BURNSIDE

Natural Heritage Assessment

Individual Environmental Assessment
Town of St. Marys Landfill Expansion

Town of St. Marys

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Town of St. Marys Landfill Expansion

Town of St. Marys

R.J. Burnside & Associates Limited
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April 2016 (Revised September 2016)
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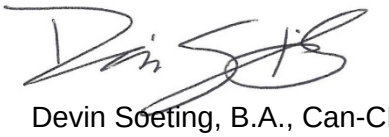
Revision	Date	Description
0	April 2016	Draft Submission to Town of St. Marys
1	April 2016	Second Draft Submission to Town of St. Marys
2	April 2016	Draft Updated to include Evaluation of Alternative Methods
3	June 2016	Third Draft Submission to Town of St. Marys
4	September 2016	Revised to address URTCA comments

R.J. Burnside & Associates Limited

Report Prepared By:



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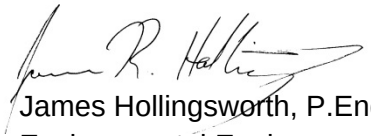

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Glossary of Terms and Acronyms

ANSI:	Significant Areas of Natural and Scientific Interest
Burnside:	R.J. Burnside & Associates Limited
COSEWIC:	Committee on the Status of Endangered Wildlife in Canada
DBH:	Diameter at Breast Height
DFO:	Fisheries and Oceans Canada
ELC:	Ecological Land Classification
LIO:	Land Information Ontario
NHIC:	Natural Heritage Information Centre
NHRM:	Natural Heritage Reference Manual
NHS:	Natural Heritage System
MNRF:	Ministry of Natural Resources and Forestry
MOECC:	Ministry of the Environment and Climate Change
OBBA:	Ontario Breeding Bird Atlas
Official Plan:	Describes an upper, lower or single-tier municipal council's policies on how land within their respective jurisdiction should be used. The Official Plan typically identifies where new industry, housing, offices and shops will be located and how, and in what order, parts of the community will grow, among other issues.
OPSS:	Ontario Provincial Standard Specifications
ORAA:	Ontario Reptile and Amphibian Atlas
PPS:	Provincial Policy Statement 2014 - the statement of the government's policies on land use planning.
SAR:	Species at Risk
SARA:	Federal Species at Risk Act
SARO:	Species at Risk in Ontario List
SCC:	Species of Conservation Concern
SWH:	Significant Wildlife Habitat
SWHTG:	Significant Wildlife Habitat Technical Guide
UTRCA:	Upper Thames Region Conservation Authority
WSC:	Wildlife Scientific Collector's Permit

1.0 Introduction

The Town of St. Marys (the Town) is conducting an Individual Environmental Assessment under the *Environmental Assessment Act* to review alternative means to managing solid waste in the Town over a 40 year planning period. The existing St. Marys landfill site (the Site), Environmental Compliance Approval (ECA) Number A150203, is located at 1221 Water St. South, St. Marys, Ontario. The 37 ha Site was part of a former clay pit that was used by St. Marys Cement in cement manufacturing and contains an approved fill area of 8 ha. The landfill is nearing its approved fill capacity and a new means to manage post-diversion solid waste is required. The location of the existing landfill is illustrated on Figure 1 of this Report.

Terms of Reference (TOR) were approved by the Minister of Environment and Climate Change (MOECC) on December 29, 2014.

The purpose of this study is to document existing natural heritage features on, and in the vicinity of, the landfill site. Impacts and proposed mitigation for each of the five Design Alternative Methods for the recommended solution will be identified.

2.0 Study Parameters

The assessment of natural heritage was completed using the parameters described in the following sections.

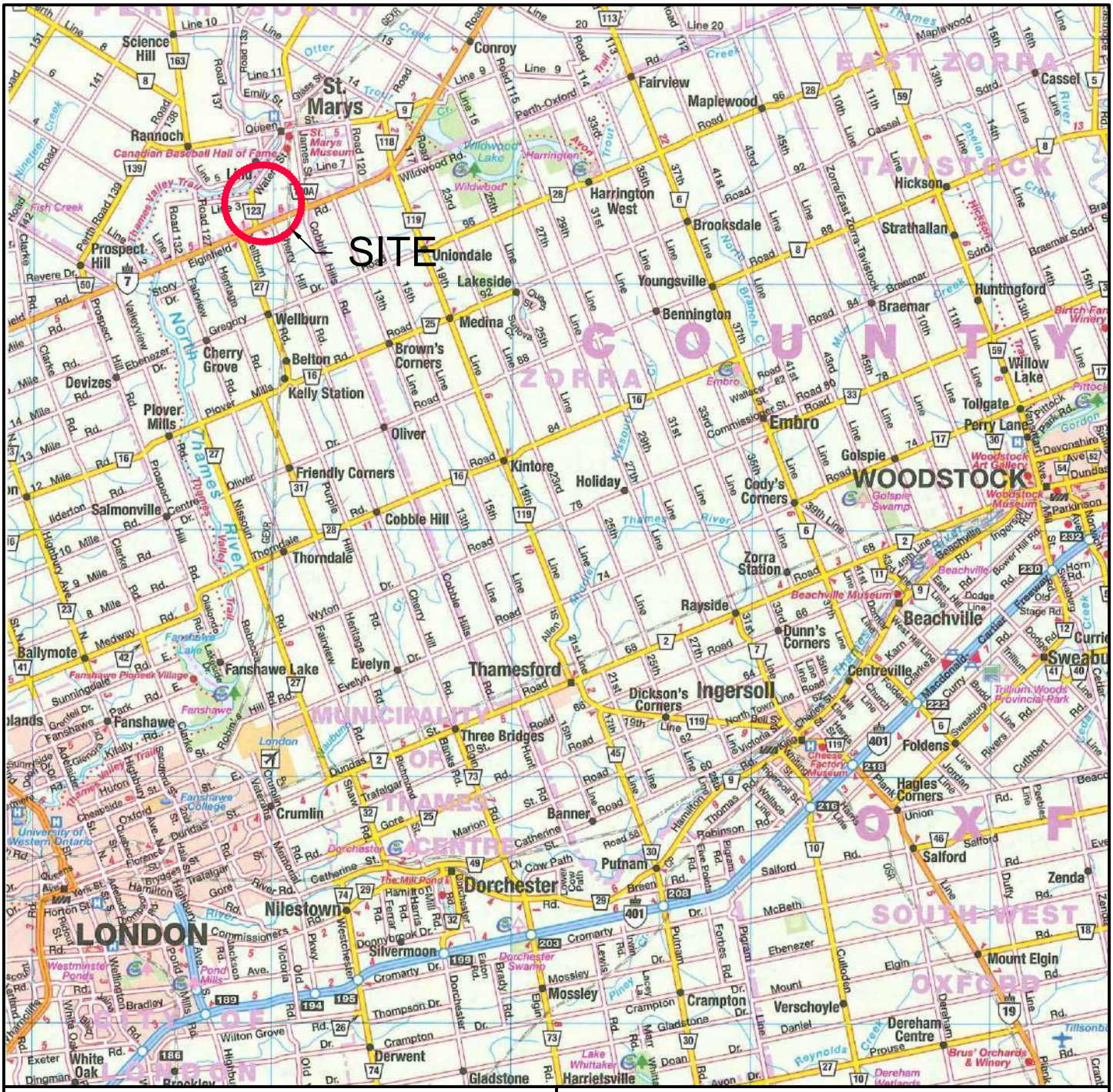
2.1 Study Purpose

The Undertaking is defined as:

> *The expansion of the St. Marys landfill in order to provide the necessary capacity to fulfill the Town's post-diversion solid waste disposal needs for the next 40 years.*

The purpose of this study is, therefore:

> *To assess the advantages and disadvantages of Alternative Methods for expanding the St. Marys landfill with respect to both provincially and locally significant natural features.*



KEY MAP OF ONTARIO

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THE CORPORATION OF THE TOWN OF ST. MARYS

Figure Title

ST. MARYS FUTURE SOLID WASTE DISPOSAL NEEDS ENVIRONMENTAL ASSESSMENT

SITE LOCATION PLAN

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2.2 Alternative Methods to be Assessed

Alternative Methods are technically, economically and environmentally feasible ways of doing, or implementing, the same activity.

The Alternative Methods to be reviewed will include those identified in Table 1.

Table 1: Alternative Methods for Carrying Out the Undertaking

Method		Description
1	Vertical expansion of the existing landfill.	This Method involves an expansion in the vertical direction within the existing footprint of the landfill.
2	Horizontal expansion of the existing landfill.	This Method involves an expansion outside of the existing landfill footprint.
3	A combination of vertical and horizontal expansion.	This Method would involve partial vertical expansion along with some horizontal expansion of the landfill footprint, basically a mixture of Methods 1 and 2.
4	Development of a new landfill footprint.	This Method involves closure of the existing 8 ha footprint and development of a new landfill footprint elsewhere on the 37 ha Site.
5	Vertical expansion plus a new footprint.	This Method is a combination of Methods 1 and 4.

These Alternative Methods and how they might affect the natural heritage of the On-site Study Area are discussed further in Section 6.0 of this Report.

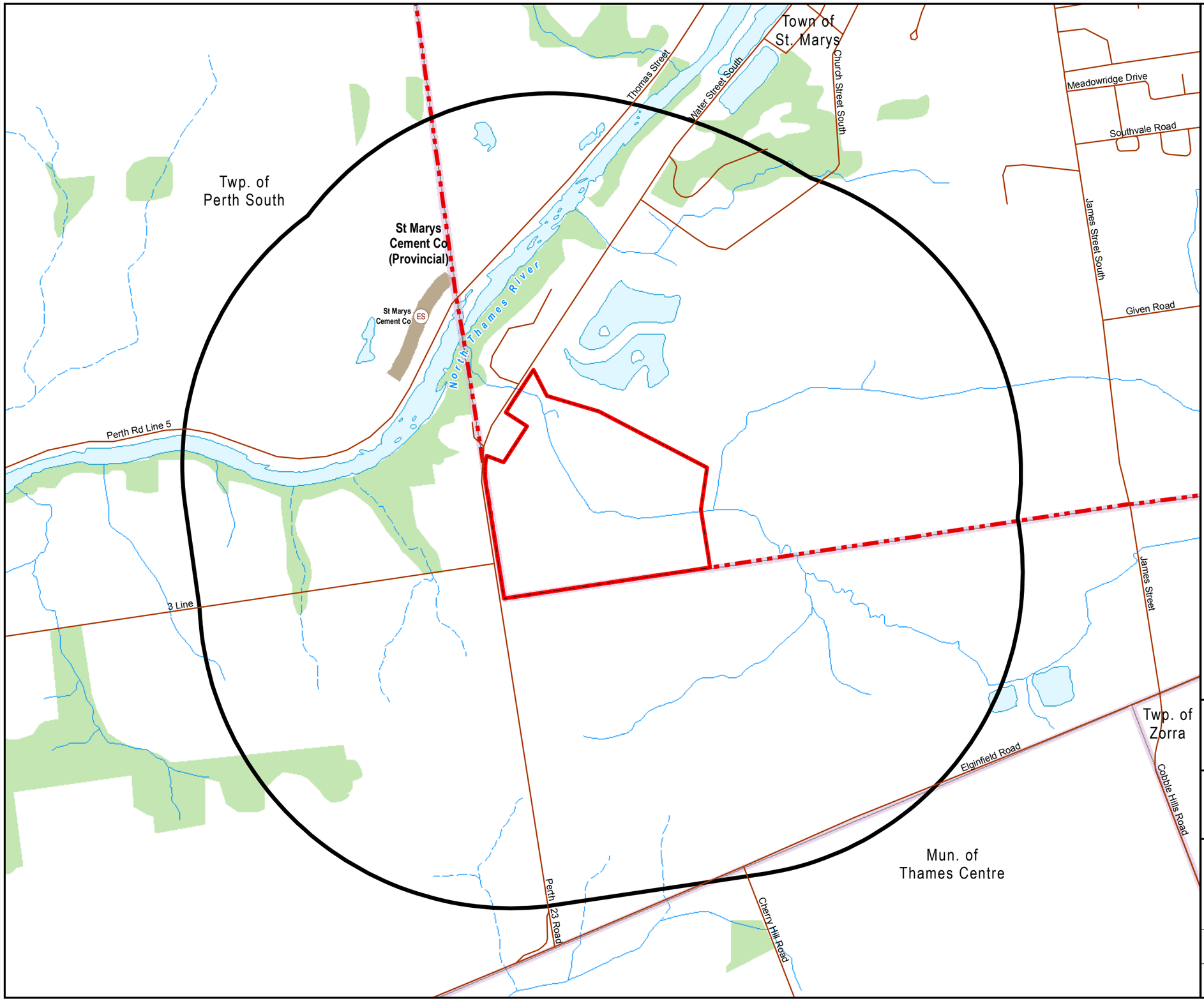
2.3 Study Area

Two specific Study Areas have been identified which will be used as the basis for defining and characterizing the natural environment which may be potentially affected by the expansion.

The Study Areas are as follows:

- On-site Study Area - includes all lands associated with the existing St. Marys landfill, the 37 ha site located as 1221 Water St. South, St. Marys; and,
- Study Area Vicinity - all lands within a 1,000 m radius of the On-site Study Area.

Both Study Areas are shown on Figure 2 of this Report.



LEGEND

- On-Site Study Area
- Study Area Vicinity (1000m Radius)
- St. Marys Town Boundary
- Municipality Boundary
- ANSI: Earth Science
- ANSI, Earth Science
- Watercourse: Intermittent
- Watercourse: Permanent
- Waterbody
- Wooded Area

Sources:

1. Ministry of Natural Resources, © Queen's Printer for Ontario
2. Natural Resources Canada © Her Majesty the Queen in Right of Canada.

Datum: North American 1983 CSRS

Coord. System: NAD 1983 CSRS UTM Zone 17N

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THE CORPORATION OF THE TOWN OF ST. MARYS

Figure Title

ST. MARYS FUTURE SOLID WASTE DISPOSAL NEEDS ENVIRONMENTAL ASSESSMENT

NATURAL HERITAGE CONSTRAINTS

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2.4 Study Timeframe

The EA will consider the potential effects on various environmental components over two main periods:

- Construction and operation of the expanded landfill:
  - Construction is currently anticipated to commence in 2017; and,
  - Operations would then occur over a 40 year period, ending in year 2057.
- Closure and post-closure of the landfill.

2.5 Features of the Natural Environment to be Studied

Section 1(1) of the *EA Act* broadly defines the environment as:

> *"(a) air, land or water,*
> *(b) plant and animal life, including human life,*
> *(c) the social, economic and cultural conditions that influence the life of humans or a community,*
> *(d) any building, structure, machine or other device or thing made by humans,*
> *(e) any solid, liquid, gas, odour, heat, sound, vibration or radiation resulting directly or indirectly from human activities, or*
> *(f) any part or combination of the foregoing and the interrelationships between any two or more of them."*

This report will focus primarily on the plant and animal life component of the environment. The study will specifically consider natural features of provincial significance, as outlined in Section 2.1 of the Provincial Policy Statement (PPS) (MMAH 2014) and features of local significance, as outlined in municipal Official Plans. Therefore, components of the environment to be studied include:

- Significant wetlands/significant coastal wetlands;
- Significant woodlands;
- Significant valleylands;
- Significant wildlife habitat (SWH);
- Significant Areas of Natural and Scientific Interest (ANSIs);
- Fish and Fish Habitat;
- Habitat of Endangered and Threatened species; and
- Locally significant natural features.

2.6 Study Organization

The Study generally includes the following:

- Background Records Review;
- Site Investigations;
- Identification of Features of Provincial Significance;
- Identification of Features of Local Significance;
- Assessment of impacts and mitigation measures;
- Identification of permit requirements; and,
- Identification of future studies and monitoring.

This Report is organized to follow the above steps.

3.0 Background Records Review

3.1 Methodology

A comprehensive desktop assessment was completed to compile and review existing natural heritage information available for the On-site Study Area and Study Area Vicinity. All lands within 1,000 m of the existing St. Marys landfill were reviewed as part of the high level desktop review in order to identify significant natural heritage features located within the On-site Study Area and Study Area Vicinity that may be impacted by the proposed works. Information acquired through this screening process was used to help guide field efforts and evaluate the significance of on-site observations. Information was reviewed from the following data sources identified in Table 2.

