



NATURAL ENVIRONMENT TECHNICAL REPORT

McCormick Pit, Part Lot 12, Conc. 2
Town of Caledon, Peel Region

SEPTEMBER 2017





Natural Environment Technical Report

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Town of Caledon, Peel Region

September 2017

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Table of Contents

1	INTRODUCTION	3
2	BACKGROUND DATA COLLECTION.....	5
3	DATA COLLECTION APPROACH AND METHODS	6
3.1	TECHNICAL METHODS AND FIELD STUDIES.....	6
3.1.1	<i>Vegetation Surveys.....</i>	6
3.1.2	<i>Wildlife Surveys</i>	8
3.1.3	<i>Fish Community.....</i>	9
4	LEVEL 1: SIGNIFICANT FEATURE ANALYSIS	10
4.1	HABITAT OF ENDANGERED AND THREATENED SPECIES	10
4.2	FISH HABITAT	11
4.3	SIGNIFICANT VALLEYLANDS	12
4.4	SIGNIFICANT WETLANDS	13
4.5	SIGNIFICANT AREAS OF NATURAL AND SCIENTIFIC INTEREST	13
4.6	SIGNIFICANT WILDLIFE HABITAT.....	14
4.6.1	<i>Assessment Summary.....</i>	15
4.7	SIGNIFICANT WOODLANDS.....	18
4.7.1	<i>Woodland Delineation.....</i>	18
4.8	OTHER FEATURES	19
4.8.1	<i>Environmentally Sensitive or Significant Areas.....</i>	19
4.8.2	<i>Valley and Stream Corridors</i>	19
4.8.3	<i>Other Woodlands</i>	19
4.9	LEVEL 1 SUMMARY	20
5	LEVEL 2: IMPACT ASSESSMENT	22
5.1	PHYSIOGRAPHIC CONDITIONS	22
5.1.1	<i>Terrain.....</i>	22
5.1.2	<i>Hydrology.....</i>	22
5.1.3	<i>Hydrogeology.....</i>	23
5.2	ECOLOGICAL CONDITIONS	23
5.2.1	<i>Wetlands</i>	23
5.2.2	<i>Fish Habitat.....</i>	24
5.2.3	<i>Significant Wildlife Habitat</i>	25
5.2.4	<i>Rare Vegetation Species.....</i>	28
5.3	PREDICTED EFFECTS, MITIGATION AND NET EFFECTS	29
5.3.1	<i>Habitat of Threatened or Endangered Species.....</i>	29
5.3.2	<i>Significant Wetlands</i>	29
5.3.3	<i>Fish Habitat.....</i>	31
5.3.4	<i>Other Woodlands</i>	31
5.3.5	<i>Significant Wildlife Habitat</i>	31
6	REGION OF PEEL GREENLANDS AND TOWN OF CALEDON ECOSYSTEM FRAMEWORK ASSESSMENT	33

7	SUBWATERSHED IMPACT ASSESSMENT	36
8	NIAGARA ESCARPMENT PLAN POLICIES.....	38
9	MITIGATION AND ENHANCEMENT	40
9.1	REHABILITATION AND ENHANCEMENT: POST-EXTRACTION	42
10	MONITORING.....	47
11	CONCLUSIONS AND RECOMMENDATIONS	48
	REFERENCES	50
	APPENDICES.....	53

1 INTRODUCTION

Blueland Farms Ltd. has proposed an aggregate extraction application, referred to as 'McCormick Pit', located on Part Lot 12, Concession 2 EHS Town of Caledon, within the Region of Peel (**Figure 1, Appendix A**). The lands subject to the proposed licence (Subject Lands) are 25.97 ha in size. The term, Adjacent Lands, refers to the prescribed areas adjacent to natural heritage features and the 120 m Aggregate Resources Act (ARA) zone around the Subject Lands (**Figure 2, Appendix A**). In some cases, studies extended beyond the 120 m ARA Adjacent Lands and included the full Subject Property for a broader landscape review. The extent of the Subject Property, Subject Lands, and 120 m Adjacent Lands are shown on (**Figure 2, Appendix A**).

The application is for a Class 'A' Licence, Category 1, with below water table extraction, proposed within an extraction footprint that is 20.75 ha in size. Supporting reports and operational/rehabilitation plans developed by the applicant's consulting team, have been reviewed for potential environmental impacts to Natural Heritage Features as outlined within this report. This report provides input to MHBC Planning Limited (MHBC) and their planning reporting and opinions.

This Level 1 and 2 Natural Environment Technical Report (NETR) has been undertaken in accordance with the requirements of the Aggregate Resources Act, 1997. This report addresses the Provincial Policy Statement (MMAH 2014), and related guidance presented in the Natural Heritage Reference Manual (MNR 2010).

Environmental policies of the relevant municipal Official Plans and the Niagara Escarpment Plan will be addressed where applicable. This report also meets the technical requirements of an Environmental Impact Study (EIS) and will be complemented by planning reporting completed by other specialist members of the applicant's consulting team.

Note: For this NETR text, all *Italic* writing sections are direct quotes from referenced documents and reports (other than Latin names for species).

This NETR is a combined Level 1 Significant Feature Analysis & Level 2 Impact Assessment in accordance with the Aggregate Resources Act (ARA) requirements; it addresses an expanded Study Area or vicinity that incorporates a literature review and impact assessment works to address concerns related to natural heritage feature and function impacts.

The Aggregate Resources of Ontario Provincial Standards version 1.0, for Natural Environment Level 1 section 2.2.3 for a Category 1-Class 'A' Pit Below Water states:

Natural Environment Level 1: determine whether any of the following features exist on and within 120m of the site: significant wetland, significant portions of the habitat of endangered or threatened species, fish habitat, significant woodlands (south and east of the Canadian Shield), significant valley lands (south and east of the Canadian Shield), significant wildlife habitat and significant areas of natural and scientific interest.

The Aggregate Resources of Ontario Provincial Standards version 1.0, for Natural Environment Level 2 section 2.2.4 for a Category 1-Class 'A' Pit Below Water states:

Natural Environment Level 2: impact assessment where the level 1 identified any features on and within 120 metres of the site to determine any negative impacts on the natural features or ecological functions for which the area is identified, and any proposed preventative, mitigative or remedial measures.

Within the Aggregate Resources of Ontario Provincial Standards version 1.0, for Terminology & Definitions section it states:

For the purpose of these standards, references should be made to the Provincial Policy Statement (revised February 1, 1997) issued under Section 3 of the Planning Act for definitions and terms used in the Natural Environment Level 1 and 2.

*Note: In 2014, the Provincial Policy Statement was re-issued. This report has been prepared in accordance with the most current version.

2 BACKGROUND DATA COLLECTION

Savanta has relied, in part, on supporting background information from government agencies and previous site surveys/investigations to provide additional insight into the overall character of these Subject Lands. These agencies/resources include:

- Federal and provincial Species at Risk (SAR) websites;
- Ontario Ministry of Natural Resources and Forestry (MNRF), Aurora District;
 - P. Kor, Ontario Parks-ANSI Program
 - E. Followes, Ecologist
 - B. Kowalyk, Lands and Resources Technical Specialist
- MNRF Land Information Ontario (LIO) Natural Features Mapping;
- Natural Heritage Information Centre (NHIC) database;
- Town of Caledon;
 - D. Kannally
 - T. Salter
- Region of Peel;
- Ontario Breeding Bird Atlas;
- Ontario Nature Reptile and Amphibian Atlas;
- Ontario Butterfly Atlas; and,
- Credit Valley Conservation.

After this preliminary consultation process, an ARA application was submitted in 2009, which included supporting technical reports. Commenting agencies reviewed the ARA submission including the February 2008 Level I and II and draft March 2013 Level I and II Natural Environment Technical Reports (NETR). An agency review of this application as it relates to the Peel Region Official Plan Amendment (ROPA) 21B (Woodlands, and Ministry of Natural Resources and Forestry), triggered the need for subsequent field investigations and revisions to the Operational Plan and supporting technical documents. A revised January 2014 NETR was prepared by AWS Environmental Consulting in association with Savanta Inc. (Savanta), which expanded upon the earlier technical reporting with updated field data collection, further assessment review for Wetlands, Wildlife Habitat, Species at Risk and Woodlands.

This 2017 report was prepared by Savanta to compile all prior field data, including field studies completed in 2016 to augment and update existing conditions on the Subject Lands and 120 m ARA Adjacent Lands.

A summary of data records assembled during background data collection is included in **Table 1, Appendix B**; and Natural Heritage Features are shown on **Figure 3 (Appendix A)**.

3 DATA COLLECTION APPROACH AND METHODS

3.1 *Technical Methods and Field Studies*

Field investigations and data collection included in this submission were carried out from October 2003 to August 2016. Details of survey types and dates are provided in **Table 2, Appendix B**. A summary of fieldwork completed to date is contained herein.

- A three-person team comprised of John Morton, Joe Johnson (now retired) and Judith Jones from AWS Environmental Consulting (biologists, botanists), completed natural environment field inventory and assessment works within the Study Lands, between October 2003 to October 2008.
- Savanta ecologists completed visits to the lands in December 2007 and in May 2008 as part of the November 2008 NETR submission.
- The November 2008 NETR reflected a total of 72.5 field survey person-hours, which were completed by AWS within the Subject Lands and its accessible 120 m Adjacent Lands.
- Further Natural Environment field investigations were carried out in 2011 and 2012 by AWS and Savanta, to augment earlier Subject Lands data inventory works through intensive field investigations and data collection. This additional and updated data supplemented earlier natural heritage analyses identified through the 2008 NETR review and addressed updated regulatory requirements.
- This supplemental field work throughout 2011 and 2012 provided an additional 146.0 hours of field data collection to augment the earlier November 2008 data reporting.
- In 2016, Savanta completed additional ecological studies to update previous data records for the Subject Lands and Adjacent Lands. That work included 65 field survey person-hours, and another 140 hours of passive data recording (i.e., acoustic monitoring).
- In total, over the nine years of field studies on the Subject Lands, 283.5 person-hours of field inventory have been completed on these lands and on accessible portions of the property Adjacent Lands (in some cases >120 m from the licence boundary proposal).

3.1.1 **Vegetation Surveys**

Vegetation surveys were conducted primarily by AWS, with supplementary surveys completed by Savanta. Overall, surveys consisted of vascular plant inventories, a Butternut (*Juglans cinerea*) tree survey, and Ecological Land Classification (ELC) mapping and classification. The survey year and methodology used are described below. A comprehensive species list, inclusive of all observations by AWS and Savanta is provided in **Table 3 (Appendix B)**. 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 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.

Field Surveys Completed by AWS

Surveys were conducted during the growing seasons of 2004, 2006 and 2012. During these surveys, significant species colony location mapping and abundance estimates were recorded for all floral species of conservation concern, along with ELC vegetation community mapping for the Subject Lands. Flora surveys followed two search methods:

- a) Field survey work was undertaken using both grid and random sampling methods. A 'grid-like' transect approach was completed with transect lines spaced 100 m apart in both north-south and west-east orientations. Transect lines were then field compassed, with all observed vascular plants recorded.
- b) A second 'random' approach was implemented, covering all habitat types, vegetation communities and portions of the Adjacent Lands to the north within the Significant Wetland Habitat (Warnock Lake and stream channel) areas.

Field Surveys Completed by Savanta

Supplementary vegetation surveys were completed by Savanta in 2016, which consisted of a Butternut Survey, ELC delineation field verification, and a summer botanical inventory that provided updates to plant data previously collected by AWS. The purpose of these surveys was to (a) determine if Butternut trees were present on the Subject Lands and if so, map their locations; (b) verify that previously assessed ELC community delineations were consistent with existing conditions; and (c) inventory summer flowering plant species, with a focus on re-locating previously identified rare species, and documenting any new species observations.

Butternut is listed as Endangered under the federal Species at Risk Act and the Ontario Endangered Species Act (ESA). Butternut is intolerant of shade and is generally found growing individually or in small populations within hardwood stands, along hedgerows, or in open fields (Farrar 1995). Survey efforts focused on forest perimeters and interior openings, as well as all cultural habitats (e.g., cultural woodlands, meadows, hedgerows, etc.). Habitat adjacent to the Subject Lands were also scanned using binoculars since butternuts are afforded up to 50 m of protected buffers. Surveys were completed by a certified Butternut Health Assessor.

ELC as previously presented in the 2012 NETR was verified in the field, with any minor revisions reflected in current mapping shown on **Figure 4 (Appendix A)**.

The summer botanical survey was conducted concurrently with the Butternut survey, with focus on herbaceous plants, as well as all potentially rare, uncommon, or protected species. Additional survey effort was given to habitat mapped by AWS as harboring regionally rare plants, such as wetlands.

3.1.2 Wildlife Surveys

Within the Subject Property, wildlife surveys included specific searches and/or investigation for amphibians, breeding birds, hibernation emergence and gestation activity for snakes, turtles and nesting habitat, general searches for mammals and movement corridor functions, and fieldwork to assess bat species assemblages. A full summary list of all recorded fauna species over the 13-year study period has been provided under **Appendix D** with current rankings, status levels and highest bird breeding codes observed.

Breeding Bird Surveys

Surveys to assess birds for the Subject Lands followed several standardized search methods:

- a) Monitoring activity included a 'Point Count' methodology for breeding activity in accordance with Bird Studies Canada. Point Count Locations were established to cover all habitat types within the Subject Lands, with no point count location closer than 100 m (limited overlapping of potential territories). Occurrences were recorded through both sightings and auditory observations for a total of 10 minutes at each point count location in the early morning hours. Data records have been provided under **Appendix D**.
- i) Point Count locations were established in the spring of 2004 and repeated during the spring of 2006 and 2007, for three survey dates. In June 2012 and 2016 these same point counts were monitored over four survey dates, with detailed point count records and location mapping provided in **Appendix D**.
- b) Augmented Species at Risk (SAR) bird survey work was undertaken in June 2012 and again in 2016 and included assessing potential habitat use polygons. Observations are provided in **Appendix D**.
- c) Point Counts were also established within the open habitat areas specifically focusing on SAR birds (Bobolink and Eastern Meadowlark). The 2012 survey methodology followed the MNRF survey protocol for Bobolinks, other than the transect lines for point count location establishment. Given the small size of the grassland fields on the Subject Lands, point count locations and numbers provided coverage over all suitable habitat areas. In 2016, when these areas were subsequently re-assessed for suitability for grassland bird breeding habitat, it was determined they were not suitable due to their narrow widths and interspersed shrubs and tall trees. Data records have been provided under **Appendix D** for the 2012 grassland bird surveys.
- d) Point Counts were also established for taped 'playback calls' for territorial responses. Both daytime and evening/dusk playback calling periods were completed in 2006, 2007 and 2012. Evening point counts and evening travel between point count locations were used to document any Whip-poor-will or Common Nighthawk activity. Full data records have been provided under **Appendix D**.
- e) Additional bird observations of feeding adults and fledglings during summer site visits were also recorded and listed under **Appendix D** summary.

Herpetofaunal Surveys

Surveys to document amphibians and reptiles were conducted throughout the Subject Property but were focused within suitable habitat areas: Adjacent Lands to the north and westerly Provincially Significant Wetland (PSW) environment, within and around the identified three small wetlands on the Subject Property, old fence lines, and hedgerows with rock piles.

- a) Amphibian - Frog Calling Surveys followed the Ontario Marsh Monitoring Program protocol in 2006 and 2007 with repeated point counts over three evening survey dates in 2012 and 2016. Full data records have been provided under **Appendix D** for the 2012 and 2016 surveys.
- b) Amphibian - Salamander breeding activity with active searches for egg masses was undertaken for the three Subject Property wetland habitat areas, in April of 2007 and 2012, as well as in 2016.
- c) Reptiles - Turtle activity was monitored within suitable habitat on the Subject Property for any potential egg laying activity during the spring season, and the summer season was monitored for basking adults.
- d) Reptiles - Snakes were actively searched for during the spring hibernation emergence period and summer gestation period within suitable habitat areas.

Mammal Surveys

Sightings or observations of habitat use (tracks, scat) were recorded during all other flora and fauna investigation work during site visits from 2003 to 2016. Specific searches plus random coverage across the Subject Lands and Adjacent Lands focused on rock piles, mature forests, wetland swales, fence lines, downed woody debris, game trails and habitat/vegetation transition zones.

In 2016, ultrasonic recording devices were deployed to record any ultrasonic calls made by bats within woodlands with suitable habitat on the Subject Lands.

3.1.3 Fish Community

Survey works were undertaken on June 19, 2004 by using baited minnow traps within the two on-site wetland environments which support surface water ponding and the adjacent stream immediately north of the north property boundary. Two traps were placed within Caledon Creek on Lot 13, Conc. 2 EHS, one at the Heart Lake Road crossing and the second approximately 40 m downstream within the wetland/pond environment. Additionally, one minnow trap was placed within the two wetland ponds on the Subject Lands. All minnow traps were left 'fishing' for a minimum of 4 hours.

Subsequent to the January 2013 NETR submission, eight site visits have been completed in relation to Natural Heritage feature investigations or surveys, providing an additional 205.0 hours of field inventory work.

4 LEVEL 1: SIGNIFICANT FEATURE ANALYSIS

The following seven Natural Heritage Features as defined by the PPS (MMAH 2014) section 2.1', have been assessed with available reports, data banks, maps etc., gathered through municipal, provincial and federal agencies for this Study Area.

4.1 *Habitat of Endangered and Threatened Species*

A literature search for historic records of Endangered and Threatened species has been undertaken for the surrounding landscape extending 1 km from the Subject Lands utilizing the Species at Risk in Ontario (SARO) listings maintained by the Ontario Ministry of Natural Resources and Forestry (MNRF); and the national lists maintained by Environment Canada (i.e., Committee on the Status of Endangered Wildlife in Canada; COSEWIC). As input to this work and in conjunction with agency staff inquiries, a review was undertaken of the Natural Heritage Information Centre (NHIC) web site, (**Table 1, Appendix B**), along with published resources of the local MNRF District Office and through the published resources of Credit Valley Conservation (CVC).

The Provincial Policy Statement (PPS) section 2.1.7 states:

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

The historical data record search as provided in **Appendix B**, identified one Endangered fish species; Redside Dace, and three Threatened bird species; Barn Swallow, Bobolink and Eastern Meadowlark, with potential to have ranges overlapping with the Subject Property.

In discussion with the MNRF district ecologist in 2004, further details relating to the Redside Dace record location were provided (sensitive information not for public documentation). It was also acknowledged by the MNRF that given the pit location and the separation distance to this species' suitable habitat and historical records, no negative impacts would be anticipated. As such, no further impact assessment works were deemed necessary in relation to Redside Dace. Agency correspondence can be found in **Appendix C**.

The November 2008 and subsequent January 2014 NETR had identified presence of Bobolink and Eastern Meadowlark individuals on the agricultural grasslands within the Subject Lands. Additional breeding bird surveys, and a habitat assessment for Species at Risk (SAR) birds were completed in 2016. The habitat assessment identified areas of cultural meadow on the Subject Lands, however these areas were narrow in shape resulting in proximity of perches for predators to be too close to any areas where Bobolink may nest. Despite the unsuitable habitat on the Subject Lands, breeding bird surveys focused efforts on these areas for grassland breeding birds. One male Bobolink was observed during the first round of 2016 breeding bird surveys, however no nests were identified, nor females observed, and the species was not observed during the second round or during any subsequent field investigation.

Barn Swallow was recorded during 2016 surveys; however, no nests were found when structures on the Subject Lands were searched.

One Species at Risk bat, Eastern Small-footed Myotis was confirmed to be using portions of the woodland on the Subject Lands. This portion of the Subject Lands is also confirmed to be Significant Wildlife Habitat for Bat Maternity Colonies, due to presence of a high density of suitable bat roosting trees and the confirmed presence of Big Brown Bat and Silver-haired Bat.

Any Habitat of Endangered and Threatened Species will be addressed through additional consultation with MNRF to meet requirements of the *Endangered Species Act*.

4.2 Fish Habitat

Within the Subject Lands no watercourses occur, only surface water ponding has been identified associated with three isolated wetland pockets on-site. No historical fish community data is available for the Subject Lands. Two of these isolated wetlands (central and south corner) have been used historically and currently as livestock watering sites with year-round surface water retention. These two wetlands may support *Cyprinidae* (Minnow Family) species. The third and smallest wetland feature (along property south western boundary) on the Subject Lands, is a shallow terrain depression observed to be dry from mid spring to late fall, and it was determined to be incapable of supporting Fish Habitat.

North and west of the Subject Lands but within the 120 m Adjacent Lands are two additional surface water features. Located just west of the Subject Lands, is a small inland marsh lake known as Warnock Lake. At its closest point, it is 35 m from the Subject Lands (i.e., to the lake high water level). This shallow and warm-water seasonal waterbody provides minimal and restrictive fisheries habitat, with little historical documentation other than periodic use for *Cyprinidae* (Minnow); sourced from MNR stream file data. While this waterbody was observed on several occasions to become dry during the summer months, it does support seasonal fish habitat. It is intermittently connected during high water conditions to Caledon Creek watercourse and its fish communities.

Caledon Creek flows through the northwest corner of the Adjacent Lands. This stream flows in a west and southerly orientation and at its closest point is about 50 m north of the licence boundary. This creek has a warm-water thermal regime and primarily supports *Cyprinidae* species (minnows and carp). The MNRF has documented tributary sections within this subwatershed to contain Redside Dace, an Endangered fish species. Due to the sensitivity of information related to this endangered species, this report respects the request of the MNRF not to divulge the specific location of these historical records. However, it is noted that this species has not been documented within the Subject Lands, nor within the Caledon Creek reaches on Adjacent Lands (or within the immediate upstream/downstream reaches). The historic record (1995) for this endangered fish species has a significant separation distance from the Study Area with no identifiable suitable habitat for this species within this area of Caledon Creek.

The Provincial Policy Statement (PPS) Natural Heritage section 2.1.6 states:

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

The PPS Natural Heritage section 2.1.8 states:

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

With Fish Habitat confirmed within the ARA Adjacent Lands and potential Fish Habitat within the Subject Lands, further impact assessment review is required and provided under the Level 2 reporting in Section 5.2.2.

4.3 Significant Valleylands

The Region of Peel Official Plan defines key natural heritage features in accordance with definitions outlined in the Oak Ridges Moraine Conservation Plan (ORMCP). Thus, this feature analysis will review the existing features within the Subject Lands and within subwatershed No. 16, in relation to ORMCP and Provincial criteria guidelines.

Though portions of the full Credit River watershed may be considered significant, subwatershed No. 16 does not clearly display provincial criteria features associated with significant valleylands such as; unique habitat, landform prominence, distinctive geomorphic landforms, cliff faces, oxbows or steep valley slopes which provide distinctive valleyland features.

Federal topographical mapping of the surrounding area, demonstrates that elevation contours, steep terrain and slopes, cliff faces, etc., typically identifiable with Significant Valley land features, and are not located within this Study Area.

The Provincial Policy Statement (PPS) section 2.1.5 (c) states:

Development and site alteration shall not be permitted in significant valleylands in Ecoregions 6E and 7E (including island in (Lake Huron and the St. Mary's River).

Through this desktop analysis process, this application follows the PPS for Significant Valleylands and similar policies for regulatory agencies.

The Subject Lands occur within the Credit River Conservation (CVC) Authority sub watershed No. 16. The watershed report mapping prepared by CVC, Figure 4.11, has identified valley land and watercourse corridors feature along the Caledon Creek-Warnock Lake riparian zone, beyond the Subject Lands. Through the above provincial criteria analysis, this riparian zone environment would be considered a 'water course corridor' not a significant valleyland feature.

Through this analysis, it can be concluded that the Caledon Creek-Warnock Lake feature within subwatershed No. 16, would not be deemed to be significant valleyland. No significant

valleyland features occur within the Subject Lands or the within the ARA 120 m Adjacent Lands. No negative impacts to valleyland features or functions are anticipated from this pit application.

4.4 Significant Wetlands

A Provincially Significant Wetland (PSW) named the 'Star Wetland Complex', was identified in the November 2008 NETR as occurring outside of the Subject Lands, but within the 120 m ARA Adjacent Lands. Portions of the 'Star Wetland Complex' within 120 m include Warnock Lake and a portion of the Caledon Creek floodplain. After the McCormick Pit application process in 2009, the MNR district office completed a review and wetland evaluation of the wetland features within the Subject Lands, see **Appendix C**.

In September 2012 two wetlands on the Subject Lands were incorporated into the larger PSW complex: (1) the central wetland (Wetland 4); and (2) the wetland in the south corner (Wetland 5). As such, these two former locally significant wetland features on the Subject Lands are now deemed to be Provincially Significant by the MNR.

These wetlands are shown on **Figure 3 (Appendix A)**, which delineates Provincially Significant features on the Subject Lands and on the 120 m ARA Adjacent Lands.

The Provincial Policy Statement (PPS) section 2.1.4 (a) states:

Development and site alteration shall not be permitted in significant wetlands in Ecoregions 5E, 6E and 7E.

The PPS Natural Heritage section 2.1.8 states:

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

The Subject Lands occur within Ecoregion 6E, the Provincially Significant Star Wetland Complex includes two wetland areas on the Subject Lands and other wetland areas within the 120 m ARA Adjacent Lands. Further review and impact assessment is required and provided under Level 2 reporting Sections 5.2.1 and 7.1.2.

4.5 Significant Areas of Natural and Scientific Interest

The Subject Lands were originally within the Mono Mills-Caledon Meltwater Channels Provincially significant earth science Area of Natural and Scientific Interest (ANSI). A boundary revision in 1993 determined the southern extent of this ANSI feature is within Lot 12, Concession 4E, northeast of the Subject Lands. **Appendix C** provides a copy of MNR correspondence relating to this boundary map revision as provided by the local MNR office. As such, neither the Subject Lands nor the 120 m ARA Adjacent Lands have Life Science or Earth Science ANSI designations.

The Provincial Policy Statement (PPS) section 2.1.5 (e) states:

Development and site alteration shall not be permitted in significant areas of natural and scientific interest unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions.

No ANSIs occur within the Subject Lands or within the 120 m ARA Adjacent Lands. No negative impacts to ANSIs are anticipated from this pit application.

4.6 Significant Wildlife Habitat

Significant wildlife habitat is one of the more complex natural heritage features to identify and evaluate. In 2012, the Natural Environment Technical Report prepared on behalf of BlueLand Farms for the proposed McCormick Pit explored Significant Wildlife Habitat using criteria prepared by Peel Region. Since that time, the Ministry of Natural Resources and Forestry finalized the SWH Eco-region Criteria Schedule (MNRF 2015). There are several provincial documents that discuss identifying and evaluating SWH including the NHRM (MNR 2010), the Significant Wildlife Habitat Technical Guide (MNR 2000), and now also the SWH Eco-region Criteria Schedule (MNRF, 2015). The Subject Lands are in Eco-region 6E and were therefore assessed using the 6E Criteria Schedule (MNRF 2015). Although there is much overlap between the MNRF SWH as described in the Criteria Schedule and the Peel-Caledon SWH types described in the 2009 *Peel-Caledon Significant Woodland and Significant Wildlife Habitat Study*, the screening of ecological features using both was undertaken to address both the Peel Region (Figure 5, ROP, 2014) and Town of Caledon Official Plans (2016). Results from both screening exercises are provided in Appendix B, and are discussed by section below.

There are four general types of Significant Wildlife Habitat:

- Seasonal concentration areas of animals;
- Rare vegetation communities or specialized habitat for wildlife;
- Habitat for species of conservation concern; and
- Animal movement corridors.

Seasonal Concentration Areas of Animals

Seasonal concentration areas of animals are those sites where large numbers of a species gather together at one time of the year, or where several species congregate, including bat hibernacula and bat maternity colonies.

Rare Vegetation Communities or Specialized Habitat for Wildlife

Rare vegetation communities and 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 Natural Heritage Information Centre (NHIC), could qualify. It is to be assumed that these habitats are at risk and that they are also likely to support additional wildlife species that are considered significant.

Specialized habitats are microhabitats that are critical to some wildlife species. The Natural Heritage Reference Manual (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.

Habitat for Species of Conservation Concern

Species of conservation concern include four types of species, those:

- that are rare;
- whose populations are significantly declining;
- that have been identified as being at risk to certain common activities; and/or
- with relatively large populations in Ontario compared to the remainder of the globe.

Habitats of species of conservation concern do not include habitats of endangered or threatened species as identified by the ESA, 2007. Endangered and threatened species are discussed in sections 4.1 and 7.1.1.

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, including areas used by amphibians between breeding and summering habitat, called amphibian movement corridors.

4.6.1 Assessment Summary

All SWH types were assessed, where applicable, within the Subject Lands. **Tables 4A and 4B, (Appendix B)**, provide details regarding the methods used to confirm the presence of SWH, including confirmation of the appropriate ecosites, requirement of targeted surveys, presence of candidate SWH and the confirmation of SWH.

Significant wildlife habitat was confirmed for two types within the Subject Lands and for two types within 120 m Adjacent Lands, as shown on **Figure 7 (Appendix A)**. These are further discussed below:

Significant Wildlife Habitat Confirmed on Subject Lands:

- Bat Maternity Colonies (Subject Lands);
- Bat Maternity Colonies present in woodlands on northwest portion of proposed licenced boundary (**Figure 7, Appendix A**);
- Habitat for Species of Conservation Concern (Subject Lands); and

- Monarch observed using open habitat throughout the surrounding landscape, including on the Subject Lands.

Significant Wildlife Habitat Confirmed on Adjacent Lands (within 120 m):

- Woodland Amphibian Breeding Habitat;
 - Wetland 5: Low diversity and abundance of calling amphibian species, Spring Peepers, one Northern Leopard Frog and one Chorus Frog;
 - Wetland 4: High diversity and abundance of calling amphibian species: Full choruses of Gray Tree Frogs and Spring Peepers; Smaller numbers of Northern Leopard Frogs, Green Frogs, Wood Frogs and one Chorus Frog; and
 - Habitat for Species of Conservation Concern
- Eastern Wood-Pewee at PC stations 2 and 8, a cultural woodland (CUW1) and deciduous forest (FOD5-2), respectively.
- Snapping Turtle was observed in Wetland 4.

Development is not permitted within SWH unless it can be demonstrated that there will be no negative impacts on the feature or its functions (MMAH 2014).

Bat Maternity Colonies

Bats frequently move their pups during the active maternity roosting season. Although individuals will return to the same general area year after year, they are not loyal to a specific roosting tree. In this case, Big Brown Bat and Silver Haired Bat were present in sufficient numbers during the month of June 2016 to indicate the suitable roosting trees may be used as maternity roosting sites within 3.65 ha of FOD5-7 and FOD3-1 communities on the Subject Lands. Within 200 m of these features additional trees suitable for roosting occur in the 5.82 ha FOD5-2 community outside the proposed licenced boundary on Adjacent Lands to the south. The bat maternity colonies on the Subject Lands are not unique in the landscape, or even within the Subject Property. Further assessment of this SWH type is required in the Level 2 Assessment.

