www.cosewic.gc.ca/eng/sct3/index\_e.cfm/.

#### SAVANTA INC. Table 8: Breeding Bird Survey List

		Provincial	Global	COSSARO	COSEWIC	SWH	Highest
Common Name	Scientific Name	Status	Status	(MNRF)	(Federal)	Indicator	Breeding
		(S Rank)	(G Rank)		(rederal)	Species	Evidence
Canada Goose	Branta canadensis	S5	G5			Х	PO-H
Mallard	Anas platyrhynchos	S5	G5			Х	PO-H
Wood Duck	Aix sponsa	S5	G5			Х	CO-FY
Hooded Merganser	Lophodytes cucullatus	S5B,S5N	G5			Х	PO-H
Rock Pigeon	Columba livia	SNA	G5				PO-H
Mourning Dove	Zenaida macroura	S5	G5				PO-H
Chimney Swift	Chaetura pelagica	S4B, S4N	G5	THR	THR		PR-T
Virginia Rail	Rallus limicola	S5B	G5			Х	CO-DD
Killdeer	Charadrius vociferus	S5B, S5N	G5				PR-A
American Woodcock	Scolopax minor	S4B	G5				PO-H
Ring-billed Gull	Larus delawarensis	S5B,S4N	G5			Х	OB-X
Herring Gull	Larus argentatus	S5B,S5N	G5			Х	OB-X
Caspian Tern	Hydroprogne caspia	S3B	G5			Х	OB-X
Common Tern	Sterna hirundo	S4B	G5			Х	OB-X
Common Loon	Gavia immer	S5B,S5N	G5			Х	OB-X
Double-crested Cormorant	Phalacrocorax auritus	S5B	G5				OB-X
Black-crowned Night-Heron	Nycticorax nycticorax	S3B,S3N	G5			х	OB-X
Cooper's Hawk	Accipiter cooperii	S4	G5			х	OB-X
Red-tailed Hawk	Buteo jamaicensis	S5	G5			х	OB-X
Belted Kingfisher	Megacervle alcvon	S4B	G5				PO-H
Downy Woodpecker	Picoides pubescens	\$5	G5				PR-T
Hairy Woodpecker	Picoides villosus	\$5	G5				PO-H
Northern Flicker	Colaptes auratus	S4B	G5				PR-T
Peregrine Falcon	Falco perearinus	S3B	G4	SC	SC	x	OB-X
Willow Flycatcher	Empidonax traillii	\$5B	G5			X	PR-T
Least Elycatcher	Empidonax minimus	S4B	G5				PO-S
Eastern Phoebe	Savornis phoebe	S5B	G5				PO-H
Fastern Kingbird	Tyrannus tyrannus	S4B	G5				PR-P
Warbling Vireo	Vireo gilvus	\$5B	G5				PR-T
Red-eved Vireo	Vireo olivaceus	S5B	G5				PO-H
Blue lav	Cvanocitta cristata	\$5	G5				OB-X
American Crow	Corvus brachyrhynchos	\$5B	G5				PR-A
Fish Crow	Corvus ossifragus	SNA	G5				PO-H
Tree Swallow	Tachycineta bicolor	S4B	65				CO-AF
Northern Bough-winged		540					CO AL
Swallow	Stelgidopteryx serripennis	S4B	G5			х	PR-T
Bank Swallow	Rinaria rinaria	S/IB	65	тнр	THR		OB-X
Barn Swallow	Hirundo rustica	54B	65		THR		PO-H
Cliff Swallow	Petrochelidon nyrrhonota	54B	65	THK	TTIN	x	CO-AF
Black-capped Chickadee	Poecile atricapillus	540	65			^	
Bod broasted Nutbatch	Sitta canadonsis	55	65			~	
House Wrop	Troglodutos godon	55	65			^	
House Wren	Cistothorus palustris	55D 54D	GS			~	
Amorican Bohin	Turdus migratorius	SED	GS			^	
	Turuus Inigratorius	55D	GS				
		54B	GS			×	
Brown Infasher	Aireus naluslattas	54B	GS			^	CO-NE
	Mimus polygiottos	54	GS				PU-H
Coder Weinrin -	Scurrius vulgaris	SINA	65				
	Bombycilla cedrorum	55B	65				PK-1
House Sparrow	Passer aomesticus	SNA	65				PK-I
House Finch	Carpodacus mexicanus	SNA	G5				PR-T
American Goldfinch	Spinus tristis	S5B	G5				PR-P
Black-and-white Warbler	Mniotilta varia	S5B	G5				OB-X
Common Yellowthroat	Geothlypis trichas	S5B	G5				PO-S
Yellow Warbler	Setophaga petechia	S5B	G5				PR-P
Blackpoll Warbler	Setophaga striata	S4B	G5				OB-X