Table 2: Background Data Sources Reviewed

Database	Website/Source
Species, Habitat Natural Area Records	
Natural Heritage Information Centre (NHIC) Natural Heritage Viewer NHIC 1x1 km^2 Square 17MH8787	http://www.giscoeapp.lrc.gov.on.ca/Mamnh/Index.html?site=MNR_NHLUPS_NaturalHeritage&viewer=NaturalHeritage&locale=en-US
Land Information Ontario (LIO)	Geographic Information Systems (GIS)
MNRF Interactive Map of Species at Risk by County/Region	http://www.ontario.ca/environment-and-energy/find-species-risk-your-area

Database	Website/Source
Ontario Breeding Bird Atlas (OBBA 2001-2005) OBBA 10x10 km^2 Square 17MH88	http://www.birdsontario.org/atlas/squareinfo.jsp?lang=en
Conservation Authority/Fisheries and Oceans Canada (DFO) Aquatic Species at Risk mapping	http://www.conservation-ontario.on.ca/projects/DFO.html
Canada-Important Bird Areas	http://www.ibacanada.ca/mapviewer.jsp?lang=EN
Ontario Reptile and Amphibian Atlas (ORAA)	http://www.ontarionature.org/protect/species/reptiles_and_amphibians/index.php
Land and Soils Data	
Soil Surveys of Ontario	http://sis.agr.gc.ca/cansis/publications/surveys/on/index.html
Agricultural Capability/Soils Classification	http://www.omafra.gov.on.ca/english/landuse/gis/soil_data/nts.htm
Natural Resources Canada National Air Photo Library	http://www.nrcan.gc.ca/earth-sciences/geomatics/satellite-imagery-air-photos/9265
CA Regulations	
Upper Thames River Conservation Authority (UTRCA)	http://maps.thamesriver.on.ca/
Official Plans	
Town of St. Marys Official Plan	http://www.townofstmarys.com/uploadedFiles/Town_Services/Permits_and_Zoning/OfficialPlan.pdf
Perth County Official Plan	http://www.perthcounty.ca/Official_Plan_Sechdules_of_Detailed_Maps
Thames River Background Documents	
Aquatic Species at Risk in the Thames River Watershed (Cudmore et.al., 2004)	http://www.dfo-mpo.gc.ca/Library/316802.pdf
Aquatic Ecosystem Recovery in the Thames River Watershed (Taylor 2004)	http://www.arlis.org/docs/vol1/69415913/taylori_edited_final.pdf

Database	Website/Source
The Thames River, Ontario Canadian Heritage Rivers System Ten Year Monitoring Report 2000 - 2012	http://thamesriver.on.ca/wp-content/uploads/Publications/CHRS-10YearReport.pdf
Plover Mills Watershed Report Card 2012	http://thamesriver.on.ca/wp-content/uploads//WatershedReportCards/RC_PloverMills.pdf

In addition to background documents, relevant agencies were also contacted to provide additional records. Agencies consulted are listed in Table 3.

Table 3: Agencies Contacted for Site-Specific Records

Agency	Contact
Ministry of Natural Resources and Forestry (MNRF)	Mr. Dave Marriott District Planner 1 Stone Road West Guelph ON N1G 4Y2
Upper Thames Region Conservation Authority (UTRCA)	Ms. Tracy Annett Land Use Planner 1424 Clarke Road London ON N5V 5B9
Perth County	Mr. Allan Rothwell Director of Planning & Development 1 Huron Street Stratford ON N5A 5S4
Town of St. Marys	Mr. David Blake Supervisor of Environmental Services 408 James Street South PO Box 998 St. Marys ON N4X 1B6

Additional input regarding natural features was sought from First Nations and stakeholders through the consultation process. No additional information was received.

Records of agency correspondence are found in Appendix I.

3.2 Summary of the Background Records Review

3.2.1 Identification of Provincially Significant Natural Features

Provincially Significant natural features are natural areas that have been identified by the MNRF as being valuable. Some of these areas are determined by established ranking systems, and others are determined by the wildlife they support. The Table below provides a summary of the Provincially Significant natural features that were identified through the review of existing records.

Table 4: Summary of Provincially Significant Natural Features Identified through Existing Records

Feature	Description of Existing Record	Present/ Potentially Present On-site Study Area	Present/ Potentially Present Study Area Vicinity
Significant Wetlands	No existing record.	Not present	Not present
Significant Woodlands	Woodlands and Significant Woodlands are identified as "Natural Heritage" features in Schedule A, Land Use Plan of the St. Marys Official Plan and as any woodland greater than 1 ha in the County of Perth Official Plan.	Not present	Present
Significant Valleylands	Thames River valley	Not present	Present (Significance Unconfirmed)
Significant Areas of Natural and Scientific Interest	St. Marys Cement Co Provincially Significant Earth Science ANSI	Not present	Present
Significant Wildlife Habitat	MNRF SWH Criteria Schedules for Ecoregion 6E (January 2015)	Candidate and Confirmed SWH Present	Present
Fish Habitat	A watercourse flows through the landfill property. Within the Thames River (Study Area Vicinity), a variety of fish and aquatic species (including Species at Risk) are known to occur.	Potentially Present	Present

Feature	Description of Existing Record	Present/ Potentially Present On-site Study Area	Present/ Potentially Present Study Area Vicinity
Habitat of Endangered and Threatened Species	Various records of Endangered and Threatened species provided by the MNRF, including aquatic species in the Thames River.	Present	Present

3.2.2 Identification of Provincially Significant Species

3.2.2.1 Species of Conservation Concern

The term “species of conservation concern” (SCC) is defined under the Natural Heritage Reference Manual (NHRM) (MNR 2010) as follows:

- Species that are rare or are substantially declining, or have a high percentage of their global population in Ontario;
- Special Concern species identified on the Species at Risk in Ontario (SARO) list, which were formally referred to as “vulnerable” in the Significant Wildlife Habitat Technical Guide (SWHTG) (MNR 2000); and
- Species identified as nationally Endangered or Threatened by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in Canada, which are not protected in regulation under Ontario’s ESA 2007.

The definition for SCC excludes habitats of Endangered and Threatened species covered under the PPS (MMAH 2014), specifically, Policy 2.1.3(a). These are discussed separately in Section 5.0 of this Report.

3.2.2.2 Species at Risk

Species designated as Endangered are defined under the PPS (MMAH 2014) as ‘a species that is listed or categorized as an “Endangered Species” on the MNRF’s official species at risk list, as updated and amended from time to time’.

Species designated as Threatened are defined under the PPS (MMAH 2014) as ‘a species that is listed or categorized as a “Threatened Species” on the MNRF’s official species at risk list, as updated and amended from time to time’.

According to the NHRM (MNR 2010), the definition of “significant” as it pertains to the habitat of Endangered or Threatened species has two basic characteristics that habitat must exhibit to meet the definition. The habitat must be:

- Necessary for the maintenance, survival and/or recovery of naturally occurring or reintroduced populations; and,
- Occupied or habitually occupied by the species during all or any part(s) of its life cycle.

Species that are listed as SCC or Species At Risk (SAR) that were recorded from Burnside's background records review are discussed below and included in the Screening Tables in Appendix A of this Report. The results of the background review of features and species that may be present in the On-site Study Area and Study Area Vicinity guided the field investigations that were conducted in 2014 and 2015 and are discussed in Section 4.2 of this Report.

3.2.2.3 Vegetation

Two plants identified as SCC were recorded from the NHIC.

3.2.2.4 Avifauna

Seven birds identified as SCC and eight SAR birds were recorded from a review of the OBBA (2001 to 2005) and MNRF records from St. Marys and Perth South.

3.2.2.5 Amphibians and Reptiles

Four reptiles identified as SCC and one SAR reptile were recorded from a review of the MNRF records from St. Marys and Perth South, NHIC and the ORAA. No amphibians identified as SCC or SAR were recorded from a review of secondary sources.

3.2.2.6 Bats

Two SAR bats were recorded from a review of the MNRF records from St. Marys and Perth South.

3.2.2.7 Fish

Five SAR fish were identified through a review of the MNRF records from St. Marys and Perth South, as well as the DFO Distribution of Fish SAR mapping (2015).

3.2.2.8 Other Species

Two insects identified as SCC and two SAR molluscs were recorded from a review of the MNRF records from St. Marys and Perth South.

4.0 Site Investigations

The purpose of the site investigations was to verify the information collected through the background records review, further characterize known features and identify any additional features not previously recorded. The site investigations included:

- Classification of vegetation communities using the Ecological Land Classification (ELC) for Southern Ontario protocol (Lee et.al. 1998), including updated communities found in the 2008 draft version of the ecosystem catalogue for Southern Ontario;
- Avifauna surveys for potential SAR;
- Amphibian breeding call surveys;
- Targeted reptile surveys for potential SAR;
- Tree cavity searches for potential bat SAR;
- An assessment of aquatic habitat (including fish community sampling); and,
- A review of cultural (originating from, or maintained by, anthropogenic influences and culturally based disturbances) features with the potential to provide significant habitats.

The survey methodologies used are summarized and described below.

4.1 Methodology

4.1.1 Vegetation Communities

Communities in the On-site Study Area were classified to the Vegetation Type and communities in the Study Area Vicinity were classified to the Community Series or Ecosite level.

Detailed vegetation community surveys were completed for the existing landfill property on May 8 and August 21, 2015. An ELC characterization with a botanical inventory was carried out to delineate natural heritage features and determine presence of SAR vegetation species. Each community was carefully walked and all plants and their relative abundance (dominant, abundant, occasional and rare) within height layers (canopy, subcanopy, understory, groundlayer) were documented. A roadside investigation and air photo review were carried out to generally characterize natural heritage features in the Study Area Vicinity. The MNRF's 2008 ELC draft naming conventions were used to distinguish natural features that were reviewed.

The results of the ELC surveys are provided in Section 4.2 and Appendix B of this Report.

4.1.2 Avifauna

4.1.2.1 Breeding Bird Surveys

Breeding bird surveys were completed on June 4, 22, and July 3, 2015 by an Avian Biologist during targeted surveys for Bobolink (*Dolichonyx oryzivorus)* and Eastern Meadowlark (*Sturnella magna*) described below in Section 4.2.2.2 of this Report. Breeding bird surveys were completed following the general principles outlined in the *Ontario Breeding Bird Atlas (OBBA) Guide for Participants* (March 2001), tailored to the needs of this project. To summarize:

- Surveys were conducted between May 24, 2014 and July 10, 2015, which falls within the peak breeding window for the majority of bird species in Southern Ontario;
- The OBBA Guide states that breeding bird surveys conform to the following weather conditions requirements: counts should not be done if it is raining, there is thick fog, or if winds are greater than 19 km per hour (i.e., >3 on the Beaufort scale); Generally, weather conditions were conducive for auditory and visual surveys, with winds less than 19 km per hour, and no precipitation;
- A comprehensive search of the On-site Study Area (see Figure 3of this Report) was conducted by walking transects that covered the entire property and recording presence, abundance and level of breeding evidence (see Appendix C of this Report).

4.1.2.2 Bobolink and Eastern Meadowlark Surveys

Bobolink and Eastern Meadowlark are listed as Threatened under the ESA 2007. Both species have similar habitat requirements and were surveyed concurrently. Based on the presence of grassland/cultural meadow habitat within the On-site Study Area, targeted breeding bird surveys for Bobolink and Eastern were based on MNRF's *Draft Survey Methodology under the ESA 2007 for Bobolink* (2011). As per the Survey Methodology for Bobolink, three sets of point count surveys were conducted at least one week apart. Surveys were completed on June 4, 22, and July 3, 2015 by an Avian Biologist (see Figure 3 of this Report).

As per the Survey Methodology for Bobolink, surveys for Bobolink/Eastern Meadowlark were completed between dawn and approximately 9:00 a.m. Breeding bird surveys within the On-site Study Area continued until approximately 10:30 a.m., covering areas that were not at specific point count stations for Bobolink/Eastern Meadowlark. All surveys were conducted under weather conditions with no precipitation, no or low wind speed and good visibility. Parallel transects for Bobolink/Eastern Meadowlark surveys were established by crossing the fields lengthwise at approximately 250 m intervals and locating point counts along the transects at approximately 250 m intervals. Point counts were chosen based on good visibility of the surrounding fields/open areas (see Figure 3 of this Report). Each point count was surveyed for 10 minutes and all species of birds, including Bobolink/Eastern Meadowlark, were recorded. On transit between point

counts, all species of birds that were not observed or heard at the point count stations were recorded.

Table 5: Details of Bobolink/Eastern Meadowlark Surveys Conducted by Burnside Staff

June 4, 2015	**Breeding Bird Survey #1**
Time (24h): 0630-1030	Air Temp (°C): 10-18
Sky Code[1]: 0	Wind Scale[2]: 0-1
June 22, 2015	**Breeding Bird Survey #2**
Time (24h): 0645-1034	Air Temp (°C): 15-23
Sky Code[1]: 1	Wind Scale[2]: 0
July 3, 2015	**Breeding Bird Survey #3**
Time (24h): 0711-1030	Air Temp (°C): 11-18
Sky Code[1]: 0-1	Wind Scale[2]: 0-2

[1] NAAMP/Beaufort Sky Codes: 0=clear (no cloud cover); 1=partly cloudy (scattered or broken) or variable; 2=cloudy or overcast; 3=sandstorm, duststorm or blowing snow; 4=fog, smoke, thick dust, or haze; 5=drizzle or light rain; 6=rain; 7=snow or snow/rain mix; 8=showers; 9=thunderstorms.

[2] Beaufort Wind Scale: 0=calm, smoke rises vertically (0-2 km/hr); 1=light air movement, smoke drifts (3-5); 2=slight breeze, wind felt on face; leaves rustle (6-11); 3=gentle breeze, leaves & twigs in constant motion (12-19); 4=moderate breeze, small branches moving, raises dust & loose paper (20 to 30); 5=fresh breeze, small trees begin to sway (31-39); 6=strong breeze, large branches in motion (40 to 50).

The results of the breeding bird surveys are provided in Section 4.2.2.1 and Appendix C of this Report.

LEGEND

- APPROXIMATE ON-SITE STUDY AREA
- 2015 SNAKE COVER BOARD PLACEMENT WITH UNIT ID AND NUMBER OF COVER BOARDS PRESENT
- 2015 BOBOLINK / EASTERN MEADOWLARK POINT COUNT ID
- SURVEY TRANSECT
- 2014 AMPHIBIAN SURVEY LOCATION
- 2015 MINNOW TRAP SURVEY LOCATION
- WATERCOURSE
- STORMWATER MANAGEMENT BASIN
- WET DEPRESSION

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Figure Title
ST. MARYS FUTURE SOLID WASTE DISPOSAL NEEDS ENVIRONMENTAL ASSESSMENT
ECOLOGICAL SURVEYS

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4.1.3 Amphibians and Reptiles

4.1.3.1 Amphibian Breeding Call Surveys

A review of aerial photographs and mapping, as well as on-site field investigations, identified the presence of two stormwater management basins, wetland features (i.e., existing watercourse), and localized seasonal ponding at two small depressions located adjacent to interior landfill roads within the On-Site Study Area. Through the review of historic aerial photographs and design drawings of the landfill, it appears that the configurations of the two existing stormwater management basins were likely constructed in 1993-1994. Based on background information, no amphibian SAR was identified as potentially being located within the On-site Study Area. However, since potential amphibian habitat could potentially be disrupted or destroyed as part of the proposed Alternative Methods, field assessments and an amphibian breeding habitat survey were required to confirm potential presence and use by amphibians.

Amphibian breeding call surveys for frogs and toads were conducted in the On-site Study Area limits during the last two weeks of April, May, and June, 2014, respectively. Survey protocols were based on the *Marsh Monitoring Program Participant's Handbook for Surveying Amphibians* (BSC 2009).

As per the above handbook, surveys for frog and toad species are conducted three times per year during the peak breeding times for individual species. The survey guidelines divide the province of Ontario into three main regions (south, central and north). As a general rule, sites located in southern Ontario would typically be surveyed earlier each month compared to sites located further north in central or northern Ontario (i.e., first survey between April 1 to 15) due to the earlier onset of breeding in southern Ontario.

The On-site Study Area is located in central Ontario, according to the definition provided in the above noted handbook (between the 43rd and 47th parallels); therefore, surveys were conducted over the last two weeks of each respective month, as noted above. Suitable weather conditions to maximize calling activity and provide the best chance for recording call counts include air temperatures above 5°C for the first survey, 10°C for the second survey and 17°C for the third survey. Winds should be calm. The Table below shows the details of the field conditions during the amphibian breeding surveys.

Table 6: Details of Amphibian Breeding Surveys Conducted by Burnside Staff

April 30, 2014	**Amphibian Breeding Survey #1**
Time (24h): 20:30	Air Temp (°C): 8
Sky Code[1]: 4	Wind Scale[2]: 1
May 20, 2014	**Amphibian Breeding Survey #2**
Time (24h): 21:15	Air Temp (°C): 10
Sky Code[1]: 4	Wind Scale[2]: 3
June 24, 2014	**Amphibian Breeding Survey #3**
Time (24h): 21:15	Air Temp (°C): 20
Sky Code[1]: 4	Wind Scale[2]: 2

[1] NAAMP/Beaufort Sky Codes: 0=clear (no cloud cover); 1=partly cloudy (scattered or broken) or variable; 2=cloudy or overcast; 3=sandstorm, duststorm or blowing snow; 4=fog, smoke, thick dust, or haze; 5=drizzle or light rain; 6=rain; 7=snow or snow/rain mix; 8=showers; 9=thunderstorms.

[2] Beaufort Wind Scale: 0=calm, smoke rises vertically (0-2 km/hr); 1=light air movement, smoke drifts (3-5); 2=slight breeze, wind felt on face; leaves rustle (6-11); 3=gentle breeze, leaves & twigs in constant motion (12-19); 4=moderate breeze, small branches moving, raises dust & loose paper (20 to 30); 5=fresh breeze, small trees begin to sway (31-39); 6=strong breeze, large branches in motion (40 to 50).

Three call level codes are used for amphibians (Code 1, Code 2, and Code 3). The Table below shows the descriptions for each of the codes (taken from BSC 2009).

Call Code	**Code Description**
1	Calls not simultaneous, number of individuals can be accurately counted.
2	Some calls simultaneous, number of individuals can be reliably estimated.
3	Full chorus, calls continuous and overlapping, number of individuals cannot be reliably estimated.