Woodland Amphibian Breeding Habitat

This significant wildlife habitat type was confirmed at AMC 5, also referred to as Wetland 4. It is a bur-reed organic shallow marsh (MAS3-7) and is part of the Provincially Significant Star Wetland Complex. The SWH consists of the wetland unit itself, plus an area extending to upland habitat within a 230 m radius (OMNRF 2015). To determine the amphibian upland habitat associated with the wetland amphibian breeding habitat, a 230 m radius extending from the boundary of Wetland 4 was examined for suitable upland woodland habitat. In this case, suitable upland habitat exists directly adjacent to Wetland 4, and thus the amphibian habitat includes these wooded features to the south of Wetland 4, on Adjacent Lands as shown on **Figure 7 (Appendix A)**.

Wetland 4 and its adjacent upland features (FOD6-5 and FOD8-1), as well as the large deciduous woodland to the west (FOD5-2) will not be removed. The habitat feature will be retained as part of the Adjacent Lands.

Wetland 4 depends upon surface water inputs to sustain its hydroperiod. A catchment area assessment was completed by Groundwater Science Corp (2017) to assess the potential impacts of changes to surface water inputs to this feature. The results of this study indicated negligible change in surface water inputs once mitigation is applied. Mitigation includes a proposed amendment to catchment area location to incorporate lands currently in agricultural use, and not proposed for extraction.

Additional enhancement measures can be incorporated to offer continuous cover for amphibian movement and improved habitat conditions on Adjacent Lands. An agricultural field exists between the FOD6-5/FOD8-1 and the FOD5-2. This field may be enhanced/planted to provide shade, litter and woody debris.

Habitat for Species of Conservation Concern

Generally, species of conservation concern include those species listed as S1 to S3 or SH by SRANKS. Habitats of species of conservation concern do not include habitats of Endangered or Threatened species as identified by the ESA, 2007. Endangered and threatened species are discussed in sections 4.1 and 7.1.1. Wildlife species observed are listed in **Appendix D**, including current provincial and national statuses (NHIC 2016).

Three species with Special Concern status were observed on the Subject Lands or on the 120 m ARA Adjacent Lands. One insect species, Monarch Butterfly, having a Provincial status of 'Special Concern' was identified on the Subject Lands. In addition, Snapping Turtle and Eastern Wood-Pewee were identified on the 120 m Adjacent Lands.

Three specialized surveys for Butterflies and Moths (*Lepidoptera* Family), Dragonflies and Damselflies (*Odonata* Family) were completed during key emergence periods on the Subject Lands. Habitat characterization for insect species is summarized within **Table 5, (Appendix B)**. This survey work recorded one Special Concern status Lepidoptera species, Monarch butterfly, with 50 observations of adults over a period of three surveys during the months of June, July and August. Further assessment for this habitat type is provided in Level 2 reporting.

Eastern Wood-Pewee is a provincial species of Special Concern and was added to the Species at Risk in Ontario (SARO) list in June 2014. At this point it is unknown why there are population declines; however, there is speculation that there is a loss and/or degradation of habitat; a reduction in the availability of flying insects upon which the bird preys; and a loss of eggs and fledgling birds due to an increasing number of predators (Blue Jays and Red Squirrels) (MNRF 2015).

Two singing males were recorded calling from PC 2 and PC 8, within the FOD5-2 community within 120 m ARA Adjacent Lands. This species prefers to nest in the mid-canopy layer of forest clearings and edges of deciduous and mixed forests. It is most abundant in mid-age-to-mature woodlots that contain little understory vegetation (MNRF 2015). The area of SWH for this habitat

type and species is the area of the habitat to the finest ELC scale that protects the habitat form and function. No negative impact is anticipated to habitat for this species.

Snapping Turtle is a provincial species of Special Concern, and was observed on Adjacent Lands in Wetland 4.

The Natural Heritage Provincial Policy Statement (PPS) 2.1.5 (d) states:

Development and site alteration shall not be permitted in significant wildlife habitat unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions.

Further impact assessment of SWH is required and provided under Level 2 reporting.

4.7 Significant Woodlands

The Region of Peel's Official Plan (OP) (Office Consolidation October 2014) identifies Core Areas, including significant woodlands, on Schedule A within the Subject Lands. Portions of the Star Wetland Complex and the associated Caledon Creek riparian zone, which occur within the 120 m ARA Adjacent Lands, are also designated as Core Areas.

4.7.1 Woodland Delineation

Vegetation community boundaries on the Subject Property are depicted on **Figure 4 (Appendix A)**; they were mapped and defined in the field based upon the Ecological Land Classification for Southern Ontario, First Approximation. The field verified boundaries are similar to those mapped (principally through air photo interpretation) by CVC and the Region, however refinement based on fieldwork completed in 2016 was warranted.

Results of the Ecological Land Classification and woodland delineation exercise are shown on **Figures 4 and 5 (Appendix A)** with ELC community descriptions provided in **Table 3 (Appendix B)**.

As part of the 2016 vegetation surveys, existing ELC mapping as presented in the 2012 NETR was reviewed and refined to reflect the ongoing advance of succession since field surveys were undertaken in 2004. These refinements incorporated the results of representative woodland stem density surveys. The majority of refinements consisted of revising communities classified as Cultural Woodland to poplar Forest communities (i.e., CUW1 to FOD3-1). In following the ELC manual for Southern Ontario, communities designated as 'forest' must have tree cover greater than 60%, while those designated 'cultural woodland' will have 35% to 60% tree cover.

The delineation of the woodland boundary that includes portions on the Subject Lands and within and beyond the 120 m Adjacent Lands is shown on **Figure 5 (Appendix A)**, and results of woodland stem-density sampling are provided in **Appendix D**.

The woodland within the proposed license boundary is patchy, interrupted by active agriculture and early successional habitat. Many of the treed areas are narrow and linear in configuration.

The total woodland area overlapping the Subject Property is 23.0 ha in size if measured conservatively, well below the 30 ha threshold for Significance as Core woodland in accordance with the Peel Region OP. This size threshold is consistent with policies for aggregate extractions identifying Core Woodlands, and thus no Significant Woodlands exist on the Subject Lands or within the 120 m Adjacent Lands. The largest woodland patch on the Subject Lands is 18.7 ha. Total woodland area being removed due to extraction is 8.99 ha. Additionally, 11.32 ha of wooded area on the Subject Property have been excluded from the extraction area and will be retained.

4.8 Other Features

4.8.1 Environmentally Sensitive or Significant Areas

Environmentally Sensitive or Significant Areas, as defined in the Town of Caledon OP, 2016, identifies areas of land or water containing natural landscapes which contain or support natural forms, features or attributes deemed to be significant or essential in the context of a watershed or municipal jurisdiction as defined by the TRCA and CVC.

For the natural features identified on the Subject Lands and Adjacent Lands, no Environmentally Significant Areas have been identified by the CVC, nor the Town. Natural areas on the Subject Property are not unique to the watershed, nor to the municipality of Caledon, and therefore would not be considered essential in the context of either.

4.8.2 Valley and Stream Corridors

Confined and unconfined river or stream valleys are considered Valley Corridors and Stream Corridors, respectively. Limits of these features are defined by the greater of the long-term stable top of slope/bank, toe of slope, regulatory floodplain, meander belt and any contiguous natural features and areas plus a buffer area.

Caledon Creek exists north of the Subject Property, on Adjacent Lands, and would be considered a Stream Valley under the Town of Caledon OP. This feature may also be considered under *Core valley and stream corridors* under the Peel Region OP.

The CVC regulatory floodplain limit extends south from Caledon Creek onto the Subject Lands. The floodplain mapped on the Subject Lands exists on active agricultural fields, and does not provide contiguous natural area. Caledon Creek and its associated Stream Corridor, as considered under the Town of Caledon OP, are considered as part of Fish Habitat under the Level 2 Assessment.

4.8.3 Other Woodlands

Contiguous woodland areas are illustrated on **Figure 5 (Appendix A)**. The contiguous woodland that includes features overlapping the Subject Lands meets ROPA criteria to be considered a Peel Greenlands “Natural Areas and Corridors (NAC)” woodland. It appears that two smaller contiguous woodlands are located on the 120 m ARA Adjacent Lands east of the Subject Property. Due to lack of access to the 120 m ARA Adjacent Lands, it is not known

whether vegetation communities in areas east of Heart Lake Road meet the Region's *woodland* definition (i.e., no quantitative tree density measurements were conducted). If the woodland definition were to be satisfied, these areas across Heart Lake Road would also be considered Peel Greenlands NAC woodlands.

The ROP states that individual area municipalities are responsible for the protection, stewardship, and management of NAC features. According to Town of Caledon Official Plan (2016), the woodlands on-site are classified as *Other Woodlands*, which are considered Supportive Natural System and Natural Linkages. The proposed extraction footprint would result in the removal of 9.5 ha of NAC / Other Woodland.

4.9 Level 1 Summary

Through the Level 1 analysis of the seven Provincial Natural Heritage features assessed, five have been identified to occur at some level of importance (e.g., local, regional, provincial) either within the Subject Lands or within the 120 m ARA Adjacent Lands (see **Figure 2** for licence boundary).

Within Subject Lands:

- Habitat for Threatened or Endangered Species
 - Eastern Small-footed Myotis were recorded in FOD5-2 and FOD3-1 ecosites during 2016 acoustic surveys on the Subject Lands.
- Significant Wildlife Habitat
 - Species of Conservation Concern; Monarch was observed using the Subject Lands.
 - Bat Maternity Colonies; ecosites FOD5-2 and FOD3-1 provide habitat suitable for bat maternity colonies.

Within 120 m ARA Adjacent Lands:

- Significant Wetlands: Provincially Significant Star Wetland Complex
 - Four wetland areas designated by the MNRF as part of a PSW complex occur on Adjacent Lands within 120 m – Wetlands 1 and 11 (associated with Warnock Lake and Caledon Creek), and Wetlands 4 and 3 to the south of the proposed Licence boundary.
- Fish Habitat
 - Confirmed within the 120 m ARA Adjacent Lands (Warnock Lake and Caledon Creek)
 - Potential within two wetlands that sustain permanent surface water ponds on the Subject Property (Wetland 4 and Wetland 5; **Figure 6, Appendix A**)
- Significant Wildlife Habitat
 - Confirmed Amphibian Breeding Habitat (Wetland) located within 120 m ARA Adjacent Lands (Wetland 4)

- Confirmed Amphibian Breeding Habitat (Woodland) associated with Wetland 5 confirmed within 120 m ARA Adjacent Lands
- Confirmed Habitat for Species of Conservation Concern – Snapping Turtle in Wetland 4, and Eastern Wood-Pewee in woodland patches within the 120m ARA Adjacent Lands.

The aforementioned features identified within the Level 1 review are assessed in greater detail within the Level 2 Impact Assessment component, which also meets the requirements of a Natural Heritage Environmental Impact Study (EIS).

5 LEVEL 2: IMPACT ASSESSMENT

Based on the Level 1 natural heritage assessment summarized above, the presence of Habitat of Endangered or Threatened Species, Significant Wetlands, Fish Habitat, and Significant Wildlife Habitat necessitates a Level II evaluation of the potential impacts due to the pit development and operation. A part of the Level 2 assessment also includes recommendations regarding any mitigation and rehabilitation.

5.1 *Physiographic Conditions*

5.1.1 Terrain

The Subject Lands are located on the southeastern flank of an outwash gravel deposit (Caledon outwash deposit), a feature created by glacial melt waters forming a channel between the Paris Moraine and the Niagara Escarpment. Through borehole investigations, the hydrogeological assessment technical reporting determined that the site is characterized by a thick layer of sand and gravel, overlying glacial till. In places, patches of till form a thin surface veneer over the sand and gravel.

The Subject Lands range from flat agricultural crop fields, to gently rolling agricultural pastures, to hummocky moderately sloped-forested lands. Elevation ranges across the Subject Lands from a high of 432 m ASL near the westerly property corner to 412 m ASL along the northern property line. This rolling topography has contributed to numerous depressions with separate catchment areas over the Subject and Adjacent Lands and contributed to the establishment of 3 small isolated wetland pockets on the Subject Lands. The Operational Plans completed by Harrington McAvan Ltd. provide a more detailed overview of topographic contours for the Subject Lands. The Hydrogeological assessment report (Groundwater Science Corp 2017) also provides a more detailed review of site soils and geological characteristics.

5.1.2 Hydrology

The Subject Lands are situated within the Caledon Creek subwatershed No. 16 of the Credit River. Caledon Creek is located on Adjacent Lands north of the proposed licence boundary. It is a stream with warm water thermal regime and has been observed over the 9-year study period, to have intermittent flows (typically dry in summer months) at the Heart Lake Road crossing. Approximately 5 km downstream, the Caledon Creek tributary merges into the Credit River, which has a coldwater thermal regime. Silver Creek (coldwater regime) is located approximately 1.5 km south of the Subject Lands and is known to support brook trout. Within the Subject Lands, no surface water flows have been identified and as such, no off-site surface water linkages occur. Soil characteristics and terrain features on-site promote a high surface percolation rate over the entire property with minimal run-off events other than during snow melt periods or heavy precipitation events. Several small surface catchment areas are present within the Subject Lands (Groundwater Science Corp. 2017) where each catchment area directs and supports drainage to isolated terrain depressions.

While recharge rates are generally high, the three small wetland areas on the Subject Property (Wetlands 3, 4 and 5; **Figure 5, Appendix A**) in depressions where fine grained soils reduce

infiltration and allow water to collect. These three isolated wetland pockets are fed by seasonal surface water with fluctuating water level conditions during the growing season in response to changes in precipitation, evapotranspiration and evaporation. During the drier summer season, all three of these wetland features are reduced in surface water surface area, with Wetlands 3 and 5 exhibiting no surface water retention function during the drier summer months. No potential overland connections to off-site hydrological features were identified from the three wetland areas. Warnock Lake and Caledon Creek, located to the north, are both focused recharge features that do not rely on groundwater contributions.

5.1.3 Hydrogeology

The hydrogeological assessment report by Groundwater Science Corp. (2017) provides a detailed description of the ground water setting underneath the Subject Lands and in the broader Study Area. Most of the Subject Lands have been identified as a significant recharge area by the CVC. Regionally, the groundwater flows to the southwest towards the Credit River. These flows occur within one thick unconfined aquifer. Generally, the water table lies in the granular materials on the site throughout the year.

5.2 Ecological Conditions

5.2.1 Wetlands

No wetlands exist within the proposed Licence boundary. Five wetlands associated with the PSW Star Wetland Complex are located within 120 m ARA Adjacent Lands and are characterized below and identified on **Figure 3 (Appendix A)**.

To the north of the Subject Lands, two wetlands (Wetland 1 and Wetland 11) are associated with Warnock Lake and Caledon Creek. Due to limited site access to these features, their characterization was based on aerial interpretation and existing information available through previous studies completed by AECOM, Groundwater Science Corp, and data collected by AWS. These wetland features are summarized below:

Wetland 1 (0.42 ha within 120 m ARA Adjacent Lands), SWT2-2

- Associated with Warnock Lake
- Water levels fluctuate seasonally
- Willow-mineral thicket swamp

Wetland 11 (0.57 ha within 120 m ARA Adjacent Lands), MAS3-3

- Associated with Caledon Creek floodplain, north of the Subject Lands and east and west of Heart Lake Road
- Linear feature with hydroperiod reflective of Caledon Creek's seasonal nature
- Narrow-leaved sedge organic marsh

The Subject Property includes three small, isolated wetland areas. Characterization of each is summarized below.

Wetland 3 (0.05 ha) at the southwest property boundary:

- One locally rare plant identified; minimal wildlife habitat functions; and
- Seasonally wet site, dense growth of grasses/sedges.

Wetland 4 (0.45 ha) located southeast of the proposed extraction limit:

- 24 locally rare plants identified; provides Significant Wildlife Habitat; Provincially Significant Wetland;
- Fluctuating water levels of 0.3 m, but year-round surface waters present with open water/shallow marsh habitat; and
- North end of wetland used for livestock watering and south end shows evidence of agricultural equipment crossing.

Wetland 5 (0.12 ha), outside 120 m ARA Adjacent Lands, but on south corner of Subject Property:

- 7 locally rare plant species identified; provides Significant Wildlife Habitat; Provincially Significant Wetland;
- Fluctuating water levels of 0.5 m, but year-round surface waters present with open water/shallow marsh habitat; and
- Southwest corner of wetland used for livestock watering and grade changes off-site to the west (affecting catchment size).

The Provincially Significant Star Wetland Complex occurs within Ecoregion 6E. The original significant wetland areas (before two wetland areas on the Subject Property were added to the complex in late 2012) are identified within the Peel Regional Official Plan as Greenlands System 'Core' area and described as 'protected' within Policy section 2.3.2.1 (a) of that Plan.

The identified significant wetlands have been characterized as developed above the water table by previous studies (AECOM, 2013) and are addressed in the Groundwater Science Corp (2017) technical reporting. Work completed concludes that the wetlands receive surface water input as the primary source water for these three wetlands. A detailed surface water catchment review and mapping was undertaken for the Subject Property (see Figure 4, Groundwater Science Corp, 2017 technical report).

5.2.2 Fish Habitat

Two warm water surface features, Warnock Lake and Caledon Creek, have been identified within the 120 m ARA Adjacent Lands as providing some fish habitat function. Both features are seasonal in nature, with Warnock Lake drying during the summer months and with Caledon Creek flowing only during winter melt, spring freshet and late fall heavy rainfall event conditions (based on personal observations and communication with adjacent pit employees). The adjacent section of Caledon Creek is characterized as having intermittent flows, with several summer season site visits over the multi-year study period noting no stream channel waters at the Heart Lake Road crossing. At those times only standing water was observed within the wetland-floodplain environment immediately downstream.

Within the Subject Property, fish sampling was undertaken within Wetland 4 and Wetland 5, which support year-round surface water retention. Baited minnow traps were deployed for four hours on June 19, 2004 at both sites, with no fish captures made. Over the multi-year study period, no fish species have been observed at any time within these two wetland environments. Additionally, no forage activity from predator bird species (herons, etc.) or evidence of fish within these two surface water retention ponds were observed. Given these features are isolated with little water input source (primarily run-off events), nutrient and high organic material loading, it is expected that dissolved oxygen levels are below threshold limits in the summer season for fish survival. Therefore, it can be concluded that No Fish Habitat occurs within the Subject Lands that would meet the definition for Fish Habitat within the federal Fisheries Act.

The supporting groundwater assessment technical report has concluded no alterations are anticipated to Caledon Creek or Warnock Lake from the proposed below water table extraction. Therefore, with no groundwater alterations and no surface water linkage between the Subject Property and Caledon Creek or Warnock Lake, no adverse impacts on Fish Habitat within these two adjacent surface water features are expected from this proposed aggregate extraction operation.

No significant surface water flow patterns, groundwater flow patterns, source water input or riparian vegetation cover changes shall occur in lands adjacent to Warnock Lake and Caledon Creek. This surface water review has identified setbacks from the proposed licenced boundary measured 35 m from the identified fisheries habitat of Warnock Lake and 50 m from stream channel high water level of Caledon Creek. The setbacks exceed the 30 m setback from warmwater streams noted in the NHRM (MNR 2010, Table 11.3).

The 2017 hydrogeological assessment technical report has reviewed water contributions, groundwater alterations and potential impacts from the proposed below-water extraction operation to both surface water features that support fish habitat. A mitigation strategy has been proposed by Groundwater Science Corp. (2017) to be implemented along the northwest property boundary of the Subject Lands to negate potential off-site groundwater impacts to these surface water features and their associated fisheries habitat.

With the hydrogeological mitigation strategy in place, it is anticipated that no negative impacts will occur to the fish habitat provided by Warnock Lake and Caledon Creek.

5.2.3 Significant Wildlife Habitat

Species of Conservation Concern, Monarch Butterfly

Given the distance of the Subject Property from the Great Lakes (>5 km), there is no stopover or migration habitat for Monarch butterfly. Habitat present is limited to the species' breeding and feeding habitat. Monarch require Milkweed species upon which its larvae feed and develop. Adults of the eastern population of Monarch feed on nectar from asters, goldenrods, and other flowering herbaceous species. The SWH type for Species of Conservation Concern requires the habitat be easily mapped (MNRF 2015). In this case, Common Milkweed is found sparingly throughout the Subject Property and local landscape on road and field edges, and in agricultural patches. Infrequent mowing of the agricultural patches and roadsides does not allow for

continuous milkweed growth, making the plant's abundance difficult to map. The extraction footprint overlaps with some areas of agricultural fields where Common Milkweed is present when not mowed. Common Milkweed is also present on roadside edges, within agricultural lands retained as part of the catchment area for Wetland 4, and in cultural meadow and riparian habitat adjacent to Caledon Creek and Warnock Lake north of the Subject Property. No negative impact to breeding habitat for Monarch is anticipated due to the proposed extraction. Opportunities occur to improve/enhance habitat for this species through the use of restoration seed mixes which include Common Milkweed for open areas and post-extraction lake margins where appropriate.

Bat Maternity Colonies

Bat maternity colonies were confirmed on the Subject Lands within 3.65 ha of FOD5-2 and FOD3-1 forest community. This habitat is not limited on the Subject Property, as suitable roosting habitat also exists in the FOD5-7 forest community to be retained on Adjacent Lands. To retain and enhance this habitat function in the post extraction landscape, a reforestation strategy to increase suitable forest cover to the south of the extraction limit will be implemented prior to extraction. Additionally, bat boxes will be installed around the Operational Limits of the Subject Lands ahead of extraction to provide functioning artificial roosting structures during the Operational phase of the project. Notwithstanding these enhancement measures, avoidance of complete removal of snag habitat for bats will be incorporated into the Operational Phasing such that forest communities in later phases of extraction will be retained on site to provide rotational habitat for roosting bats. As earlier phases are extracted, trees in areas of woodland in later phases will mature to suitable decay classes to provide roosting habitat for bats. This provision of rotational successional forest habitat for roosting bats allows enhancement areas to mature during the operations lifecycle of the aggregate project. Given these measures, no negative impacts are expected on roosting habitat for bats, and opportunities occur for habitat enhancement.

Species of Conservation Concern, Eastern Wood-Pewee

Eastern Wood-Pewee was observed in woodland patches within 120 m ARA Adjacent Lands south of the proposed licence boundary. Maintaining the integrity of these patches provides protection to the habitat and thus to the species. Due to the irregular shape of these woodland patches, core habitat area is limited. Increases to the core area of the woodland will be targeted through reforestation efforts in open agricultural areas between the forest community patches. This reforestation effort will also provide some interior habitat where none currently exists. No negative impacts to Eastern Wood-Pewee habitat is expected.

Species of Conservation Concern, Snapping Turtle

One Snapping Turtle was observed in Wetland 4. While Snapping Turtles can travel long distances between aquatic habitat and nesting habitat, all types of habitat are present and available on the 120 m ARA Adjacent Lands. During Operations, fencing will be maintained along the edge of the Extraction Limit to prevent Snapping Turtle from inadvertent movement into active extraction areas. Protection of Wetland 4's surface water inputs as discussed in earlier sections of the report to address wetlands will also protect Snapping Turtle habitat. Rehabilitation targets include turtle nesting habitat along the shoreline of the post-extraction

lake. No negative impact is expected to this species and habitat – opportunities for habitat enhancement are present that will benefit this species.

Animal Movement Corridors

Animal movement corridors is a type of SWH identified in the Peel-Caledon Significant Woodland and Significant Wildlife Habitat Study (2009). The Peel Region 'Greenlands' and Town of Caledon 'Environmental Protection Area' Official Plans have identified a wildlife movement corridor along the riparian zone of Caledon Creek, immediately north of this Study Area. Two small portions of the Caledon EPA corridor designation occur within the very northwest and northeast corners of the Subject Lands, within active agricultural lands. This designated corridor zone provides limited aquatic/terrestrial linkage functions within this portion of the Caledon Creek riparian zone due to the limited forest cover within Lot 13, concession 2 EHS.

There are some more limited localized movement areas for wildlife within the broader landscape. This movement function has not been ascribed any significance by CVC or by the municipalities. The function is primarily a summer-fall intermittent occurrence for local fauna. The Subject Lands do not provide habitat that would function as seasonal migration corridor habitat, which is of greater significance to long-term sustainability of local wildlife populations. Localized movement patterns, specifically by deer and small mammals, were observed primarily along the southern property line, between vegetation communities FOD5-2, FOD5-8 and the forested lands on Lot 12, Concession 3 EHS.

Peel Official Plan Policy section 2.3.2.1 (b) 'Natural Areas and Corridors', is reflected in the Caledon Plan mapping of the EPA designated lands as shown within OP Figures 5 and 7b. Based on site features, field observations, land use practices and woodland ecological functions noted throughout, within the Subject Property, localized wildlife corridor functions are limited and focused along the southeastern property line.

With the inclusion of Wetland 4 and 6 as part of the Provincially Significant Star Wetland Complex, local vegetation linkages will be maintained for wildlife (including amphibian) movement and flora genetic diversity maintenance. Vegetation ELC communities CUW1 (14, 15 and 16), FOD8-1 and FOD6-5 provide a direct vegetated corridor to and from the Wetlands 4 and 6 areas and provide ecological functions attributed to the wetland Adjacent Lands features.

Municipal policies and CVC mapping have identified lands off-site as the primary wildlife corridors. Vegetation communities along the southern limit of the Subject Lands provide for local corridor movement, habitat for Species of Conservation Concern and ecological functions that support the Provincially Significant Wetlands within 120 m ARA Adjacent Lands. Woodlands along the perimeter of Lot 12 abutting the property Lot 12/Lot 11 line contribute to these local functions.

Through this impact assessment review, a pit 'Operational Limit' boundary was staked and surveyed in the field (depicted on **Figure 8, Appendix A**). This surveyed boundary delineates the northern and western extent of several overlapping significant natural heritage features and identified ecological functions along the Lot 12 southerly perimeter, which should be maintained as a local corridor-linkage. Negative impact to animal movement corridors is not anticipated.

5.2.4 Rare Vegetation Species

Table 3, Appendix B, provides a description of the vegetation communities found on the Subject Lands and within the 120 m ARA Adjacent Lands. The following provides more detail regarding the floristic surveys completed and the vascular plant diversity observed.

Botanical inventories completed on the Subject Property identified a total of 242 species of vascular plants, inclusive of AWS and Savanta data. Of that number, 181 (or 75%) are native and 61 (or 25%) are exotic. A full species list is included in **Appendix D**.

Most the native species (89%) are ranked S5 (secure in Ontario), while 19 species (11%) are ranked S4 (apparently secure in Ontario; NHIC, 2016). No provincially rare plant species were identified. Thirty-eight regionally rare plants were observed, as per the Peel Region rarity rankings (Varga et al. 2005). None of the species recorded from the Subject Lands had a coefficient of conservation value of 9 or 10.

No Butternut trees were observed on or adjacent to the Subject Lands. An NHIC search was undertaken for the Subject Lands using the MNRF Biodiversity Explorer. No rare or protected species have been historically documented (within the last 20 years) on or in the vicinity of the Subject Lands.

Floristic Quality Assessment values for all 181 native species are provided in **Appendix D**. The “coefficient of conservatism” scoring ranks for all native vascular plant species are based on a plants degree of fidelity to a range of synecological parameters.

Flora Species of Conservation Concern

No Butternut trees or other provincial/federal plant SAR were present on the Subject Lands, nor were any provincially rare plants present (i.e., S1 to S3 species). In total, 38 plants rare to Peel Region were observed on the Subject Lands (Varga 2005). Colony characterization for each species is provided in **Table 6 (Appendix B)**, with colony location mapping provided on **Figure 6 (Appendix A)**.

The surveys conducted by AWS identified 29 regionally rare plants. While it’s unknown what version of the Peel regional plant list was used, the presently accepted regional list (Varga 2005) indicates that 32 of the species observed by AWS are rare in Peel Region. The species documented by AWS but not previously identified as regionally rare are:

- Silvery Spleenwort (*Deparia acrostichoides*) (S4, R5);
- Royal Fern (*Osmunda regalis*) (S5, R8); and,
- White Spruce (*Picea glauca*) (S5, R3).

None of these species were documented during the 2016 Savanta survey; assuming they are still present, their exact location on the Subject Lands is uncertain. Silvery Spleenwort is known to occur in rich, moist deciduous or mixed forests, often around seeps or streams (Michigan Flora Online, 2016); on the Subject Lands, this species was potentially observed in a moist area of a forest. Royal Fern is known to occur in shaded swamps, often growing on hummocks in

very wet sites; this species was potentially observed in wet, transitional habitat where shallow marsh (MAS) transitioned into forest (FO). White Spruce is likely considered rare in Peel region because naturally occurring specimens are uncommon, though planted specimens are often encountered. Naturally occurring species tend to grow in swamps, forests, and stream borders; planted specimens could potentially grow anywhere on the Subject Lands.

5.3 Predicted Effects, Mitigation and Net Effects

Table 7 below provides a summary of impacts, predicted effects, proposed mitigation, rehabilitation and restoration measures and predicted net effects. Aspects of this work related to hydrogeological and hydrological conditions and predicted effects draw upon the reporting prepared by Groundwater Science Corp. (2017). These components are further discussed in the following text.

The following text summarizes predicted effects of the proposed extraction.

5.3.1 Habitat of Threatened or Endangered Species

Bird Species at Risk surveys in 2012, identified the occurrence of Bobolink (Threatened in Ontario), within the Subject Lands. Previous (2006) bird surveys within the Subject Lands had identified another provincially threatened bird, Eastern Meadowlark. A habitat assessment completed in 2016 confirmed that cultural meadow polygons on the Subject Lands are now too narrow in width due to growth of shrubs and presence of too many perches for predators to be considered suitable breeding habitat for either species. Species surveys completed in 2016 confirmed no breeding evidence from either species on the Subject Lands.

Surveys in 2016 confirmed the presence of Eastern Small-footed Myotis utilizing portions of woodland in the northwest corner of the site. The presence of this bat species using suitable habitat within the Subject Lands may trigger the *Endangered Species Act* (ESA), 2007. Follow-up discussions with the MNRF will define any potential permitting requirements that may be applied to these lands. The MNRF has not defined any Significant Habitat for these species as per the PPS, or Regulated Habitat under the ESA, therefore the general habitat provisions of the Act apply. These ESA considerations will be part of supplementary discussions with the MNRF.