Common Name	Scientific Name	Provincial Status (S Rank)	Global Status (G Rank)	COSSARO (MNRF)	COSEWIC (Federal)	SWH Indicator Species	Highest Breeding Evidence
Wilson's Warbler	Cardellina pusilla	S4B	G5				OB-X
Chipping Sparrow	Spizella passerina	S5B	G5				PR-T
Savannah Sparrow	Passerculus sandwichensis	S4B	G5			Х	PR-T
Song Sparrow	Melospiza melodia	S5B	G5				CO-CF
Lincoln's Sparrow	Melospiza lincolnii	S5B	G5				OB-X
Northern Cardinal	Cardinalis cardinalis	S5	G5				PR-T
Bobolink	Dolichonyx oryzivorus	S4B	G5	THR	THR		OB-X
Red-winged Blackbird	Agelaius phoeniceus	S4	G5				CO-FY
Common Grackle	Quiscalus quiscula	S5B	G5				CO-CF
Brown-headed Cowbird	Molothrus ater	S4B	G5				PR-P
Orchard Oriole	Icterus spurius	S4B	G5				PO-S
Baltimore Oriole	lcterus galbula	S4B	G5				PR-T

Species Code: consistent with the American Ornithologists' Union. 2012. Species 4-Letter-Codes. Accessed May 25, 2012. Available online: www.birdsontario.org/atlas/codes.jsp?lang=en&pg=species/

Highest Breeding Evidence: Codes assigned for breeding evidence are consistent with the Ontario Breeding Bird Atlas (OBBA). 2012. Breeding Evidence Codes. Accessed January 25, 2014. Available online: http://www.birdsontario.org/ dataentry/codes.jsp?page=breeding/. Several different types of breeding evidence are often recorded for any given species over the course of surveys - this table reports only the highest level of breeding evidence

S ranks: Provincial ranks are from the Natural Heritage Information Centre; S1 (critically imperiled), S2 (imperiled), S3 (vulnerable), S4 (apparently secure), S5 (secure); ranks were updated using NHIC species list October 2013

G ranks: National ranks are from the Natural Heritage Information Centre; G1 (extremely rare), G2 (very rare), G3 (rare to uncommon), G4 (common), G5 (very common); ranks were updated using NHIC species list October 2013

COSSARO (MNRF): Ontario Species at Risk as listed by the Committee on the Status of Species at Risk in Ontario (from NHIC Table October 2013); END - Endangered, THR - Threatened, SC - Special Concern, NAR - Not at Risk; Candidate Species at Risk to be assessed by COSSARO are listed online: www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/STDPROD\_068707.html/.

**COSEWIC:** Assessed Species at Risk at the national level as listed by the Committee on the Status of Endangered Wildlife in Canada (from NHIC Table October 2013); END - Endangered, THR - Threatened, SC - Special Concern, NAR - Not at Risk; Candidate Species at Risk to be assessed by COSEWIC are listed online: www.cosewic.gc.ca/eng/sct3/index\_e.cfm/.