Potential breeding habitat for amphibians was limited to three locations in the On-site Study Area. The southernmost stormwater management basin located in the central portion of the landfill features an open water pond with Narrowleaf Cattail (*Typha angustifolia*) around the perimeter. Additionally, two small depressions of temporary standing water with Narrowleaf Cattail and Common Reed (*Phragmites australis*) vegetation are present in the sourthern portion of the On-site Study Area (see Figure 4 of this Report). No amphibian calls were observed from the watercourse and related wetland feature during the amphibian breeding call surveys conducted at survey stations in proximity to those features; therefore, it was not considered potential amphibian breeding habitat and was not included as a survey station. The results of the amphibian breeding call surveys are provided in Section 4.2.3.1 and Appendix D of this Report.

4.1.3.2 Reptile Surveys

Turtles

Based on records of SCC and SAR turtles that may be present within the landfill limits, the UTRCA recommended surveying generally for basking and nesting turtles (email communication with Karen Winfield dated May 21, 2015) (see Appendix I at the end of this Report). Provincially significant species known from the vicinity of the On-site Study Area include: Spiny Softshell Turtle (*Apalone spinifera*), Northern Map Turtle (*Graptemys geographica*), and Snapping Turtle (*Chelydra serpentine*).

There is one watercourse present within the On-site Study Area. This feature is characterized on Figure 4 of this Report as a graminoid mineral shallow marsh/willow mineral deciduous thicket swamp community complex. As described in Section 4.2.1 of this Report, this mixed wetland extends from the northwest corner of the site to the central east property limit, at the base of the slopes. A perched culvert is located at Water Street where the watercourse drains into the Thames River, thereby creating a significant barrier to turtles entering the watercourse from the river system. As stated above in Section 4.1.3.1, the southernmost stormwater management basin located in the central portion of the landfill and two small depressions of temporary standing water located in the sourthern portion of the landfill also provide potential for Midland Painted Turtle (*Chrysemys picta)* and Snapping Turtle.

Based on the limited amount of potentially suitable turtle habitat within the On-site Study Area and the small size of potentially suitable features present visual surveys for basking and nesting turtles were conducted at the same time as targeted surveys for snakes (see below) and breeding birds, given that weather conditions and timing for both coincided with suitable conditions for searching for turtles (i.e., warm air temperatures, calm winds).

Basking surveys were conducted at potential sites on warm, sunny days when the landfill was closed, thereby reducing noise disturbances. Wetland features were approached carefully and quietly and the perimeter was surveyed with high-powered binoculars.

Surveys to document evidence of turtle nesting were conducted in June and July around the shorelines and perimeter of potential sites, roadside shoulders, as well as all other spoil piles detected within the landfill property where suitable habitat may be present, such as the composting and curing area. Surveyors searched for evidence of turtles actively nesting, predated nests, recent turtle excavations or suitable nesting habitat.

Snakes

Background information sourced from the MNRF identified the potential presence of two species listed as Special Concern under the ESA 2007[1]: Eastern Milksnake (*Lampropeltis triangulum*) and Eastern Ribbonsnake (*Thamnophis sauritus*). These two species have been recorded in Perth County; therefore, the UTRCA and MNRF recommended targeted surveys for these snakes (email communication with Karen Winfield (UTRCA) dated May 20, 2015; and, Dave Marriott and Graham Buck (MNRF) dated February 24, 2015 and April 2, 2015, respectively). (See Appendix I at the end of this Report).

Cover board surveys were conducted with a Wildlife Scientific Collector's (WSC) Authorization issued by MNRF Guelph District to Burnside on June 11, 2015 (Appendix E of this Report). Cover boards were lifted towards the surveyor. Any species observed under the cover material was photographed (if possible), identified to species and recorded on field data sheets. Cover board surveys did not involve handling or capturing of any species. The cover material was replaced carefully to the way it was found, minimizing disturbance of the microhabitat and species under it.

A total of six snake surveys (either cover board, visual and/or hand searches) were conducted on May 8, June 4, 12, 22, July 3 and August 21, 2015. Surveys were conducted on sunny days when air temperature was between 8°C and 25°C.

Eastern Milksnake surveys were conducted by a combination of active hand searches (i.e., looking under and turning over potential cover objects by hand) cover board surveys, whereby artificial covers (1 m x 1 m plywood) were installed within the On-site Study Area to attract Eastern Milksnake seeking shelter. These cover boards were uniquely identified and labeled. See Figure 3 of this Report for specific locations.

Eastern Ribbonsnake surveys were conducted by walking transects and visually inspecting shoreline and wetland edges within the landfill limits for snakes moving around or basking. The Eastern Ribbonsnake is generally not found under cover materials.

[1] As of June 15, 2016, Eastern Milksnake is no longer a species at risk under the Ontario Endangered Species Act. Although the Milksnake is still listed as a species of special concern under the federal Species at Risk Act, the Committee on the Status of Species at Risk in Ontario (COSSARO) has downlisted this species to "Not at Risk". According to the MNRF," the status change was based largely on the fact that Milksnakes are relatively widespread in Ontario, there is no evidence of decline throughout most of its Canadian (Ontario) range, and threats to this species are limited outside of southern Ontario." This status change has been updated throughout the remainder of this Report.

Table 7: Snake Surveys Conducted by Burnside Staff

May 8, 2015 (Visual surveys)	**Placement of Cover Boards**
Time (24h): 1108-1330	Air Temp (°C): 18
Sky Code[1]: 0	Wind Scale[2]: 0
June 4, 2015 (Visual surveys)	**Breeding Bird Survey #1**
Time (24h): 0630-1030	Air Temp (°C): 10-18
Sky Code[1]: 0	Wind Scale[2]: 0-1
June 12, 2015 (Cover board and visual surveys, hand searches)	**Cover Board Survey**
Time (24h): 0650-1005	Air Temp (°C): 10-18
Sky Code[1]: 0-1	Wind Scale[2]: 0-1
June 22, 2015 (Cover board and visual surveys, hand searches)	**Cover Board Survey/Breeding Bird Survey #2**
Time (24h): 0645-1034	Air Temp (°C): 15-23
Sky Code[1]: 1	Wind Scale[2]: 0
July 3, 2015 (Cover board and visual surveys, hand searches)	**Cover Board Survey/Breeding Bird Survey #3**
Time (24h): 0711-1030	Air Temp (°C): 11-18
Sky Code[1]: 0	Wind Scale[2]: 0-2
August 21, 2015 (Cover board and visual surveys, hand searches)	**Cover Board Survey/Ecological Land Classification**
Time (24h): 1015-1600	Air Temp (°C): 18-23
Sky Code[1]: 1	Wind Scale[2]: 4-5

[1] NAAMP/Beaufort Sky Codes: 0=clear (no cloud cover); 1=partly cloudy (scattered or broken) or variable; 2=cloudy or overcast; 3=sandstorm, duststorm or blowing snow; 4=fog, smoke, thick dust, or haze; 5=drizzle or light rain; 6=rain; 7=snow or snow/rain mix; 8=showers; 9=thunderstorms.

[2] Beaufort Wind Scale: 0=calm, smoke rises vertically (0-2 km/hr); 1=light air movement, smoke drifts (3-5); 2=slight breeze, wind felt on face; leaves rustle (6-11); 3=gentle breeze, leaves & twigs in constant motion (12-19); 4=moderate breeze, small branches moving, raises dust & loose paper (20-30); 5=fresh breeze, small trees begin to sway (31-39); 6=strong breeze, large branches in motion (40-50).

The results of reptile surveys are provided in Section 4.1.3.2 and Appendix E of this Report.

4.1.4 Bats

Little Brown Myotis (*Myotis lucifugus*) and Northern Myotis (*Myotis septentrionalis*) are two species of bats which have recently been listed as Endangered both provincially and federally. This is due to a rapidly spreading fungus called white-nose syndrome that originated in Europe and that thrives in caves and mines where both of these species of bats hibernate. While hibernacula for these species is not present in the On-site Study Area or Study Area Vicinity (i.e., no caves or mines), there is growing concern over protecting bat maternity colonies and roosting habitat (designated by the MNRF as SWH) for these species.

According to the MNRF, maternal summer roosting habitat for these species is often associated with the cavities and crevices of large diameter trees (25 to 44 cm dbh) exhibiting early stages of decay (Class 1-3; Watt & Caceres 1999) in deciduous or mixed mature forest and wetland habitat types (MNR 2012).

Several deciduous forest communities are present in the Study Area Vicinity, primarily along the Thames River valley corridor. It is assumed that bats could be roosting in these forests. Due to access limitations, surveys were not conducted in these areas.

A high-level scoped review of potential bat maternity roost habitat in the On-site Study Area was conducted through a desktop survey using aerial photography interpretation combined with the results of the ELC surveys carried out during the 2015 field investigations (i.e., identifying FOD, FOM, FOC, SWD, SWM and SWC communities[2]). A search was conducted during ELC surveys for any large, mature trees with cavities which could provide habitat for bats. The results of this assessment are discussed in Section 4.2.4 of this Report.

4.1.5 Aquatic Habitat Assessment

Background records review yielded information related to the history of the watercourse, the local fish community, thermal regime, and potential SAR. Review of historic aerial photographs indicated that the current alignment of the watercourse was constructed sometime between 1963 and 1978. Previously, the watercourse alignment appeared to gently bend north, approximately 100 m west of the upstream, on-site culvert (located along the eastern property boundary). However, this section appears to have been taken offline with the creation of the current alignment of the watercourse. The current alignment flows from east to west, and gently bends north, approximately 350 m west of the upstream, on-site culvert. In both alignments, the watercourse flowed off-site through the existing culvert that crosses beneath Water Street South. The 1963 and 1978 historic aerial photographs are shown in Appendix F of this Report.

Fish community records were provided by the UTRCA and identified the potential presence of several fish species within the connected sections of watercourse upstream (Sgariglia Drain) and downstream (west of Water Street South) of the subject unnamed watercourse within the Site. The Table below identifies the fish species sampled in 2011, provided by UTRCA (see also Appendix I at the end of this Report).

[2] FOD – Deciduous Forest; FOM – Mixed Forest; FOC – Coniferous Forest; SWD – Deciduous Swamp; SWM – Mixed Swamp; SWC – Coniferous Swamp.

Table 8: Summary of Fish Community Records for Sections of the Watercourse

Species (Common Name)	Species (Scientific Name)	Provincial Status S-Rank	Preferred Thermal Regime
Water Street at Cement Plant (Downstream of Site)			
Bluntnose Minnow	*Pimephales notatus*	S5	Warm
Central Stoneroller	*Campostoma anomalum*	S4	Warm
Common Shiner	*Luxilus cornutus*	S5	Cool
Rosyface Shiner	*Notropis rubellus*	S4	Cool to Warm
Smallmouth Bass	*Micropterus dolomieu*	S5	Cool
Spotfin Shiner	*Cyprinella spiloptera*	S4	Cool
Striped Shiner	*Luxilus chrysocephalus*	S4	Cool
White Sucker	*Catostomus commersoni*	S5	Cool
James Street South, South of St. Marys (Upstream of Site)			
Largemouth Bass	*Micropterus salmoides*	S5	Warm

Correspondence with UTRCA confirmed the presence of the perched culvert at the Water Street South crossing, which substantially impedes the potential for fish to migrate upstream from the Thames River. It is therefore assumed that the fish species sampled at the Water Street South and Cement Plant location are isolated from the Site itself and most likely rely on the habitat provided by the Thames River for the majority of their life processes. UTRCA also indicated that the presence of Largemouth Bass was likely attributed to an online pond, upstream of the Site (near James Street South). Connectivity of this pond to the on-site watercourse could not be confirmed due to property access restrictions.

Although the thermal regime could not be confirmed through review of background information, based on the fish species identified in the Table above, it is likely that the thermal regime in the watercourse is warm to cool in nature.

Potential fish SAR records within the Study Area Vicinity were reviewed through the NHIC and 2015 DFO Distribution of Aquatic SAR Mapping (May 2015), as well as correspondence with the MNRF. These sources indicated that a section of the Thames River, approximately 500 m downstream of the outlet of the subject unnamed watercourse to the Thames River, is “Under consideration for listing (Endangered, Threatened)” for Pugnose Minnow (*Opsopoeodus emiliae*) and Silver Shiner (*Notropis photogenis*). The 2015 DFO Distribution of Mussel SAR (May 2015) mapping indicated the potential presence of “Special Concern Species (including under consideration for listing)” Wavy-rayed Lampmussel (*Lampsilis fasciola*) throughout a section of the Thames River, located approximately 2.5 km downstream of the unnamed watercourse outlet to the Thames River. The MNRF also provided potential fish SAR within the County of Perth South, and St. Marys, respectively. In addition to Silver Shiner, the MNRF also identified the potential presence of Black Redhorse (*Moxostoma duquesnei*), Northern Brook Lamprey (*Ichthyomyzon fossor*), Redside Dace (*Clinostomus elongatus*), and Rainbow Mussel (*Villosa iris*) within the list provided for the County of Perth South.

It should be noted that no fish SAR were included on the list provided for the Town of St. Marys.

For further information regarding regional SAR identified through the background information, the SAR Screening Table can be found in Appendix A of this Report.

Although a thorough amount of information was available for the mainstem of the Thames River, a relatively limited amount of background data was available for the upstream Sgariglia Drain, and the subject unnamed watercourse. In order to characterize the form and function of on-site watercourse and determine the potential presence of fish and fish habitat, an aquatic habitat assessment was conducted on two dates (April 30, 2014 and June 22, 2015). The entire length of the subject watercourse was observed for morphology, function, as well as fish habitat and potential enhancement opportunities and limitations. A fish presence investigation was conducted over June 22 and 23, 2015, using baited minnow traps as well as targeted dip-net sampling.

In total seven minnow traps were set and distributed throughout the watercourse where conditions allowed (water depth) and where fish were most likely to be present (relatively deep pools). Traps were retrieved approximately 12 hours later on June 23, 2015, and their inventory was recorded. Targeted dip-net surveys were also conducted at locations throughout the complete length of watercourse within the site property. Further details describing the aquatic habitat assessment and its results are discussed in Section 4.2.5 of this Report.

4.1.6 Incidental Wildlife Sightings

Incidental wildlife sightings were limited to the On-site Study Area and were documented during all field investigations in order to provide a general characterization of the habitat functions of the site. Incidental observations were those that were observed during targeted surveys for other aquatic or terrestrial investigations. Examples include tracks, carcasses, live sightings, etc. A list of incidental wildlife observations are noted below in Section 4.2.6 of this Report.

4.1.7 Anthropogenic Features

A review of background sources revealed that a number of SCC or SAR that are known to utilize anthropogenic features may be present in the Study Area Vicinity or On-site Study Area. These include Barn Swallow (*Hirundo rustica*), Bank Swallow (*Riparia riparia*), Chimney Swift (*Chaetura pelagica*), Eastern Milksnake and bats. Therefore, a site reconnaissance was undertaken during the ELC mapping in May 2015 to identify any man-made features which could provide a habitat function and may require targeted surveys. This included a search for uncapped chimneys, buildings with open roof/trusses, barn structures, rock piles or rock fences extending into the ground, and landfill spoil piles.

Anthropogenic features are discussed below in Section 4.2.7 of this Report.

4.2 Findings of the Site Investigation

Based on the site investigations conducted in 2014 and 2015, the On-site Study Area and Study Area Vicinity are characterized as follows. Selected photographs taken during the site investigations are found in Appendix G of this Report.