5.3.2 Significant Wetlands

Four areas of significant wetland features have been reviewed as part of the impact assessment, all PSW features that occur beyond the Subject Lands but occurring within 120 m ARA Adjacent Lands. All wetland features are outside the proposed aggregate licence limits and will not be subject to direct effects.

The supporting hydrogeological report (Groundwater Science Corp. 2017) for the Subject Property indicates that mitigation is proposed to ensure the post extraction lake “water levelling effect” does not impact water conditions at off-site PSW areas and/or fish habitat. The mitigation measures to address potential effects are discussed further in the Hydrogeological Assessment Report (2017) and are summarized in this section of the NETR.

No surface water linkages have been identified from the Subject Lands to any surface water feature within the 120 m ARA Adjacent Lands. Emphasis has been placed upon a detailed understanding of how groundwater will respond in the operational and post extraction stages of the development of the Subject Lands. The supporting hydrogeology assessment report (2017) has reviewed water contribution, impacts, and mitigation design measures from the Subject Lands to the PSW Star Wetland Complex and Caledon Creek.

With the installation of the hydraulic barrier mitigation technology, hydrogeological conditions associated with Caledon Creek and the off-site PSW Star Wetland Complex are expected to be maintained. An overall minor reduction in contributions of baseflow from the Subject Lands downstream to the Credit River is predicted. The amount of reduction is expected to be immeasurable (i.e., 0.02%). Two isolated wetland features occur within the 120 m ARA Adjacent Lands, identified as Wetland 4 and Wetland 5. The supporting hydrogeology assessment report (2017) has characterized both wetlands as recharge features developed above the water table within depressions and having isolated catchment areas. The primary water input source is through seasonal surface run-off events and precipitation. The supporting Hydrogeological Assessment Report (2017) for the wetland catchment area mapping (see Figure 4 in Groundwater Science Corp, 2017) shows that the entirety of the catchment area for Wetland 3 is beyond the extraction limits, thus no alterations to surface water inputs shall occur. The same hydrology catchment area mapping shows that Wetland 4 has just under a third of its catchment area within the proposed extraction lands. While changes in natural drainage have been avoided and/or minimized through the proposed extraction plan, some catchment basin alteration is required to maintain the post extraction delivery of surface water to Wetland 4. Through mitigation measures on the extraction operations and design, this mitigation will limit potential hydrological changes in this feature to a net change in water input of about 0.8%.

This change in run-off contribution is within normal seasonal fluctuations for surface water run-off and is also consistent with other provincial guidelines for surface water protection that require water taking operations to be <10%, to maintain no ecological negative impacts on a surface water feature. No measurable ecological effects are predicted in the wetland areas conserved by this proposal.

The technical team engaged by the applicant (i.e., physical and ecological specialists) have completed a detailed review of groundwater functions, surface water patterns, hydrology catchment areas, wetland and adjacent land ecological functions and terrestrial linkages, and appropriate mitigation measures have been recommended and are depicted on the Operational Plans. These measures are intended to avoid potential negative impacts to these wetland features and their associated ecological functions.

The impact assessment work, with the implementation of recommended hydrogeological mitigation and natural environment mitigation measures, indicate that no negative impacts are predicted on the ecological functions provided to the identified significant wetland features.

5.3.3 Fish Habitat

This Level 2 report has determined that no Fish Habitat occurs within the Subject Property or within the proposed aggregate licence boundary. Therefore, no direct impacts to Fish Habitat are predicted.

Through the multi-disciplinary review, and as described in the Groundwater Science Corp (2017) report, it has been demonstrated that with the implementation of recommended mitigation measures including the hydraulic barrier, no adverse indirect alterations from groundwater or surface water quantity or quality will occur to the supporting habitat of Warnock Lake and Caledon Creek.

5.3.4 Other Woodlands

The contiguous woodland overlapping the Subject Lands (**Figure 5, Appendix A**) is less than the required 30 ha for designation as Core Woodland (Peel Region OP, 2016). It satisfies criteria for the secondary level of woodland importance in the Region (i.e., NAC) and falls under Other Woodlands in Town of Caledon Official Plan. Portions of the woodland within the extraction footprint include one type of significant wildlife habitat (bat maternity colonies), however the woodland patches are small, narrow and weakly connected. These patches provide no interior forest habitat.

Reforestation of the open agricultural areas to the south of the extraction limit, but on the Subject Property, will create some interior forest habitat (i.e., > 100 m from forest edge). Interior forest habitat is considered of high importance to biodiversity since this habitat type is rare in the Credit River Watershed, with less than 3% cover across the watershed (CVC, 2009). Interior forest provides suitable breeding habitat for Eastern Wood-Pewee, a species known to exist in patches south of the extraction limit on Adjacent Lands.

Additionally, reforestation mitigation measures in this location will connect two woodland patches, increasing the overall woodland size along the southeast boundary of the Subject Property by 2.1 ha.

Mitigation measures such as establishing adjacent forest cover setbacks to these features and ecological woodland functions, Limit of Extraction, Remedial Action sites for Tree Planting and Corridor Enhancement etc., are recommended to avoid and/or minimize any potential for negative impacts on these treed areas.

5.3.5 Significant Wildlife Habitat

With the removal of the central area vegetation cover on the Subject Lands some habitat for bats, Monarch butterfly, and regionally rare plant species may be impacted. A variety of measures to minimize and limit effects are proposed, including plant relocation, the creation of replacement habitat to support localized wildlife movement, diverse habitat creation and maintenance to support locally and provincially significant wetland environments. The more intact, contiguous and higher quality habitat for wildlife is being retained within the natural features to the south of the extraction limit on the Subject Property. With mitigation and with the

enhancement of the woodlands on the Subject Property, wildlife movement, connectivity, and local habitat for regionally rare plant species will be maintained.

Bat Maternity Colonies are located within portions of wooded features on the Subject Lands, as well as within woodland on 120 m ARA Adjacent Lands. This habitat type is not limited in the local landscape; enhancement to features providing this type of habitat within 120 m ARA Adjacent Lands are proposed. This SWH type overlaps with Habitat of Threatened and Endangered Species, a component addressed through the *Endangered Species Act* in a parallel process to this ARA Licence Application. Measures to achieve an overall benefit to bat species protected under the ESA will mutually benefit other bat species and therefore no negative impact to Significant Wildlife Habitat for Bat Maternity Colonies is expected.

No negative impacts are anticipated to Habitat for Species of Conservation Concern (Monarch and Snapping Turtle), located on 120 m ARA Adjacent Lands. With mitigation and with the enhancement measures proposed, habitat for these species will be enhanced in the post extraction landscape.

With natural environment setbacks, maintenance of key habitat diversity areas, local movement corridor functions and the maintenance of viable populations of locally rare flora and fauna, this proposed aggregate project will not lead to negative impacts on Significant Wildlife Habitat.

Table 7 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
PPS NATURAL HERITAGE FEATURES						
1. Significant Wetlands	Within Ontario, Significant Wetlands are identified by the MNRF or by designates. Other evaluated or unevaluated wetlands may be identified for conservation by the municipality or the conservation authority	Potential direct and/or indirect effects from extraction limit and/or operations such as change in topography due to extraction within portion of catchment area for Wetland #4	Potential reduction of surface water catchment area size	Avoidance of wetland by establishment of the Operational Limit based on environmental feature boundaries. Pit Operational Limit has been surveyed which is beyond the wetland boundary. Extraction/Site alteration lands maintain a minimum 15m setback to this surveyed Operational Limit line (which is beyond the wetland boundaries)	Estimated change in surface water input of 0.8% which will be within normal seasonal fluctuations No measurable negative impacts to the feature or its ecological functions are predicted	
	Wetland 4: <ul style="list-style-type: none">Wetland reliant on surface water inputs			PSW # 4 has a 20 m separation distance at its closest point from the extraction lands, sufficient for buffering a range of potential ecological effects Extraction operation phasing realignment and grade contours required to maintain volumes of surface water input Adjustment of the abutting operational extraction area between Wetland 4 and Heart Lake Road. Extending the catchment area eastward and establishing a new area to provide surface water input		
	Wetland 3 <ul style="list-style-type: none">Perched wetland reliant on surface water inputs	Potential direct and/or indirect effects from extraction limit and/or operations	No effects (direct or indirect) predicted	Realignment of extraction limit to provide 15 m offset to the operational line / licence boundary extending to the adjacent 'top of ridge', to maintain existing water balance	No measurable negative impacts to the feature or its ecological functions are predicted	

NATURAL HERITAGE FEATURES AND ASSOCIATED FUNCTIONS	SIGNIFICANT CHARACTERISTICS AND SENSITIVITY	IMPACTOR	PREDICTED EFFECTS	AVOIDANCE, MITIGATION AND/OR RESTORATION	NET EFFECTS	MONITORING AND MANAGEMENT
	Wetland 5 <ul style="list-style-type: none">Perched wetland reliant on surface water inputs	Potential direct and/or indirect effects from extraction limit and/or operations	No effects (direct or indirect) predicted	PSW # 6 has a 275 m separation distance at its closest point from the extraction lands, which is a sufficient buffer to maintain feature form and ecological functions	No measurable negative impacts to the feature or its ecological functions are predicted	N/A
2. Significant Coastal Wetlands	Not Present/not applicable	N/A	N/A	N/A	N/A	N/A
3. Significant Woodlands	Not Present/not applicable	N/A	N/A	N/A	N/A	N/A
4. Significant Valleylands	Not present/not applicable	N/A	N/A	N/A	N/A	N/A
5. Significant Wildlife Habitat	Subject Lands <ul style="list-style-type: none">Bat Maternity ColoniesHabitat for Species of Conservation Concern – Monarch Adjacent Lands <ul style="list-style-type: none">Amphibian Breeding HabitatHabitat for Species of Conservation Concern – Snapping TurtleHabitat for Species of Conservation Concern – Eastern Wood-Pewee	Vegetation removal for operations	Reduction of suitable habitat due to vegetation removal required for extraction. Mature forests with snags and trees suitable for roosting (over 25cm dbh) are retained within natural heritage features situated south of the proposed extraction limit Some open thicket and disturbed areas associated with the farmstead will be removed, temporarily reducing number of host plants used for Monarch breeding. The host plant for Monarch larva, Common Milkweed, is abundant on roadsides, field edges, and in pastures abundant in the surrounding landscape, including Adjacent Lands and licenced areas not within extraction limit	Phasing of extraction will allow younger forest patches to mature and provide suitable roost trees progressively during the Operations phase. Retention and enhancement of forest ecosites on Adjacent Lands will provide continuous Bat Maternity Colony habitat. In advance of tree clearing, habitat enhancement through reforestation on Adjacent Lands and through installation of roosting structures on edges of licenced lands will also be installed. While planted trees grow and mature, habitat for bats will be continuously available through progressive phasing of extraction areas. This measure allows progressive succession of woodlands within licenced boundary to provide roosting habitat for bats as trees mature to suitable decay classes	Increased foraging opportunities for open air foraging bat species No net change in available roosting sites suitable for bats during operations or during post-extraction condition Increase in suitable microhabitat for Eastern Wood-Pewee on Adjacent Lands through habitat enhancements	Monitoring of quantity of suitable bat roosting trees during operations phasing Monitoring of occupancy and use of bat roosting structures Enhancement plantings success Regular check by operations personnel of drift fencing for disrepair or impaired function

NATURAL HERITAGE FEATURES AND ASSOCIATED FUNCTIONS	SIGNIFICANT CHARACTERISTICS AND SENSITIVITY	IMPACTOR	PREDICTED EFFECTS	AVOIDANCE, MITIGATION AND/OR RESTORATION	NET EFFECTS	MONITORING AND MANAGEMENT
		Change in surface area catchment size for Wetland 4.	Potential change to water quality and quantity in Wetland 4. Potential for amphibian and reptile movement into extraction area from Wetland 4.	of Subject Lands, meadow and open areas will be seeded with mixes that include Common Milkweed to provide pesticide free host and nectar plants for the species Retention of all three wetland features. Movement corridor functions from/to Wetland 4 are anticipated to be in a southern orientation, outside of the extraction footprint. Drift fencing to be installed by Qualified Professional along extraction limit adjacent to woodland amphibian breeding and Wetland 4 prevent accidental movement of reptiles or amphibians into active extraction area Site rehabilitation measures will incorporate shoreline wetland communities and shallow marsh zones, as well as providing enhanced woody cover between forest patches to improve movement opportunities between upland habitats	areas retained for Wetland 4 catchment area Increased amphibian productivity anticipated from final pit rehabilitation design Increase in turtle nesting opportunities in vicinity of Wetland 4 and in final rehabilitated open water feature	
6. Fish Habitat	No fish habitat present on Subject Lands. Caledon Creek and Warnock Lake provide warmwater fish habitat on Adjacent Lands.	Extraction below water table, joining of CSG Concession II pond with new McCormick pond resulting in one large post- extraction pond.	No direct effects on fish habitat in Caledon Creek or Warnock Lake Water Table Drawdown: Extraction below water will cause drawdown effects on the order of less than 13 cm in the areas of more sensitive receptors offsite (i.e., Warnock Lake, Caledon Creek) Water Table Leveling: Water table leveling will occur due to the establishment of one larger post-extraction pond on the Subject lands. That leveling will see the water table change	Hydrogeological assessment has proposed a mitigation strategy through construction of a hydraulic barrier between the large lake proposed in a post extraction setting and Warnock Lake and Caledon Creek north of the Subject Lands. This mitigation technique has proven effective in a similar situation immediately to the west of the Subject Lands in an operation owned and run by Caledon Sand and Gravel Inc. (Groundwater Science Corp, 2017). In post-extraction conditions, the McCormick Pit post-extraction water feature will	No measurable groundwater level changes are predicted for the Provincially Significant Star Wetland Complex, Warnock Lake, Caledon Creek and their associated ecological functions (e.g. fish habitat) Resultant net loss of ground water contributions to the downstream Credit River of about 0.4 L/s, or about 0.02% of the Credit River flows (AECOM, 2013)	A Monitoring, Trigger Mechanisms and Contingency Plan is described in the 2017 Hydrogeological Assessment technical report to ensure the effectiveness of the ground water mitigation design

NATURAL HERITAGE FEATURES AND ASSOCIATED FUNCTIONS	SIGNIFICANT CHARACTERISTICS AND SENSITIVITY	IMPACTOR	PREDICTED EFFECTS	AVOIDANCE, MITIGATION AND/OR RESTORATION	NET EFFECTS	MONITORING AND MANAGEMENT
			between 0.7 m and 2 m along the boundary closest to Warnock Lake. This leveling will occur gradually over the life of the extraction operation (e.g., 14 years)	be joined with the CSG Concession II feature		
7. Habitat of Endangered and Threatened Species	Suitable roosting trees for Eastern Small-footed Myotis are present in woodland patches within the extraction footprint	Tree clearing activities will result in reduction of suitable maternity roosting snags	Reduction of suitable habitat due to vegetation removal required for extraction. Mature forests with snags and trees suitable for roosting (over 25cm dbh) are retained within natural heritage features situated south of the proposed extraction limit	Activities associated with achieving an overall benefit for Eastern Small-footed Myotis will be addressed through consultation with the MNRF outside of, but in parallel with the licence approvals process	Overall benefit to the species and its habitat through activities to be addressed under the ESA	Monitoring as confirmed through provisions under the ESA
8. Significant Areas of Natural and Scientific Interest	Not Present/not applicable	N/A	N/A	N/A	N/A	N/A
OTHER FEATURES AND FUNCTIONS						
1. Other Woodlands	Removal of portions of a woodland within extraction footprint	Extraction will occur where portions of woodland are present	Reduction in forest size	Extraction limits established to maintain important ecological functions associated with mature woodlands situated south of the proposed extraction area Progressive rehabilitation through tree planting around portions of below-water extraction area Restoration plantings will begin in advance of extraction on open agricultural lands situated on Adjacent Lands south of the proposed extraction area. Stock used will be collected from vegetation on Subject Lands Extraction below water limits area available on site for woodland reforestation. Adjacent Lands owned by the Applicant will be reforested as part of progressive rehabilitation, with focus on a range of habitat types that enhance ecological values	Functions provided in portions of woodland on the Subject Lands will be maintained in portions of woodland to remain on the local landscape. Wildlife movement function persists in southern corridor on the Subject Property, and genetic stock of vegetation from portions removed will be preserved through advanced and progressive rehabilitation through reforestation	Enhancement and reforestation planting success monitoring

NATURAL HERITAGE FEATURES AND ASSOCIATED FUNCTIONS	SIGNIFICANT CHARACTERISTICS AND SENSITIVITY	IMPACTOR	PREDICTED EFFECTS	AVOIDANCE, MITIGATION AND/OR RESTORATION	NET EFFECTS	MONITORING AND MANAGEMENT
2. Regionally and Locally Important Species	No regionally important species were identified Three small colonies of the locally significant sedge <i>Carex sprengelli</i> within the extraction lands of ELC communities FOD3-1 and FOD5-7 One colony of the locally significant sedge <i>Carex cephaloides</i> within the extraction lands of ELC community FOD5-7	Vegetation removal during Operations may result in removal of locally rare plant species	Population impact on <i>Carex sprengellii</i> anticipated to be <10% Primary and seed source colony is located within ELC community FOD5-8 which is maintained	Single colony of <i>Carex cephaloides</i> shall be relocated to suitable habitat within the interior of ELC colony FOD5-2 prior to vegetation removal of ELC community FOD5-7	Minor negative impact to the population of the identified locally rare flora on the Subject Lands will be limited and localized, considered to be within natural population number fluctuations No long-term effects anticipated No loss of indigenous genetic stock	None required
3. Environmentally Significant Areas	Not Present/ Not Applicable	N/A	N/A	N/A	N/A	N/A
4. Other – Presence of Species under the ESA	Eastern Small-footed Myotis was confirmed to be present on the Subject Lands. Disturbance to wooded areas during their active roosting season could result in harm or harassment and contravention of the ESA	Vegetation removal	Inadvertent harm or harassment to bat species	Any tree removal should occur outside of the active bat roosting window of April 1 – September 30 (approximate)	None predicted	Monitoring commitments as per ESA conditions provided in consultation with MNRF
5. Other - Presence of Species Under the Migratory Birds Convention Act	The federal <i>Migratory Birds Convention Act</i> (MBCA) prohibits the killing, capturing, injuring, taking or disturbing of migratory birds (including eggs) or the damaging, destroying, removing or disturbing of nests	During Operations, vegetation removal, and topsoil stripping/grading, migratory birds, eggs and nests could inadvertently be harmed	Inadvertent harm to migratory birds or their eggs or nests	Any tree or vegetation removal should occur outside of the migratory bird-nesting window of April 1 – August 31 (approximate). In rare circumstances where this window cannot be avoided, a nest search by a qualified ecologist is recommended and a buffer will be marked off surrounding any active nests that must be maintained until activity in the nest has ceased	With the implementation of the mitigation measures, no net effect is anticipated	None.

Note: The updated Niagara Escarpment Plan is generally aligned with the PPS; it is considered in this table in the same context as the

6 REGION OF PEEL GREENLANDS AND TOWN OF CALEDON ECOSYSTEM FRAMEWORK ASSESSMENT

The Regional Official Plan implements the Provincial Policy Statement's (PPS) natural features policies through the Greenlands System's Core Areas, Natural Areas and Corridors (NAC) and Potential Natural Areas and Corridors (PNAC) policy framework. The Regional Official Plan outlines natural heritage policies and identifies the following components as Core Areas (Schedule A) of the Peel Greenlands system (Peel OP, Policy 2.3.2.2):

- Significant wetlands;
- Significant coastal wetlands;
- Core woodlands meeting one or more criteria in Table 1;
- Environmentally Sensitive or Significant Areas;
- Provincial Life Science ANSIs;
- Significant habitats of threatened and endangered species;
- Escarpment Natural Areas of the Niagara Escarpment Plan; and,
- Core Valley and Stream corridors meeting one or more criteria in Table 2.

The town of Caledon Official Plan incorporates and refines the Regional Greenlands System in a manner that conforms with the ROP and organizes ecosystem components into four categories:

- Natural Core Areas;
- Natural Corridors;
- Supportive Natural Systems; and
- Natural Linkages.

Given that the Town of Caledon Official Plan is in conformity with the Peel Region Official Plan, Peel Greenlands will be discussed under appropriate Town of Caledon Ecosystem Framework categories within this section.

Many of the Peel Region and Town of Caledon components present on the Subject Lands and Adjacent Lands are discussed in other sections of this report. For clarity, references to applicable sections addressing Peel Greenlands and Town of Caledon Ecosystem Framework components are provided in **Table 8, below**).

Table 8: Natural Heritage Components on the Subject Lands and Within 120 m Adjacent Lands as Identified under Town of Caledon Ecosystem Framework (Table 3.1)

ECOSYSTEM FRAMEWORK CATEGORY	WITHIN SUBJECT LANDS	WITHIN 120m ADJACENT LANDS	REPORT SECTION REFERENCE
NATURAL CORE AREAS			
Significant Wildlife Habitat (Bat Maternity Colonies)	Yes	Yes	Sections 4.6, 5.2.3, and 5.3.5
Significant Wildlife Habitat (Species of Conservation Concern – Monarch)	Yes	Yes	Sections 4.6, 5.2.3, and 5.3.5
Significant Wildlife Habitat (Amphibian Breeding Habitat – Woodland / Wetlands 4 and 6)	No	Yes	Sections 4.6, 5.2.3, and 5.3.5
Significant Wildlife Habitat (Species of Conservation Concern – Eastern Wood-Pewee)	No	Yes	Sections 4.6, 5.2.3, and 5.3.5
Wetland Core Areas (Star Complex Provincially Significant Wetland)	No	Yes	Sections 5.2.1 and 7.1.2.
Fish Habitat (Warnock Lake and Caledon Creek)	No	Yes	Sections 4.2, 5.2.2, and 5.3.3
NATURAL CORRIDORS			
Valley and Stream Corridors (Caledon Creek)	No	Yes	Sections 4.2, 5.2.2, and 5.3.3
SUPPORTIVE NATURAL SYSTEMS			
Other Woodlands	Yes	Yes	Sections 4.8.3 and 5.3.4
Habitat of Threatened and Endangered Species	Yes	No	Sections 4.1 and
Other Wildlife Habitat	Yes	Yes	Sections 3.1.2 and 7
NATURAL LINKAGES			
Other Woodlands	Yes	Yes	Sections 4.8.3, 5.3.4, Section 7

Development proposals adjacent to Environmental Policy Areas (Core Areas) or containing Supportive Natural Systems and Natural Linkages are required to conduct appropriate environmental studies/investigations, up to, and including an EIS & MP in accordance with the provisions of section 5.7 (OP 3.1.4.7). The Provincially Significant Star Wetland Complex and associated Caledon Creek riparian zone are considered Peel Greenland Core Areas and EPA in the Town OP. The Town OP Schedule A also depicts lands immediately south of Escarpment Sideroad as EPA, however this area is over 600 m south of the property.

7 SUBWATERSHED IMPACT ASSESSMENT

To support the proposed extraction limit within and adjacent to Woodlands and Significant Wildlife Habitat as defined in the Town of Caledon Official Plan (2016), certain conditions need to be met as outlined in 5.11.2.2.6.

The Caledon Creek subwatershed study (CVC, 2001) identifies impacts from aggregate resource extraction in Subwatershed 16, Caledon Creek. Impacts identified on terrestrial ecosystems, such as those present on the Subject Property, includes breaking up corridors, encroaching on habitat, and decreasing the amount of interior habitat, which is sparse in both subwatersheds.

An analysis of these identified impacts as they relate to the Subject Property are discussed below.

Corridors

Linkage functions on the Subject Property are discussed earlier in section 5.2.3 under Animal Movement Corridors. The forested and interconnected woodlands on the Subject Property provide a limited and localized linkage function between the forested/PSW habitat around the perimeter of Warnock Lake and the forested area within the Greenland system east and south of the Subject Property. The more important linkage function has been identified in municipal planning documents as the riparian zone along Caledon Creek, north of the Subject Property. Intensive field investigations have delineated a localized linkage function along the south perimeter of the Subject Property, outside the licence boundary lands. Enhancement measures to bolster the connectivity of the features to the south of the licence boundary are discussed further in sections 7, 9 and 10.

Encroachment on Habitat

Habitat on the Subject Lands is concentrated in the natural features excluded from the proposed licence boundary, except for habitat for Eastern Small-footed Myotis. The habitat used by this species of bat is not unique in the subwatershed, and much is proposed for exclusion from the licenced boundary.

The passive agriculture land use over the last few decades plus occasional land clearing (grading & tilling) over portions of the Subject Lands has provided an opportunity for early succession tree species to colonize inactive agricultural lands. With periodic livestock disturbance that reduces tree and shrub density in some areas of the Subject Lands, narrow areas of successional thicket meadow are evident.

The Subject Lands and 120 m ARA Adjacent Lands do contain some areas that are identified as Significant Wetland and Significant Wildlife Habitat.

The woodland environment and three wetland features on the Subject Property provide habitat for 28 species of locally rare flora, with some colonies exhibiting healthy, dense growth.

The isolated Wetland 4 located on 120 m ARA Adjacent Lands, provides a specialized habitat for amphibian breeding and habitat for Snapping Turtle, a Special Concern species.

Thirty-seven bird species have been observed using the Subject Property. Eastern Wood-Pewee is ranked Special Concern, and is present in portions of woodland to be excluded from the licence boundary. The Subject Property also supports Monarch Butterfly and Snapping Turtle, each a Special Concern species in Ontario. In addition, some regionally rare butterflies, moths and dragonfly species were recorded utilizing habitat within the Subject Lands.

The significance of these features has been discussed in detail in earlier sections of this report. Avoidance measures, mitigation, enhancement and progressive rehabilitation to address impacts to these features is presented in Section 7 of this report.

Decreasing Interior Habitat

Interior habitat is not present currently on the Subject Property, and is known to be sparse in the Caledon Creek subwatershed (SWS 2001). Upon planting of the woodland restoration area associated with the portions of woodland excluded from the licence boundary, interior forest habitat will exist on the Subject Property.

8 NIAGARA ESCARPMENT PLAN POLICIES

Policies of the Provincial Greenbelt Plan, do not apply within the subject study lands (as per NEC earlier review commenting), as section 2.2 of the Greenbelt Plan states:

The requirements of the NEP, established under the Niagara Escarpment Planning and Development Act, continue to apply and the Protected Countryside policies do not apply with the exception of section 3.3 (Parkland, Open Spaces and Trails).

The Subject Property is designated by the NEC as 'Escarpment Rural Area', as shown on **Figure 3 (Appendix A)** of this report. This text provides a summary of ecological considerations related to the NEP and provides input to the planning reporting and opinions.

Protection of the groundwater and surface water systems on a watershed basis:

No surface water flows exit the proposed licenced boundary, thus no surface water flow patterns alterations are anticipated. Groundwater features and functions have been reviewed through the Hydrogeological report with mitigative measures recommended to avoid negative impacts.

Protection of the habitat of rare, vulnerable, threatened or endangered species:

Habitat supporting identified Endangered bat species on-site must demonstrate compliance to the *Endangered Species Act, 2007*. Habitat for Flora and Fauna species of local rarity (species of conservation concern) have been addressed, with the majority seeing no impacts, while some flora and fauna habitat minor impacts are mitigated through relocation, reforestation, or pit rehabilitation plans.

Protection of the Provincially significant wetlands:

The Provincially Significant Wetland has been reviewed, for potential impacts on hydrologic and hydrogeologic functions and associated ecological features. With the implementation of mitigation measures (e.g., buffers/setbacks, catchment change mitigation) no negative impacts to are predicted.

Protection of the Provincially significant ANSI's:

No significant ANSI occurs on the Subject Lands or the immediate surrounding landscape.
Maintenance and enhancement of the quality and character of natural systems, water supplies, including fish habitat:

All significant aquatic and terrestrial systems within the Subject Lands and surrounding landscape have been reviewed and will be maintained, with aspects enhanced through reforestation and pit rehabilitation design. Water supplies have been addressed, along with the protection and maintenance of surrounding Fish Habitat.

New Development Within Wooded Areas and Wildlife Habitat:

Operational limits and extraction setback/buffers incorporate the majority of the relatively more mature forest stands, minimizing tree loss on the proposed Subject Property. Habitat supporting identified Threatened bird species on-site needs to be addressed through the *Endangered Species Act, 2007*. For significant plant species that occur within the extraction lands relocation measures have been recommended for those having low population numbers on-site. Bird nesting habitat impacts will be limited and localized, with reforestation increasing terrestrial linkages.

Wildlife corridors have been identified with corridor functions maintained, through habitat enhancements recommended for mitigative measures to address minor impacts from the removal of on-site immature tree and shrub cover.

9 MITIGATION AND ENHANCEMENT

The following mitigation and enhancement measures shall be represented on Operational Plan drawings to address the identified potential negative environmental impacts from the proposed aggregate extraction operation. These measures are recommended to maintain the ecological function of natural heritage features that have been identified and are in keeping with Provincial and Municipal policies and guidelines. The enhancement opportunities associated with mitigation and improvements to ecological functions are also considered in the following section. Recommendations are provided to advance the establishment of mitigation and enhancement measures, wherever possible, to avoid and limit any potential temporal effects associated with extraction.

- The extraction limit shall maintain a minimum setback distance of 15 m from the identified and surveyed 'Operational Limit', as shown on (**Figure 10, Appendix A**).
 - No site alterations associated with the pit operations shall occur beyond the 'operational limit' line.
- Prior to adversely altering any surface water input to Wetland 4 (PSW #4) existing catchment area, as delineated on Figure 4 of Groundwater Science Corp 2017 technical report, appropriate operational measures shall be put in place to maintain a surface water catchment area to Wetland 4 that shall not decrease catchment size by more than 10% over pre-extraction conditions.
- The aggregate extraction design shall reflect the intent of the identified extraction 'constraint area' shown on the NETR Figure 10 for surface water input maintenance to Wetland 4.
 - Proposed extraction limits for this constraint zone area can be found within the Groundwater Science Corp. (2017) supporting technical report with the pre and post extraction catchment area for Wetland 4, consistent with mitigation.
- All surface water runoff (if any) during the pit operational periods must be collected within the 'extraction zone' and be maintained within settling basins for gradual infiltration into the shallow groundwater. No discharge of pumped water from the site has been proposed.
- No site or sequential compartment vegetation clearing or overburden stripping shall occur that has natural tree/shrub cover (lands other than active cash crop fields) from April 1 to September 30 in any given year. This will provide sufficient protection for any active bird nests or bat roosting and is in accordance with the federal *Migratory Birds Convention Act* requirements. Any additional specific timing constraints identified by the MNRF related to Eastern Small-footed Myotis will be respected.
- Woodlands retained within the extraction footprint will provide ongoing rotational roosting habitat for bats. Woodland patches will mature to sufficient decay classes to provide roosting habitat for bats. The extraction will be phased such that woodland patches outside the active extraction area will be retained until each phase has been completed.