SWH Indicator Species: SWH refers to Significant Wildlife Habitat as defined by the MNRF Significant Wildlife Habitat Criteria Tables for Ecoregion 7E. SWH indicator species are identified in this table and any potential SWH is discussed in the text of this report.

### Table 9: 2017 Bat Acoustic Survey Results

SURVEY S	SURVEY	TRANSECT/ POINT				SPE		DE			
DATES	ROUND	COUNT/SM3BAT	NOBA	LACI	LANO	EPFU	LABO	PESU	MYLU	MYSE	MYLE
JU-05-2017	1	BT1	Х								
JU-05-2017	1	BT2	Х								
JU-05-2017	1	BT3				Х					
JU-05-2017	1	BT4				Х					
JU-05-2017	1	BT5				Х					
JU-05-2017	1	BT6	Х								
JU-05-2017	1	BP1	Х								
JU-05-2017	1	BP2				Х					
JU-05-2017	1	BP3				Х					
JU-13-2017	2	BT1	Х								
JU-13-2017	2	BT2	Х								
JU-13-2017	2	BT3				Х					
JU-13-2017	2	BT4				Х					
JU-13-2017	2	BT5				Х					
JU-13-2017	2	BT6				Х					
JU-13-2017	2	BP1				Х					

SPECIES CODE	COMMON NAME	SCIENTIFIC NAME
NOBA	No Bats	No recorded despite survey effort
LACI	Hoary bat	Lasiurus cinereus
LANO	Silver-haired bat	Lasionycteris noctivagans
EPFU	Big Brown bat	Eptesicus fuscus
LABO	Eastern Red bat	Lasiurus borealis
PESU	Tri-coloured bat	Perimyotis subflavus
MYLU	Little Brown Myotis	Myotis lucifugus
MYSE	Northern Myotis	Myotis septentrionalis
MYLE	Eastern Small-footed Myotis	Myotis leibii

### Table 9: 2017 Bat Acoustic Survey Results

SURVEY	SURVEY	TRANSECT/ POINT				SPE		DE			
DATES	ROUND	COUNT/SM3BAT	NOBA	LACI	LANO	EPFU	LABO	PESU	MYLU	MYSE	MYLE
JU-13-2017	2	BP2	Х								
JU-13-2017	2	BP3				Х					
JU-24-2017	3	BT1	Х								
JU-24-2017	3	BT2	Х								
JU-24-2017	3	BT3		Х		Х					
JU-24-2017	3	BT4		Х		Х					
JU-24-2017	3	BT5		Х	Х	Х					
JU-24-2017	3	BT6				Х					
JU-24-2017	3	BP1	Х								
JU-24-2017	3	BP2				Х					
JU-24-2017	3	BP3		Х	Х	Х	Х				

SPECIES CODE	COMMON NAME	SCIENTIFIC NAME
NOBA	No Bats	No recorded despite survey effort
LACI	Hoary bat	Lasiurus cinereus
LANO	Silver-haired bat	Lasionycteris noctivagans
EPFU	Big Brown bat	Eptesicus fuscus
LABO	Eastern Red bat	Lasiurus borealis
PESU	Tri-coloured bat	Perimyotis subflavus
MYLU	Little Brown Myotis	Myotis lucifugus
MYSE	Northern Myotis	Myotis septentrionalis
MYLE	Eastern Small-footed Myotis	Myotis leibii



## Table 10: Amphibian Call Count Survey Station Results

					WAT	ER									
SURVEY ROUND	STATION NUMBER	NOAM	ΑΜΤΟ	FOTO	GRTR	SPPE	CHFR	WOFR	NLFR	PIFR	GRFR	BULL	MIFR	Present (Y/N)	Depth (CM)
1	AMC1	Х												Y	200
2	AMC1										1(6)			Y	300
3	AMC1		1(8)											Y	300
3	AMC1										1(2)			Y	100
1	AMC2										1(2)			Y	N/A
2	AMC2	Х												Y	N/A