4.2.1 Vegetation Communities

On-site Study Area

Four types of on-site vegetation communities were characterized using ELC and their locations are illustrated onFigure 4:

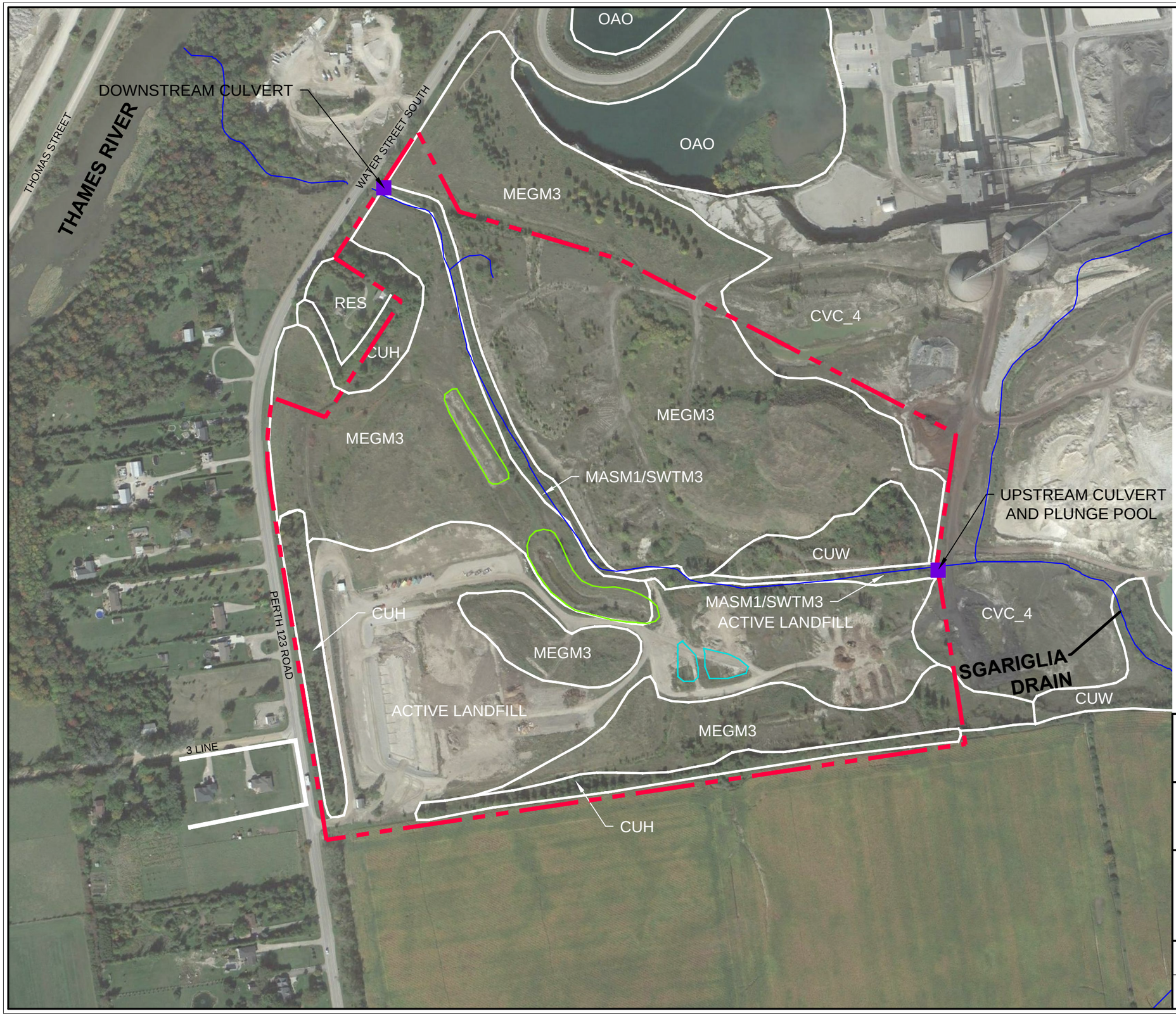
Dry – Fresh Graminoid Meadow (MEGM3):

This community represents the majority of the Site. Cool season grasses, including Smooth Brome (*Bromus inermis*), Quack Grass (*Elymus repens*) and Fescue species (*Festuca sp*.) are the dominant vegetation type found throughout this community, and likely originate mainly from seed mixes applied to the portions of the landfill that are capped. Other species present include common meadow species such as Canada Goldenrod (*Solidago canadensis var. canadensis*), White-sweet Clover (*Melilotus albus*) and Heath Aster (*Symphyotrichum ericoides*). The early successional vegetation is becoming established on the variable topography.

Tree and shrub cover in the canopy, subcanopy and understory is sparse (<10% total coverage) within scattered small groupings and individual trees in less active areas of the landfill: groupings (inclusions) of Eastern Cottonwood (*Populus deltoides ssp. deltoides*), Black Walnut (*Juglans nigra*) and Eastern White Cedar (*Thuja occidentalis*) are were documented and single open-grown Green Ash (*Fraxinus pennsylvanica*), Eastern Cottonwood and Black Locust (*Robinia pseudoacacia*) are also found. Common Buckthorn (*Rhamnus cathartica*) is found establishing throughout the meadow.

Conditions throughout this feature vary between established meadow to bare soil and active landfill area. Isolated stormwater features also vary from seasonally wet to permanent standing water.

Garden species, mainly annuals, likely originating from the compost area at the southeast corner of the Site were recorded spreading southward into the meadow.



LEGEND

APPROXIMATE ON-SITE STUDY AREA

ECOLOGICAL LAND CLASSIFICATION

CUH	CULTURAL HEDGEROW
CUW	CULTURAL WOODLAND
MEGM3	DRY-FRESH GRAMINOID MEADOW
OAO	OPEN WATER
CVC_4	EXTRACTION
RES	RESIDENTIAL (URBAN OR RURAL)

COMMUNITY COMPLEX

MASM1	GRAMINOID MINERAL SHALLOW MARSH
SWTM3	WILLOW MINERAL DECIDUOUS THICKET SWAMP

WATERCOURSE

STORMWATER MANAGEMENT BASIN

WET DEPRESSION

Air Photo Source:
Background 2013 satellite / air photoobtained from Google Earth Professional. © Google Earth, use of products are subject to the Terms and Conditions of Licensed Google Earth Software.

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BURNSIDE

Client

THE CORPORATION OF THE TOWN OF ST. MARYS

Figure Title

ST. MARYS FUTURE SOLID WASTE DISPOSAL NEEDS ENVIRONMENTAL ASSESSMENT

ECOLOGICAL LAND CLASSIFICATION
ON-SITE STUDY AREA

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Community Complex: Graminoid Mineral Shallow Marsh (MASM1)/Willow Mineral Deciduous Thicket Swamp (SWTM3)

This mixed wetland represents the watercourse that extends from the northwest corner of the Site to the central east property limit, at the base of the slopes. Dominant vegetation found within the wetland varies between graminoid marsh dominated by Reed Canary Grass (*Phalaris arundinacea),* Common Reed or Narrowleaf Cattail, or deciduous swamp dominated by shrub Willow species: *Salix eriocephala*, *S. petiolaris*, *S. exigua* and *S. lucida*, as well as Cracked Willow (*Salix x rubens*).

Cultural Woodland:

This community is located on the east side of the Site, growing on the south facing portion of the slope. The dominant trees, Eastern Cottonwood and Manitoba Maple (*Acer negundo*), represent early successional species that indicate that this community is in the early stages of its establishment. Meadow species, such as Canada Goldenrod and cool season grasses are found throughout the majority of the community.

Cultural Hedgerows:

There are three Cultural Hedgerows identified within the On-site Study Area: one at the west limit and the other along the south property limit. The former is predominantly White Spruce that has been planted to screen the landfill from Water Street South and the adjacent residences. Large deciduous species of Eastern Cottonwood and Green Ash are also found in the hedgerow, as well as groupings of Common Buckthorn.

The hedgerow at the south property limit is dominated by Manitoba Maple with meadow groundcover (i.e., Smooth Brome, Canada Goldenrod) in the base in the western portion of the community. The hedgerow is much denser, with no groundlayer vegetation and is dominated by Apple (*Malus pumila*) with abundant Common Buckthorn.

The third hedgerow is located at the northwest corner of the site, adjacent to the rural residence. It is comprised of a mix of mid-aged Eastern White Cedar, Black Walnut (*Juglans nigra*), Norway Spruce (*Picea abies*). It is contiguous with the hedgerows that surround the periphery of the residence.

Study Area Vicinity

The locations of vegetation communities for the Study Area Vicinity are shown on Figure 5.

LEGEND

- APPROXIMATE ON-SITE STUDY AREA
- 120m FROM ONSITE STUDY AREA
- STUDY AREA VICINITY (1000m RADIUS)

ECOLOGICAL LAND CLASSIFICATION

CVC_4	EXTRACTION
CUW	CULTURAL WOODLAND
MEGM3	DRY - FRESH GRAMINOID MEADOW
FOD	DECIDUOUS FOREST
FODM7	FRESH - MOIST LOWLAND DECIDUOUS FOREST
FODM7-3	FRESH - MOIST WILLOW LOWLAND DECIDUOUS FOREST
THDM3	DRY - FRESH HEDGEROW THICKET
OAGM1	ANNUAL ROW CROPS
TAGM1	CONIFEROUS PLANTATION
TAGM5	FENCEROW
RES	RESIDENTIAL (URBAN OR RURAL)

Air Photo Source:
Background 2013 satellite / air photoobtained from Google Earth Professional. © Google Earth, use of products are subject to the Terms and Conditions of Licensed Google Earth Software.

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BURNSIDE

Client
THE CORPORATION OF THE TOWN OF ST. MARYS

Figure Title
ST. MARYS FUTURE SOLID WASTE DISPOSAL NEEDS ENVIRONMENTAL ASSESSMENT
ECOLOGICAL LAND CLASSIFICATION
STUDY AREA VICINITY

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CD	TR	March 2016	5
Scale		Project No.	
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Fresh – Moist Lowland Deciduous Forest (FODM7):

This forest is located on the east side of the Thames River and is dominated by Willow with associates of White Elm (*Ulmus americana*) and Manitoba Maple.

A cultural mixed wooded area is found north of On-site Study Area, immediately east of Water Street South.

Hedgerows associated with the roadside and separating agricultural properties generally consist of a single tree species including Black Walnut, Eastern Cottonwood and Green Ash.

A spruce-dominated plantation, ornamental trees associated with rural residences and vegetated drainage features are also found within 1,000 m of the On-site Study Area.

4.2.2 Avifauna

4.2.2.1 Breeding Bird Surveys

At total of 35 summer resident bird species exhibiting some level of breeding evidence were observed within the On-site Study Area during the breeding bird surveys conducted in 2015. A complete list of species observed, along with the highest recorded breeding evidence, is found in Appendix C of this Report.

Eight species were observed in the On-site Study Area during the breeding bird surveys but no breeding evidence (i.e., suitable breeding habitat or breeding behavior) was recorded within the landfill limits: Ring-billed Gull (*Larus delawarensis*), Turkey Vulture (*Cathartes aura*), American Crow (*Corvus brachyrhynchos*), Bald Eagle (*Haliaeetus leucocephalus*), Cliff Swallow (*Petrochelidon pyrrhonota*), Barn Swallow, Great Blue Heron (*Ardea herodias*) and Green Heron (*Butorides virescens*).

Ring-billed Gull, Turkey Vulture and American Crow are scavengers and were observed in large numbers at the active fill area of the landfill scavenging for food. No nesting habitat for these species is present within the On-site Study Area. While Bald Eagle was observed as a flyover observation only, it is likely they may also scavenge at the landfill.

Cliff Swallow and Barn Swallow are aerial insectivores, and are frequently observed foraging over open areas of the landscape where insects are abundant (i.e., open water, wetlands, fields). These two species were observed foraging over the graminoid meadows present within the landfill (see Figure 4 of this Report). No nesting habitat for these species is present within the On-site Study Area.

Great Blue Heron and Green Heron are typically associated with wetland habitats or woodland habitats adjacent to wetlands. Bald Eagle is associated with large waterbodies and habitats adjacent to large waterbodies. All three of these species were

flyover observations only and were not observed utilizing habitat within the On-site Study Area. Given the presence of large waterbodies and wetland habitats on lands in the Study Area Vicinity, it is assumed they were flying to and from nesting and/or foraging areas beyond the On-site Study Area limits. No nesting habitat for these species is present within the On-site Study Area.

Three “area-sensitive” bird species, as defined by the MNRF, were observed within the Study Area during the breeding bird surveys: American Redstart (*Setophaga ruticilla*), Eastern Meadowlark (*Sturnella magna*), and Savannah Sparrow (*Passerculus sandwichensis*). Breeding habitat was confirmed within the On-site Study Area limits for Eastern Meadowlark and Savannah Sparrow.

One singing male American Redstart was observed in the conifer-cedar hedgerow located at the residence at the far northwest end of the On-site Study Area limits. This hedgerow borders the limits with the landfill. Suitable breeding habitat for this species is not present within the On-site Study Area; woodlands located in the Vicinity are assumed to be breeding habitat for this species.

Savannah Sparrow was recorded during breeding bird surveys; however, habitat within the On-site Study Area is not sufficient to meet the criteria for Significant Wildlife Habitat (SWH) (see Appendix A).

The presence of Eastern Meadowlark is discussed further in Section 4.2.2.2 and Section 5.0 of this Report.

Four bird species listed as either provincially and/or federally significant were observed within the On-site Study Area during the breeding bird surveys: Bald Eagle, Bank Swallow, Barn Swallow, and Eastern Meadowlark. These species are listed in Appendix C of this Report and are discussed under Section 5.0 of this Report. Based on a background review of the study limits, other SAR may be present in the vicinity of the Study Area but were not observed during field investigations. A Screening Table for SAR for the Study Area is included in Appendix A of this Report. As mentioned above, Bald Eagle was a flyover observation only. Bank Swallow and Barn Swallow are discussed in more detail in Section 5.0 of this Report. Eastern Meadowlark is discussed below in Section 4.2.2.2 and Section 5.0 of this Report.

4.2.2.2 Bobolink and Eastern Meadowlark Surveys

Bobolink was not observed during any of the surveys; however, Eastern Meadowlark was observed. This species is an obligate grassland species most commonly found in pastures, hayfields, native grasslands, savannahs as well as in a wide variety of other grassland habitats such as weedy meadows, golf courses, young orchards, and grassy roadside verges which typically feature elevated song perches such as scattered trees and shrubs or fence posts (Cadman, M.D. et al. 2007; McCracken, J.D. et al. 2013). Nesting and foraging habitat was confirmed in the Study Area.

On May 8, 2015, one singing male was observed and heard calling at PC 1 on the former landfill stockpile (Phase I) on the west side of the Site that has since been capped and re-vegetated and is now cultural meadow (see Figure 4of this Report). During each breeding bird survey conducted on June 4, 22 and July 3, 2015, one singing male was observed and heard calling on territory at PC 5 on the former landfill stockpile for cement and kiln dust (see Figure 6 to Figure 10 of this Report) on the northeast side of the site. This area of the landfill features a large, steep hill dominated by grass with a smaller component of herbaceous flowering plants (i.e., forbs) such as vetch, with scattered trees and shrubs. By the final breeding bird survey on July 3, 2015, grass and herbaceous vegetation was approximately 90 cm in height. The male recorded on May 8, 2015 was likely the same individual recorded during breeding bird surveys conducted in June and July, perhaps recently arriving from wintering grounds and seeking to establish territory in the general area. Eastern Meadowlark typically forage on the ground or in low vegetation for insects in the same general area as nesting habitat or adjacent agricultural crops (McCracken, J.D. et al. 2013).

The implications of the presence of Eastern Meadowlark are discussed in Section 5.6 of this Report.

4.2.3 Amphibian and Reptiles

4.2.3.1 Amphibians

As previously discussed in Section 4.1.3 of this Report, three amphibian breeding call surveys for frogs and toads were conducted in the On-site Study Area limits during the last two weeks of April, May, and June, 2014, respectively, to determine the presence of breeding amphibians.

Confirmed amphibian habitat was limited to two relatively small depressions located adjacent to interior landfill roads (Stations A and B, respectively), and the two stormwater management basins (aligned parallel to the south of the watercourse) in the central portion of the Site (Stations C and D, respectively). As stated in Section 4.1.3.1, no amphibian calls were observed from the watercourse and related wetland feature during the amphibian breeding call surveys conducted at survey stations in proximity to those features; therefore, it was not considered potential amphibian breeding habitat and was not included as a survey station. Locations for the amphibian breeding surveys can be found on Figure 3 of this Report.

The results of the amphibian breeding monitoring are shown in the Table below and Appendix D of this Report.

Table 9: Amphibian Breeding Monitoring Results

April 30, 2014					
Station ID	**Easting**	**Northing**	**Calls Heard**	**Species**	**Code**
A	487611	4787052	Yes	Spring Peeper	2
B	487578	4787063	Yes	Spring Peeper	1
C	487436	4787127	Yes	Spring Peeper	2
D	487385	4787202	Yes	Spring Peeper	3
May 20, 2014					
Station ID	**Easting**	**Northing**	**Calls Heard**	**Species**	**Code**
A	487611	4787052	Yes	Spring Peeper, American Toad	1, 1
B	487578	4787063	Yes	Spring Peeper	1
C	487436	4787127	Yes	Spring Peeper	2
D	487385	4787202	Yes	Spring Peeper	1
June 24, 2014					
Station ID	**Easting**	**Northing**	**Calls Heard**	**Species**	**Code**
A	487633	4787043	No	No calls	-
B	487568	4787073	Yes	Green Frog, Gray Tree Frog	1, 1
C	487469	4787117	Yes	Green Frog	2
D	487386	4787208	Yes	Green Frog	1

Based on the background records review and field assessments, none of the four identified amphibian breeding habitat features meet the criteria for candidate Amphibian Woodland Breeding Habitat or Amphibian Wetland Breeding Habitat, based on the SWH Ecoregion 6E Criteria Schedule (MNRF 2015).

4.2.3.2 Reptiles

Turtles

One Midland Painted Turtle was observed in the existing watercourse on May 27, 2015. A second individual was observed on July 3, 2015 in the stormwater management basin located in the central portion of the landfill (see see Figure 6 to Figure 10 of this Report).

Potential hibernation habitat for Midland Painted Turtle may be present within the existing watercourse. Observations made from the shoreline indicated that the plunge pool at the upstream culvert on the east side of the On-site Study Area was noted to be approximately 2.5 to 3 m wide and could potentially have the depth and substrate required for turtle hibernation (i.e., to bury beneath the frost line). The substrate appeared to be comprised of finer sediment (silt and muck near the shoreline), though observations of the substrate at the deepest sections of this pool were not possible due to water clarity issues.

No evidence of turtle nesting was observed within the On-site Study Area. Turtle habitat for species that are highly aquatic and that inhabit mainly larger waterbodies such as the Thames River is present within the Study Area Vicinity and the Thames River generally (e.g., Spiny Softshell and Northern Map Turtle). Given the large perched culvert located at the downstream end of the landfill watercourse at Water Street South (i.e., draining into the Thames River), this culvert is considered a significant barrier for these two highly aquatic turtle species to access the watercourse present within the On-site Study Area.