- The rehabilitation plan shall incorporate at a minimum the following aspects for woodland and wildlife habitat enhancement:
 - A shallow water marsh environment around the excavated pond perimeter, having a minimum 3:1 side slope and strewn with scattered boulders and embedded woody debris that have portions above surface to allow for turtle basking. Shallow water areas are to be planted with emergent aquatic plant species native to the local landscape;
 - An extended tree planting zone having an overall final minimum corridor width of 30 m along the Subject Property southwesterly property boundary;
 - A reforestation zone along the northerly tip area of Wetland 4 (PSW #4) which extends to the excavation pond perimeter and provides linkage habitat at least 30 m in width; and
 - Remainder of the shoreline environment to be irregularly naturalized through planting of native trees and shrub seedlings with habitat features that include turtle nesting mounds and raptor perches.
- The colony of *Carex cephaloides* (Thin-leaf Sedge) identified within ELC community FOD5-7, shall be relocated to suitable habitat within the interior of ELC community FOD5-2, prior to any site alterations or vegetation removal of ELC community FOD5-7. This plant relocation work shall be undertaken according to a Transplantation Plan and will be implemented in the month of June (immediately following plant fruiting and seed harvest as supplemental mitigation), by qualified and experienced personnel, with monitoring requirements as outlined under NETR section 11.

9.1 Rehabilitation and Enhancement: Post-Extraction

Several areas on the Subject Property, both within Subject Lands, and within 120 m ARA Adjacent Lands, are not proposed for extraction and will be used for ecological enhancements. The natural areas conserved and enhanced on the Subject Lands will contribute at a local scale to a more robust, linked regional natural heritage system, which is aligned along a broad, naturally vegetated matrix south of the Subject Property. That matrix forms an important corridor and linkage area, connecting to the south and southwest with large blocks of forested land on the Niagara Escarpment. Similarly that matrix connects to the east and southeast, with large Oak Ridges Moraine and Humber River headwater forests.

The areas of enhancement on the Subject Lands and the areas of rehabilitation on the Subject Property present an opportunity to reflect advances in the field of ecological restoration in Ontario. Recognizing that the post-extraction landscape will include a mix of open water, shoreline and terrestrial components, the Subject Lands are planned to achieve an increase in biodiversity. The composition, structure and resilience of the rehabilitated ecosystem have been considered in the enhancement and rehabilitation planning. The increased richness and abundance established in the final landscape will serve as a source for vegetation and wildlife species that can populate the local landscape. The increased presence of open water and shallow marsh will provide some buffer against periodic droughts expected to continue to occur in this landscape, associated with climate change. The open water area may serve, for example, as a reservoir for some species dependent upon permanent water on the landscape (e.g., turtles, Bullfrog). They may also serve as reservoirs to supply other natural areas or to reduce/control local fire hazards in extreme climate situations.

While the details of the enhancement and rehabilitation measures are provided on the Site Plans, a summary of proposed measures has been provided below.

The Subject Lands shall be rehabilitated to:

Lake and Wetland Shoreline	11.30 ha
Marsh	2.80 ha
Meadow	6.75 ha
Forest	1.75 ha

Total Area Rehabilitated Within Extraction Area: 22.6 ha

Forest Restoration Outside of Extraction Area: 2.0 ha

Total Rehabilitation 24.6 ha

Restoration efforts should include interpretative signage and wildlife crossing signs along Heart Lake Road. Wildlife habitat features proposed will provide opportunities for more wildlife to colonize and reside in the area, and signs describing the features and species known as

residents on the Subject Property will aid with stewardship of the natural heritage features of the Caledon Creek subwatershed. The locations of these signs will be included on the site plans. Restoration of the pond will generally be accomplished by extraction and rough grading to create a nearshore shoreline area at a slope of 10:1. Underwater slopes (with a maximum slope of 2:1) will be formed with on-site fill. The pit floor shall be left irregular and the edges shall be sculpted for physical variety, in turn providing opportunity for added biological diversity and productivity.

Woody debris such as branches, tree trunks, and stumps, cleared in the extraction process will be salvaged where possible, for use in shoreline restoration / underwater habitat enhancement. Stumps, logs, brush bundles shall be installed ± 30 m o.c. along the shoreline in the shallow zone to provide refuge areas for aquatic animals and to provide visual diversity. Oversize rocks not utilized in the aggregate operations will also be placed in the shallow zone to provide basking habitat.

Rehabilitation efforts will incorporate areas that will be suitable for turtle nesting. To encourage this use, three nesting areas will be constructed northeast of the pond, in upland areas of shoreline to ensure a south facing slope. Artificial turtle nesting beaches are composed of a gravel and sand mixture that replicates natural turtle nesting habitat. Different depths of gravel and sand substrate are created along the length of the nesting area to create variations in temperature and moisture. The sand and gravel mixture is to be a suitable depth to allow for excavation and egg-laying. Each nest should be approximately 10 m x 8 m.

The shoreline will be sporadically naturalized with woody plant species. Plantings will include only native species such as:

- Red Maple (*Acer rubrum*);
- White Spruce (*Picea glauca*);
- Eastern White Pine (*Pinus strobus*);
- Pussy Willow (*Salix discolor*);
- Speckled Alder (*Alnus incana*);
- Silver Maple (*Acer saccharinum*);
- Eastern White Cedar (*Thuja occidentalis*); and
- Red Osier Dogwood (*Cornus stolonifera*).

Initial shoreline areas shall be planted with clumps of emergent and submergent native wetland plants to initiate colonization of the site as nutrient levels increase to support them. Native wetland plants such as:

- Floating Pondweed (*Potamogeton natans*);
- Coontail (*Ceratophyllum demersum*);
- Soft-stemmed Bulrush (*Schoenoplectus tabernaemontani*);
- River Bulrush (*Bolboschoenus fluvialis*);
- Pickerel Weed (*Pontederia cordata*); and
- Broad-leaved Arrowhead (*Sagittaria latifolia*).

Aquatic plants will be installed in clusters of 5 at appropriate depths to begin colonization. All vegetated slopes will be maintained in a healthy and vigorous growing condition.

Upland areas shall be reforested, where shown on site plans, with native species which may include the following (dependent on availability), and should include at least two pollinator tree species (indicated by “*”):

- Eastern White Pine (*Pinus strobus*);
- Red Pine (*Pinus resinosa*);
- White Spruce (*Picea glauca*);
- Eastern White Cedar (*Thuja occidentalis*);
- Silver Maple (*Acer saccharinum*);
- Sugar Maple (*Acer saccharum*);
- Red Maple (*Acer rubrum*)*;
- Paper Birch (*Betula papyrifera*);
- Staghorn Sumac (*Rhus typhina*);
- Bur Oak (*Quercus macrocarpa*);
- Northern Red Oak (*Quercus rubra*);
- Black Cherry (*Prunus serotina*)*;
- Basswood (*Tilia americana*)*;
- Grey Dogwood (*Cornus racemosa*);
- Chokecherry (*Prunus virginiana*);
- Red Chokeberry (*Aronia arbutifolia*);
- Common Elderberry (*Sambucus canadensis*); and
- Nannyberry (*Viburnum lentago*).

Nurse crop species will include:

- Eastern Cottonwood (*Populus deltoids*);
- Trembling Aspen (*Populus tremuloides*); and
- Hybrid Poplars (*Populus* sp.)

A nurse crop of deciduous tree species will be selectively planted to provide cover for the hardwood trees proposed above. Oak, White Spruce, Sugar Maple, Red Maple and Basswood are species that have a higher success rate when grown in partly shaded conditions. These conditions are to be created by planting fast growing Poplar species while underplanting the hardwood species noted for their preference to shaded conditions.

Berms will be planted with open meadow and pollinator species. Native flowering species will include species such as:

- Common Milkweed (*Asclepias syriaca*);
- Wild Bergamot (*Monarda fistulosa*);
- Brown Eyed Susan (*Rudbeckia triloba*);
- Common Evening Primrose (*Oenothera biennis*);
- New England Aster (*Symphyotrichum novae-angliae*); and

- Early Goldenrod (*Solidago juncea*).

Pollinator habitat will be created through two habitat types, a pollinator supporting forest and a sloped open meadow habitat along the berms. The pollinator forest will be planted with tree species that are known to flower, with species selected by their range in blooming times. Red Maple blooms in the early spring, Black Cherry blooms mid-spring and Basswood flowers from late May to July. These species will be the foundation of the pollinator forest, as they flower at different times in the spring and summer, additionally Basswood is known for having one of the longest bloom times of all native species and is still in bloom when most other species are no longer in flower.

The open meadow habitat along the berms will provide ideal conditions for many pollinator species, but will also target Monarch Butterflies, which are listed as special concern in Ontario and endangered in Canada. The key herbaceous species for Monarch habitat is Common Milkweed, as they need the plant to complete their lifecycle however there are many other species that are particularly useful when creating pollinator habitat, as listed above. The herbaceous species will provide dual benefits, a food source for pollinators and as a soil stabilization tool along the berms. The berms should also include some herbaceous species such as grasses, and include a periodic shrub species for deeper ground penetration. Wild Bergamot and Common Evening Primrose also provide both pollinator forage and slope stabilization.

Areas selected for reforestation are currently used for pasture and other agricultural purposes. These areas were selected based on their suitability to enhance woodlands on the Subject Property, and for their potential to be converted back to agricultural uses in the future.

In addition to reforesting open areas, enhancements to existing forest communities will assist with long-term persistence of Eastern Wood-Pewee, which are known to inhabit low canopy layers in forest clearings or forest edges in the local landscape. Understory management and removal of invasive plants will increase foraging opportunities. Retention of dead branches on mature tree specimens within the forest community will provide hunting perches. The species tends to prefer intermediate to mature forests (>40 cm DBH) with relatively little understory.

The Subject Property will be host to 25 bat boxes installed prior to the first phase of extraction. Boxes should be designed with least three interior chambers houses with wood roughened to allow for bats to grip and hang from surfaces. Boxes are to be mounted back to back on each pole, one facing north and one facing south. Boxes should be placed where early day sun can provide radiant heat, and should be mounted 3 m to 4 m off the ground on poles. Bat boxes should be situated between the open water feature and the forest edge, and at meadow and forest interfaces. Exact locations are to be determined by a qualified environmental professional with knowledge of Ontario bat species.

By Increasing the availability of aerial insect prey including flies, bugs, butterflies, moths, bees, wasps, beetles, grasshoppers, crickets, stoneflies, and mayflies, bat foraging will be encouraged. To achieve this, flowering plant species will be included in seed mixes used to revegetate any adjacent meadow habitats to attract the insects.

After side slopes are created and required berms are removed from setbacks adjacent to Heart Lake Road these areas will be immediately stabilized with a suitable groundcover and then reforested the following spring. Setback areas proposed for reforestation and devoid of berms will be planted within two years of licence issuance.

Within the Subject Lands extraction area, rehabilitation goals for habitat types have focused on providing greater ecological values, including:

- Increased habitat diversity and connectivity;
- Enhanced local linkages, and contribution to a strengthened landscape linkage from the Caledon Creek headwaters into the Main Branch of the Humber near Bolton/Palgrave;
- Increased habitat types considered to be under-represented within this watershed (per CVC Watershed Reports);
- Expanded/enhanced habitat types beneficial to flora and fauna Species of Conservation Concern e.g., Snapping Turtle, Eastern Wood-Pewee, and Monarch;
- Increased aquatic habitat for amphibians, odonates, and turtles to aid in population viability and growth;
- Increased nesting and basking habitat availability for Snapping Turtle; and
- Increased suitable habitat for bat maternity colonies.

10 MONITORING

Monitoring of the Rare Flora Colony transplantation/propagation (Thin-leaf Sedge), installed Wildlife Habitat Features, and Reforestation shall be undertaken after each stage of rehabilitation site works has been completed. The duration and frequency of monitoring is conditional on the type of monitoring required, as outlined below. All monitoring is to be completed by a qualified environmental professional.

Findings are to be summarized in a report submitted to the MNRF in the year such monitoring has occurred.

Monitoring inspections shall be undertaken during seasonally appropriate times as determined by qualified professional and will continue for durations indicated. Any visible negative impacts associated with the pit operations within the monitoring zones shall be assessed, and recommended remedial action works and contingency planning are to be included in annual reporting.

- Visual inspection of the reforestation area is to take place in years 1, 3, 5, and 10 after planting by a qualified environmental professional. Reforested areas are to be assessed for change in canopy coverage and survival percentage. Assessment should include where 'in-filling' is warranted should planting mortalities exceed 10% any given year or 15% cumulative over the first five years. Monitoring is to include photographic documentation.
- Annual visual inspection by a qualified environmental professional of the transplanted/propagated locally rare Thin-leaf Sedge colony for general health and survivorship, with photographic documentation. Inspection should occur at a seasonally appropriate time of year to assess health and survivorship of plant specimens. Monitoring of transplanted rare flora colony should occur once annually for 3 years post-transplantation.
- Annual visual inspection by a qualified environmental professional of wildlife habitat features (turtle nesting mounds and bat boxes) for installation stability, signs of use by target or other wildlife species, and photographic documentation. Inspections are to take place during seasonally appropriate times to best detect use by target species. Monitoring of habitat feature should occur once annually for 3 years post-installation.

11 CONCLUSIONS AND RECOMMENDATIONS

The proposed extraction on the Subject Property will affect habitats and species that are mostly locally common and widespread. No provincially significant features, or populations will be affected by the proposed extraction on the Subject Lands. Rehabilitation measures of the pit will see a long-term net gain for suitable habitat for bat species observed to be using the Subject Lands. Additionally, recommendations contained in this report provide for the conservation of locally important habitat and for the transplantation of plant species of local concern.

This report and the supporting Hydrogeological Assessment report have examined the potential for negative effects on natural features and functions within and beyond the Subject Property. More specifically, potential hydrogeological effects associated with proposed extraction below the water table and with the post-extraction establishment of a lake feature have been considered. The potential effects have been identified and addressed with a proposed mitigation program (using barrier technology described further in Groundwater Science Corp. 2017).

With mitigation and the implementation of a series of recommendations presented in this report, no effects are predicted to occur on the important features both on-site and off-site (i.e., Star Wetland Complex, Caledon Creek, Woodland Linkages). This report has demonstrated that with the proper mitigative measures in place, no measurable negative impacts should occur to the natural heritage features or their associated functions. Recognizing that the post-extraction landscape will include a mix of open water, shoreline and terrestrial components, the Subject Lands are planned to achieve an increase in biodiversity. The composition, structure and resilience of the rehabilitated ecosystem have been considered in the enhancement and rehabilitation planning. Enhancement and rehabilitation will contribute at a local scale to the robust, linked regional natural heritage system connecting the Subject Lands with the Niagara Escarpment and with large natural areas of the Oak Ridges Moraine and Humber River headwater forests.

In terms of increased resilience, the proposed open water and shallow marsh will provide some buffer against periodic droughts expected to continue to occur in this landscape, associated with climate change. The open water area may serve, for example, as a reservoir for some species dependent upon permanent water on the landscape (e.g., turtles, Bullfrog).

All comments contained within this report pertain to available literature, reports, documents and existing site conditions for this Study Area. All ELC boundaries and rare plant colonies were plotted with hand held GPS units and/or mapped through field air photography/topographical estimation within +/- 2m. The field staked 'operational limit' has been surveyed by an Ontario Land Surveyor company and incorporated into these detailed site maps and the Site Plans. The full maps contained within this report should not be considered 'a legal survey' but are adequate for this planning/application review process and are based on the Site Plans by Harrington McAvan Ltd.

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APPENDICES

Appendix A – Figures

Appendix B – Tables

Appendix C – Correspondence

Appendix D – Ecological Data

Appendix A – Figures

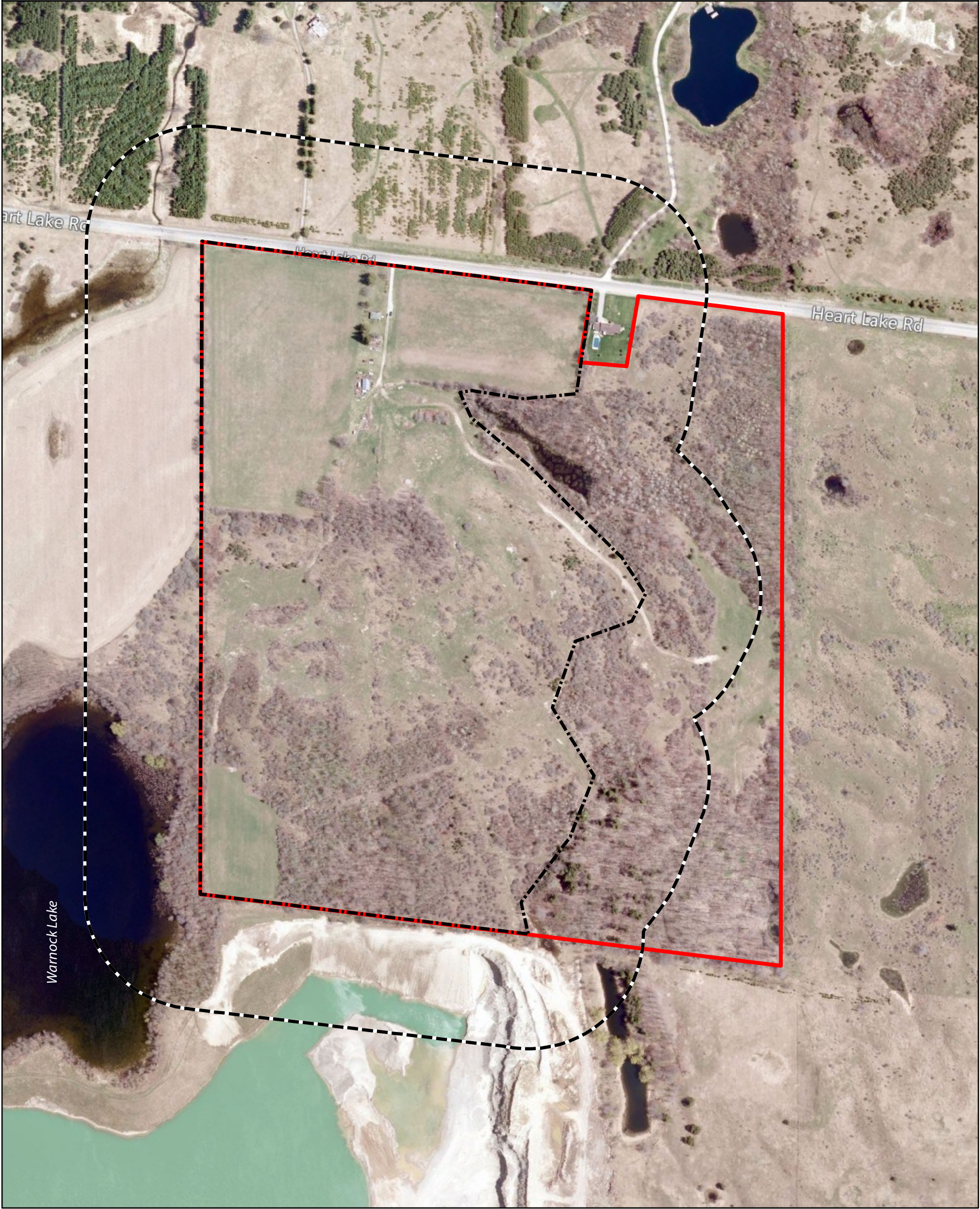
Figure 1	Site Location
Figure 2	Study Lands
Figure 3	Natural Heritage Features
Figure 4	Ecological Land Classification
Figure 5	Woodlands
Figure 6	Locally Significant Flora, Colony Sites
Figure 7	Significant Wildlife Habitat
Figure 8	Natural Environment Feature – Maximum Operational Limit
Figure 9	Natural Environment Setback and Constraints



McCormick Pit - Blueland Farms




Figure 1
Location of Subject Lands





0 40 80 Meters
1:4,000

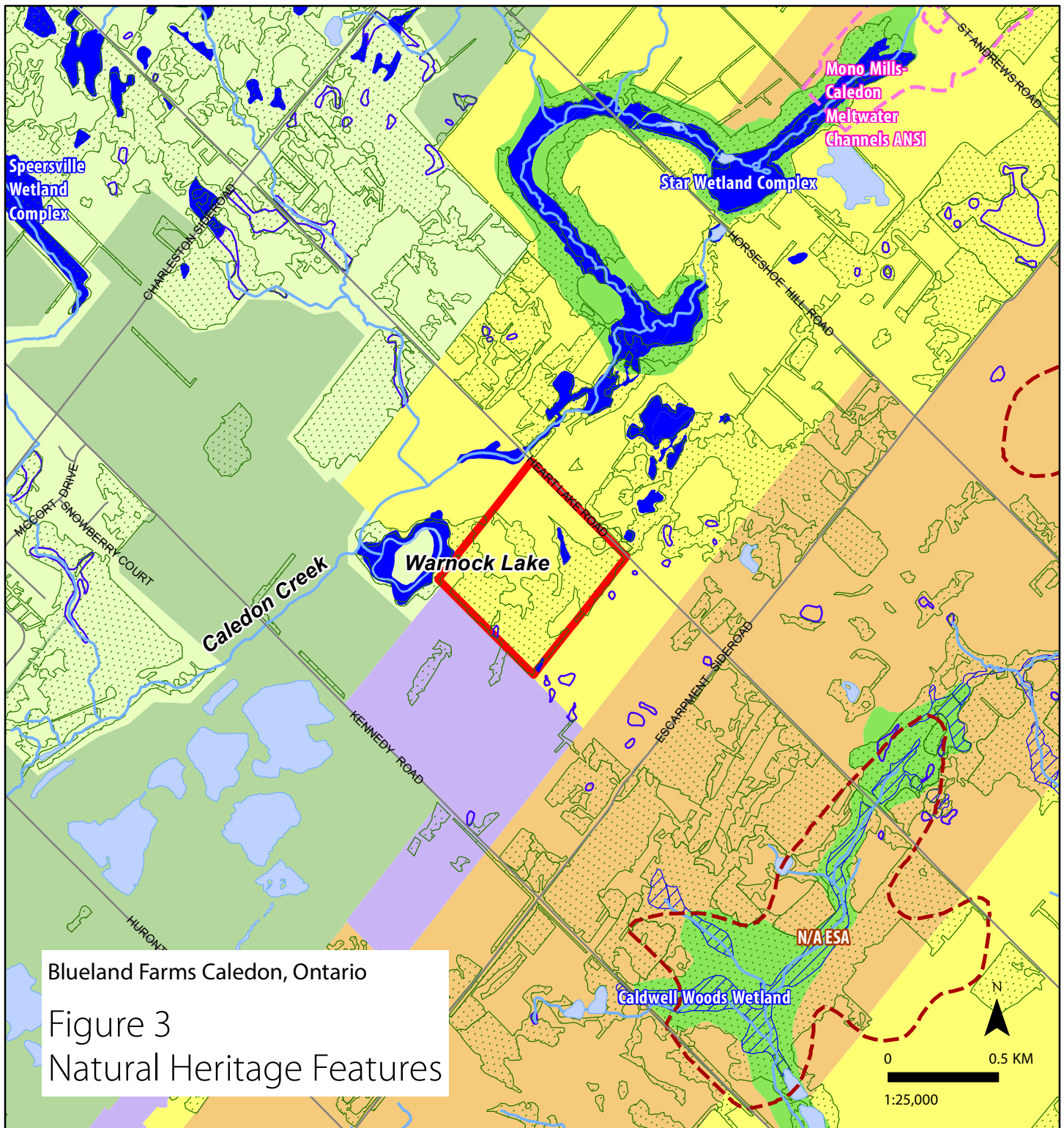


-  Subject Property
-  Approximate Licence Boundary
(See Site Plans)
-  120m Adjacent Lands

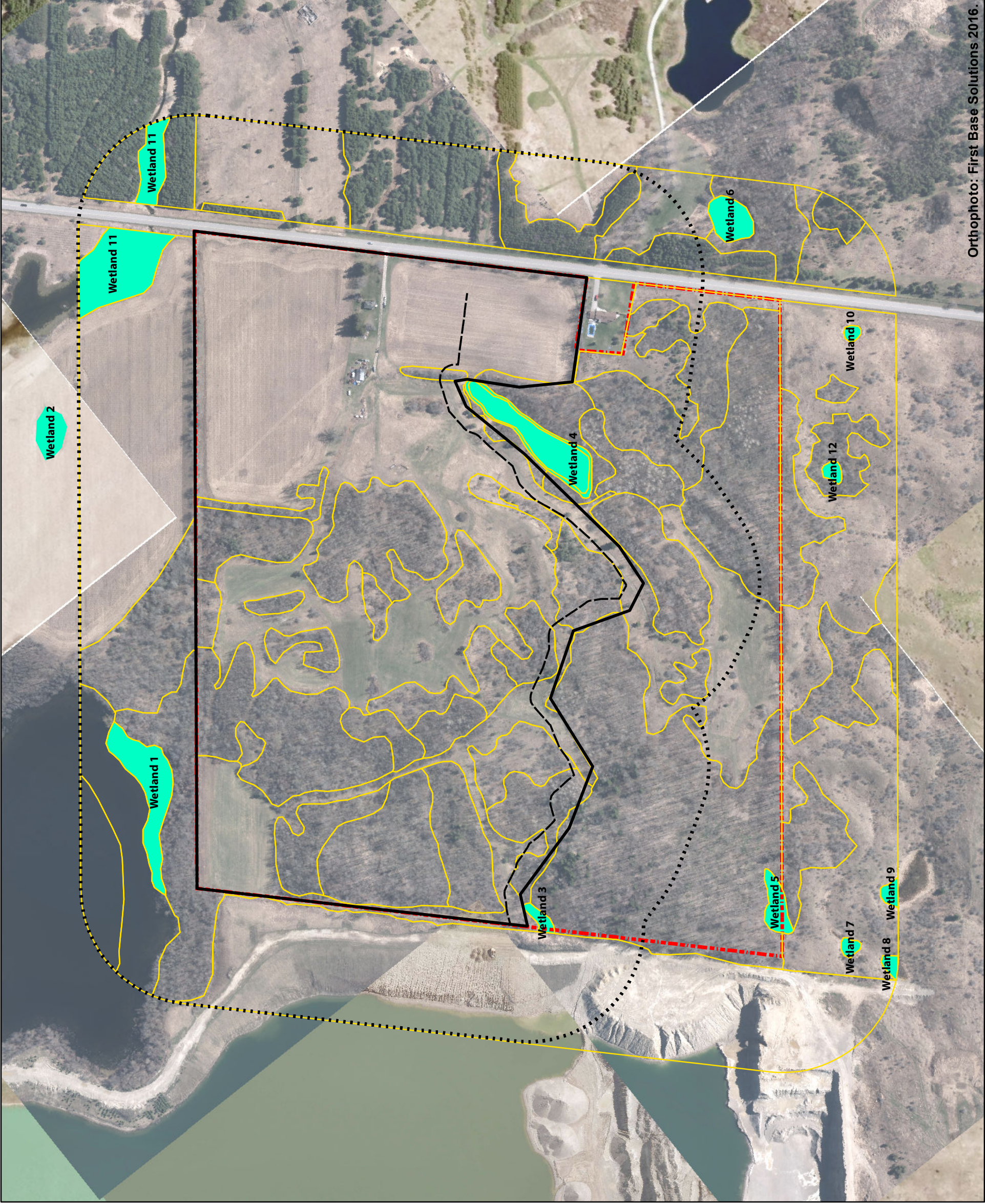
McCormick Pit - Blueland Farms Caledon, Ontario

Figure 2
Study Lands





- | | | |
|------------------------|---|----------------------------------|
| Subject Property | Wetland Evaluated-Provincial (MNRF LIO) | Escarpment Natural Area |
| ANSI (MNRF LIO) | Evaluated-Other | Escarpment Protection Area |
| ESA (MNRF LIO) | Wetland not evaluated per OWES (MNRF LIO) | Escarpment Recreation Area |
| Waterbody (MNRF LIO) | Woodland | Escarpment Rural Area |
| Watercourse (MNRF LIO) | Greenbelt Natural Heritage System | Mineral Resource Extraction Area |
| | Greenbelt Protected Countryside | Urban Area |



0 100 Meters
1:4,000



ELC LEGEND

FOREST

- FOD Deciduous Forest
- FOD3-1 Dry - Fresh Poplar Deciduous Forest
- FOD5-2 Dry - Fresh Sugar Maple - Beech Deciduous Forest
- FOD5-7 Dry - Fresh Sugar Maple - Black Cherry Deciduous Forest
- FOD5-8 Dry - Fresh Sugar Maple - White Ash Deciduous Forest
- FOD6-5 Fresh - Moist Sugar Maple - Hardwood Deciduous Forest
- FOD8-1 Fresh - Moist Poplar Deciduous Forest

CULTURAL

- CUM1-1 Dry - Moist Old Field Meadow
- CUP3 Coniferous Plantation
- CUT1 Mineral Cultural Thicket
- CUT1-1 Sumac Cultural Thicket
- CUW1 Mineral Cultural Woodland

MARSH

- MAM2 Mineral Meadow Marsh
- MAS Shallow Marsh
- MAS3-3 Narrow-leaved Sedge Organic Shallow Marsh
- MAS3-7 Bur-reed Organic Shallow Marsh

SWAMP

- SWT2-2 Willow Mineral Thicket Swamp
- SWT3-5 Red-osier Organic Thicket Swamp
- SWT3-7 Winterberry Organic Thicket Swamp

OTHER

- AG - Agriculture
- H - Hedgerow



Subject Lands

Approximate Licence Boundary (See Site Plans)

Limit of Extraction

120m Adjacent Lands of Licensed Boundary

Ecological Land Classification

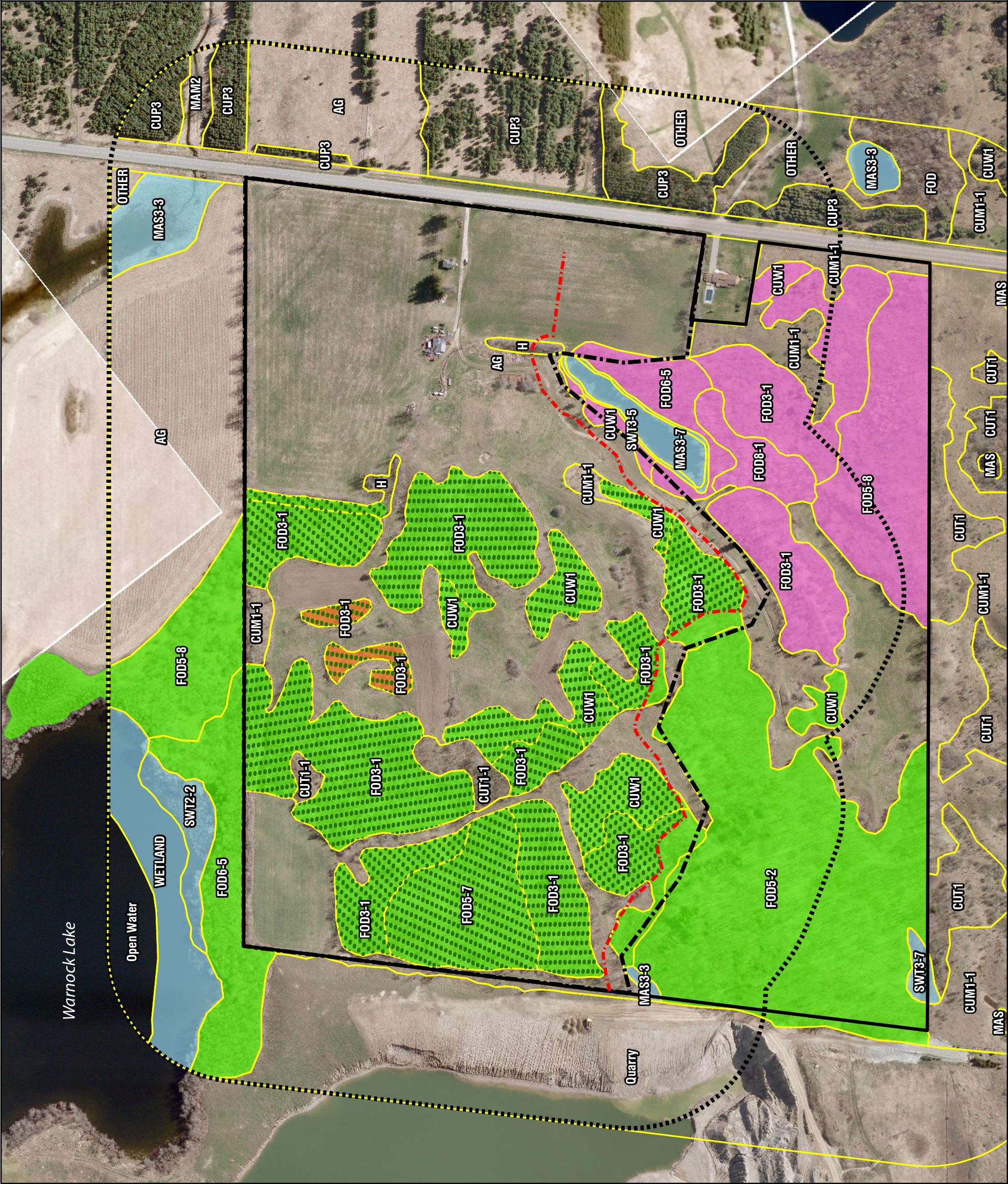
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McCormick Pit - Blueland Farms

Figure 4
Ecological Land Classification



Orthophoto: First Base Solutions 2016.