### LEGEND:

SPECIES CODE	COMMON NAME	SCIENTIFIC NAME			CALL CODES
NOAM	No Amphibians	No amphibians despite survey effort	Х	(	No amphibians heard
AMTO	American Toad	Anaxyrus americanus	1		Calls can be counted without error
FOTO	Fowler's Toad	Anaxyrus fowleri	2	2	Calls overlap but can be reliably estimated
GRTR	Gray Treefrog	Hyla versicolor	3	}	Calls overlap too much to estimate number
CHFR	Western Chorus Frog	Pseudacris triseriata			
WOFR	Wood Frog	Lithobates sylvaticus			
NLRF	Northern Leopard Frog	Lithobates pipiens			
PIFR	Pickerel Frog	Lithobates palustris			
GRFR	Green Frog	Lithobates clamitans			
BULL	American Bullfrog	Lithobates catesbeianus			
MIFR	Mink Frog	Lithobates septentrionalis			
SPPE	Spring Peeper	Pseudacris crucifer			

Note: For each species, the first number is the call code and the second number, which is in brackets, is the number of individuals of that species heard calling



## Table 10: Amphibian Call Count Survey Station Results

				WATER											
SURVEY ROUND	STATION NUMBER	NOAM	ΑΜΤΟ	FOTO	GRTR	SPPE	CHFR	WOFR	NLFR	PIFR	GRFR	BULL	MIFR	Present (Y/N)	Depth (CM)
3	AMC2	Х												Y	N/A
3	AMC2	Х												Y	N/A
1	AMC3	Х												Y	15
1	AMC4	Х												Y	10
1	AMC5								1(2)					Y	150
2	AMC5	Х												Y	150
3	AMC5	Х												Y	100

### LEGEND:

SPECIES CODE	COMMON NAME	SCIENTIFIC NAME			CALL CODES	
NOAM	No Amphibians	No amphibians despite survey effort		Х	No amphibians heard	
AMTO	American Toad	Anaxyrus americanus		1	Calls can be counted without error	
FOTO	Fowler's Toad	Anaxyrus fowleri		2	Calls overlap but can be reliably estimated	
GRTR	Gray Treefrog	Hyla versicolor		3	Calls overlap too much to estimate number	
CHFR	Western Chorus Frog	Pseudacris triseriata				
WOFR	Wood Frog	Lithobates sylvaticus				
NLRF	Northern Leopard Frog	Lithobates pipiens				
PIFR	Pickerel Frog	Lithobates palustris				
GRFR	Green Frog	Lithobates clamitans				
BULL	American Bullfrog	Lithobates catesbeianus				
MIFR	Mink Frog	Lithobates septentrionalis				
SPPE	Spring Peeper	Pseudacris crucifer				

Note: For each species, the first number is the call code and the second number, which is in brackets, is the number of individuals of that species heard calling



### Table 11: Amphibian Egg Mass Survey Results

						S	PECIES	CODE						WAT	ER
SURVEY ROUND	STATION NUMBER	NOAM	ΑΜΤΟ	FOTO	GRTR	SPPE	CHFR	WOFR	NLFR	PIFR	GRFR	BULL	MIFR	Present (Y/N)	Depth (CM)
1	AMC1	Х												Y	200
1	AMC2	N/A												Y	N/A
1	AMC3	Х												Y	15
1	AMC4	Х												Y	30

Notes:

- The quantity reported in each cell is the cumulative count of all life stages (egg mass, tadpole, adult) of the individuals observed of that species during each egg mass survey round
- Survey station AMC2 consists of a concrete-walled oil-water separator that is fenced off and therefore, could not be accessed to complete the visual egg mass survey

SPECIES CODE	COMMON NAME	SCIENTIFIC NAME
NOAM	No Amphibians	No amphibians despite survey effort
AMTO	American Toad	Anaxyrus americanus
FOTO	Fowler's Toad	Anaxyrus fowleri
GRTR	Gray Treefrog	Hyla versicolor
CHFR	Western Chorus Frog	Pseudacris triseriata
WOFR	Wood Frog	Lithobates sylvaticus
NLRF	Northern Leopard Frog	Lithobates pipiens
PIFR	Pickerel Frog	Lithobates palustris
GRFR	Green Frog	Lithobates clamitans
BULL	American Bullfrog	Lithobates catesbeianus
MIFR	Mink Frog	Lithobates septentrionalis
SPPE	Spring Peeper	Pseudacris crucifer