Species such as Midland Painted Turtle are known to travel over land to reach suitable hibernation, breeding, basking or foraging habitat. There are two small man-made ponds upstream of the existing watercourse. The existing watercourse within the landfill is connected hydraulically to the Thames River downstream and the Sgariglia Drain located upstream of the Site. The two man-made ponds are located north of Elginfield Road immediately outside of the Study Area Vicinity southeast of the landfill property. These ponds may provide additional habitat for Midland Painted Turtle.

Generally, soil conditions are not considered ideal for turtle nesting within the On-site Study Area. Overall, soils are mainly comprised of fill material and are very compact and typically characterized by silt-clay with gravel and cobbles. Nesting turtles typically prefer well-drained soil substrate, usually sand or sand mixed with gravel for oviposition sites. No suitable spoil piles or sandy/gravelly shorelines for nesting turtles were observed in 2015 within the On-site Study Area.

Snakes

Table 10 provides a summary of species observed during snake cover board surveys and/or hand searches. Figure 3 of this Report shows the locations of cover board units with the corresponding number of cover boards placed at each unit location.

Three species of snakes were observed under cover board materials or materials adjacent to cover boards: Dekay's Brownsnake (*Storeria dekayi*), Eastern Gartersnake (*Thamnophis sirtalis sirtalis*) and Eastern Milksnake.

As summarized in Table 10, a total of three live Eastern Milksnakes were observed under a thin, wooden rectangular board directly adjacent to CB 29 and 30 (Unit 8) in long, grassy vegetation on June 12 and June 22, 2015. A snake skin (not identified to species, but assumed to be Eastern Milksnake) was observed under this material on July 3, 2015. This grassy vegetation is adjacent to the wood/brush pile and is part of a cultural meadow community that slopes steeply southwards to the edge of the landfill's southern limits (see Figure 6 to Figure 10 of this Report). This rectangular board was a random piece of debris from the landfill left by customers dumping wood/brush material in this location. Given that this rectangular board had evidently been present in this location longer than the cover boards placed out by Burnside, the surveyor lifted this material incidentally to check if any species may be underneath. This was essentially located in edge habitat adjacent to the wood/brush pile area of the landfill.

The implications of these findings to the project are discussed further in Section 5.5 of this Report.

Visual Surveys

No species of snakes, including Eastern Ribbonsnake, were observed while conducting visual surveys for this species along the edges of wetlands/ponds and the shoreline of the watercourse.

Table 10: Summary of Snake Cover Board Surveys/Hand Searches Conducted in 2015

Surveys Conducted By: Hannah Maciver, Kevin Butt		**PROVINCIAL**	**PROVINCIAL**	**FEDERAL**	**FEDERAL**	**FEDERAL**	**Highest Number Recorded (Cover Board Unit-Number): Condition**	**Date(S) Observed And Comments**
COMMON NAME	***SCIENTIFIC NAME***	***SRANK[1]***	***SARO (Endangered Species Act, 2007)[2]***	***COSEWIC[3]***	***SARA (Species At Risk Act)[3]***	***SARA Schedule[4]***		
Dekay's Brownsnake	*Storeria dekayi*	S5	-	-	-	-	1 (1-2): Alive 1 (1-4): Alive 1 (7-26): Alive 1 (8-30): Alive	June 22, 2015 July 3, 2015
Eastern Gartersnake	*Thamnophis sirtalis sirtalis*	S5	-	-	-	-	1 (3-12): Alive 1 (5-19): Alive 3 (8-29): Alive 5 (n/a): Alive	May 8, 2015 (observed under white plastic bag in location where boards were being placed at Unit 5) June 12, 2015 June 22, 2015 August 21, 2015
Eastern Milksnake	*Lampropeltis triangulum*	S4		SC	Schedule 1	SC	3 (n/a): Alive	June 12, 2015 June 22, 2015 Observed on both dates under a thin, wooden rectangular board adjacent to CB 29 and 30 (Unit 8) in long, grassy vegetation; edge habitat adjacent to active landfill wood/brush pile area. Approximate UTM Coordinate: 17T 0487438 4786981

4.2.4 Bats

The search for potential bat maternity roosting cavities within the cultural woodland and hedgerows in the On-site Study Area did not identify any potential trees or mature forested habitat. Due to the disturbed nature of the site, most trees were relatively young, and therefore not suitable as bat maternity roosting sites.

4.2.5 Aquatic Habitat

As previously discussed, one watercourse is located within the On-Site Study Area and generally flows from east to west, across the northern section of the existing landfill. This watercourse was assessed over two dates (April 30, 2014 and June 22, 2015), and included a fish presence survey. Due to the amount of background information available, and property access restrictions, an aquatic habitat assessment was not conducted on the Thames River, which is downstream of this unnamed watercourse. The unnamed watercourse was observed throughout its entire length across the On-Site Study Area. Aquatic assessment field notes are included in Appendix F of this Report.

The subject unnamed watercourse is considered to be a channelized drain that is connected to Sgariglia Drain, which is located upstream of the On-Site Study Area. The On-site watercourse flows through a concrete culvert to a relatively deep plunge pool (approximately 1 m deep) at its eastern extent within the On-Site Study Area. A mature riparian belt is evident throughout its entire length and features Manitoba Maple, shrub willow species, Common Reed, and grass species. In general, the On-site watercourse is relatively slow-moving and ranges from approximately 0.5 to 2.5 m in width. It is located within a constructed channel, which is characterized throughout its extent by steep berms adjacent to its northern bank. The substrate was characterized as predominantly consisting of silt and clay, with trace amounts of sand and gravel. Toward the western extent of the watercourse, near Water Street South, the substrate also contains rip-rap and angular stone. The watercourse in this section was observed to be seasonally dry during periods of low amounts of precipitation.

The watercourse is generally aligned from east to west for approximately 350 m where it then flows northwest through a constructed channel for approximately 430 m. The watercourse then flows west, through a highly vegetated section of channel for approximately 80 m, through a perched corrugated steel pipe (CSP) culvert, beneath Water Street South. The section of watercourse west of Water Street South was observed from the road right-of-way and is characterized as a very steep gradient (rip-rap and boulder substrate) at the western extent of the perched culvert, completely restricting the potential for fish migration from the Thames River. A review of aerial photography and mapping indicated that the watercourse appears to discharge to the Thames River approximately 210 m west of Water Street South. Potential fish passage from the Thames River was notably obstructed at several locations due to a very steep

gradient and the above-noted perched culvert. Nearshore environments along the Thames River were not able to be observed due to property access restrictions.

Fish Presence Survey

Although no fish were observed within the On-Site watercourse during the watercourse assessment, a fish community sampling survey was conducted to determine potential fish presence. This survey was conducted from June 22 to June 23, 2015 and included the use of seven baited minnow traps distributed throughout the On-site watercourse. The traps were re-visited approximately 12 hours later to allow for sufficient sampling time. With the exception of one crayfish (*Cambarus bartonii)*, no fish were captured during trap retrieval. This result, combined with the lack of visual observations of fish during the watercourse assessment and targeted dip-netting, and the lack of direct connectivity with the Thames River, indicates that this section of watercourse is not considered to be direct fish habitat. However, because the subject watercourse is hydraulically connected upstream to the Sgariglia Drain, and downstream of the Thames River, it is considered to contribute to the water quality and quantity of the Thames River. Fish presence survey locations are shown on Figure 3 of this Report.

As previously discussed, because the Thames River is considered a “recreational” and “Aboriginal fishery” as defined in the *Fisheries Act* and is habitat for aquatic SAR, the watercourse is considered to support fish habitat that contributes to a “fishery”. As such, “serious harm to fish” as described in the *Fisheries Act* must be avoided as part of the proposed site works.

4.2.6 Incidental Wildlife Sightings

Insects

Two Monarch butterflies (*Danaus plexippus*) were recorded in the cultural meadow of the On-site Study Area during the August site visit. The presence of Common Milkweed (*Asclepias syriaca*), which serves as both host (caterpillar) and nectar (food source) plant, indicates that suitable habitat for this species is present within the On-Site Study Area. Other wildflower nectar sources also support the species.

Terrestrial Crayfish

Terrestrial Crayfish (*Fallicambarus fodiens and/*or *Cambarus diogenes*) chimneys (burrows) were observed in muddy substrate present around the edges of Common Reed northwest of the capped cement kiln dust pile, as shown on Figure 6 to Figure 10 of this Report. Because this species is not typically observed during daylight hours (they are nocturnal), identification to species was not possible. Only the presence of crayfish burrows was observed.

Mammals

Several incidental observations of mammals were documented during the field investigations. According to the MNRFs provincial ranks (i.e., S1 to S5) that are used to set protection priorities for rare species and natural communities, none of these species are listed as provincially and/or federally significant and are listed as 'secure' in Southern Ontario (in other words, they are ranked as S5, which is defined by the MNRF as species that are common, widespread and abundant in the province). These include: Muskrat (*Ondatra zibethicus*), White-tailed Deer (*Odocoileus virginianus*), Coyote (*Canis latrans*), Ermine (*Mustela ermine*), Striped Skunk (*Mephitis mephitis*) and Star-nosed Mole (*Condylura cristata*). White-tailed Deer appear to utilize the On-site Study Area based on extensive tracks and signs (i.e., scat, browsing) observed during field investigations. Muskrat lodges were observed in one of the small ponds within the landfill.

4.2.7 Anthropogenic Features

As noted in Section 4.1 of this Report, the search for cultural/man-made habitat features was limited to the On-site Study Area. There are two buildings on site: the compactor storage shed at the main gate, and the scale house located along the landfill road to the northeast of the main entrance. Both of these buildings were inspected for evidence of nesting birds. No nests were recorded on these structures. Neither of the two buildings feature a chimney or attic and no holes or entrances were observed which could provide access to the interior of the building by wildlife such as birds and bats.

The landfill is in itself an anthropogenic feature. The Site is currently used to dispose of waste and other materials such as leaf and yard waste, woody debris and brush. The Site was also part of a former clay pit that was used by St. Marys Cement in cement manufacturing, which has since been capped. Eastern Milksnake was observed utilizing man-made waste materials adjacent to the woody debris and brush stockpiles during field investigations in 2015; other species of snakes were observed during snake cover board surveys. Therefore, the On-site Study Area contains confirmed foraging and refuge habitat for snakes. Based on other anthropogenic features present such as animal burrows, compost piles and mulch for example, the On-site Study Area may also contain candidate sites for oviposition and hibernation. Significant Wildlife Habitat is discussed further in Section 5.0 of this Report.

5.0 Identification of Provincially Significant Features

Provincially significant natural features include those listed in the PPS (2014), NHRM (MNR, 2010), SWHTG (MNR 2000) and SWH Criteria Schedules (MNRF 2015). The findings of the site investigation were cross-referenced with criteria provided in these documents in order to identify the presence or potential presence of Provincially Significant natural features.

5.1 Provincially Significant Wetlands

The PPS, 2014 Section 6.0 defines significant wetlands as "*an area identified as provincially significant by the Ontario Ministry of Natural Resources using evaluation procedures established by the Province, as amended from time to time.*"

No records of Provincially Significant Wetlands have been found for the On-site Study Area or Study Area Vicinity.

Within the On-site Study Area, there are no wetlands which could potentially meet the criteria for significance. There are two narrow stormwater management basins along the central portion of the Site. These are man-made and serve a stormwater control function. Due to their nature, stormwater management basins typically contain relatively poor water quality that could inhibit their use by wildlife. The habitat provided from these basins/ponds is marginal and does not include any habitat structures (i.e., logs, rocks). Both basins/ponds are also subject to ongoing disturbance from landfill activities and regular clean-out requirements. Some wetland vegetation is found within the riparian corridor along the existing watercourse. Species include Reed Canary Grass, Common Reed, Narrowleaf Cattail and a variety of shrub willow species. There is little wetland function provided by this narrow strip of vegetation.

There are two ponds to the north of the On-site Study Area within the St. Marys Cement operations. These are remnant pits from aggregate extraction activities and habitat features are minimal. No other wetlands were observed within the Study Area Vicinity.

As no significant wetlands are present, this type of feature will not be addressed further in this report.

5.2 Significant Valleylands

The NHRM (MNR 2010) provides criteria for identifying Significant Valleylands, including a variety of landform related functions and attributes as well as ecological features and functions. The Thames River valley crosses the western portion of the Study Area Vicinity. A formal assessment of the valley has not been conducted; however, based on aerial photo interpretation and background information (including Regulation Limits provided by the UTRCA), the following conclusions were made:

- The Thames River valley is likely significant;
- The boundaries of the valley, including floodplain and adjacent vegetation are limited to the western side of Water Street South and do not extend onto the On-site Study Area; and
- The existing watercourse is a modified channelized feature within limited floodplain and little riparian ecological function. There is minimal topography and the drain lacks a well-defined valley morphology.

Therefore, the Thames River valley is significant but limited to the west side of Water Street South (i.e., the Study Area Vicinity) and there are no valleylands present on the On-site Study Area.

No impacts to the Thames River valley are anticipated and no further discussion of this feature is provided herein.

5.3 Significant Woodlands

Significant Woodlands are typically identified by the local municipality. According to the PPS (MMAH 2014), significant woodland is defined as:

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

It is noted that no forest communities were identified in the On-site Study Area through ELC mapping. Forests were noted as being present in the Study Area Vicinity adjacent to the Thames River and north of the St. Marys Cement facility. These features will not be impacted by the landfill expansion and no further discussion is provided in this report.

5.4 Significant Areas of Natural and Scientific Interest

The PPS (MMAH 2014), Section 6.0 defines areas of natural and scientific interest (ANSIs) as:

> *"areas of land and water containing natural landscapes or features that have been identified as having life science or earth science values related to protection, scientific study or education."*

According to the NHRM (MNR 2010), provincially significant ANSI's include some of the most significant and best examples of these features in the province, and only include ANSIs identified as provincially significant.

One ANSI was identified through the background information review: the St. Marys Cement Company Provincially Significant Earth Science ANSI. This ANSI is located west of the Thames River within the Study Area Vicinity. It will not be affected by the project and will not be further assessed within this Report. No other ANSIs were identified within the Study Area Vicinity.

5.5 Significant Wildlife Habitat

Determination of SWH is broadly categorized and described in the NHRM for Natural Heritage Policies of the *Provincial Policy Statement, 2005* (MNR 2010). Additionally, the MNRF's SWHTG (MNR 2000) and SWH Criteria Schedule for Eco-regions 6E (MNRF 2015) are additional supplemental documents intended to assist in identifying SWH. The four categories of SWH are identified as:

1. Habitats of seasonal concentrations of animals;

2. Rare vegetation communities or specialized habitat for wildlife;

3. Habitat of species of conservation concern; and,

4. Animal movement corridors.

Appendix A includes a screening of the various categories of SWH both within the On-site Study Area and Study Area Vicinity based on background records review, the findings of the site investigations in 2014 and 2015, ELC site reconnaissance of the Study Area Vicinity, agency records, and aerial photo interpretation. The potential presence of habitat for Special Concern and Rare Wildlife Species was also screened and is presented in Appendix A.

Table 11 summarizes Candidate and Confirmed SWH within the On-site Study Area and Study Area Vicinity.

Table 11: Candidate and Confirmed SWH within the On-site Study Area and Study Area Vicinity

On-site Study Area	Study Area Vicinity*
Seasonal Concentration Areas of Animals	
• Candidate Reptile Hibernaculum	• Candidate Raptor Wintering Area • Candidate Bat Maternity Colonies • Candidate Turtle Wintering Areas • Candidate Reptile Hibernaculum
Specialized Wildlife Habitat	
• None present	• Candidate Bald Eagle and Osprey Nesting, Foraging and Perching Habitat • Candidate Turtle Nesting Areas • Candidate Amphibian Breeding Habitat (Woodland)

On-site Study Area	Study Area Vicinity*
Habitat of Species of Conservation Concern	
• Confirmed Terrestrial Crayfish	• Candidate Terrestrial Crayfish
• Confirmed Special Concern and Rare Wildlife Species: – Monarch (SC) • Other: Eastern Milksnake (formerly listed as SC under SARO; listed as SC under COSEWIC and SARA)	• Candidate Special Concern and Rare Wildlife Species: – Bald Eagle – Common Nighthawk – Eastern Wood-pewee – Red-headed Woodpecker – Wood Thrush – Monarch – West Virginia White – Eastern Milksnake – Eastern Ribbonsnake – Northern Map Turtle – Snapping Turtle – Northern Brook Lamprey
Animal Movement Corridors	
• None present	• Candidate Amphibian Movement Corridors

*Potential habitats are Candidate only as no field verification has been undertaken.

It is not predicted that the SWH features potentially present within the Study Area Vicinity will be directly affected by the landfill expansion. Habitats found within or adjacent to the Thames River and associated with its hydrology could be affected by water quality in the Sgariglia Drain which subsequently drains to the Thames River. Habitats which could be affected by water quality impacts include:

- Turtle Wintering Areas;
- Turtle Nesting Areas;
- Amphibian Breeding Habitat (Woodland); and,
- Habitat for Terrestrial Crayfish.

Impacts to these habitats as a result of each of the Alternative Methods are described in Section 7.4.1 of this Report.

Each of the Candidate or Confirmed SWH features found within the On-site Study Area are described below.

Confirmed Special Concern and Rare Wildlife Species and Candidate Reptile Hibernaculum

Monarch habitat has been confirmed within the On-site Study Area in the graminoid meadow (MEGM3) vegetation communities as shown on Figure 6 to Figure 10 of this

Report. Milkweed is a food source (i.e., nectar) and host plant for Monarch larvae. Threats to Monarch on their breeding grounds in the USA and Canada include habitat loss (breeding), climate change and pesticides. The biggest threat to Monarch are on their wintering grounds in Mexico where forest fragmentation (direct habitat loss) occurs (National Wildlife Foundation, 2016).