- Subject Lands
- Approximate Licence Boundary (See Site Plans)
- Extraction Limit
- 120m Adjacent Lands of Licence Boundary
- Ecological Land Classification (2017)
- Portion of Woodland Within Proposed Extraction Limit (9.5 ha)
- NAC (Woodland Patch 1) 18.7 ha
- NAC (Woodland Patch 2) 5.6 ha
- Excluded (Excluded) 0.3 ha
- Star Wetland Complex Provincially Significant Wetland

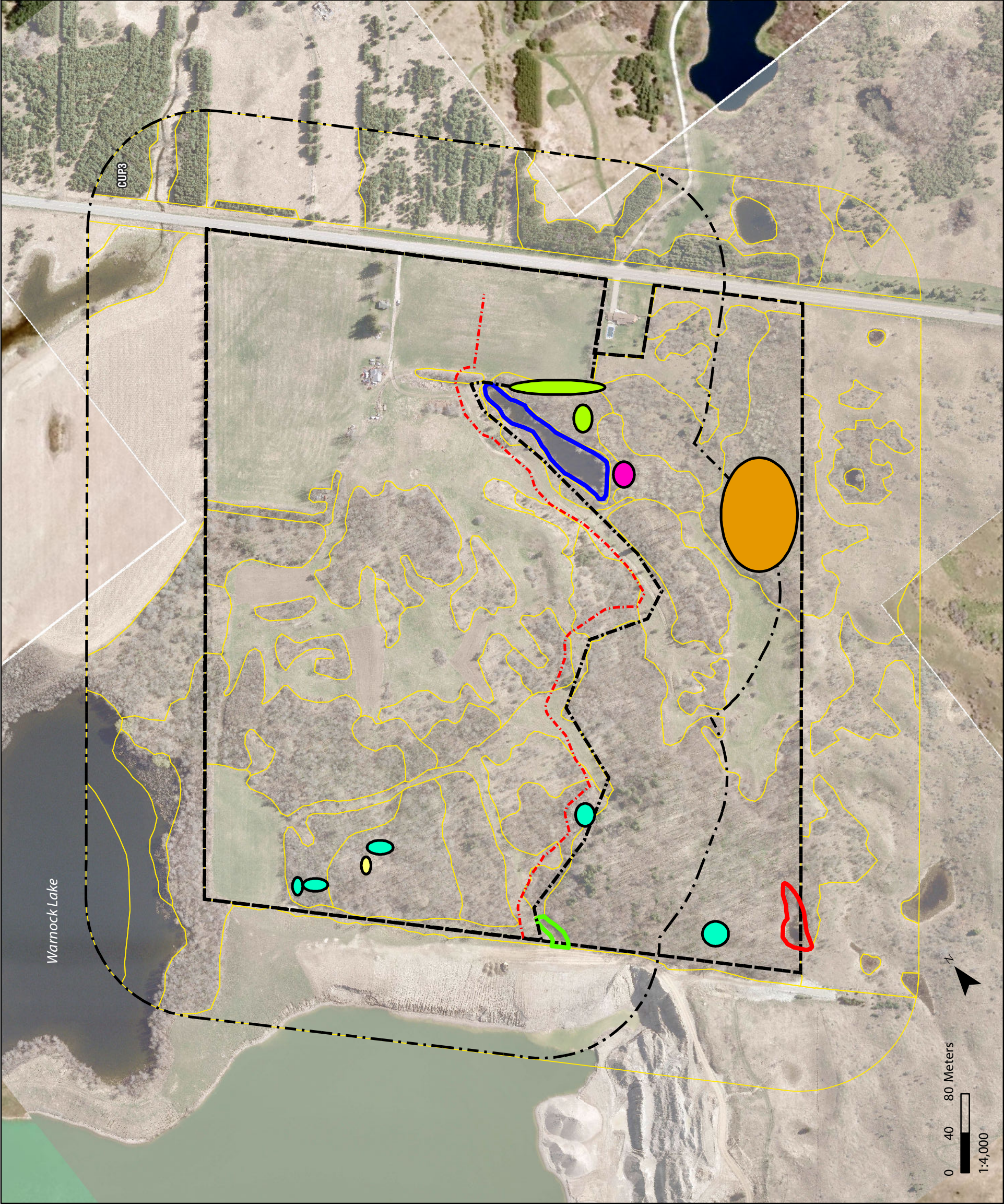
Note: Woodlands <20 m apart are considered continuous.

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McCormick Pit - Blueland Farms

Figure 5
Woodlands





- Proposed Licence Boundary (See Site Plans)
- 120m Adjacent Lands to Licence Boundary
- Ecological Land Classification (ELC) Boundary
- Proposed Extraction Limit

Wetlands

- MAS3-7 (Central Wetland, Wetland 4):
21 Peel Region Rare Plants

Central Wetland (21 species):

- Bidens tripartita* ; Three-lobed begger ticks
- Ceratophyllum demersum*; Common Coontail
- Cornus amomum* ; Silky Dogwood
- Eleocharis fluviatile* ; Small's Spikerush
- Equisetum fluviatile*; Water Horestalk
- Galium tinctorium*; Stiff Marsh Bedstraw
- Glyceria borealis*; Nothern Manna Grass
- Glyceria septentrionalis*; Eastern Glyceria
- Lemna triscula*; Star Duckweed
- Myriophyllum sibiricum*; Water Milfoil
- Potamogeton foliosus*; Leafy Pondweed
- Potamogeton pusillus* var. *Pusillus*; (Small Pondweed)
- Potamogeton pusillus* var. *Tenuissimus*; (Small Pondweed)
- Proserpinaca palustris*; Mermaid Weed
- Ranunculus flabellaris*; Yellow Water Buttercup
- Sparganium emersum*; Narrow-leaved Bur-reed
- Sparganium eurycarpum*; Giant Bur-reed
- Utricularia minor*; Small Bladderwort
- Veronica scutellata*; Marsh Speedwell
- Wolffia borealis*; Dotted Water Meal
- Wolffia columbiana*; Columbia Water Meal

- SWT3-7 (Southwest Corner Wetland, Wetland 5) :
7 Peel Region Rare Plants

South Corner Wetland (7 species):

- Bidens tripartita*; Three-lobed Begger-ticks
- Dulichium arundinaceum*; Three-way Sedge
- Eleocharis smalii*; Small's Spikerush
- Glyceria septentrionalis*; Eastern Glyceria
- Sparganium eurycarpum*; Giant Bur-reed
- Wolffia borealis*; Dotted Water Meal
- Wolffia columbiana*; Columbia Water Meal

- MAS3-3 (West boundary Wetland, Wetland 3):
1 Peel Region Rare Plant

West Boundary Wetland (1 species):

- Glyceria borealis*; Northern Manna Grass

Uplands

- Carex cephaloides*: Thin-leaf Sedge
- Carex sprengelii* ; Sprengel's Sedge
- Carex sprengelii* + *Carex albursina* + *Carex leptonevia* ; Sprengel's Sedge + White Bear Sedge + Fine-nerved Sedge
- Carex tribuloides* + *Impatiens pallida* ; Blunt Broom Sedge + Pale Touch-me-not
- Viburnum cassinoides* ; Wild Raisin

Figure 6

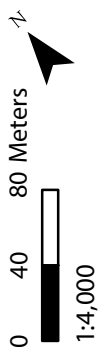
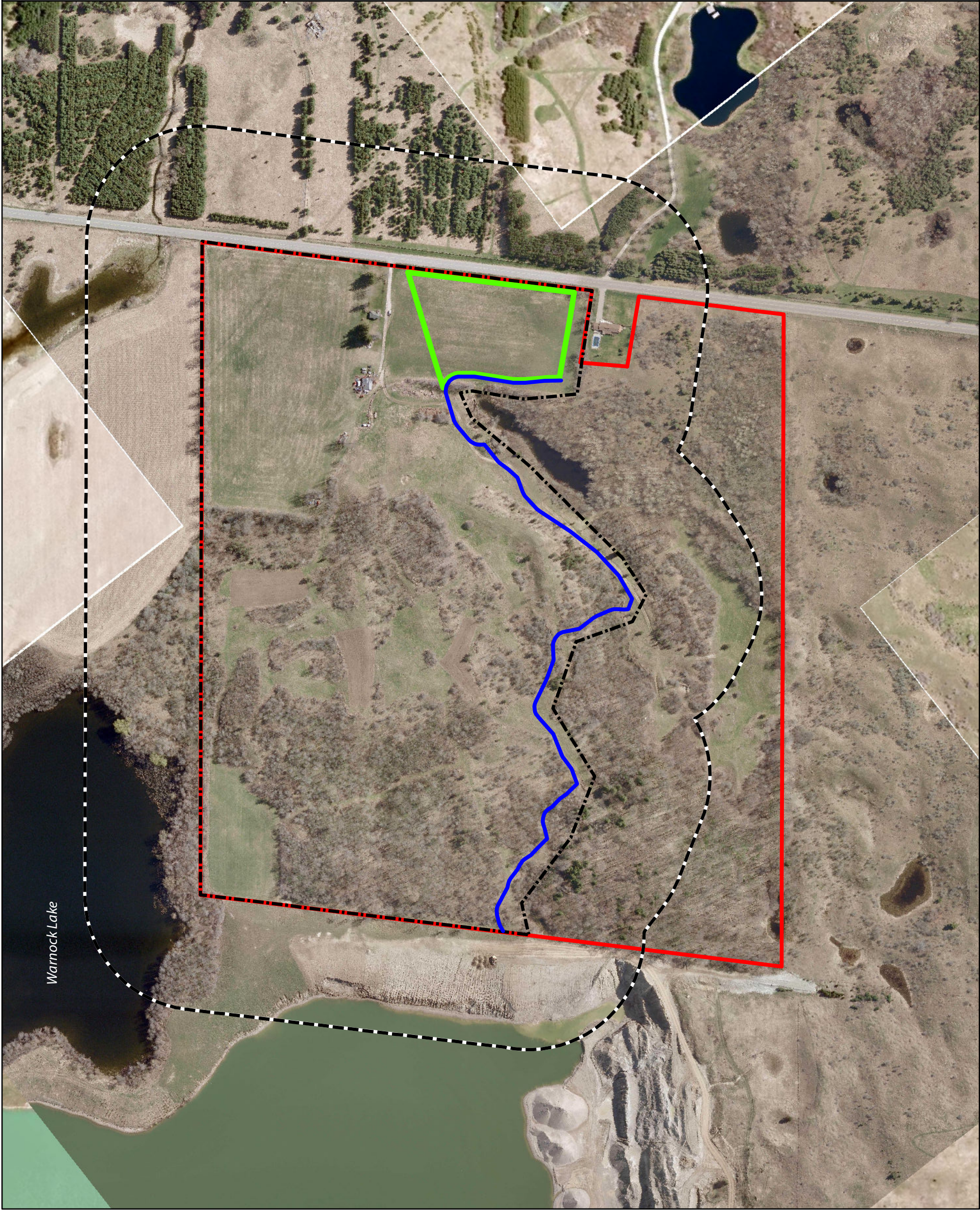
Locally Significant Flora, Colony Sites



- Subject Property
- Staked Feature (to the full property)
- Surveyed Proposed Feature - Maximum Operational Limit

McCormick Pit - Blueland Farms

Figure 8
Natural Environment Feature
Maximum Operational Limit



- Subject Property
- Subject Lands (Approximate Licence Boundary - See Site Plans)
- 120m Adjacent Lands
- Extraction limit established 15m from the surveyed natural environment-operational limit line
- Extraction Constraint Zone: Extraction operations and rehabilitation of lands are to direct seasonal surface water run off towards the adjacent Central Wetland Community

McCormick Pit - Blueland Farms

Figure 9
Natural Environment
Setback and Constraints

Appendix B – Tables

Table 1	Secondary Source Natural History Data
Table 2	Field Studies and Natural Inventories
Table 3	Ecological Land Classification (ELC) Community Types
Table 4	Significant Wildlife Habitat Analysis
Table 5	Habitat Characterization for Butterfly and Odonate Species
Table 6	Characterization of Locally Rare Plant Species
Table 7	Predicted Effects, Mitigation, Enhancement and Net Effects (*located in report)

Table 1: Natural Heritage Information Centre (NHIC) Data

Common Name	Scientific Name	S-Rank	G-Rank	COSSARO	COSWEIC	Last Observed	Extirpated
Hart's-tongue Fern	<i>Asplenium scolopendrium</i> var. <i>americanum</i>	S3	G4T3	SC	SC	1976-PRE	No
Redside Dace	<i>Clinostomus elongatus</i>	S2	G3G4	END	END	1966-09-01	No
A Moss	<i>Gyroweisia tenuis</i>	S1	G3G5			1893-05-06	No
Restricted Species	<i>Restricted Species</i>					1952-10-14	
Restricted Species	<i>Restricted Species</i>					1975-09-24	Yes

Table 2: Savanta Field Studies and Natural Inventories (2003-2016)

FIELD DATE	NATURE OF INVESTIGATION	SURVEYOR
2003		
October 30	<ul style="list-style-type: none"> Preliminary Field Assessment Fall Wildlife Habitat Survey 	AWS
2004		
June 19	<ul style="list-style-type: none"> Breeding Bird Survey Botanical Survey Surface Water Features Assessment Fisheries and Wetlands Surveys 	AWS
August 12	<ul style="list-style-type: none"> Summer Flora and Fauna Vegetation Community Mapping Wetland Surveys 	AWS
2006		
May 26	<ul style="list-style-type: none"> Breeding Bird Survey Botanical Survey Herpetofaunal Survey Evening Birds Survey Bat Survey 	AWS
August 17	<ul style="list-style-type: none"> Botanical Survey Fauna Survey Ecological Land Classification Community Mapping 	AWS
2007		
April 25	<ul style="list-style-type: none"> Herpetofaunal Survey Evening Birds Survey Bats Survey 	AWS
May 29	<ul style="list-style-type: none"> Breeding Birds Survey Fauna Survey Botanical Survey Woodland Stand Analysis 	AWS
August 16	<ul style="list-style-type: none"> Site visit of adjacent pit operation for Hydraulic Barrier Warnock Lake and Caledon Creek Flora and Fauna 	AWS

FIELD DATE	NATURE OF INVESTIGATION	SURVEYOR
2008		
October 15	<ul style="list-style-type: none"> Surface Water Features Assessment Vegetation Community Mapping Fall Bird Migration Survey 	AWS
November	<ul style="list-style-type: none"> ARA Application: NETR Level I and II 	
2011		
February 25	<ul style="list-style-type: none"> Woodland Survey: Tree stem density counts and mature forest stand analysis 	
October 3	<ul style="list-style-type: none"> Woodland Survey: Tree stem density counts 	AWS and Savanta
October 4	<ul style="list-style-type: none"> Woodland Survey: Tree stem density counts 	AWS and Savanta
October 5	<ul style="list-style-type: none"> Woodland Survey: Tree stem density counts 	AWS and Savanta
2012		
April 19	<ul style="list-style-type: none"> Amphibian Breeding Activity Marsh Monitoring – Frog Calling 	AWS
May 11	<ul style="list-style-type: none"> Amphibian Breeding Activity Marsh Monitoring – Frog Calling 	AWS
May 24	<ul style="list-style-type: none"> Amphibian Breeding Activity Marsh Monitoring – Frog Calling 	AWS
June 8	<ul style="list-style-type: none"> Flora Spring Season Survey and General Fauna 	AWS
June 15	<ul style="list-style-type: none"> Lepidoptera and Odonata Survey 	Entomogen
June 20	<ul style="list-style-type: none"> SAR Habitat/Bird Survey 	Savanta
June 22	<ul style="list-style-type: none"> Breeding Bird Survey and General Fauna 	AWS
June 27	<ul style="list-style-type: none"> Breeding Bird Survey and General Fauna 	AWS
July 5	<ul style="list-style-type: none"> Breeding Bird Survey 	AWS

FIELD DATE	NATURE OF INVESTIGATION	SURVEYOR
July 11	<ul style="list-style-type: none"> Lepidoptera and Odonata Survey 	Entomogen
July 23	<ul style="list-style-type: none"> Snake Gestation Survey Vegetation Community Mapping 	AWS
August 15	<ul style="list-style-type: none"> Woodlands and Feature Review 	Savanta
August 17	<ul style="list-style-type: none"> Woodland Survey Surface Water Features Assessment Snake Gestation Survey Summer Botanical Survey 	AWS
August 21	<ul style="list-style-type: none"> Lepidoptera and Odonata Survey 	Entomogen
August 23	<ul style="list-style-type: none"> Woodlands and Feature Review with pit operational limit boundary staking and survey 	AWS and Savanta
August 28	<ul style="list-style-type: none"> Agency Site Tour to review features and surveyed operation 	AWS and Savanta
September 25	<ul style="list-style-type: none"> Ministry of Natural Resources field visit for property Wetland review /evaluation 	OMNR and AWS
2016		
April 28	<ul style="list-style-type: none"> Amphibian Egg Mass Survey Turtle Basking Survey Round 1 Amphibian Call Count Survey 	C. Collinson H. Davis
May 3	<ul style="list-style-type: none"> Bat Snag Density Survey 	J. Leslie O. Park
May 6	<ul style="list-style-type: none"> Insect Survey 	P. Burke
May 18	<ul style="list-style-type: none"> Round 2 Amphibian Call Count Survey 	C. Collinson J. Leslie
June 12	<ul style="list-style-type: none"> Round 1 Breeding Bird Survey 	B. Charlton
June 16	<ul style="list-style-type: none"> Round 3 Amphibian Call Count Survey 	C. Collinson O. Park
June 17-26	<ul style="list-style-type: none"> Passive Acoustic Bat Surveys (SM3BAT) 	C. Collinson
July 5	<ul style="list-style-type: none"> Round 2 Breeding Bird Survey 	S. Lohnes
July 20	<ul style="list-style-type: none"> Butternut Survey Summer Botanical Update 	J. Leslie

Table 3: Ecological Land Classification (ELC) Community Types

ELC CODE	TYPE	DESCRIPTION	S-RANK & AREA ON SUBJECT PROPERTY
None-AG	Active Agriculture	<ul style="list-style-type: none"> Cash crop fields 	<ul style="list-style-type: none"> S Rank N/A 17.68 ha
CUW1	Cultural Woodland, Sugar Maple-White Birch-Poplar-Scots Pine	<ul style="list-style-type: none"> Numerous riding trails throughout, early successional stand with less than 60% tree cover 	<ul style="list-style-type: none"> S5 Rank 9.32 ha
CUM1-1	Dry-Moist Old Field Meadow Type	<ul style="list-style-type: none"> Passive Livestock Pasture Lands with scattered tree seedlings/saplings 	<ul style="list-style-type: none"> S5 Rank 1.57 ha
None-H	Hedgerow	<ul style="list-style-type: none"> Vegetated fence line, wider than normal with scattered trees 	<ul style="list-style-type: none"> S Rank not applicable 0.29 ha
CUT1-1	Sumac Cultural Thicket Type	<ul style="list-style-type: none"> Dense tall shrub stand with scattered Poplar & Sugar Maple trees 	<ul style="list-style-type: none"> S5 Rank 0.35 ha
FOD3-1	Dry-Fresh Poplar Deciduous Forest Type	<ul style="list-style-type: none"> Stand of Poplar intermixed with Hawthorne and White Ash 	<ul style="list-style-type: none"> S5 Rank 1.25 ha
FOD5-2	Dry-Fresh Sugar Maple-Beech Deciduous Forest Type	<ul style="list-style-type: none"> Mature stand with patch groundcover and understory growth. Stand has a few scattered Hemlock 	<ul style="list-style-type: none"> S5 Rank 5.58ha
FOD5-7	Dry-Fresh Sugar Maple-Black Cherry Deciduous Forest Type	<ul style="list-style-type: none"> Mature stand with patchy understory growth primarily tree seedlings, little ground cover. 	<ul style="list-style-type: none"> S5 Rank 1.29 ha
FOD5-8	Dry-Fresh Sugar Maple-White Ash Deciduous Forest Type	<ul style="list-style-type: none"> Mature stand, dense understory growth, patches of dense tree sapling regeneration, dense ground cover layer. 	<ul style="list-style-type: none"> S5 Rank 1.99 ha
FOD6-5	Fresh-Moist Sugar Maple-Hardwood Deciduous Forest	<ul style="list-style-type: none"> Mid mature age stand, dense understory growth of shrubs with recent select thinning cutting. 	<ul style="list-style-type: none"> S5 Rank 0.6 1 ha

ELC CODE	TYPE	DESCRIPTION	S-RANK & AREA ON SUBJECT PROPERTY
	Type		
FOD8-1	Fresh-Moist Poplar Deciduous Forest Type	<ul style="list-style-type: none"> Mid maturity age stand, dense stands of tree regeneration and pockets of dense shrub growth. 	<ul style="list-style-type: none"> S5 Rank 0.44 ha
MAS3-3	Narrow-leaved Sedge Organic Shallow Marsh Type (Wetland 3)	<ul style="list-style-type: none"> Dominated with grass and sedges with seasonal surface water. Formally, community extended southward onto adjacent pit extraction lands. 	<ul style="list-style-type: none"> S5 Rank 0.04 ha
MAS3-7	Bur-reed Organic Shallow Marsh Type (Part of Wetland 4)	<ul style="list-style-type: none"> PSW feature dominated with aquatic emergent vegetation. Livestock watering, year-round surface water ponding 	<ul style="list-style-type: none"> S5 Rank 0.37 ha
SWT3-5	Red-osier Organic Thicket Swamp Type (Part of Wetland 4)	<ul style="list-style-type: none"> PSW feature. Dominated with dense low and tall shrubs with scattered trees. 	<ul style="list-style-type: none"> S5 Rank 0.09 ha
SWT3-7	Winterberry Organic Thicket Swamp Type (Wetland 6)	<ul style="list-style-type: none"> PSW feature. Dominated with tall shrubs, year-round surface water, past excavation for livestock watering 	<ul style="list-style-type: none"> S3S4 Rank 0.12 ha

Table 4: Assessment of Candidate Significant Wildlife Habitat for Proposed McCormick Pit Based on Criteria for Eco-region 6E (OMNRF, 2015)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	WILDLIFE SPECIES PRESENT	SWH TYPE PRESENT (Within the Subject Lands or 120m ARA Adjacent Lands)
A. SEASONAL CONCENTRATION AREAS					
• INSECTS					
Migratory Butterfly Stopover Areas	Yes	<ul style="list-style-type: none"> No - The Subject Lands are located outside of 5km from Lake Ontario 	No	N/A	Not present
• REPTILES					
Turtle Wintering Areas	Yes	<ul style="list-style-type: none"> Yes - The Subject Lands contain candidate habitat within Wetland 4 Wetland 2 is also suitable but is located off site 	Yes	No - 1 Snapping Turtle observed swimming in Wetland 2	Not present
Reptile Hibernacula	Yes	<ul style="list-style-type: none"> No - The Subject Lands do not contain suitable habitat features to support reptile hibernacula (determined via targeted field studies) 	Yes	No	Not present

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	WILDLIFE SPECIES PRESENT	SWH TYPE PRESENT (Within the Subject Lands or 120m ARA Adjacent Lands)
3. BIRDS					
Waterfowl Stopover and Staging Areas (terrestrial)	No	<ul style="list-style-type: none"> No 	No	N/A	Not present
Waterfowl Stopover and Staging Areas (aquatic)	No	<ul style="list-style-type: none"> No 	No	N/A	Not present
Shorebird Migratory Stopover Areas	No	<ul style="list-style-type: none"> No 	No	N/A	Not present
Migratory Landbird Stopover Areas	Yes	<ul style="list-style-type: none"> No - The woodlots are not within 5km of Lake Ontario. 	No	N/A	Not present
Raptor Wintering Areas	Yes	<ul style="list-style-type: none"> No - Size criteria for the forest and upland communities in the Subject Lands are not met. 	No	N/A	Not present
Colonial Bird Nesting Sites (bank/cliff; tree/shrub; or ground)	Yes	<ul style="list-style-type: none"> No - Potential habitat is off-site in adjacent quarry operation 	No	N/A	Not present
4. MAMMALS					
Bat Hibernacula	No	<ul style="list-style-type: none"> No 	No	N/A	Not present

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	WILDLIFE SPECIES PRESENT	SWH TYPE PRESENT (Within the Subject Lands or 120m ARA Adjacent Lands)
Bat Maternity Colonies	Yes	<ul style="list-style-type: none"> Yes - The required density of suitable cavity trees was met 	Yes	Yes	Present (Subject Lands)
Deer Yarding Areas	N/A MNRF to determine	<ul style="list-style-type: none"> N/A – MNRF to determine 	No	N/A	Not present – determined by MNRF
Deer Winter Congregation Areas	N/A MNRF to determine	<ul style="list-style-type: none"> N/A – MNRF to determine 	No	N/A	Not present – determined by MNRF
5. RARE VEGETATION COMMUNITIES					
Rare Vegetation Types (Cliffs, talus slopes, sand barrens, alvars, old-growth forests, savannahs, and tallgrass prairies)	No	<ul style="list-style-type: none"> No - Vegetation types were not identified on Subject Lands (determined by field studies) 	ELC conducted	N/A	Not present
Other Rare Vegetation Types	No	<ul style="list-style-type: none"> No - No S1, S2 or S3 vegetation communities were identified within Subject Lands (determined by field studies) 	ELC conducted	N/A	Not present

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	WILDLIFE SPECIES PRESENT	SWH TYPE PRESENT (Within the Subject Lands or 120m ARA Adjacent Lands)
B. SPECIALIZED WILDLIFE HABITAT					
2. Vegetation					
Seeps and Springs	No	<ul style="list-style-type: none"> No - The Subject Lands are not within a headwater aquatic feature system. 	No	N/A	Not present
3. Amphibians					
Woodland Amphibian Breeding Habitats (Within or < 120m from woodland)	Yes	<ul style="list-style-type: none"> Yes 	Yes	Yes	Present (Adjacent Lands) Wetlands 4 and 6
Wetland Amphibian Breeding Habitats (Wetland >120m from woodland)	Yes	<ul style="list-style-type: none"> Yes 	Yes	Yes - Minimum diversity and/or abundance not met	Not present
4. Reptiles					
Turtle Nesting Areas	Yes	<ul style="list-style-type: none"> Yes - Subject Lands contain candidate habitat within Wetland 4. - Wetland 2 is also suitable but 	Yes	No - 1 Snapping Turtle observed swimming in Wetland 2)	Not present

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	WILDLIFE SPECIES PRESENT	SWH TYPE PRESENT (Within the Subject Lands or 120m ARA Adjacent Lands)
		is located off site			
5. Birds					
Waterfowl Nesting Area	Yes	<ul style="list-style-type: none"> Yes 	Yes	Yes - Minimum diversity &/or abundance not met	Not present
Bald Eagle and Osprey Habitats	No	<ul style="list-style-type: none"> No 	No	N/A	Not present
Woodland Raptor Nesting Habitat	Yes	<ul style="list-style-type: none"> No - Size criteria for woodlots in the Subject Lands are not met (too small, no interior habitat) 	No	N/A	Not present
Woodland Area-Sensitive Bird Breeding Habitat	Yes	<ul style="list-style-type: none"> No - Size criteria for woodlots in the Subject Lands are not met (too small, no interior habitat) 	No	N/A	Not present
C. SPECIES OF CONSERVATION CONCERN					
Marsh Bird Breeding Habitat	Yes	<ul style="list-style-type: none"> Yes 	Yes	Yes - Minimum species diversity and/or abundance not met	Not present