DATE	SURVEY	TRANSECT							SPE	ECIES	CODE						
SURVEYED	ROUND	ʻT' NUMBER	NOSN	EAGA	MISN	BRSN	RBSN	RASN	RISN	BLRA	BUGA	FOSN	HOSN	MASS	RNSN	SGSN	QUSN
17-AP-17	1	T1		Х													
17-AP-17	1	T2	Х														
17-AP-17	1	Т3	Х														
17-AP-17	1	T4	Х														
17-AP-17	1	T5	Х														
17-AP-17	1	Т6	Х														

CODE JA FE MR AP MA JU JU JL SE OC NO NO

SPECIES	COMMON NAME	SCIENTIFIC NAME	DATE
CODE			MONTH
NOSN	No Snakes	No snakes despite survey effort	January
EAGA	Eastern Gartersnake	Thamnophis sirtalis sirtalis	February
MISN	Eastern Milksnake	Lampropeltis triangulum triangulum	March
BRSN	Northern Brownsnake	Storeria dekayi dekayi	April
RBSN	Northern Red-bellied Snake	Storeria occipitomaculata occipitomaculata	May
RASN	Gray Rat Snake	Elaphe obsolete obsoleta	June
RISN	Eastern Ribbonsnake	Thamnophis sauritus	July
BLRA	Blue Race Snake	Coluber constrictor foxii	August
BUGA	Butlers Gartersnake	Thamnophis butleri	September
FOSN	Eastern Foxsnake	Elaphi gloydi	October
HOSN	Eastern Hog-nosed Snake	Heterodon platifhinos	November
MASS	Eastern Massassauga	Sistrusus catenatus catenatus	December
RNSN	Ring-necked Snake	Diadophis punctatus	]
SGSN	Smooth Greensnake	Opheodrys vernalis	]
QUSN	Queen Snake	Regina septemvittata	

DATE	SURVEY	TRANSECT							SPE	ECIES	CODE						
SURVEYED	ROUND	ʻT' NUMBER	NOSN	EAGA	MISN	BRSN	RBSN	RASN	RISN	BLRA	BUGA	FOSN	HOSN	MASS	RNSN	SGSN	QUSN
28-AP-17	2	T1	Х														
28-AP-17	2	T2	Х														
28-AP-17	2	Т3		Х													
28-AP-17	2	T4	Х														
28-AP-17	2	T5	Х														
28-AP-17	2	T6	Х														
3-MA-17	3	T1	Х														

CODE JA FE MR AP MA JU JU JL SE OC NO NO

LEGEND:

SPECIES	COMMON NAME	SCIENTIFIC NAME	DATE
CODE			MONTH
NOSN	No Snakes	No snakes despite survey effort	January
EAGA	Eastern Gartersnake	Thamnophis sirtalis sirtalis	February
MISN	Eastern Milksnake	Lampropeltis triangulum triangulum	March
BRSN	Northern Brownsnake	Storeria dekayi dekayi	April
RBSN	Northern Red-bellied Snake	Storeria occipitomaculata occipitomaculata	May
RASN	Gray Rat Snake	Elaphe obsolete obsoleta	June
RISN	Eastern Ribbonsnake	Thamnophis sauritus	July
BLRA	Blue Race Snake	Coluber constrictor foxii	August
BUGA	Butlers Gartersnake	Thamnophis butleri	September
FOSN	Eastern Foxsnake	Elaphi gloydi	October
HOSN	Eastern Hog-nosed Snake	Heterodon platifhinos	November
MASS	Eastern Massassauga	Sistrusus catenatus catenatus	December
RNSN	Ring-necked Snake	Diadophis punctatus	
SGSN	Smooth Greensnake	Opheodrys vernalis	]
QUSN	Queen Snake	Regina septemvittata	