Impacts to Monarch and their habitat and mitigation are provided in Section 7.4.1 of this Report.

As of June 15, 2016, Eastern Milksnake is no longer considered “at risk” in Ontario; however, it is designated as Special Concern under COSEWIC and SARA (Schedule 1). Eastern Milksnakeis considered a habitat generalist and can be found in a variety of habitats such as woodland edges, fields, wetlands, etc. It is often observed in rural areas around barns and other agricultural settings given their preference for rodents as a food source and their tendency to spend much of their time hiding beneath logs, rocks, boards, bark, and other debris (Harding, J.H. 1997).

As described in Section 4.2.3.2 of this Report, three Eastern Milksnakes were observed during snake cover board surveys and hand searches for snakes under woody debris directly adjacent to CB 29 and 30 (Unit 8).

Based on confirmed records of Eastern Milksnake during field investigations and other snake species found under coverboard material, it is highly likely that reptile hibernaculum is present within the landfill limits. Anthropogenic features that may be suitable include mammal burrows and crevices that may be present within the landfill. A portion of the landfill was a former clay pit. Large excavations that have disturbed underlying material may have created suitable crevices that snakes can reach below the frost line during the winter months. Exact locations for this candidate feature has not been mapped on the Report Figures due to the scale at which these features often occur unless a confirmed location has been identified. The entire site is considered “candidate habitat.”

Impacts to Eastern Milksnake and their habitat and mitigation are provided in Section 7.4.1 of this Report.

Confirmed Habitat for Terrestrial Crayfish

According to the SWH Criteria Schedules for Eco-regions 6E (MNRF 2015), terrestrial crayfish are listed by MNRF as S3 or S4, depending on the species. They have no designation under provincial or federal legislation; however, the presence of one or more individuals of either of these two species or their chimneys (burrows) in suitable meadow marsh, swamp or moist terrestrial sites may classify the habitat they depend on as SWH. Because the presence of burrows or chimneys is often the only indicator of species presence, observance or collection of individuals is very difficult.

Eight terrestrial crayfish burrows were incidentally observed on July 3, 2015 during breeding bird surveys/snake cover board surveys. The burrows were observed at the edges of damp Common Reed pockets that have established in the area northwest of the capped cement kiln dust dust pile , as shown on Figure 6 to Figure 10 of this Report.

Impacts to this terrestrial crayfish habitat and mitigation are provided in Section 7.4.1 of this Report.

5.6 Habitat of Endangered and Threatened Species

No wildlife species designated as Endangered under the ESA 2007 were confirmed within the On-site Study Area during the 2015 field investigations. Three species designated as Threatened under the ESA 2007 were confirmed utilizing habitat within the On-site Study Area during the 2015 field investigations. These included: Eastern Meadowlark, Bank Swallow and Barn Swallow. They are also all listed as Threatened by COSEWIC. There is currently no schedule or status for these species under the federal Species at Risk Act (SARA).

The MNRF provided a list of species that have historically or currently been observed within the Town of St. Marys and Perth County (received February 24, 2015 via email communication). This list was reviewed relative to the findings of the site investigations. This screening is presented in Appendix A of this Report.

Table 12 summarizes Candidate and Confirmed habitat for Endangered and Threatened species within the On-site Study Area and Study Area Vicinity.

Table 12: Candidate and Confirmed habitat for Endangered and Threatened species within the On-site Study Area and Study Area Vicinity

	On-site Study Area	Study Area Vicinity
Confirmed Habitat Present	• Eastern Meadowlark (foraging and nesting) • Bank Swallow (foraging and unsuccessful nesting attempt at soil stockpile) • Barn Swallow (foraging overhead only)	• Bank Swallow (observed foraging overhead at St Marys Cement; nesting habitat may also be present)
Candidate Habitat Present	None	• Barn Swallow (nesting and foraging) • Bobolink (nesting and foraging) • Chimney Swift (nesting and foraging) • Eastern Meadowlark (nesting

	On-site Study Area	Study Area Vicinity
		and foraging) • Black Redhorse • Silver Shiner • Redside Dace • Pugnose Minnow • Northern Myotis (roosting) • Little Brown Myotis (roosting) • Butternut • Spiny Softshell (nesting, hibernation) • Rainbow Mussel • Wavy-rayed Lampmussel

Species and habitats present or potentially present in the Study Area Vicinity are not expected to be directly affected by the landfill expansion. Species present in the Thames River (downstream) could potentially be affected indirectly as a result of proposed alterations of, and potential leachate contamination to, the On-site watercourse. Potential impacts and mitigation for these species and habitats are presented in Section 7.4.1 of this Report.

A discussion of each of the three SAR species confirmed within the On-site Study Area is provided below.

Eastern Meadowlark

As discussed in Section 4.2.2. of this Report, breeding habitat for this species was confirmed On-site.

As per the MNRF's General Habitat Description for the Eastern Meadowlark, habitat for this species is defined by three levels of tolerance to alteration:

Category 1 – confirmed nest location and the area within 10 m of the nest - habitat has the lowest tolerance to alteration.

Category 2 – the area between 10 m and 100 m of the nest or centre of approximated defended territory - habitat has a moderate tolerance to alteration.

Category 3 – the area of continuous suitable habitat between 100 m and 300 m of the nest or approximated centre of defended territory - habitat has the highest tolerance to alteration.

The extent of suitable nesting habitat for this species (i.e., Category 1 and 2) includes the two capped areas of the landfill that have been characterized as ELC community

MEGM3 “Dry-Fresh Graminoid Meadow” (Figure 4 of this Report). Category 3 habitat extends beyond suitable breeding habitat into other areas of the landfill that may be used for foraging habitat if ground cover vegetation is present. These two capped areas of the landfill are not currently active areas of the landfill operations.

Eastern Meadowlark receives general habitat protection under the ESA 2007. Development exemptions for this species are addressed under the ESA 2007 in Ontario Regulation 242/08 Subsections 23.2 and 23.6. Generally, Subsection 23.2 applies to development activities that are either part of a development of land under the *Planning Act*, *Registry Act* or *Land Titles Act*, or development of a unit under the *Condominium Act, 1998*. Subsection 23.6 generally applies to any other development activity to which Subsection 23.2 does not apply.

The proposed works on the Site are eligible for exemptions under Section 23.2. Specific conditions must be met prior to, and during, development activities that will damage or destroy Eastern Meadowlark habitat. This includes, but is not limited to, preparation of a development or habitat management plan for compensation habitat (new or enhanced) for Eastern Meadowlark that is located outside of the area where the development activity is occurring and that meets the criteria set out in the regulation. For the five years following habitat creation or enhancement, the compensation habitat must be managed and monitored.

Given that provincial regulations may change at any time, it is recommended that prior to any scheduled development activities, the most current consolidated provincial legislation should be reviewed in detail. Consultation with the local district of the MNRF is also recommended, as each situation is dealt with on a case-by-case basis.

Impacts to this habitat as a result of each of the Alternative Methods are described in Section 6.0 of this Report.

Bank Swallow

This species prefers open habitats including, farmland, lake/river shorelines, grasslands, and wetlands. They nest in exposed vertical or near-vertical earthen banks along shorelines and in artificial sites such as sand and gravel pits and even compost piles (Cadman, M.D. et al. 2007). As discussed in Section 4.2.2 of this Report, a pair was observed at the beginning of the breeding bird season attempting to nest in a soil stockpile in the composting area of the landfill. Nesting habitat was confirmed at the active windrow composting area in the southeast portion of the landfill. One pair was observed on June 4, 2015 entering and exiting excavated burrows located on the vertical slopes of a topsoil pile (see Figure 6 to Figure 10 of this Report). On subsequent visits during breeding bird surveys on June 22 and July 3, 2015, the topsoil pile was found to have slumped causing the entrances to the excavated burrows to partially collapse. An unidentified animal burrow was also noted immediately adjacent to the excavated sites.

No Bank Swallows were observed utilizing the topsoil pile on these subsequent visits. The pair was likely forced to abandon the site when the site became unsuitable.

Foraging habitat for this species was confirmed in the On-site Study Area during 2015 field investigations. Foraging habitat is present over open areas of the landfill where this species will forage for insects (such as compost piles and capped stockpiles that have since re-vegetated).

It should be noted that immediately north and northeast of the landfill site is the St. Marys Cement Plant where Bank Swallows were observed foraging (and likely nesting) in large numbers around the sand/gravel piles located on the Plant's property during breeding bird surveys conducted at the landfill site in 2015. Due to the landfill's close proximity to this Plant and its operations, Bank Swallows may have sought out adjacent suitable habitat for nesting if they were unsuccessful elsewhere nearby. Other Bank Swallow "exploratory" excavation burrows were observed on the landfill site at a spoil pile immediately west of the confirmed nesting site. However, it was evident from the shallow depth of the excavations that these were exploratory holes only due to the unsuitable composition of the spoil pile (fairly compact soil material mixed with small rocks and gravel). While there are number of other locations at the landfill site where large piles of exposed vertical spoil piles are present, none of these were noted being used by Bank Swallow in 2015. This is likely because the material composition of these spoil piles was also unsuitable for Bank Swallow that prefers sand-silt substrates for excavating nest burrows.

Burnside consulted with MNRF after the first observation of breeding evidence on June 4, 2015 to determine what, if any, mitigation measures were required to be in place during active landfill operations in order to avoid disturbance or destruction to Bank Swallow habitat. A 50 m setback from the nesting site was implemented where disturbance was not permitted. Due to absence of breeding evidence at the topsoil pile on subsequent surveys, it was confirmed with MNRF that if no further evidence of breeding was observed at the site after the final and third breeding bird survey, it was safe to assume that the habitat was no longer suitable or occupied by this species and the Town could resume activities at the topsoil pile and surrounding area (pers. comm. with Graham Buck, June 24, 2015).

Bank Swallow receives general habitat protection under the ESA 2007. There are currently no development exemptions for this species under the ESA 2007. While no nesting habitat was determined to be suitable for this species within the On-site Study Area in 2015, nesting attempts may be made in subsequent years by this species because of the nature of the landfill operations. However, in consultation with MNRF, this Report outlines potential impacts and mitigation measures to ensure the protection of this species in the future. Impacts to this habitat as a result of each of the Alternative Methods are described in Section 6.0 of this Report.

Barn Swallow

As discussed in Section 4.2.2 of this Report, Barn Swallow is an aerial insectivore, and is frequently observed foraging over open areas of the landscape where insects are abundant (i.e., open water, wetlands, fields). This species were observed foraging over the graminoid meadows present within the landfill (see Figure 6 to Figure 10 of this Report). No nesting habitat for these species is present within the On-site Study Area (i.e., barns or other typical nesting structures).

Barn Swallow receives general habitat protection under the ESA 2007. Development exemptions for this species are addressed under the ESA 2007 in Ontario Regulation 242/08 Subsections 23.5 and 23.18. Generally, Subsection 23.5 applies to development activities that are related to the maintenance, repair, modification, replacement or demolition of a building or structure that provides Barn Swallow habitat. Subsection 23.18 generally applies to development activities that are necessary to avoid or reduce a threat to human health or safety in situations where the threat is not imminent but is likely to have serious consequences in the short or long term if the activity is not carried out.

Given that there is no nesting habitat within the On-site Study Area, the development exemptions listed above do not apply. However, foraging habitat for Barn Swallow is not exempted under the ESA 2007. Impacts to foraging habitat as a result of each of the Alternative Methods are described in Section 6.0 of this Report.

5.7 Fish Habitat

With the exception of one “Common” Crayfish, no fish were visually observed or captured during the aquatic assessment and fish presence survey. This result, combined with the results of the background information (fish restricted to downstream and a pond upstream), and the lack of direct connectivity with the Thames River, indicates that this section of watercourse is not considered to be direct fish habitat. As such, the watercourse on-site does not contain or provide habitat for any fish SAR. However, because the subject watercourse is connected upstream to the Sgariglia Drain, and downstream to the Thames River, it is considered to be indirect fish habitat and contributes to the water quality and quantity of the Thames River. As previously discussed, since the Thames River is considered a “fishery” as defined in the *Fisheries Act* and is habitat for several aquatic SAR, the watercourse is considered to be part of that “fishery”. As such, “serious harm to fish” as described in the *Fisheries Act* must be avoided as part of the proposed site works.

6.0 Alternative Methods

As previously stated in Section 2.2 of this Report, there are five Alternative Methods that are to be evaluated as part of the assessment process. Conceptual drawings of each of

the five respective Alternative Methods have been created and are included in the figures below. These are not landfill designs, but rather general footprint areas taking into account required buffers, setbacks and maximum slopes. The five methods are:

1. Vertical expansion of the existing landfill.

2. Horizontal expansion of the existing landfill.

3. A combination of vertical and horizontal expansion.

4. Development of a new landfill footprint.

5. Vertical expansion plus a new footprint.

The potential volume created by each Alternative Method has been calculated based on the footprint area and height of fill contours. The estimated volume required by the Town for 40 years of waste and cover capacity is approximately 708,000 m^3.

6.1 Alternative Method 1

Alternative Method 1 involves the vertical expansion of the waste cell/filling area within the existing limit of waste footprint. Landfilling would take place above existing, and previously active, waste cells, building the elevation of the waste cells through time. Relatively minor land-clearing would be required (at previously filled areas), and no watercourse realignment would be necessary.

6.2 Alternative Method 2

This Method involves the horizontal expansion of the existing waste footprint into areas north and east of the existing footprint. A relatively moderate amount of earthworks would be required to accommodate this Method. In general, earthworks would include: replacement of the stormwater management basins; the re-grading of relatively steep topography; removal of several treed areas; and, watercourse realignment.

6.3 Alternative Method 3

Alternative Method 3 is a combination of vertical and horizontal expansion that would involve additional waste placement vertically, within the existing footprint, as well as an expanded horizontal fill area, aligned east of the existing fill area. The use of this Method would require a relatively moderate amount of construction and design effort, including the replacement of the stormwater management basins, re-grading of land, the realignment of the watercourse, as well at the removal of several treed areas.

6.4 Alternative Method 4

This Method involves the creation of a new landfill footprint including filling both subgrade and above grade, northeast of the existing fill area. This Method would require the removal of several treed areas, as well as earthworks to properly grade and excavate the new footprint. No watercourse realignment would be necessary.

6.5 Alternative Method 5

Alternative Method 5 is a combination of vertical expansion and separate development of a new landfill footprint and would create the most capacity. The new landfill footprint is proposed to be located northeast of the existing fill area, north of the watercourse (same location as Alternative Method 4. This Method would require the removal of several treed areas, as well as earthworks to properly grade and excavate the new footprint. No watercourse realignment would be necessary.

7.0 Evaluation of Relative Impacts on the Natural Environment between Alternative Methods

The following details how each of the Alternative Methods impact the terrestrial wildlife, vegetation, and aquatic habitat including confirmed/candidate habitat of SAR under the ESA 2007 and candidate/confirmed SWH identified from 2015 field investigations. Potential impacts and mitigation measures related to these features are discussed in detail in Section 7.4.1 and Appendix H of this Report.

As described below, some potential impacts apply to more than one Alternative Method. The magnitude of these potential impacts was assessed based on both the severity of the impact and the scale of the mitigation measures needed to address it. The rankings were:

- Low potential impact indicates minor potential impact to the existing environment (minimal earthworks and avoidance of natural features).
- Medium-Low potential impact requires some earthworks beyond the existing active footprint into “naturalized” areas, including basic erosion and sediment control measures, and could require continued monitoring.
- Medium potential impact requires some impacts to confirmed SAR and their habitat under the ESA 2007 and confirmed/candidate SWH.
- Medium-High potential impact indicates direct and permanent removal of habitat for subject species and could require habitat replacement/restoration and extensive monitoring and design.
- High potential impact requires substantial engineering, design, and monitoring measures (i.e., redesigned habitat, high potential impact to SAR and habitat, highest amount of vegetation removals).

7.1 Evaluation of Relative Impacts on Vegetation Communities

7.1.1 Alternative Method 1

- Vegetation removals restricted mainly to the area of the active landfill area and adjacent cultural meadow habitat that is currently in an inactive portion of the landfill (Phase 1).
- Very limited tree removal anticipated, particularly if south hedgerow is preserved.

7.1.2 Alternative Method 2

- The majority of vegetation removals are restricted to the wetland communities associated with the watercourse removal and stormwater basins. The southernmost basin is an established wetland community. The wetland communities are anticipated to be replaced in watercourse realignment.
- Trees associated with the existing watercourse (thicket swamp) and a portion of the cultural woodland will be removed. Approximate treed area 425 m^2.
- The remaining vegetation that will be removed is characterized by cultural meadow/thicket habitat in an inactive portion of the landfill.

7.1.3 Alternative Method 3

- More area of overall vegetation removal than Alternative Method 1 and 2.
- Vegetation removals required in the area of the active landfill area and adjacent cultural meadow habitat that is currently in an inactive portion of the landfill (Phase 1).
- Trees associated with the existing watercourse (thicket swamp) and a portion of the cultural woodland will be removed. Approximate treed area 475 m^2.
- Vegetation removals required in the wetland communities associated with the watercourse removal and stormwater basins. The southernmost basin is an established wetland community.
- The remaining vegetation that will be removed is characterized by cultural meadow habitat in an already previously disturbed portion of the landfill.