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	WILDLIFE SPECIES PRESENT	SWH TYPE PRESENT (Within the Subject Lands or 120m ARA Adjacent Lands)
				and were not within wetland feature	
Open Country Bird Breeding Habitat	Yes	<ul style="list-style-type: none"> No - Size criteria for cultural meadows in the Subject Lands are not met. 	No	N/A	Not present
Shrub/Early Successional Bird Breeding Habitat	Yes	<ul style="list-style-type: none"> No - Size criteria for cultural thickets in the Subject Lands are not met. 	No	N/A	Not present
Terrestrial Crayfish	Yes	<ul style="list-style-type: none"> Yes 	Yes	No	Not present
Special Concern and Rare Wildlife Species	N/A	N/A	Yes	Yes - Eastern Wood-Pewee - Monarch - Snapping Turtle	Present - FOD5-2 (Adjacent Lands) - Agricultural Fields & Edges; - Roadsides; - Cultural Meadow (Subject Lands and Adjacent Lands) - Wetland 4 (Adjacent Lands)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	WILDLIFE SPECIES PRESENT	SWH TYPE PRESENT (Within the Subject Lands or 120m ARA Adjacent Lands)
D. ANIMAL MOVEMENT CORRIDORS					
Amphibian Movement Corridors	N/A	<ul style="list-style-type: none"> No 	No	N/A	Not present (as determined by no amphibian breeding habitat).
Deer Movement Corridors	N/A	<ul style="list-style-type: none"> No - No deer wintering habitat identified by MNRF. 	No	N/A	Not present

Table 5: Habitat Characterization for Identified Significant Insects

Scientific Name	Common Name	Recognized Habitat Characterization	On-Site Habitat Characterization
<i>Danaus plexippus</i>	Monarch (Special Concern)	<ul style="list-style-type: none"> Throughout their life cycle, Monarchs use three different types of habitat. Only the caterpillars feed on milkweed plants and are confined to meadows and open areas where milkweed grows. Adult butterflies can be found in more diverse habitats where they feed on nectar from a variety of wildflowers. Monarchs spend the winter in Oyamel Fir forests found in central Mexico <p>Note: Recorded numbers were low within the Subject Lands with 50 sightings over 2 days in June & July 2013 and only 4 sightings in August 2013 when fall migration commences.</p> <p>As such, the Subject Lands are not considered a migration stopover or feeding habitat area.</p>	<ul style="list-style-type: none"> The largest threat to Ontario Monarchs is habitat loss and fragmentation at overwintering sites in central Mexico. <p>Widespread pesticide and herbicide use throughout the Monarch's range may also limit recovery.</p> <ul style="list-style-type: none"> Subject Lands are primarily adult habitat, within the Old Field Habitat, woodland edges and livestock trails on-site. <p>Pre-extraction conditions, total suitable habitat is estimated at 2.0 ha. Post-extraction and rehabilitation, a total suitable habitat area of 9.3ha, a net gain</p>

Scientific Name	Common Name	Recognized Habitat Characterization	On-Site Habitat Characterization
<i>Callophrys augustinus</i>	Brown Elfin (Locally Rare)	<ul style="list-style-type: none"> It is found almost anywhere in Canada where acidic soils predominate, including bogs, barrens, and conifer woods where the larval food plants occur. They often fly in company with other elfins and like to sip moisture from wet sand and earth (Source: Environment Canada) 	<ul style="list-style-type: none"> Species does not depend upon habitats found on the Subject Lands; no effects are expected on this presumably transitory species
<i>Euphydryas phaeton</i>	Baltimore Checkerspot (Locally Rare)	<ul style="list-style-type: none"> This is a butterfly of wet meadows and marshes in Canada. It is a relatively weak flier and can be followed closely as it remains near the ground and alights frequently on vegetation. (Source: Environment Canada) 	<ul style="list-style-type: none"> Primarily associated with the three on-site wetlands and immediate adjacent wetlands (damp soils). Pre-extraction conditions, total suitable habitat is 1.06 ha. Post-extraction and rehabilitation, a total suitable habitat area of 1.8ha, a net gain.
<i>Limenitis arthemis arthemis</i>	White Admiral (Locally Rare)	<ul style="list-style-type: none"> Roads and clearings in wooded areas are where this butterfly is most often seen. They like to sun themselves on leaves or on gravel roads, where they periodically open and close their wings. They are rarely seen on flowers, but congregate on rotting fruit and animal dung. (Source: Environment Canada) 	<ul style="list-style-type: none"> Primarily associated with the Old Field Habitat, woodland edges and livestock trails on-site. Pre-extraction conditions, total suitable habitat is estimated at 2.0 ha. Post-extraction and rehabilitation, a total suitable habitat area of 9.3ha, a net gain

Scientific Name	Common Name	Recognized Habitat Characterization	On-Site Habitat Characterization
<i>Polygonia progne</i>	Gray Comma (Uncommon)	<ul style="list-style-type: none"> Along dirt roads, along streamsides, and within clearings in rich deciduous or coniferous woods, in aspen parks, yards, and gardens. Often in hilly terrain or canyons (Source: Butterflies and Moths of North America) 	<ul style="list-style-type: none"> Primarily associated with the Old Field Habitat, woodland edges, poplar stands, cultural woodlands and livestock trails on-site. Host food plants are gooseberries and currants. Pre-extraction conditions, total suitable habitat is estimated at 11.76 ha. Post-extraction and rehabilitation, a total suitable habitat area of 12.23ha, a net gain
<i>Lestes disjunctus</i>	Northern Spreadwing (Uncommon)	<ul style="list-style-type: none"> Prefer still-water and well-vegetated habitats of lakes and ponds, some of which can be temporary, as well as marshes, swamps, pools and bogs, and even slow, sluggish streams. (Source: Montana Gov. Field Guide) 	<ul style="list-style-type: none"> Primarily associated with the three on-site wetlands and immediate adjacent wetlands (damp soils). Pre-extraction conditions, total suitable habitat is 1.06 ha. Post-extraction and rehabilitation, a total suitable habitat area of 1.8ha, a net gain.

Table 6: Characterization of Regionally Rare Plant Species

Vegetation Community	Scientific Name	Common Name	Colony Comments
FOD3-1	<i>Carex sprengelii</i>	Sprengel's Sedge	<ul style="list-style-type: none"> Four colonies within FOD3-1 habitat were observed, with each colony having 25-100 specimens, approximately.
FOD5-2	<i>Carex hitchcockiana</i>	Hitchcock's Sedge	<ul style="list-style-type: none"> Scattered occurrences, population estimated to be < 50 specimens
FOD5-7	<i>Carex cephaloidea</i> <i>Carex sprengelii</i>	Thin-leaf Sedge Sprengel's Sedge	<ul style="list-style-type: none"> <i>C. cephaloidea</i> was observed as a small colony, approximately 2m x 5m in size with <50 plants observed. <i>C. sprengelii</i> was observed as a single colony, with plant numbers estimated at 250 to 500 specimens.
FOD5-8	<i>Carex albursina</i>	White Bear Sedge	<ul style="list-style-type: none"> <i>C. albursina</i> and <i>C. leptoneuria</i> were observed as scattered occurrences, with estimated plant numbers of <25 for each.
	<i>Carex leptoneuria</i>	Fine-nerved Sedge	<ul style="list-style-type: none"> <i>C. sprengelii</i> was found growing as a large colony, estimated to be in excess of 2500 specimens.
	<i>Carex sprengelii</i>	Sprengel's Sedge	
FOD6-5	<i>Viburnum cassinoides</i> <i>Carex sprengelii</i>	Wild Raisin Sprengel's Sedge	<ul style="list-style-type: none"> <i>V. cassinoides</i> was observed along an old fence line and areas that had been partially cut-over. Plant numbers were estimated at 25-50. <i>C. sprengelii</i> was observed in one area having a population size estimated at 50-150 specimens.
FOD8-1	<i>Carex tribuloides</i>	Blunt Broom Sedge	<ul style="list-style-type: none"> <i>C. tribuloides</i> was observed growing in a well-spread colony with plant numbers estimated at <25.

Vegetation Community	Scientific Name	Common Name	Colony Comments
			<ul style="list-style-type: none"> <i>pallida</i> was found growing as a single colony, with plant numbers estimated at 50-100.
	<i>Impatiens pallida</i>	Pale Touch -me-not	
	<i>Bidens tripartita</i>	Three-way Sedge	
	<i>Dulichium arundinaceum</i>	Small's Spikerush	
	<i>Eleocharis smallii</i>	Eastern Glyceria	
	<i>Glyceria septentrionalis</i>	Giant bur-reed	
	<i>Sparganium eurycarpum</i>	Dotted Water Meal	
	<i>Wolffia borealis</i>	Columbia Water Meal	
Wetland 11	<i>Wolffia columbiana</i>	Three-lobed begger-ticks	<ul style="list-style-type: none"> Found scattered throughout ELC community MAS3-3
	<i>Glyceria borealis</i>	Northern Manna Grass	

APPENDIX C – CORRESPONDENCE

October 31, 2012

Mr. John Morton
Biologist
242090 Conc. Rd. 3
R.R. #1,
Shallow Lake, ON N0H 2K0
aws@gbtel.ca

**Re: Update to the Provincially Significant Star Wetland Complex at Blueland Farms
(parcel roll number: 21240300021580000000), Town of Caledon, Regional Municipality
of Peel**

Dear Mr. Morton:

On September 25, 2012, the Ministry of Natural Resources (MNR) examined wetlands on Blueland Farms (parcel roll number: 21240300021580000000) in the Town of Caledon with the permission of the owner. Staff of the MNR Aurora District office delineated wetlands on an ortho-rectified airphoto base and characterized the wetland vegetation communities and soils. Also attending the site visit was yourself, a consultant for the owner. The wetland boundaries were agreed to by all parties at the time.

The two wetlands examined on the property occur in natural kettles on the Horseshoe Moraines. They support organic soils that are fed by surface waterflow from the surrounding hills. Wetland No. 4 is 0.45 hectares in size and has a Green-fruited Burr-reed (*Sparganium emersum*) marsh ringed by a thicket swamp of Red-osier Dogwood (*Cornus stolonifera*) with scattered trees of Green Ash (*Fraxinus pennsylvanica*). Wetland No. 6 at 0.12 hectares supports a thicket swamp dominated by shrubs of Winterberry (*Ilex verticillata*), Red-osier Dogwood and Bebb's Willow (*Salix bebbiana*).

These two wetlands have been incorporated into the Star Wetland Complex. They occur within 257 and 426 metres of adjacent wetlands in the complex (a wetland must be within 750 metres of the nearest neighbouring wetland to be considered part of wetland complex). The two wetlands are also connected by woodlands and field habitats to other wetlands in the Star Wetland Complex, and all wetlands in the complex occur in Ecodistrict 6E1 and in the Credit River watershed (Caledon Creek subwatershed). As wetlands under 2 hectares in size, justification must be given for the inclusion of Wetland Nos. 4 & 6 in the wetland complex. They have been included in the wetland complex for the following reasons: 1. they are kettle wetlands an uncommon wetland type in Aurora District, 2. they support breeding amphibians (Leopard Frog, Green Frog, Wood Frog and American Toad in Wetland No. 4 and Leopard Frog in Wetland No. 6), and 3. they support locally and regionally rare plant species (1 regionally rare and 21 locally rare plant species in Wetland No. 4 and seven locally rare plant species in Wetland No. 6).

Enclosed for your information is a table of the wetland communities noting the significant species and wildlife present; and there is a map showing the wetlands and communities on an ortho-rectified digital photo base. The update has been put into MNR's web-accessible digital warehouse (LIO – Land Information Ontario) and can be accessed in a few weeks at <http://www.applio.lrc.gov.on.ca/lids/>. The information is stored under the "Wetland Unit" data class.

If you have any questions please do not hesitate to call me at 905-713-7370 or e-mail me at steve.varga@ontario.ca

Yours sincerely

A handwritten signature in cursive script that reads "Steve Varga". The signature is written in dark ink and is positioned below the "Yours sincerely" text.

Steve Varga
District Inventory Biologist, MNR Aurora District

cc. Mr. Mark Head, Regional Municipality of Peel
Mr. Tim Manley, Town of Caledon
Ms. Nancy Mott-Allen, Niagara Escarpment Commission
Mr. Gary Murphy, Credit Valley Conservation
Mr. Glenn Harrington, Harrington McAvan Ltd.

**1. 2. 2. Vegetation Communities – Star Wetland Complex 2012 Update for Blueland Farms,
Parcel Roll Number: 21240300021580000000, Town of Caledon)**

Wet- land #	Field #	Map Code	Vegetation Forms	Dominant Species (size in hectares; site type: I- isolated; soil type, O- depth of organics in cm; sw- % standing water on Sept 25, 2012, ow- estimated % permanent open water; significant plant species that are regionally rare in MNR's former Central Region (Riley 1989) or locally rare in the Regional Municipality of Peel (Varga 2004) based on the observations of v- Steve Varga & Brittany Ferguson, MNR Aurora District on Sept. 25, 2012, and j- Judith Jones & John Morton in the spring and summer of 2012; wildlife records based on observations by v- Steve Varga & Brittany Ferguson on Sept. 25, 2012 and m- John Morton on April 19, May 11 & 24, 2012)
4	1	neM7- B	ne*,ff	ne: Sparganium emersum; ff: Lemna minor, Spirodela polyrhiza, Wolffia columbiana, Ricciocarpus natans (0.36; I; mesic organic, O-60+, sw-20%, ow-40%; regionally rare: v- Ranunculus flabellaris, locally rare: j & v- Bidens tripartita & Glyceria borealis, v- Ceratophyllum demersum, Cornus amomum, Galium tinctorium, Glyceria septentrionalis, Potamogeton foliosus, Sparganium emersum, Wolffia borealis & Wolffia columbiana; j- Eleocharis smallii, Equisetum fluviatile, Lemna trisulca, Myriophyllum sibiricum, Proserpinacea palustris, Sparganium eurycarpum, Utricularia minor & Veronica scutellata; Wildlife: v- 2 adult Leopard Frogs, Green Frog tadpoles, White-tailed Deer tracks, pair of Garter Snakes near wetland, pair of Spotted Sandpipers feeding in wetland, m- north end of wetland: Leopard Frog & Green Frog each call level 2 on April 19, Leopard Frog & American Toad each call level 1 on May 11, Leopard Frog & Green Frog each call level 1 on May 24, and south end of wetland: Leopard Frog, Green Frog & Wood Frog each call level 2 on April 19, Leopard Frog & Green Frog each call level 2 on May 11, and Leopard Frog & Green Frog each call level 1 on May 24)
4	2	tsS7	h,ts*,gc,ne	h: Fraxinus pensylvanica; ts: Cornus stolonifera; gc: Onoclea sensibilis; ne: Phalaris arundinacea (0.09; I; mesic organic, O-60+; sw-0%, ow-0%; locally rare: j & v- Carex tuckermanii, Menispermum canadense, j- Osmunda regalis)
6	3	tsS8	ts*,gc,ne,ff	ts: Cornus stolonifera, Ilex verticillata, Salix bebbiana; gc: Sium suave, Boehmeria cylindrica, ne: Phalaris arundinacea; ff: Lemna minor, Wolffia columbiana (0.12; I; mesic organic, O-60+; sw-70%, ow-70%; locally rare: v- Bidens tripartita, Dulichium arundinaceum, Eleocharis smallii, Glyceria septentrionalis, Sparganium eurycarpum, Wolffia borealis, Wolffia columbiana; wildlife: v- 5 adult Leopard Frogs, m- Leopard Frog call level 1 on April 19 and May 11)

Legend

Vegetation Forms:

h- deciduous trees
ts- tall shrubs
gc- herbs (ground cover)
ne- narrow-leaved emergents
ff- free-floating plants
* - dominant form

Map Codes:

M - Marsh
S - Swamp

STAR WETLAND COMPLEX
ROLL #2124030002158000000
TOWN OF CALEDON



Scale 1:3,000 (approx.)



Legend

- MNR Evaluated Wetland
- MNR Identified Wetlands
- Subject Lands

c S17 Wetland Vegetation Community

PUBLICATION

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October, 2012.

Cartography by Aurora District
Geomatics.

Universal Transverse Mercator
(6 degree) projection, Zone 17.
North American Datum 1983

SOURCE OF INFORMATION

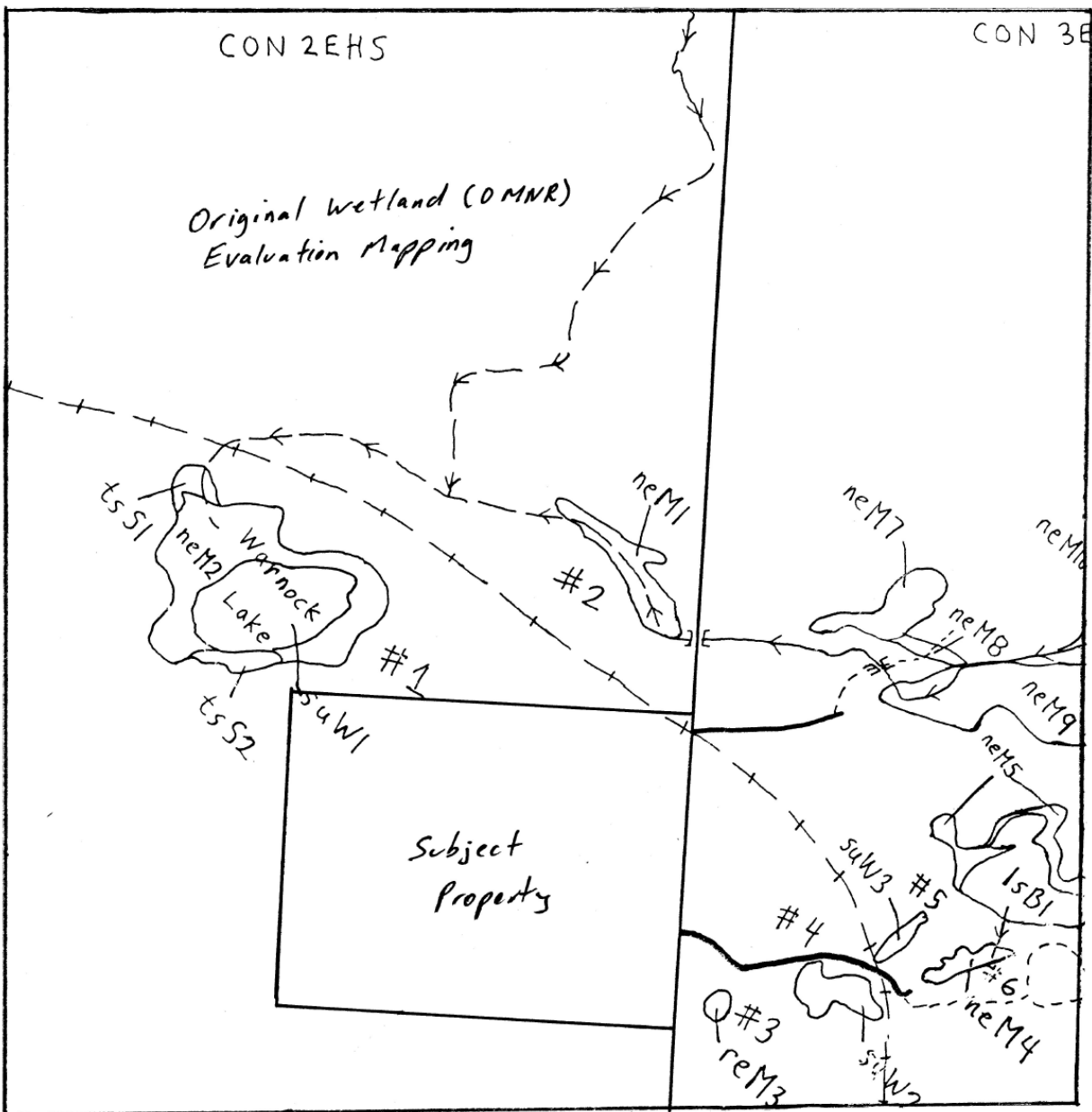
Information provided by the Ministry of Natural Resources district office in Aurora.
Ministry of Natural Resources - Aurora District 50 Bloomington Road West, Aurora, ON L4G 3G8
Base information derived from the Ontario Base Map, 1983 at a scale of 1:10,000 and the Natural Resources Values Information System (NRVIS).

NOTE

The information displayed on this map has been compiled from various sources. While every effort has been made to accurately depict the information, this map should be viewed as illustrative only. Do not rely on it as being a precise indicator of routes, locations of features, nor as a guide to navigation.
For detailed information on natural features such as their location, size or status, the individual files held by the Aurora district office of the Ministry of Natural Resources should be consulted.
Imagery capture date Spring 2011 copyright, J.D. Barnes and Land Information Ontario

Star Wetland: OMNR wetland evaluation mapping, prior to McCormick Pit application

- Source, Ontario Ministry of Natural Resources wetland evaluation mapping
- Vegetation communities and wetland boundary





June 24, 2003

Emma Followes
District Ecologist
Ontario Ministry of Natural Resources
4th Floor
50 Bloomington Road West
Aurora, Ontario L4G 3G8

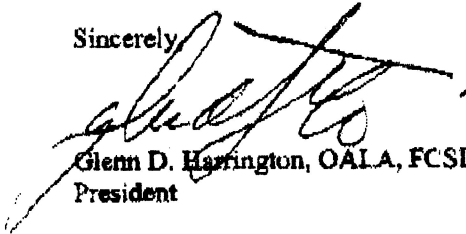
Dear Ms. Followes,

Attached please find a fax from Phil Kor, confirming that the ANSI boundary was recommended for revision in 1993.

We will be proceeding with a development proposal on lands south of Hart Lake Road within the former ANSI boundary based upon this information. Please let us know immediately if you disagree with the change in the ANSI, or our decision to proceed.

Thank you for your help.

Sincerely,



Glenn D. Harrington, OALA, FCSLA
President

GDH/ch

Encls. (3)

c.c. Phil Kor, OMNR
Bernie Janssen, H&H

①

DATE: Mon. 23 June 2003

TO: Glenn Harrington

FROM: Phil Kor MNR, Ontario Parks,
Peterborough

RE: location of Mono Mills - Caledon Maltwater
Channels ES ANSI

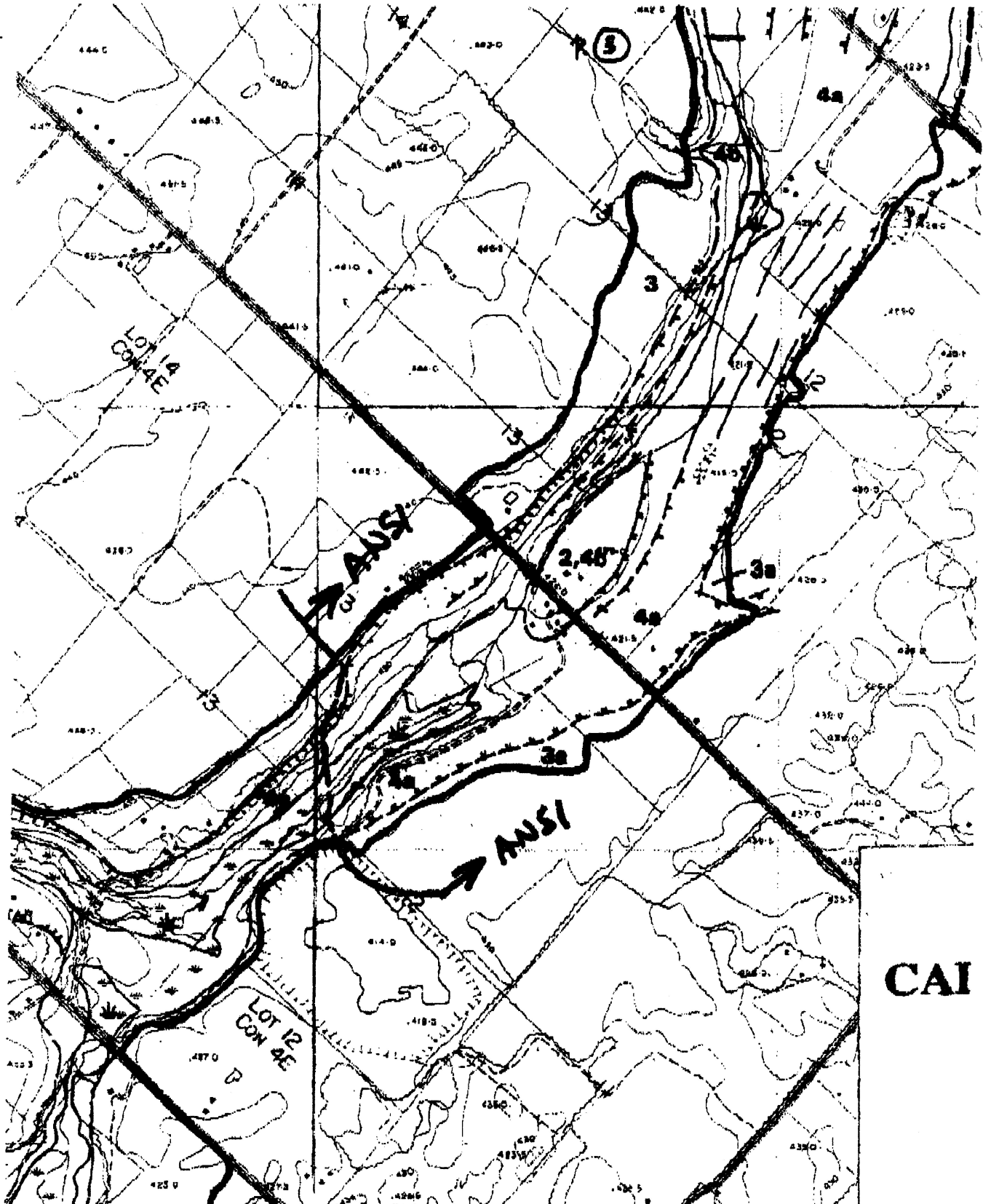
Glenn,

I can't remember where 5th sideroad is, but
the S. boundary of my revised ANSI is shown
on the bigger map. It does not follow a road.
The smaller-scale map shows the revised ANSI
boundary (Kor 1998) in black (I filled it in to
show up better in a fax). Call me if you have
any further questions, or need better definition.

Cheer.

Phil

total pages-3.



JUN 23 2003 11:46 PM INR ONTARIO PARKS 705 755 1701 TO 919052947623 P.03-03

Provincially revised 'Mono Mills-Caledon Meltwater Channels' ANSI boundary

- Map source: Ministry of Natural Resources, Phil Kor @ Peterborough main office, 2003

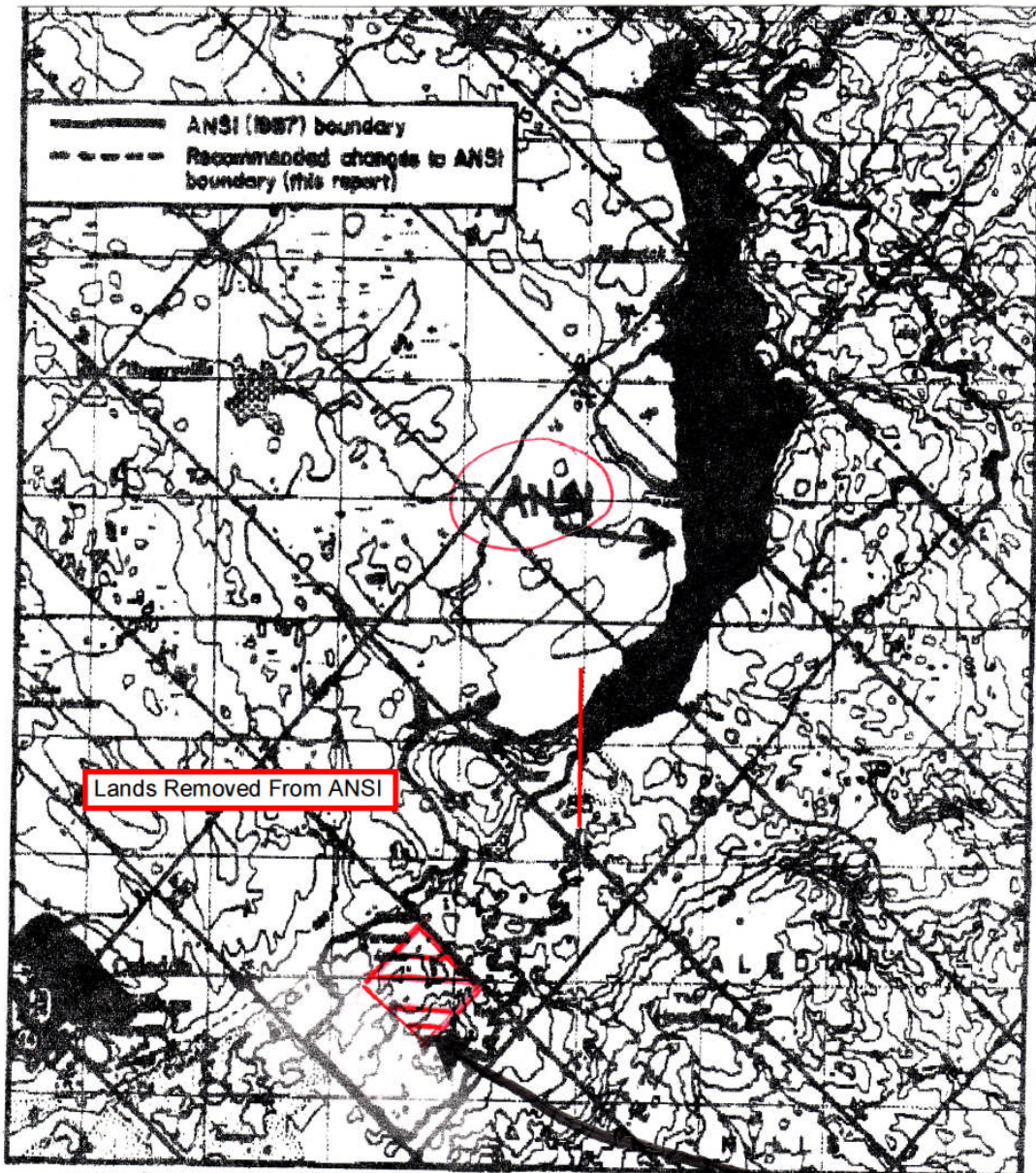


Figure 9. Boundary map, Mono Mills-Caledon Meltwater Channels ANSI.

Subject Property Removed from ANSI

50 Bloomington Road West
Aurora, Ontario
L4G 3G8

March 26, 2004

John Morton
Aquatic and Wildlife Services
R.R. # 1
Shallow Lake, Ontario
N0H 2K0

**Re: Species at Risk Information
Proposed Pit Application
Part Lot 12, Conc. 2 EHS, Town of Caledon**

Dear Mr. Morton:

Enclosed please find the species at risk information for the proposed pit site as found in the Natural Heritage Information Centre (NHIC) database.