Project No. 7684

DATE	SURVEY	TRANSECT							SPE	ECIES	CODE						
SURVEYED	ROUND	ʻT' NUMBER	NOSN	EAGA	MISN	BRSN	RBSN	RASN	RISN	BLRA	BUGA	FOSN	HOSN	MASS	RNSN	SGSN	QUSN
3-MA-17	3	T2	Х														
3-MA-17	3	Т3	Х														
3-MA-17	3	T4		Х													
3-MA-17	3	T5	Х														
3-MA-17	3	Т6	Х														
10-MA-17	4	T1	Х														
10-MA-17	4	T2	Х														
10-MA-17	4	Т3	Х														

CODE JA FE MR AP MA JU JU JL SE OC NO NO

SPECIES	COMMON NAME	SCIENTIFIC NAME	DATE
CODE			MONTH
NOSN	No Snakes	No snakes despite survey effort	January
EAGA	Eastern Gartersnake	Thamnophis sirtalis sirtalis	February
MISN	Eastern Milksnake	Lampropeltis triangulum triangulum	March
BRSN	Northern Brownsnake	Storeria dekayi dekayi	April
RBSN	Northern Red-bellied Snake	Storeria occipitomaculata occipitomaculata	May
RASN	Gray Rat Snake	Elaphe obsolete obsoleta	June
RISN	Eastern Ribbonsnake	Thamnophis sauritus	July
BLRA	Blue Race Snake	Coluber constrictor foxii	August
BUGA	Butlers Gartersnake	Thamnophis butleri	September
FOSN	Eastern Foxsnake	Elaphi gloydi	October
HOSN	Eastern Hog-nosed Snake	Heterodon platifhinos	November
MASS	Eastern Massassauga	Sistrusus catenatus catenatus	December
RNSN	Ring-necked Snake	Diadophis punctatus	
SGSN	Smooth Greensnake	Opheodrys vernalis	
QUSN	Queen Snake	Regina septemvittata	

DATE	SURVEY	TRANSECT							SPE	ECIES	CODE						
SURVEYED	ROUND	ʻT' NUMBER	NOSN	EAGA	MISN	BRSN	RBSN	RASN	RISN	BLRA	BUGA	FOSN	HOSN	MASS	RNSN	SGSN	QUSN
10-MA-17	4	T4	Х														
10-MA-17	4	T5	Х														
10-MA-17	4	T6	Х														

CODE JA FE MR AP MA JU JU JL SE OC NO NO

SPECIES	COMMON NAME	SCIENTIFIC NAME	DATE	
CODE			MONTH	
NOSN	No Snakes	No snakes despite survey effort	January	
EAGA	Eastern Gartersnake	Thamnophis sirtalis sirtalis	February	
MISN	Eastern Milksnake	Lampropeltis triangulum triangulum	March	
BRSN	Northern Brownsnake	Storeria dekayi dekayi	April	
RBSN	Northern Red-bellied Snake	Storeria occipitomaculata occipitomaculata	May	
RASN	Gray Rat Snake	Elaphe obsolete obsoleta	June	
RISN	Eastern Ribbonsnake	Thamnophis sauritus	July	
BLRA	Blue Race Snake	Coluber constrictor foxii	August	
BUGA	Butlers Gartersnake	Thamnophis butleri	September	
FOSN	Eastern Foxsnake	Elaphi gloydi	October	
HOSN	Eastern Hog-nosed Snake	Heterodon platifhinos	November	
MASS	Eastern Massassauga	Sistrusus catenatus catenatus	December	
RNSN	Ring-necked Snake	Diadophis punctatus		
SGSN	Smooth Greensnake	Opheodrys vernalis		
QUSN	Queen Snake	Regina septemvittata		