7.1.4 Alternative Method 4

- Vegetation and tree removal required in the inactive area of the landfill, rather than in the existing active area of the landfill that is more disturbed.
- No direct impact to the watercourse and associated wetland communities.
- Trees associated with a portion of the cultural woodland will be removed. Approximate treed area 180 m^2.

7.1.5 Alternative Method 5

- This Alternative Method is a combination of Methods 1 and 4. Therefore, the greatest amount of overall vegetation community disturbance will be required for this Alternative Method, both within the active and inactive portions of the landfill; however, no direct impact to the watercourse and associated wetland communities.

7.1.6 Summary of Evaluation of Relative Impacts on Vegetation Communities

Alternative Method 1	Alternative Method 2	Alternative Method 3	Alternative Method 4	Alternative Method 5
Limited impact to vegetation communities. No removal of treed features.	Relatively less tree removal to Alternative Method 3.	Greatest amount of tree canopy removal of all Alternative Methods.	Lowest amount of tree canopy removal of Alternative Methods where encroachment into wooded features is required.	Greatest amount of impact to vegetation, given the combination of vertical expansion and development of a new landfill footprint.
5 Low impact	3 Medium impact	2 Medium-high impact	4 Medium-low impact	1 High impact

7.2 Evaluation of Relative Impacts on Terrestrial Wildlife Habitat including Species at Risk and Significant Wildlife Habitat

The following details how each of the Alternative Methods impact terrestrial wildlife habitat including confirmed/candidate habitat of SAR under the ESA 2007 and candidate/confirmed SWH identified from 2015 field investigations. Potential impacts and mitigation measures related to these features are discussed in detail in Section 7.4.1 and Appendix H of this Report.

7.2.1 Alternative Method 1

- Removal of confirmed refuge habitat for a snake species (Eastern Milksnake, formerly listed as Special Concern).
- Removal of candidate nesting/foraging habitat for a Threatened species (Eastern Meadowlark).
- Removal of confirmed foraging habitat for Threatened species (Barn Swallow, Bank Swallow).

- Removal of confirmed habitat for a Special Concern species (Monarch).
- Removal of vegetation that provides confirmed breeding bird habitat.

7.2.2 Alternative Method 2

- Avoids direct impact to confirmed nesting/foraging habitat for a Threatened species (Eastern Meadowlark).
- Avoids direct impact to candidate nesting/foraging habitat for a Threatened species (Eastern Meadowlark).
- Avoids direct impact to confirmed refuge habitat for a snake species (Eastern Milksnake, formerly listed as Special Concern).
- Removal of confirmed habitat for a Special Concern species (Monarch).
- Removal of vegetation that provides confirmed breeding bird habitat. May encroach into confirmed SWH for Terrestrial Crayfish but does not overlap with actual confirmed area where this habitat was observed in 2015.
- Removal of confirmed amphibian breeding habitat.
- While the existing watercourse and stormwater basins are confirmed basking habitat and candidate hibernation habitat for Midland Painted Turtle, and candidate basking and hibernation habitat for Snapping Turtle, the watercourse will be realigned following construction and will provide continued habitat potential for these species during the operational phase.

7.2.3 Alternative Method 3

- Removal of confirmed refuge habitat for a snake species (Eastern Milksnake, formerly listed as Special Concern).
- Removal of confirmed habitat for a Special Concern species (Monarch).
- Removal of candidate nesting/foraging habitat for a Threatened species (Eastern Meadowlark).
- Removal of confirmed foraging habitat for Threatened species (Barn Swallow, Bank Swallow).
- Removal of vegetation that provides confirmed breeding bird habitat.
- Removal of confirmed amphibian breeding habitat.
- While the existing watercourse and stormwater basins are confirmed basking habitat and candidate hibernation habitat for Midland Painted Turtle, and candidate basking and hibernation habitat for Snapping Turtle, the watercourse will be realigned following construction and will provide continued habitat potential for these species during the operational phase.

7.2.4 Alternative Method 4

- Removal of confirmed nesting/foraging habitat for a Threatened species (Eastern Meadowlark).

- Removal of confirmed habitat for a Special Concern species (Monarch).
- Removal of confirmed SWH for Terrestrial Crayfish.
- Removal of vegetation that provides confirmed breeding bird habitat.

7.2.5 Alternative Method 5

- This Alternative Method is a combination of Methods 1 and 4. Therefore, this Alternative Method has the highest amount of impact to critical habitat for SAR and SWH.
- Removal of confirmed nesting/foraging habitat for a Threatened species (Eastern Meadowlark).
- Removal of confirmed refuge habitat for a snake species (Eastern Milksnake, formerly listed as Special Concern).
- Removal of confirmed habitat for a Special Concern species (Monarch).
- Removal of confirmed SWH for Terrestrial Crayfish.
- Removal of candidate nesting/foraging habitat for a Threatened species (Eastern Meadowlark).
- Removal of confirmed foraging habitat for Threatened species (Barn Swallow, Bank Swallow).
- Removal of vegetation that provides confirmed breeding bird habitat.

7.2.6 Summary of Evaluation of Relative Impacts on Terrestrial Wildlife Habitat including Species at Risk and Significant Wildlife Habitat

Alternative Method 1	Alternative Method 2	Alternative Method 3	Alternative Method 4	Alternative Method 5
Limited impact to confirmed SAR and their habitat under the ESA 2007 and confirmed/candidate SWH. Direct removal of confirmed habitat for Special Concern species (Monarch) and confirmed	Least amount of impact to confirmed SAR and their habitat under the ESA 2007 and confirmed/candidate SWH. Direct removal of confirmed habitat for Special Concern species (Monarch). No direct removal of	Some impacts to confirmed SAR and their habitat under the ESA 2007 and confirmed/candidate SWH, but no direct removal of confirmed nesting habitat for Threatened species (Eastern Meadowlark).	Some impacts to confirmed SAR and their habitat under the ESA 2007 and confirmed/candidate SWH. Direct removal of confirmed habitat for Special Concern species (Monarch). Direct removal	Greatest amount of impact to confirmed SAR and their habitat under the ESA 2007, and confirmed/candidate, given the combination of vertical expansion and development of a new landfill footprint. This Alternative Method also has the largest potential impact to wildlife species in

Alternative Method 1	Alternative Method 2	Alternative Method 3	Alternative Method 4	Alternative Method 5
refuge habitat for a snake species (Eastern Milksnake, formerly listed as Special Concern).	confirmed refuge habitat for a snake species (Eastern Milksnake, formerly listed as Special Concern) and nesting habitat for Threatened species (Eastern Meadowlark).	Direct removal of confirmed habitat for Special Concern species (Monarch). Direct removal of confirmed refuge habitat for a snake species (Eastern Milksnake, formerly listed as Special Concern).	of confirmed nesting habitat for Threatened species (Eastern Meadowlark).	general. Direct removal of confirmed habitat for Special Concern species (Monarch). Direct removal of confirmed refuge habitat for a snake species (Eastern Milksnake, formerly listed as Special Concern). Direct removal of confirmed nesting habitat for Threatened species (Eastern Meadowlark).
4 Medium-low impact	5 Low impact	3 Medium impact	2 Medium-high impact	1 High impact

7.3 Evaluation of Relative Impacts on Aquatic Habitat

The following details how each of the Alternative Methods impact aquatic habitat identified from 2014 and 2015 field investigations. Potential impacts and mitigation measures related to these features are discussed in detail in Section 7.4.1 and Appendix H of this Report.

7.3.1 Alternative Method 1

- No in-water works are planned as a result of this Method, and with the use of proper erosion and sediment controls, no impacts to the aquatic environment are anticipated.

7.3.2 Alternative Method 2

- Removal of watercourse and existing aquatic habitat for species within.

- Removal of existing stormwater basins, new stormwater management design required.

7.3.3 Alternative Method 3

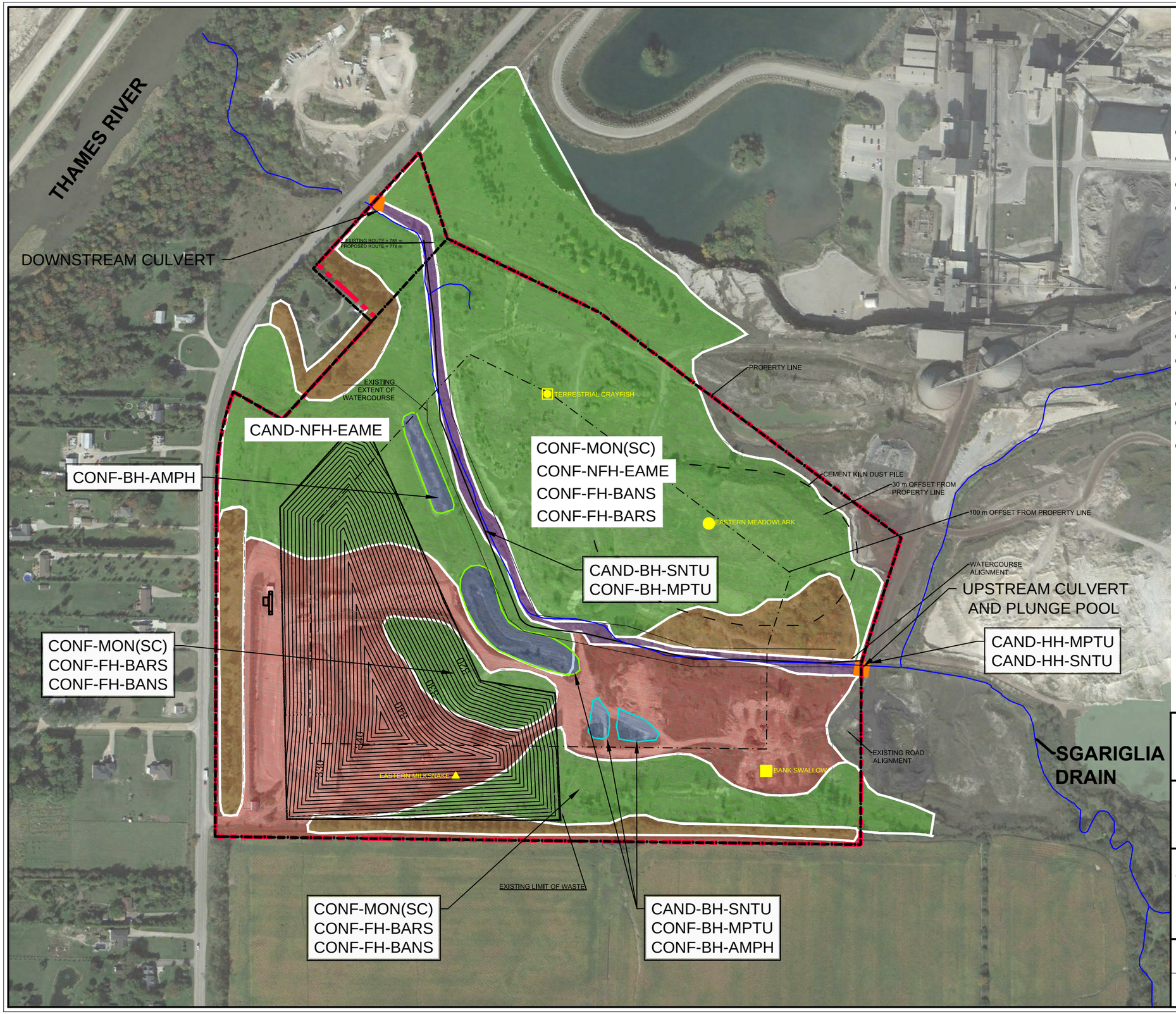
- Removal of watercourse and existing aquatic habitat for species within.
- Removal of existing stormwater basins, new stormwater management design required.
- Realignment of watercourse to the north, along the property line.

7.3.4 Alternative Method 4

- No in-water works are planned as a result of this Method, and with the use of proper erosion and sediment controls, no impacts to the aquatic environment are anticipated.
- Riparian corridor should be maintained along the watercourse.

7.3.5 Alternative Method 5

- No in-water works are planned as a result of this Method.
- More potential for erosion and sedimentation issues than Alternative Method 4.
- Riparian corridor should be maintained along the watercourse.



LEGEND

SPECIES AT RISK CONFIRMED IN 2015

- EASTERN MEADOWLARK (THR)
- BANK SWALLOW (THR)

HABITAT FOR ENDANGERED AND THREATENED SPECIES

CAND-NFH-EAME	CANDIDATE NESTING/FORAGING HABITAT FOR EASTERN MEADOWLARK
CONF-NFH-EAME	CONFIRMED NESTING/FORAGING HABITAT FOR EASTERN MEADOWLARK
CONF-FH-BARS	CONFIRMED FORAGING HABITAT FOR BARN SWALLOW
CONF-FH-BANS	CONFIRMED FORAGING HABITAT FOR BANK SWALLOW

SIGNIFICANT WILDLIFE HABITAT

- TERRESTRIAL CRAYFISH CONFIRMED IN 2015
- EASTERN MILKSNAKE CONFIRMED IN 2015

CAND-HH-MPTU	CANDIDATE HIBERNATION HABITAT FOR MIDLAND PAINTED TURTLE
CAND-HH-SNTU	CANDIDATE HIBERNATION HABITAT FOR SNAPPING TURTLE
CONF-MON(SC)	CONFIRMED HABITAT FOR MONARCH (SPECIAL CONCERN)
CAND-RH	CANDIDATE REPTILE HIBERNACULUM (ENTIRE SITE IS CONSIDERED "CANDIDATE")

OTHER WILDLIFE HABITAT FEATURES

CAND-BH-SNTU	CANDIDATE BASKING HABITAT FOR SNAPPING TURTLE
CONF-BH-MPTU	CONFIRMED BASKING HABITAT FOR MIDLAND PAINTED TURTLE
CONF-BH-AMPH	CONFIRMED AMPHIBIAN BREEDING HABITAT

ELC CLASSIFICATION

- CULTURAL
- MEADOW
- WETLAND
- CONSTRUCTED
- OTHER

- WATERCOURSE
- STORMWATER MANAGEMENT BASIN
- WET DEPRESSION

NOTES:
OBTAINED CAPACITY - 577,000m³

0 40 80 160 240 320
Metres

N

BURNSIDE

Client

THE CORPORATION OF THE TOWN OF ST. MARYS

Figure Title

ST. MARYS FUTURE SOLID WASTE DISPOSAL NEEDS ENVIRONMENTAL ASSESSMENT

ALTERNATIVE METHOD 1 - VERTICAL EXPANSION

Drawn	Checked	Date	Figure No.
AE/CD	HM	September 2016	6
Scale		Project No.	
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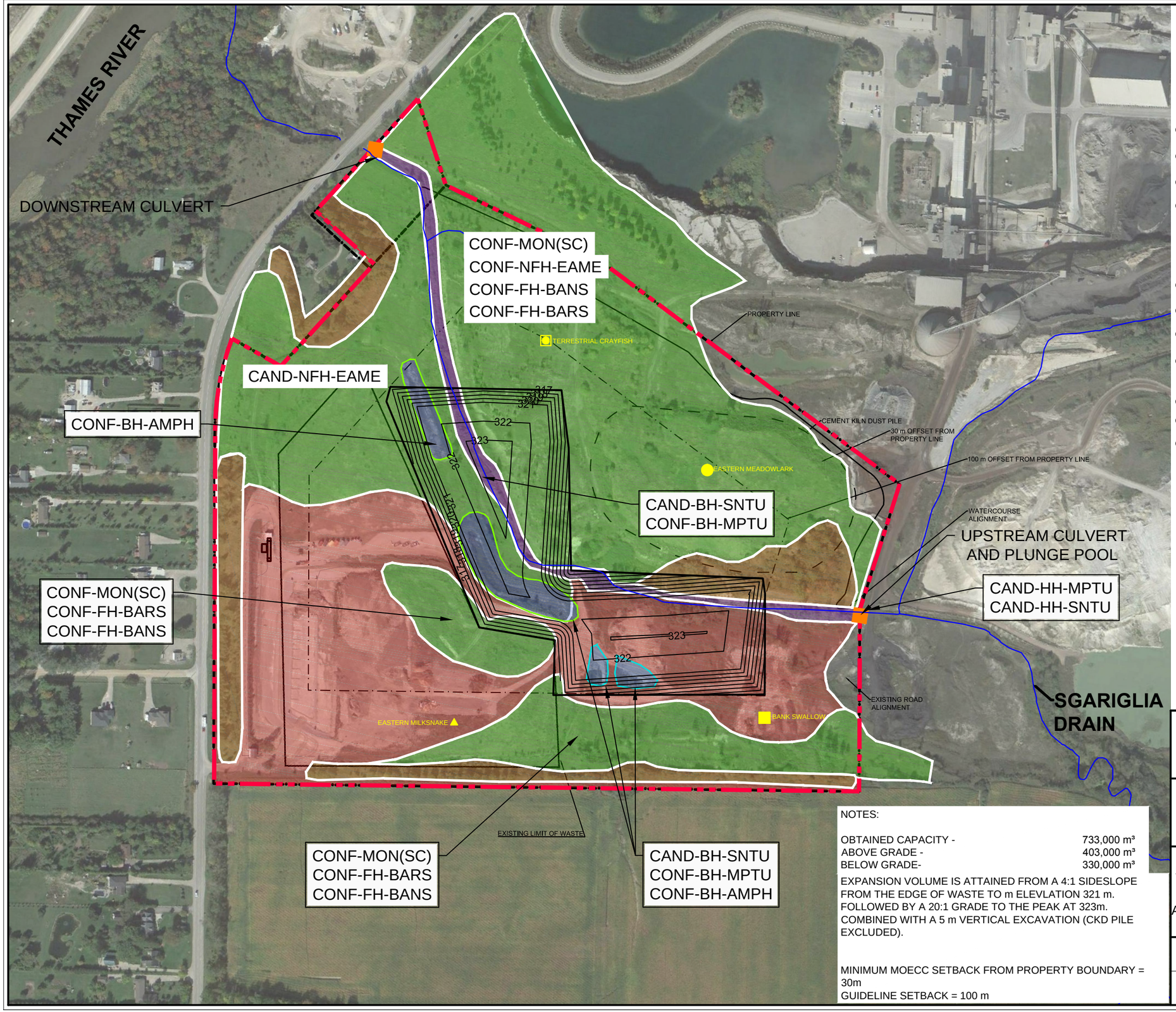
File: W:\WORKING DIRECTORY FILENET 032339 - St Marys\032339 NEA Alternative Method 1.dwg Date Plotted: September 1, 2016 - 2:10 PM