This information is highly sensitive and is not intended for anyone outside of this project. Please do not include any specific location information in reports that will be available for public record.

As you complete your fieldwork in these areas, please report all information to the NHIC. This will assist them with updating their database. Any other species at risk found (not included in the list provided) should also be reported to the NHIC. Please note that the coordinates provided are in NAD27.

Regards,



Emma Followes
Ecologist
Aurora District

APPENDIX 8

- Credit Valley Conservation; Watershed Report Excerpts



March 15, 2005

AWS Environmental Consulting
R.R.# 1
Shallow Lake, ON
N0H 2K0

Attention: John Morton

**Re: PD 05/McCormick
17736 Heart Lake Road
Part of Lot 12, Concession 2 EHS
Town of Caledon**

Credit Valley Conservation (CVC) staff would like to take this opportunity to provide the following comments based on our understanding that you are undertaking a Natural Environmental Level II Tech. report for a proposed aggregate extraction operation on the subject property.

Site Features:

The subject property is located partially within an area designated as Core Greenlands and Environmental Policy Area by the Region of Peel and the Town of Caledon respectively. It is the policy of the Region of Peel and the Town of Caledon to protect the form and function of these natural areas. CVC provides technical support to these agencies with respect to delineation of natural features and reviewing potential impacts from subsequent development within and adjacent to these lands.

Comments:

We suggest you contact the Town of Caledon and Region of Peel for further information regarding your specific questions. At such time that detailed proposals are circulated to CVC from these agencies for comment, a site visit may be necessary to collect further information about some of the specific matters raised in your email.

In regards to your information request for the Caledon Creek Subwatershed Study, the Integrated Watershed Monitoring Program 2001 Summary Report, and Ecological Land Classification Mapping for the subject property, please find attached the following:

- 1 x CD containing the Caledon Creek Subwatershed Study,
- 1 x hardcopy printout of the Integrated Watershed Monitoring Program 2001 Summary Report; and

Page 1 of 2

Credit Valley Conservation 1255 Old Derry Road, Mississauga, Ontario L5N 6R4
Phone (905) 670-1615 Fax (905) 670-2210

"Conservation Through Cooperation"

March 15, 2005

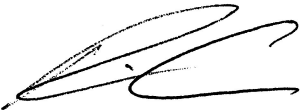
Re: PD 05/McCormick
17736 Heart Lake Road
Part of Lot 12, Concession 2 EHS
Town of Caledon

- 1 x map illustrating approximate location of subject property in relation to ELC community mapping.

Much of the additional information you requested (i.e. Corridor/Linkage mapping etc.) can be found on the CD containing the Caledon Creek Subwatershed Study.

Should you have any further questions please do not hesitate to contact this office.

Yours very truly,



Richard Clark
Data and Mapping Technician

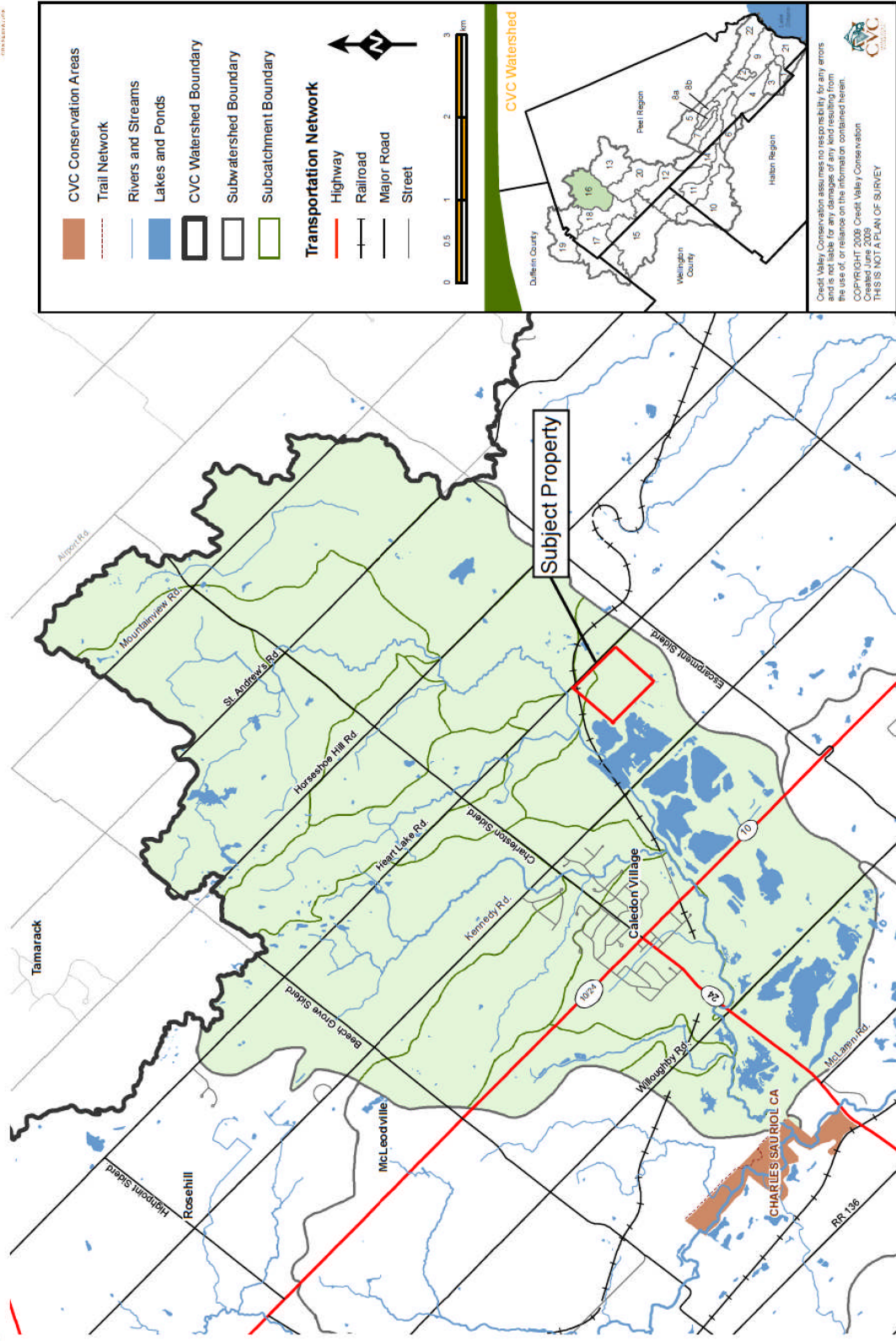
RC/rf

Enclosures.

- 1 x CD containing the Caledon Creek Subwatershed Study,
- 1 x hardcopy printout of the Integrated Watershed Monitoring Program 2001 Summary Report, and
- 1 x map illustrating approximate location of subject property in relation to ELC community mapping.



16 - Caledon Creek Subwatershed



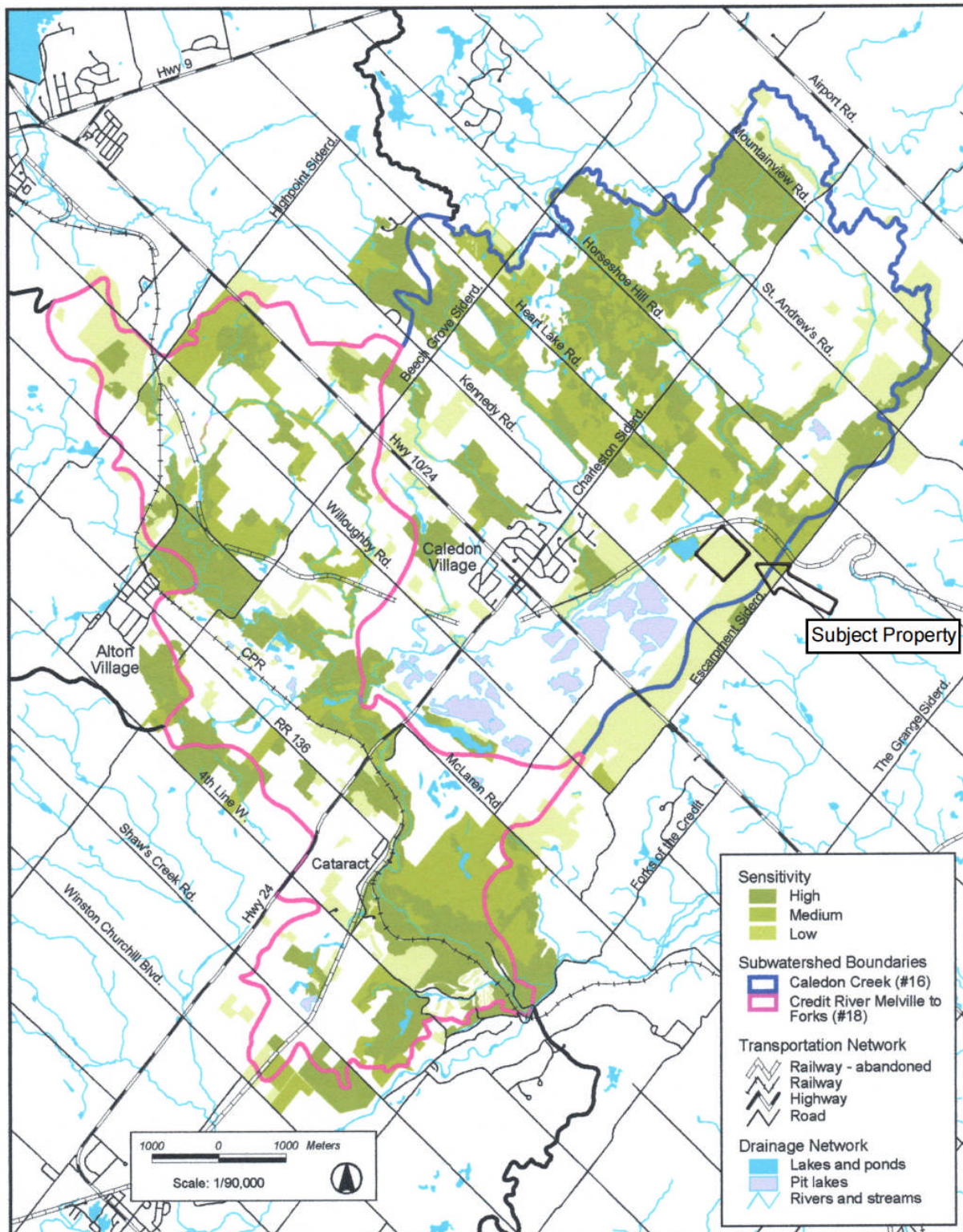


Figure 2: Upland and Wetland Sensitivity

Please note that the text of the Subwatershed Study will take precedence over any discrepancy between the text and the figures.

Source: Credit Valley Conservation, 1997; OMNR, 1982.



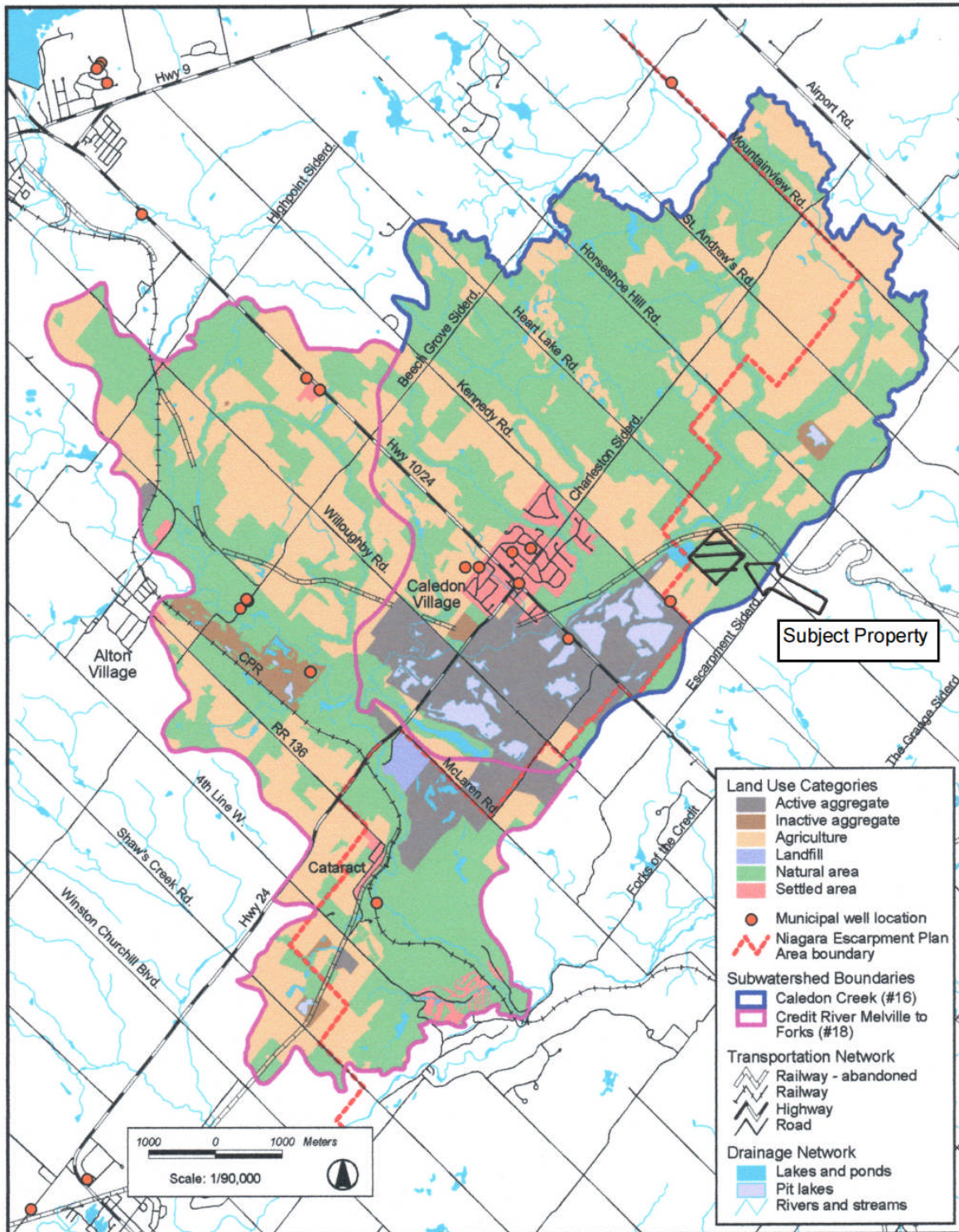


Figure 3.1: Existing Conditions

Source: Credit Valley Conservation, 1998; OMNR, 1982.



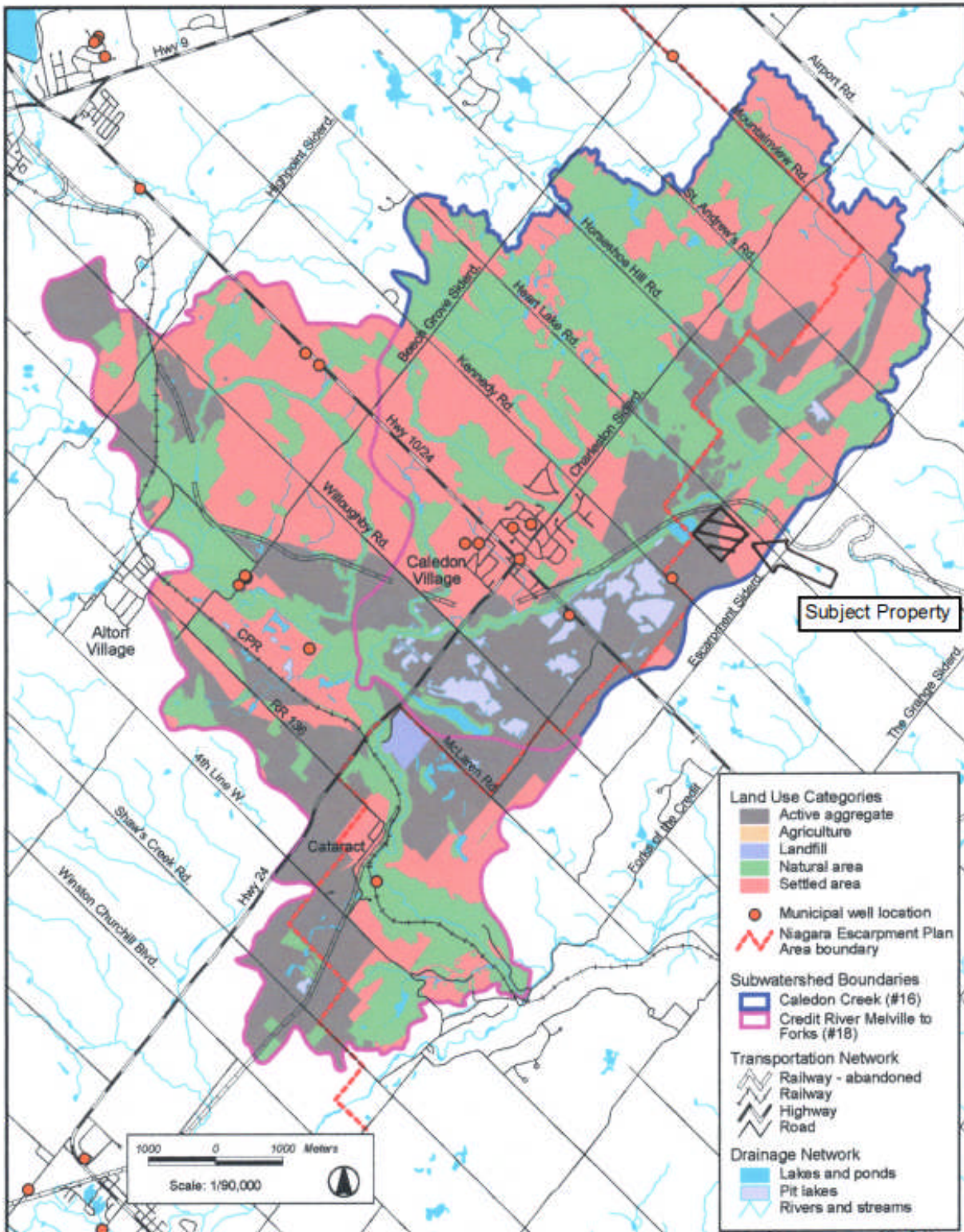


Figure 3.3: Ultimate Conditions

Source: Credit Valley Conservation, 1998; OMNR, 1982.



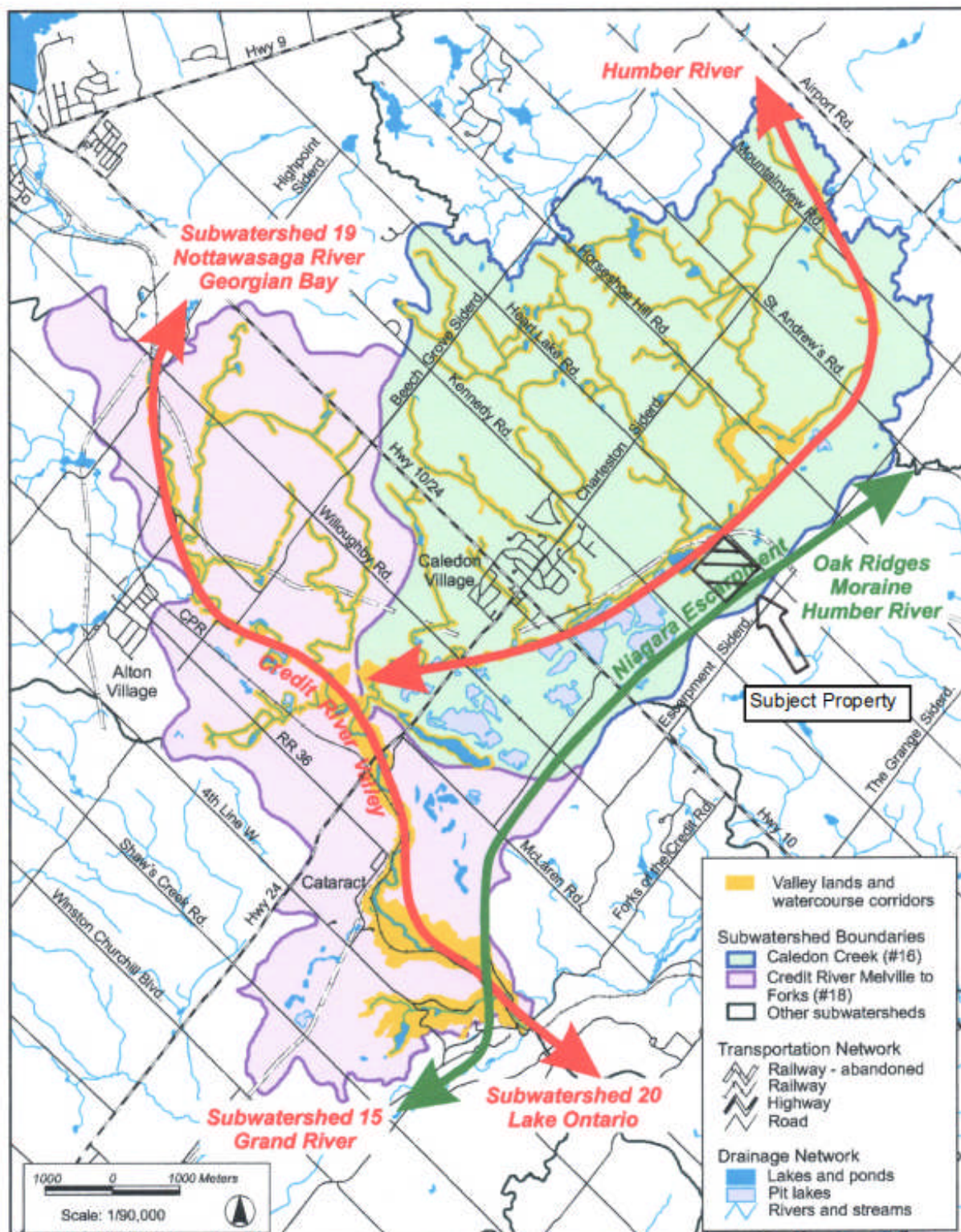


Figure 4.11: Macro Corridors and Off-Site Impacts

Source: Credit Valley Conservation, 1998; OMNR, 1982



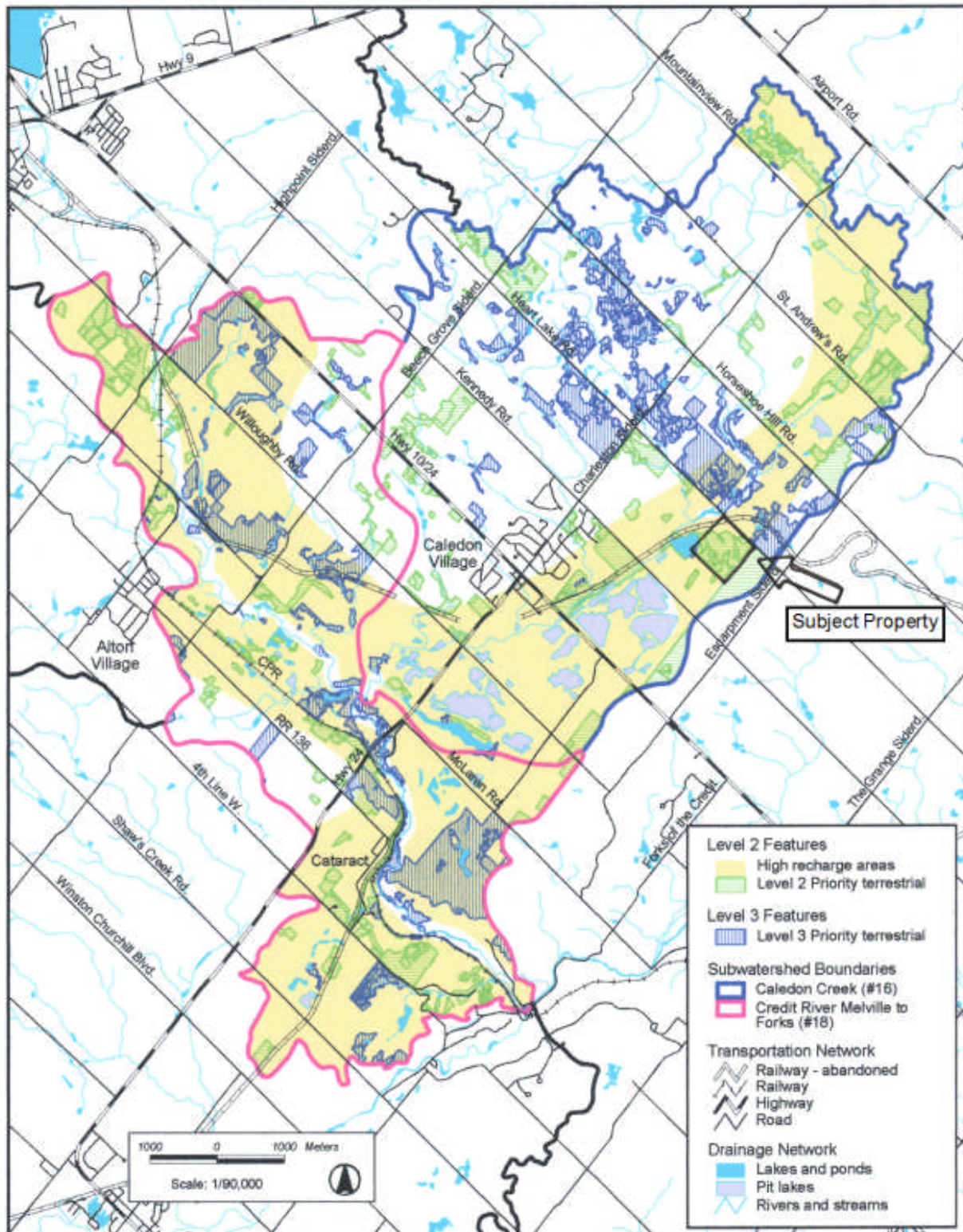


Figure 7: Protection Levels 2 and 3

For a detailed view of this figure, please see large maps at the back of the Phase III report.

Please note that the text of the Subwatershed Study will take precedence over any discrepancy between the text and the figures.

Source: Credit Valley Conservation, 1999, OMNR, 1982.



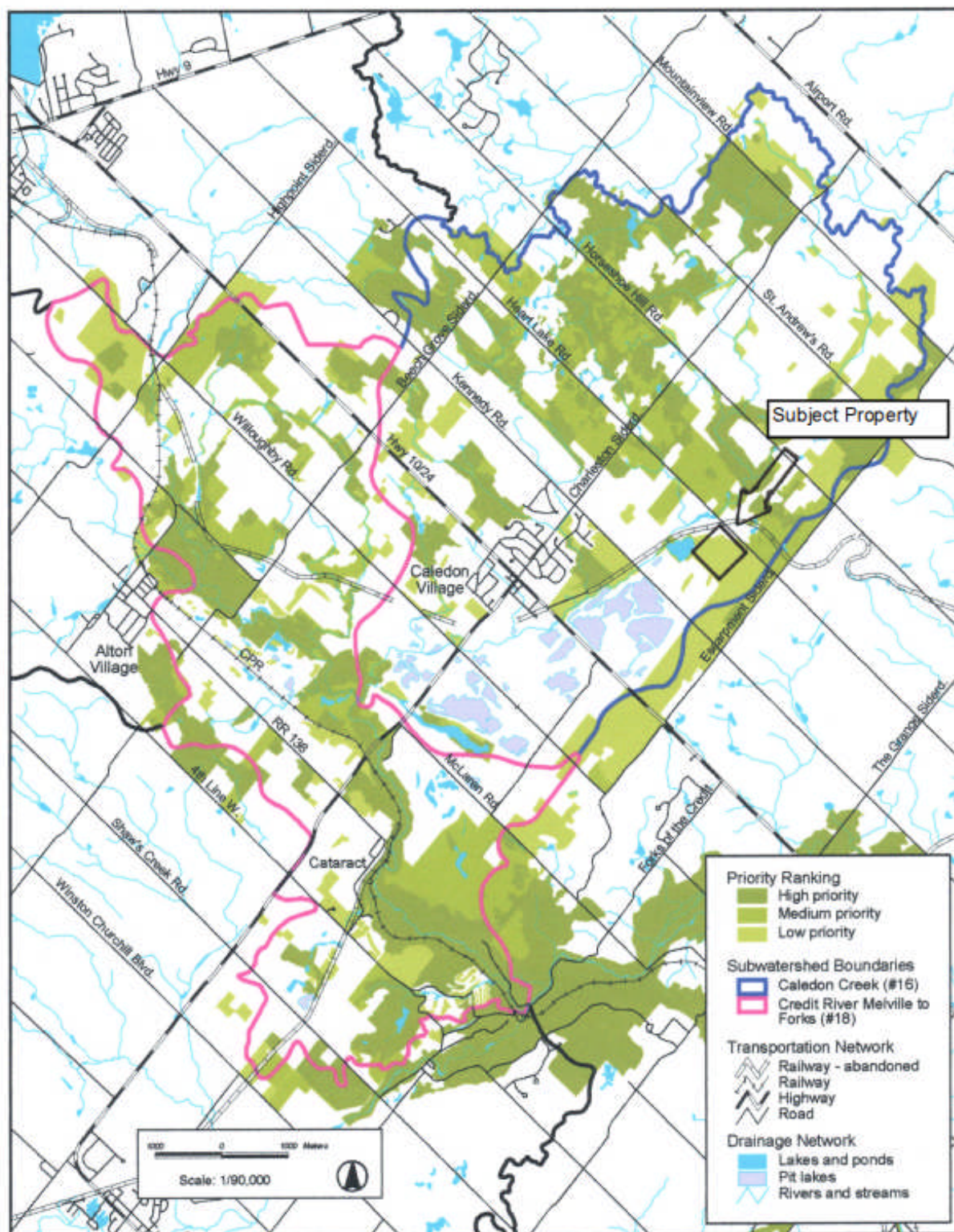


Figure 8.29: Terrestrial Priority Ranking

Source: Credit Valley Conservation, 1997; OMNR, 1982.