## Table 13: Turtle Survey Results - Basking

DATE	SURVEY ROUND	RVEY STATION DUND #	SPECIES CODE								
SURVEYED			NOTU	MPTU	SNTU	MATU	BLTU	SSTU	WOTU	STIN	SPTU
17-AP-11	1	BS-1		1*							
17-AP-11	1	BS-2	х								
28-AP-17	2	BS-1	х								
28-AP-17	2	BS-2	х								
3-MA-17	3	BS-1		1*							
3-MA-17	3	BS-2	х								

COMMON NAME	SCIENTIFIC NAME		
			N
No Turtles	No turtles despite survey effort	Γ	Janu
Midland painted turtle	Chrysemis picta	Γ	Febr
Snapping turtle	Chelydra serpentina	Γ	Marc
Northern map turtle	Graptemys geographica		April
Blanding's turtle	Emydoidea blandingii		May
Spiny soft-shelled turtle	Apalone spinifera		June
Wood turtle	Glyptemys insculpta	Γ	July
Stinkpot turtle	Stemotherus odoratus	Γ	Aug
Spotted turtle	Clemmys guttata		Sept
	COMMON NAME No Turtles Midland painted turtle Snapping turtle Northern map turtle Blanding's turtle Spiny soft-shelled turtle Wood turtle Stinkpot turtle Spotted turtle	COMMON NAME         SCIENTIFIC NAME           No Turtles         No turtles despite survey effort           Midland painted turtle         Chrysemis picta           Snapping turtle         Chelydra serpentina           Northern map turtle         Graptemys geographica           Blanding's turtle         Emydoidea blandingii           Spiny soft-shelled turtle         Glyptemys insculpta           Stinkpot turtle         Stemotherus odoratus           Spotted turtle         Clemmys guttata	COMMON NAME         SCIENTIFIC NAME           No Turtles         No turtles despite survey effort           Midland painted turtle         Chrysemis picta           Snapping turtle         Chelydra serpentina           Northern map turtle         Graptemys geographica           Blanding's turtle         Emydoidea blandingii           Spiny soft-shelled turtle         Apalone spinifera           Wood turtle         Glyptemys insculpta           Stinkpot turtle         Stemotherus odoratus           Spotted turtle         Clemmys guttata

DATE					
MONTH	CODE				
January	JA				
February	FE				
March	MR				
April	AP				
May	MA				
June	JU				
July	JL				
August	AU				
September	SE				
October	OC				
November	NO				
December	DE				



### Table 13: Turtle Survey Results - Basking

### <u>\*Turtle Survey Results – Nesting</u>

- Turtle nesting survey was completed on June 7, 2017;
- One south facing slope and two non-south facing slopes with exposed soil were observed around the perimeter of the Shale Pond where the Midland Painted Turtle was observed. However, suitability of nesting habitat at each location was generally poor, with clay to silty clay soils with exposed shale and some relatively steep slopes; and
- No nesting evidence was observed.

#### LEGEND:

SPECIES	COMMON NAME	SCIENTIFIC NAME		
CODE				N
NOTU	No Turtles	No turtles despite survey effort		Janu
MPTU	Midland painted turtle	Chrysemis picta		Feb
SNTU	Snapping turtle	Chelydra serpentina		Mar
MATU	Northern map turtle	Graptemys geographica		April
BLTU	Blanding's turtle	Emydoidea blandingii		May
SSTU	Spiny soft-shelled turtle	Apalone spinifera		June
WOTU	Wood turtle	Glyptemys insculpta		July
STIN	Stinkpot turtle	Stemotherus odoratus		Aug
SPTU	Spotted turtle	Clemmys guttata		Sep

DATE					
MONTH	CODE				
January	JA				
February	FE				
March	MR				
April	AP				
May	MA				
June	JU				
July	JL				
August	AU				
September	SE				
October	00				
November	NO				
December	DE				

DATE



Port Credit West Village, Mississauga Environmental Impact Study

Appendix C – Conceptual Landscaping Plan