APPENDIX D – ECOLOGICAL DATA

Figure	Field Investigations Map
Table	Bird List
Table	Master Wildlife List
Table	Plant Species List
Table	Amphibian Call Count Survey Dates and Conditions
Table	Amphibian Call Count Survey Stations and Transect UTM Coordinates
Table	Amphibian Call Count Survey Results

Common Name	Species Code	Scientific Name	Provincial Status (S Rank)	Global Status (G Rank)	COSSARO (MNRF)	COSEWIC (Federal)	SWH Indicator Species	Highest Breeding Evidence
Anseriformes								
Anatidae								
Canada Goose	CANG	<i>Branta canadensis</i>	S5	G5			X	OB-X
Mallard	MALL	<i>Anas platyrhynchos</i>	S5	G5			X	OB-X
Galliformes								
Phasianinae								
Podicipediformes								
Podicipedidae								
Pied-billed Grebe	PBGR	<i>Podilymbus podiceps</i>	S4B,S4N	G5			X	PO-S
Columbiformes								
Columbidae								
Rock Pigeon	ROPI	<i>Columba livia</i>	SNA	G5				OB-X
Mourning Dove	MODO	<i>Zenaida macroura</i>	S5	G5				PO-H
Cuculiformes								
Cuculidae								
Caprimulgiformes								
Caprimulgidae								
Apodiformes								
Apodidae								
Trochilidae								
Gruiformes								
Rallidae								
Gruidae								
Charadriiformes								
Charadriidae								
Scolopacidae								
Stercorariidae								
Alcidae								
Laridae								
Gaviiformes								
Gaviidae								
Suliformes								
Phalacrocoracidae								
Pelecaniformes								
Pelecanidae								
Ardeidae								
Accipitriformes								
Cathartidae								
Turkey Vulture	TUVU	<i>Cathartes aura</i>	S5B	G5				OB-X
Pandionidae								
Osprey	OSPR	<i>Pandion haliaetus</i>	S5B	G5			X	OB-X
Accipitridae								
Strigiformes								
Tytonidae								

Common Name	Species Code	Scientific Name	Provincial Status (S Rank)	Global Status (G Rank)	COSSARO (MNR)	COSEWIC (Federal)	SWH Indicator Species	Highest Breeding Evidence
Strigidae								
Coraciiformes								
Alcedinidae								
Piciformes								
Picidae								
Red-bellied Woodpecker	RBWO	<i>Melanerpes carolinus</i>	S4	G5				CO-CF
Northern Flicker	NOFL	<i>Colaptes auratus</i>	S4B	G5				CO-CF
Falconiformes								
Falconidae								
Passeriformes								
Tyrannidae								
Eastern Wood-Pewee	EAWP	<i>Contopus virens</i>	S4B	G5	SC	SC	X	PO-S
Eastern Phoebe	EAPH	<i>Sayornis phoebe</i>	S5B	G5				CO-CF
Eastern Kingbird	EAKI	<i>Tyrannus tyrannus</i>	S4B	G5				PO-H
Laniidae								
Vireonidae								
Red-eyed Vireo	REVI	<i>Vireo olivaceus</i>	S5B	G5				PR-P
Corvidae								
Blue Jay	BLJA	<i>Cyanocitta cristata</i>	S5	G5				CO-CF
American Crow	AMCR	<i>Corvus brachyrhynchos</i>	S5B	G5				PO-H
Common Raven	CORA	<i>Corvus corax</i>	S5	G5				
Alaudidae								
Horned Lark	HOLA	<i>Eremophila alpestris</i>	S5B	G5				PO-S
Hirundinidae								
Tree Swallow	TRES	<i>Tachycineta bicolor</i>	S4B	G5				PO-H
Bank Swallow	BANS	<i>Riparia riparia</i>	S4B	G5	THR	THR		OB-X
Paridae								
Black-capped Chickadee	BCCH	<i>Poecile atricapillus</i>	S5	G5				CO-FY
Sittidae								
White-breasted Nuthatch	WBNU	<i>Sitta carolinensis</i>	S5	G5				PO-H
Certhiidae								
Troglodytidae								
House Wren	HOWR	<i>Troglodytes aedon</i>	S5B	G5				PO-S
Polioptilidae								
Regulidae								
Turdidae								
American Robin	AMRO	<i>Turdus migratorius</i>	S5B	G5				PO-S
Mimidae								
Gray Catbird	GRCA	<i>Dumetella carolinensis</i>	S4B	G5				PO-S
Sturnidae								
Bombycillidae								
Passeridae								
Motacillidae								
Fringillidae								
American Goldfinch	AMGO	<i>Spinus tristis</i>	S5B	G5				PO-H

Common Name	Species Code	Scientific Name	Provincial Status (S Rank)	Global Status (G Rank)	COSSARO (MNRF)	COSEWIC (Federal)	SWH Indicator Species	Highest Breeding Evidence
Calcaridae								
Parulidae								
Blue-winged Warbler	BWWA	<i>Vermivora cyanoptera</i>	S4B	G5				PR-A
Common Yellowthroat	COYE	<i>Geothlypis trichas</i>	S5B	G5				PO-S
American Redstart	AMRE	<i>Setophaga ruticilla</i>	S5B	G5				PO-S
Yellow Warbler	YWAR	<i>Setophaga petechia</i>	S5B	G5				PO-S
Chestnut-sided Warbler	CSWA	<i>Setophaga pensylvanica</i>	S5B	G5				CO-CF
Emberizidae								
Eastern Towhee	EATO	<i>Pipilo erythrophthalmus</i>	S4B	G5			X	PR-P
Chipping Sparrow	CHSP	<i>Spizella passerina</i>	S5B	G5				PO-S
Field Sparrow	FISP	<i>Spizella pusilla</i>	S4B	G5			X	PR-P
Savannah Sparrow	SAVS	<i>Passerculus sandwichensis</i>	S4B	G5			X	PO-S
Song Sparrow	SOSP	<i>Melospiza melodia</i>	S5B	G5				PO-S
Cardinalidae								
Scarlet Tanager	SCTA	<i>Piranga olivacea</i>	S4B	G5			X	PO-S
Northern Cardinal	NOCA	<i>Cardinalis cardinalis</i>	S5	G5				PR-P
Rose-breasted Grosbeak	RBGR	<i>Pheucticus ludovicianus</i>	S4B	G5				PO-S
Indigo Bunting	INBU	<i>Passerina cyanea</i>	S4B	G5				PR-A
Icteridae								
Bobolink	BOBO	<i>Dolichonyx oryzivorus</i>	S4B	G5	THR	THR		PR-D
Red-winged Blackbird	RWBL	<i>Agelaius phoeniceus</i>	S4	G5				PR-P
Common Grackle	COGR	<i>Quiscalus quiscula</i>	S5B	G5				PO-H
Brown-headed Cowbird	BHCO	<i>Molothrus ater</i>	S4B	G5				PO-H

COMMON NAME	SCIENTIFIC NAME	Provincial Status (S RANK)	Global Status (G RANK)	COSSARO (MNR)	COSEWIC (Federal)	Local Status TRCA	Local Status CVC
ODONATA							
Common Green Darner	<i>Anax junius</i>	S5	G5				
BUTTERFLIES							
Spring Azure	<i>Celastrina ladon</i>	S5	G5				
Eastern Comma	<i>Polygonia comma</i>	S5	G5				
Mourning Cloak	<i>Nymphalis antiopa</i>	S5	G5				
BIRDS							
Mallard	<i>Anas platyrhynchos</i>	S5	G5			L5	
Ruffed Grouse	<i>Bonasa umbellus</i>	S4	G5			L3	
Turkey Vulture	<i>Cathartes aura</i>	S5B	G5			L5	
Killdeer	<i>Charadrius vociferus</i>	S5B, S5N	G5			L4	
Downy Woodpecker	<i>Picoides pubescens</i>	S5	G5			L5	
Northern Flicker	<i>Colaptes auratus</i>	S4B	G5			L4	
Eastern Kingbird	<i>Tyrannus tyrannus</i>	S4B	G5			L4	
Blue Jay	<i>Cyanocitta cristata</i>	S5	G5			L5	
American Crow	<i>Corvus brachyrhynchos</i>	S5B	G5			L5	
Tree Swallow	<i>Tachycineta bicolor</i>	S4B	G5			L4	
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	S4B	G5			L4	
Bank Swallow	<i>Riparia riparia</i>	S4B	G5	THR	THR	L3	
Black-capped Chickadee	<i>Poecile atricapillus</i>	S5	G5			L5	
House Wren	<i>Troglodytes aedon</i>	S5B	G5			L5	
Ruby-crowned Kinglet	<i>Regulus calendula</i>	S4B	G5				
American Robin	<i>Turdus migratorius</i>	S5B	G5			L5	
Brown Thrasher	<i>Toxostoma rufum</i>	S4B	G5			L3	
American Pipit	<i>Anthus rubescens</i>	S4	G5				
Blue-winged Warbler	<i>Vermivora cyanoptera</i>	S4B	G5			L3	
Pine Warbler	<i>Setophaga pinus</i>	S5B	G5			L4	
Yellow-rumped Warbler	<i>Setophaga coronata</i>	S5B	G5			L3	
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	S4B	G5			L3	
Chipping Sparrow	<i>Spizella passerina</i>	S5B	G5			L5	
Field Sparrow	<i>Spizella pusilla</i>	S4B	G5			L3	
Song Sparrow	<i>Melospiza melodia</i>	S5B	G5			L5	
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	S4	G5			L5	
Eastern Meadowlark	<i>Sturnella magna</i>	S4B	G5	THR	THR	L3	
Common Grackle	<i>Quiscalus quiscula</i>	S5B	G5			L5	
Brown-headed Cowbird	<i>Molothrus ater</i>	S4B	G5			L5	
Purple Finch	<i>Carpodacus purpureus</i>	S4B	G5			L4	
Pine Siskin	<i>Spinus pinus</i>	S4B	G5			L3	
American Goldfinch	<i>Spinus tristis</i>	S5B	G5			L5	
MAMMALS							
Eastern Chipmunk	<i>Tamias striatus</i>	S5	G5			L4	
Eastern Gray Squirrel	<i>Sciurus carolinensis</i>	S5	G5			L5	
White-tailed Deer	<i>Odocoileus virginianus</i>	S5	G5			L4	

SUMMARY

Total Odonata:	1
Total Butterflies:	3
Total Other Arthropods	0
Total Amphibians:	0
Total Reptiles:	0
Total Birds:	32
Total Breeding Birds:	24
Total Mammals:	3

SIGNIFICANT SPECIES

Global:	0
National:	2

COMMON NAME	SCIENTIFIC NAME	Provincial Status (S RANK)	Global Status (G RANK)	COSSARO (MNR)	COSEWIC (Federal)	Local Status TRCA	Local Status CVC
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Provincial: 2

Regional: 0

Local:

Explanation of Status and Acronyms

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

COSEWIC: Committee on the Status of Endangered Wildlife in Canada

S1: Critically Imperiled—Critically imperiled in the province (often 5 or fewer occurrences)

S2: Imperiled—Imperiled in the province, very few populations (often 20 or fewer),

S3: Vulnerable—Vulnerable in the province, relatively few populations (often 80 or fewer)

S4: Apparently Secure—Uncommon but not rare

S5: Secure—Common, widespread, and abundant in the province

SX: Presumed extirpated

SH: Possibly Extirpated (Historical)

SNR: Unranked

SU: Unrankable—Currently unrankable due to lack of information

SNA: Not applicable—A conservation status rank is not applicable because the species is not a suitable target for conservation activities.

S#S#: Range Rank—A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species

S#B- Breeding status rank

S#N- Non Breeding status rank

?: Indicates uncertainty in the assigned rank

G1: Extremely rare globally; usually fewer than 5 occurrences in the overall range

G1G2: Extremely rare to very rare globally

G2: Very rare globally; usually between 5-10 occurrences in the overall range

G2G3: Very rare to uncommon globally

G3: Rare to uncommon globally; usually between 20-100 occurrences

G3G4: Rare to common globally

G4: Common globally; usually more than 100 occurrences in the overall range

G4G5: Common to very common globally

G5: Very common globally; demonstrably secure

GU: Status uncertain, often because of low search effort or cryptic nature of the species; more data needed.

T: Denotes that the rank applies to a subspecies or variety

Q: Denotes that the taxonomic status of the species, subspecies, or variety is questionable.

END: Endangered

THR: Threatened

SC: Special Concern

NAR: Not At Risk

IND: Indeterminant, insufficient information to assign status

DD: Data Deficient

6: Rare in Site Region 6

7: Rare in Site Region 7

Area: Minimum patch size for area-sensitive species (ha)

H- highly significant in Hamilton Region (i.e. rare)

m- moderately significant in Hamilton Region (i.e. uncommon)

L1- extremely rare locally (Toronto Region)

L2- very rare locally (Toronto Region)

L3- rare to uncommon locally (Toronto Region)

HR- rare in Halton Region, highly significant

HU- uncommon in Halton Region, moderately significant

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Table D3: Master Wildlife List

COMMON NAME	SCIENTIFIC NAME	Provincial Status (S RANK)	Global Status (G RANK)	COSSARO (MNRF)	COSEWIC (Federal)	Local Status TRCA	Local Status CVC
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Latin Name	Common Name	Coefficient of Conservation	Wetness Index	Weediness Index	Provincial Status S-Rank	OMNR Status	COSEWIC Status	Global Status G-Rank	Local Status Peel	Local Status CVC/Peel	Authority
PTERIDOPHYTES	FERNS and ALLIES										
Dryopteridaceae	Wood Fern Family										
<i>Dryopteris carthusiana</i>	Spinulose Wood Fern	5	-2		S5			G5	X	X	(Vill.) H.P. Fuchs
GYMNOSPERMS	CONIFERS										
Pinaceae	Pine Family										
<i>Tsuga canadensis</i>	Eastern Hemlock	7	3		S5			G5	X	X	(L.) Carrière
DICOTYLEDONS	DICOTS										
Apiaceae	Carrot or Parsley Family										
<i>Sium suave</i>	Hemlock Water-parsnip	4	-5		S5			G5	X	X	Walter
Aristolochiaceae	Duchman's-pipe Family										
<i>Asarum canadense</i>	Wild Ginger	6	5		S5			G5	X	X	L.
Asclepiadaceae	Milkweed Family										
<i>Cynanchum rossicum</i>	European Swallow-wort				SNA			GNR	X	X	(Kleopov) Borhidi
Asteraceae	Composite or Aster Family										
<i>Achillea millefolium</i>	Yarrow		3	-1	S5			G5	X	X	L.
<i>Erigeron annuus</i>	Annual Fleabane				S5			G5	X	X	(L.) Pers.
<i>Leucanthemum vulgare</i>	Oxeye Daisy		5	-1	SNA			GNR	X	X	L.
<i>Rudbeckia hirta</i>	Black-eyed Susan	0	3		S5			G5	X	X	L.
<i>Solidago caesia</i>	Blue-stemmed Goldenrod	5	3		S5			G5	X	X	L.
<i>Solidago flexicaulis</i>	Zig-zag Goldenrod	6	3		S5			G5	X	X	L.
<i>Symphyotrichum lateriflorum</i>	Starved Aster	3	-2		S5			G5	X	X	(L.) Britton
<i>Tragopogon dubius</i>	Yellow Goat's-beard		5	-1	SNA			GNR	X	I	Scop.
Balsaminaceae	Touch-me-not Family										
Berberidaceae	Barberry Family										
<i>Berberis thunbergii</i>	Japanese Barberry		4	-3	SNA			GNR	X	I	DC.
<i>Caulophyllum giganteum</i>	Giant Blue Cohosh				S4S5			G4G5	X	R	(Farw.) Leconte & Blackwell
Betulaceae	Birch Family										
<i>Betula alleghaniensis</i>	Yellow Birch	6	0		S5			G5	X	X	Britton
Boraginaceae	Borage Family										
<i>Myosotis laxa</i>	Small Forget-me-not	6	-5		S5			G5	X	X	Lehm.
Brassicaceae	Mustard Family										
<i>Cardamine pensylvanica</i>	Pennsylvania Bitter-cress	6	-4		S5			G5	U	X	Muhlent. ex Willd.
Campanulaceae	Bellflower Family										
<i>Lobelia inflata</i>	Indian Tobacco	3	4		S5			G5	X	X	L.
Caprifoliaceae	Honeysuckle Family										
<i>Lonicera canadensis</i>	American Fly-honeysuckle	6	3		S5			G5	X	X	Bartram
<i>Sambucus racemosa</i>	Red Elderberry	5	2		S5			G5	X	X	L.
<i>Viburnum lentago</i>	Nannyberry	4	-1		S5			G5	X	X	L.
Caryophyllaceae	Pink Family										
<i>Silene vulgaris</i>	Maiden's Tears		5	-1	SNA			GNR	X	I	(Moench) Garcke
Ceratophyllaceae	Hornwort Family										
<i>Ceratophyllum demersum</i>	Common Hornwort	4	-5		S5			G5	R3	R	L.
Cornaceae	Dogwood Family										
<i>Cornus alternifolia</i>	Alternate-leaf Dogwood	6	5		S5			G5	X	X	L. f.
Grossulariaceae	Currant Family										
<i>Ribes cynosbati</i>	Prickly Gooseberry	4	5		S5			G5	X	X	L.
Guttiferae	St. John's-wort Family										
<i>Hypericum perforatum</i>	Common St. John's-wort		5	-3	SNA			GNR	X	I	L.
Hydrophyllaceae	Water-leaf Family										
<i>Hydrophyllum virginianum</i>	Virginia Waterleaf	6	-2		S5			G5	X	X	L.
Lamiaceae	Mint Family										
<i>Galeopsis tetrahit</i>	Common Hempnettle		5	-1	SNA			GNR	X	I	L.
<i>Mentha arvensis</i>	Corn Mint	3	-3		S5			G5	X	X	L.
<i>Monarda fistulosa</i> var. <i>fistulosa</i>	Wild Bergamot Beebalm	6	3		SU			G5T5?	X	X	L.
<i>Prunella vulgaris</i> ssp. <i>vulgaris</i>	Self-heal		0	-1	SNA			G5TU	X		L.
<i>Scutellaria galericulata</i>	Hooded Skullcap	6	-5		S5			G5	X	X	L.
<i>Scutellaria lateriflora</i>	Mad Dog Skullcap	5	-5		S5			G5	U	X	L.
Menispermaceae	Moonseed Family										
<i>Menispermum canadense</i>	Canada Moonseed	7	0		S4			G5	R5	L	L.
Papaveraceae	Poppy Family										
<i>Sanguinaria canadensis</i>	Bloodroot	5	4		S5			G5	X	X	L.
Polygonaceae	Smartweed Family										
<i>Rumex acetosa</i>	Garden Dock		5	-1	SNA			G5			L.
Pyrolaceae	Wintergreen Family										

Latin Name	Common Name	Coefficient of Conservation	Wetness Index	Weediness Index	Provincial Status S-Rank	OMNR Status	COSEWIC Status	Global Status G-Rank	Local Status Peel	Local Status CVC/Peel	Authority
<i>Pyrola elliptica</i>	Shinleaf	5	5		S5			G5	X	X	Nutt.
Ranunculaceae	Buttercup Family										
<i>Actaea pachypoda</i>	White Baneberry	6	5		S5			G5	X	X	Elliott
<i>Actaea rubra</i>	Red Baneberry	5	5		S5			G5	X	X	(Aiton) Willd.
<i>Anemone canadensis</i>	Canada Anemone	3	-3		S5			G5	X	X	L.
<i>Anemone virginiana</i>	Virginia Anemone	4	5		S5			G5	X	X	L.
<i>Ranunculus aquatilis</i> var. <i>diffusus</i>	White Water Buttercup				S5			G5	R3	R	Withering
<i>Ranunculus recurvatus</i>	Hooked Buttercup	4	-3		S5			G5	X	X	Poir.
Rosaceae	Rose Family										
<i>Agrimonia gryposepala</i>	Tall Hairy Groovebur	2	2		S5			G5	X	X	Wallr.
<i>Rubus occidentalis</i>	Black Raspberry	2	5		S5			G5	X	X	L.
<i>Rubus pubescens</i>	Dwarf Raspberry	4	-4		S5			G5	X	X	Raf.
Rubiaceae	Madder Family										
<i>Galium mollugo</i>	White Bedstraw		5	-2	SNA			GNR	X		L.
<i>Galium tinctorium</i>	Stiff Marsh Bedstraw	5	-5		S5			G5	R3	RL	L.
Scrophulariaceae	Figwort Family										
<i>Linaria vulgaris</i>	Butter-and-eggs		5	-1	SNA			GNR	X	I	Miller
<i>Veronica scutellata</i>	Marsh Speedwell	7	-5		S5			G5	R2	RL	L.
Urticaceae	Nettle Family										
<i>Boehmeria cylindrica</i>	False Nettle	4	-5		S5			G5	X	X	(L.) Sw.
<i>Laportea canadensis</i>	Wood Nettle	6	-3		S5			G5	X	X	(L.) Wedd.
Verbenaceae	Vervain Family										
<i>Verbena urticifolia</i>	White Vervain	4	-1		S5			G5	X	X	L.
MONOCOTYLEDONS	MONOCOTS										
Alismataceae	Water-plantain Family										
<i>Alisma triviale</i>	Northern Water-plantain	3	-5		S5			G5	X	X	Pursh
<i>Sagittaria latifolia</i>	Broad-leaved Arrowhead	4	-5		S5			G5	X	X	Willd.
Cyperaceae	Sedge Family										
<i>Carex blanda</i>	Woodland Sedge	3	0		S5			G5	X	X	Dewey
<i>Carex hitchcockiana</i>	Hitchcock's Sedge	6	5		S4S5			G5	R6	L	Dewey
<i>Carex hystericina</i>	Porcupine Sedge	5	-5		S5			G5	X	X	Muhlent. ex Willd.
<i>Carex intumescens</i>	Bladder Sedge	6	-4		S5			G5	X	X	Rudge
<i>Carex pseudo-cyperus</i>	Cypress-like Sedge	6	-5		S4			G4	X	X	L.
<i>Carex retrorsa</i>	Retorse Sedge	5	-5		S5			G5	X	X	Schwein.
<i>Carex rosea</i>	Rosy Sedge	5	5		S5			G5	X	X	Schkuhr ex Willd.
<i>Carex scabrata</i>	Rough Sedge	8	-5		S5			G5	R8	L	Schwein.
<i>Carex sparganioides</i>	Burreed Sedge	5	0		S4S5			G5	X	X	Muhlent. ex Willd.
<i>Carex sprengei</i>	Long-beaked Sedge	6	0		S5			G5	R1	RL	Dewey ex Spreng.
<i>Carex tuckermanni</i>	Tuckerman's Sedge	7	-5		S5			G4	R6	L	Dewey
<i>Dulichium arundinaceum</i>	Reed-like Three-way Sedge	7	-5		S5			G5	R3	RL	(L.) Britton
<i>Eleocharis palustris</i>	Small's Spike-rush	6	-5		S5			G5?	R4	L	Britton
<i>Schoenoplectus tabernaemontani</i>	American Great Bulrush	5	-5		S5			G5	X	X	L.
<i>Scirpus cyperinus</i>	Wool-grass	4	-5		S5			G5	X	X	(L.) Kunth
Juncaceae	Rush Family										
<i>Juncus dudleyi</i>	Dudley's Rush	1	0		S5			G5	X	X	Wiegelt
Lemnaceae	Duckweed Family										
<i>Lemna minor</i>	Lesser Duckweed	2	-5		S5			G5	X	X	L.
<i>Lemna trisulca</i>	Star Duckweed	4	-5		S5			G5	R4	R	L.
<i>Spirodela polyrrhiza</i>	Greater Duckweed	4	-5		S5			G5	U	X	(L.) Schleid.
<i>Wolffia borealis</i>	Northern Water-meal	4	-5		S4S5			G5	R2	R	(Engelm.) Landolt
<i>Wolffia columbiana</i>	Water-meal	4	-5		S4S5			G5	R3	RL	Karst.
Liliaceae	Lily Family										
<i>Allium tricoccum</i>	Wild Leek	7	2		S4			G5	X	X	Alton
<i>Polygonatum pubescens</i>	Downy Solomon's Seal	5	5		S5			G5	X	X	(Willd.) Pursh
Poaceae	Grass Family										
<i>Alopecurus aequalis</i>	Short-awned Foxtail		-5		S4			G5	R3	L	Sobol.
<i>Bromus inermis</i>	Awnless Brome		5	-3	SNA			G5TNR	X	I	Leyss.
<i>Glyceria grandis</i>	Tall Mannagrass	5	-5		S5			G5	X	X	S. Watson
<i>Glyceria septentrionalis</i>	Floating Manna Grass	8	-5		S4			G5	R2	RL	Hitchc.
<i>Leersia oryzoides</i>	Rice Cut Grass	3	-5		S5			G5	X	X	(L.) Sw.
<i>Phleum pratense</i>	Timothy		3	-1	SNA			GNR	X	I	L.
<i>Poa compressa</i>	Canada Blue Grass	0	2		SNA			GNR	X	X	L.
<i>Poa palustris</i>	Fowl Meadow Grass	5	-4		S5			G5	X	X	L.
Smilacaceae	Catbrier Family										
<i>Smilax herbacea</i>	Herbaceous Carrion Flower	5	0		S4?			G5	X	X	L.
Sparganiaceae	Bur-reed Family										
<i>Sparganium emersum</i> ssp. <i>emersum</i>	Green-fruited Bur-reed	5	-5		S5			G5	R2	L	Rehmann

STATISTICS

Species Richness

Total Number of Species:	242	
Native Species:	181	75%
Exotic Species:	61	25%

Table D4: Plant List

Latin Name	Common Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Provincial Status S-Rank	OMNR Status	COSEWIC Status	Global Status G-Rank	Local Status Peel	Local Status CVC/Peel	Authority
Locally Rare Species:	38	21%									
S1-S3 Species:	0	0%									
S4 Species:	19	11%									
S5 Species:	160	89%									
Floristic Quality Indices											
Mean Co-efficient of Conservatism (CC)	4.4										
CC 0 - 3 = lowest sensitivity	46	27%									
CC 4 - 6 = moderate sensitivity	108	63%									
CC 7 - 8 = high sensitivity	18	10%									
CC 9 - 10 = highest sensitivity	0	0%									
Floristic Quality Index (FQI)	57										
Weedy and Invasive Species											
Mean Weediness Index:	-1.7										
-1 = low potential invasiveness	26	46%									
-2 = moderate potential invasiveness	21	37%									
-3 = high potential invasiveness	10	18%									
Wetland Species											
Mean Wetness Index	0.1										
upland	56	24%									
facultative upland	47	20%									
facultative	32	14%									
facultative wetland	42	18%									
obligate wetland	53	23%									

See next page for explanation of terms

Table D5: Amphibian Call Count Survey Station Results

SURVEY ROUND	STATION NUMBER	SPECIES CODE											WATER	
		NOAM	AMTO	FOTO	GRTR	SPPE	CHFR	WOFR	NLFR	PIFR	GRFR	BULL	MIFR	Present (Y/N)
1	AMC1					1 (7)			1 (2)				Y	No access
2	AMC1					2 (12)							Y	No access
3	AMC1				3 (TNTC)								Y	No access
1	AMC2					1 (4)			1 (1)				Y	40
2	AMC2					2 (20)							Y	40
3	AMC2	X											Y	40
1	AMC3					3 (TNTC)							Y	No access
2	AMC3	X											Y	No access
3	AMC3				1 (6)								Y	No access
1	AMC4					1 (3)							Y	No access

LEGEND:

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

CALL CODES	
X	No amphibians heard
1	Calls can be counted without error
2	Calls overlap but can be reliably estimated
3	Calls overlap too much to estimate number

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

Table D5: Amphibian Call Count Survey Station Results

SURVEY ROUND	STATION NUMBER	SPECIES CODE											WATER	
		NOAM	AMTO	FOTO	GRTR	SPPE	CHFR	WOFR	NLFR	PIFR	GRFR	BULL	MIFR	Present (Y/N)
2	AMC4		1 (2)			1 (6)							Y	No access
3	AMC4	X											Y	No access
1	AMC5					1 (4)							Y	30
2	AMC5					3 (TNTC)			1 (2)				Y	40
3	AMC5				3 (TNTC)					1 (3)			Y	50
1	AMC6					1 (8)			1 (2)				Y	No access
2	AMC6		1 (4)			1 (9)			1 (5)				Y	No access
3	AMC6	X											Y	No access
1	AMC7					1 (5)							Y	No access
2	AMC7					2 (12)							Y	No access

LEGEND:

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

CALL CODES	
X	No amphibians heard
1	Calls can be counted without error
2	Calls overlap but can be reliably estimated
3	Calls overlap too much to estimate number

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

Table D5: Amphibian Call Count Survey Station Results

SURVEY ROUND	STATION NUMBER	SPECIES CODE											WATER		
		NOAM	AMTO	FOTO	GRTR	SPPE	CHFR	WOFR	NLFR	PIFR	GRFR	BULL	MIFR	Present (Y/N)	Depth (CM)
3	AMC7				3 (TNTC)						1 (3)			Y	No access
1	AMC8					1 (4)			1 (1)					Y	No access
2	AMC8					1 (2)								Y	No access
3	AMC8													N	Dry

LEGEND:

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

CALL CODES	
X	No amphibians heard
1	Calls can be counted without error
2	Calls overlap but can be reliably estimated
3	Calls overlap too much to estimate number

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

Table D6: Amphibian Egg Mass Survey Results

SURVEY ROUND	STATION NUMBER	SPECIES CODE											WATER		
		NOAM	AMTO	FOTO	GRTR	SPPE	CHFR	WOFR	NLFR	PIFR	GRFR	BULL	MIFR	Present (Y/N)	Depth (CM)
1	Wetland 4	X												Y	20-40
2	Wetland 4					1 (5)		1	1 (1)					Y	40-60
3	Wetland 4	X												Y	40
1	Wetland 6	X												Y	30
2	Wetland 6					1 (4)								Y	20-60
3	Wetland 6					1					3			Y	>60
1	Wetland 10	X												Y	30

Note: 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

LEGEND:

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

Table D7: Turtle Survey Results

DATE SURVEYED	SURVEY ROUND	TRANSECTOR OR STATION NUMBER	SPECIES CODE								
			NOTU	MPTU	SNTU	MATU	BLTU	SSTU	WOTU	STIN	SPTU
28-AP-16	1	WETLAND 2	X								
28-AP-16	1	WETLAND 4	X								

LEGEND:

SPECIES CODE	COMMON NAME	SCIENTIFIC NAME
NOTU	No Turtles	No turtles despite survey effort
MPTU	Midland Painted Turtle	<i>Chrysemys picta marginata</i>
SNTU	Snapping Turtle	<i>Chelydra serpentina</i>
MATU	Northern Map Turtle	<i>Graptemys geographica</i>
BLTU	Blanding's Turtle	<i>Emydoidea blandingii</i>
SSTU	Spiny Soft-shelled Turtle	<i>Apalone spinifer</i>
WOTU	Wood Turtle	<i>Glyptemys insculpta</i>
STIN	Stinkpot Turtle	<i>Stemotherus odoratus</i>
SPTU	Spotted Turtle	<i>Clemmys guttata</i>

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