LEGEND

SPECIES AT RISK CONFIRMED IN 2015

- EASTERN MEADOWLARK (THR)
- BANK SWALLOW (THR)

HABITAT FOR ENDANGERED AND THREATENED SPECIES

CAND-NFH-EAME	CANDIDATE NESTING/FORAGING HABITAT FOR EASTERN MEADOWLARK
CONF-NFH-EAME	CONFIRMED NESTING/FORAGING HABITAT FOR EASTERN MEADOWLARK
CONF-FH-BARS	CONFIRMED FORAGING HABITAT FOR BARN SWALLOW
CONF-FH-BANS	CONFIRMED FORAGING HABITAT FOR BANK SWALLOW

SIGNIFICANT WILDLIFE HABITAT

- TERRESTRIAL CRAYFISH CONFIRMED IN 2015
- EASTERN MILKSNAKE CONFIRMED IN 2015

CAND-HH-MPTU	CANDIDATE HIBERNATION HABITAT FOR MIDLAND PAINTED TURTLE
CAND-HH-SNTU	CANDIDATE HIBERNATION HABITAT FOR SNAPPING TURTLE
CONF-MON(SC)	CONFIRMED HABITAT FOR MONARCH (SPECIAL CONCERN)
CAND-RH	CANDIDATE REPTILE HIBERNACULUM (ENTIRE SITE IS CONSIDERED "CANDIDATE")

OTHER WILDLIFE HABITAT FEATURES

CAND-BH-SNTU	CANDIDATE BASKING HABITAT FOR SNAPPING TURTLE
CONF-BH-MPTU	CONFIRMED BASKING HABITAT FOR MIDLAND PAINTED TURTLE
CONF-BH-AMPH	CONFIRMED AMPHIBIAN BREEDING HABITAT

ELC CLASSIFICATION

- CULTURAL
- MEADOW
- WETLAND
- CONSTRUCTED
- OTHER

- WATERCOURSE
- STORMWATER MANAGEMENT BASIN
- WET DEPRESSION

NOTES:

OBTAINED CAPACITY -	733,000 m³
ABOVE GRADE -	403,000 m³
BELOW GRADE-	330,000 m³

EXPANSION VOLUME IS ATTAINED FROM A 4:1 SIDESLOPE FROM THE EDGE OF WASTE TO m ELEVLATION 321 m. FOLLOWED BY A 20:1 GRADE TO THE PEAK AT 323m. COMBINED WITH A 5 m VERTICAL EXCAVATION (CKD PILE EXCLUDED).

MINIMUM MOECC SETBACK FROM PROPERTY BOUNDARY = 30m
GUIDELINE SETBACK = 100 m

BURNSIDE

Client
THE CORPORATION OF THE TOWN OF ST. MARYS

Figure Title
ST. MARYS FUTURE SOLID WASTE DISPOSAL NEEDS ENVIRONMENTAL ASSESSMENT
ALTERNATIVE METHOD 2 - HORIZONTAL EXPANSION OF EXISTING LANDFILL

Drawn	Checked	Date	Figure No.
AE/CD	HM	September 2016	7
Scale		Project No.	
1:4,000		300032339	

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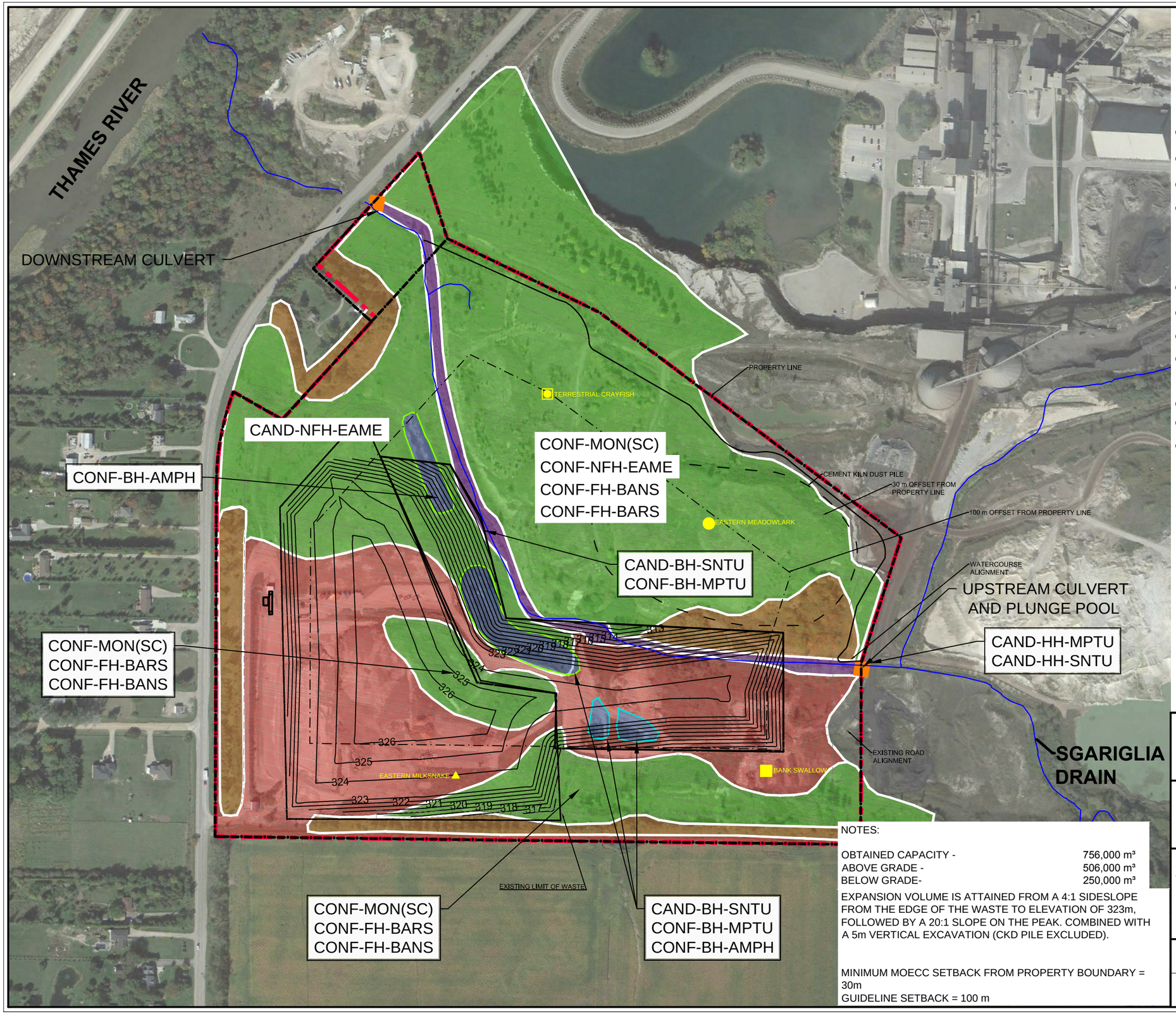

LEGEND

SPECIES AT RISK CONFIRMED IN 2015

- EASTERN MEADOWLARK (THR)
- BANK SWALLOW (THR)

HABITAT FOR ENDANGERED AND THREATENED SPECIES

CAND-NFH-EAME	CANDIDATE NESTING/FORAGING HABITAT FOR EASTERN MEADOWLARK
CONF-NFH-EAME	CONFIRMED NESTING/FORAGING HABITAT FOR EASTERN MEADOWLARK
CONF-FH-BARS	CONFIRMED FORAGING HABITAT FOR BARN SWALLOW
CONF-FH-BANS	CONFIRMED FORAGING HABITAT FOR BANK SWALLOW

SIGNIFICANT WILDLIFE HABITAT

- TERRESTRIAL CRAYFISH CONFIRMED IN 2015
- EASTERN MILKSNAKE CONFIRMED IN 2015

CAND-HH-MPTU	CANDIDATE HIBERNATION HABITAT FOR MIDLAND PAINTED TURTLE
CAND-HH-SNTU	CANDIDATE HIBERNATION HABITAT FOR SNAPPING TURTLE
CONF-MON(SC)	CONFIRMED HABITAT FOR MONARCH (SPECIAL CONVERN)
CAND-RH	CANDIDATE REPTILE HIBERNACULUM (ENTIRE SITE IS CONSIDERED "CANDIDATE")

OTHER WILDLIFE HABITAT FEATURES

CAND-BH-SNTU	CANDIDATE BASKING HABITAT FOR SNAPPING TURTLE
CONF-BH-MPTU	CONFIRMED BASKING HABITAT FOR MIDLAND PAINTED TURTLE
CONF-BH-AMPH	CONFIRMED AMPHIBIAN BREEDING HABITAT

ELC CLASSIFICATION

- CULTURAL
- MEADOW
- WETLAND
- CONSTRUCTED
- OTHER

- WATERCOURSE
- STORMWATER MANAGEMENT BASIN
- WET DEPRESSION

N

0 40 80 160 240 320

Metres

NOTES:

OBTAINED CAPACITY -	756,000 m³
ABOVE GRADE -	506,000 m³
BELOW GRADE-	250,000 m³

EXPANSION VOLUME IS ATTAINED FROM A 4:1 SIDESLOPE FROM THE EDGE OF THE WASTE TO ELEVATION OF 323m, FOLLOWED BY A 20:1 SLOPE ON THE PEAK. COMBINED WITH A 5m VERTICAL EXCAVATION (CKD PILE EXCLUDED).

MINIMUM MOECC SETBACK FROM PROPERTY BOUNDARY = 30m
GUIDELINE SETBACK = 100 m

BURNSIDE

Client
THE CORPORATION OF THE TOWN OF ST. MARYS

Figure Title
ST. MARYS FUTURE SOLID WASTE DISPOSAL NEEDS ENVIRONMENTAL ASSESSMENT
ALTERNATIVE METHOD 1 - COMBINATION OF VERTICAL AND HORIZONTAL EXPANSION

Drawn	Checked	Date	Figure No.
AE/CD	HM	September 2016	8
Scale		Project No.	
1:4,000		300032339	

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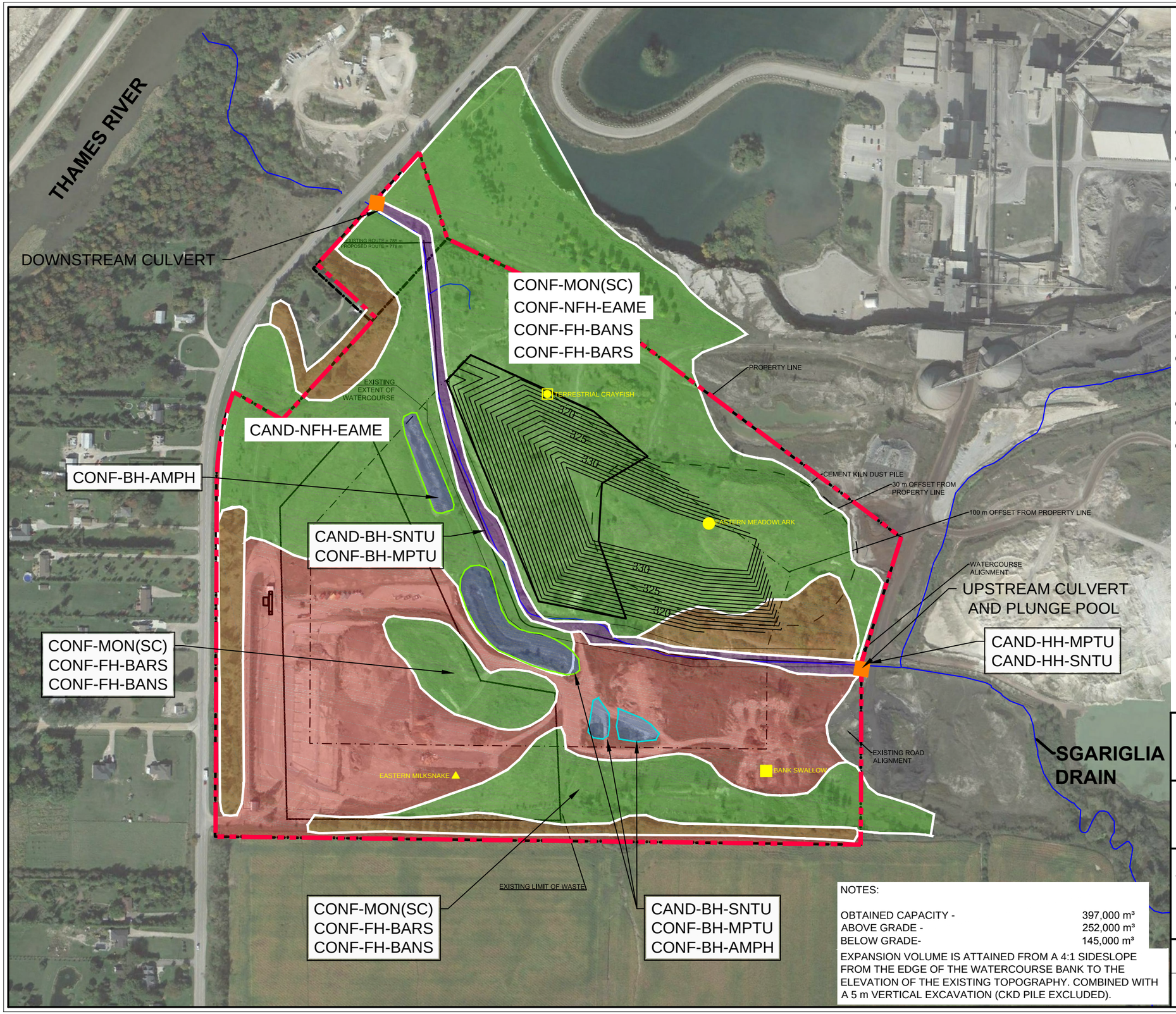


LEGEND

SPECIES AT RISK CONFIRMED IN 2015

- EASTERN MEADOWLARK (THR)
- BANK SWALLOW (THR)

HABITAT FOR ENDANGERED AND THREATENED SPECIES

CAND-NFH-EAME	CANDIDATE NESTING/FORAGING HABITAT FOR EASTERN MEADOWLARK
CONF-NFH-EAME	CONFIRMED NESTING/FORAGING HABITAT FOR EASTERN MEADOWLARK
CONF-FH-BARS	CONFIRMED FORAGING HABITAT FOR BARN SWALLOW
CONF-FH-BANK	CONFIRMED FORAGING HABITAT FOR BANK SWALLOW

SIGNIFICANT WILDLIFE HABITAT

- TERRESTRIAL CRAYFISH CONFIRMED IN 2015
- EASTERN MILKSNAKE CONFIRMED IN 2015

CAND-HH-MPTU	CANDIDATE HIBERNATION HABITAT FOR MIDLAND PAINTED TURTLE
CAND-HH-SNTU	CANDIDATE HIBERNATION HABITAT FOR SNAPPING TURTLE
CONF-MON(SC)	CONFIRMED HABITAT FOR MONARCH (SPECIAL CONVERN)
CAND-RH	CANDIDATE REPTILE HIBERNACULUM (ENTIRE SITE IS CONSIDERED "CANDIDATE")

OTHER WILDLIFE HABITAT FEATURES

CAND-BH-SNTU	CANDIDATE BASKING HABITAT FOR SNAPPING TURTLE
CONF-BH-MPTU	CONFIRMED BASKING HABITAT FOR MIDLAND PAINTED TURTLE
CONF-BH-AMPH	CONFIRMED AMPHIBIAN BREEDING HABITAT

ELC CLASSIFICATION

- CULTURAL
- MEADOW
- WETLAND
- CONSTRUCTED
- OTHER

- WATERCOURSE
- STORMWATER MANAGEMENT BASIN
- WET DEPRESSION

N

0 40 80 160 240 320
Metres

NOTES:

OBTAINED CAPACITY -	397,000 m³
ABOVE GRADE -	252,000 m³
BELOW GRADE-	145,000 m³

EXPANSION VOLUME IS ATTAINED FROM A 4:1 SIDESLOPE FROM THE EDGE OF THE WATERCOURSE BANK TO THE ELEVATION OF THE EXISTING TOPOGRAPHY. COMBINED WITH A 5 m VERTICAL EXCAVATION (CKD PILE EXCLUDED).

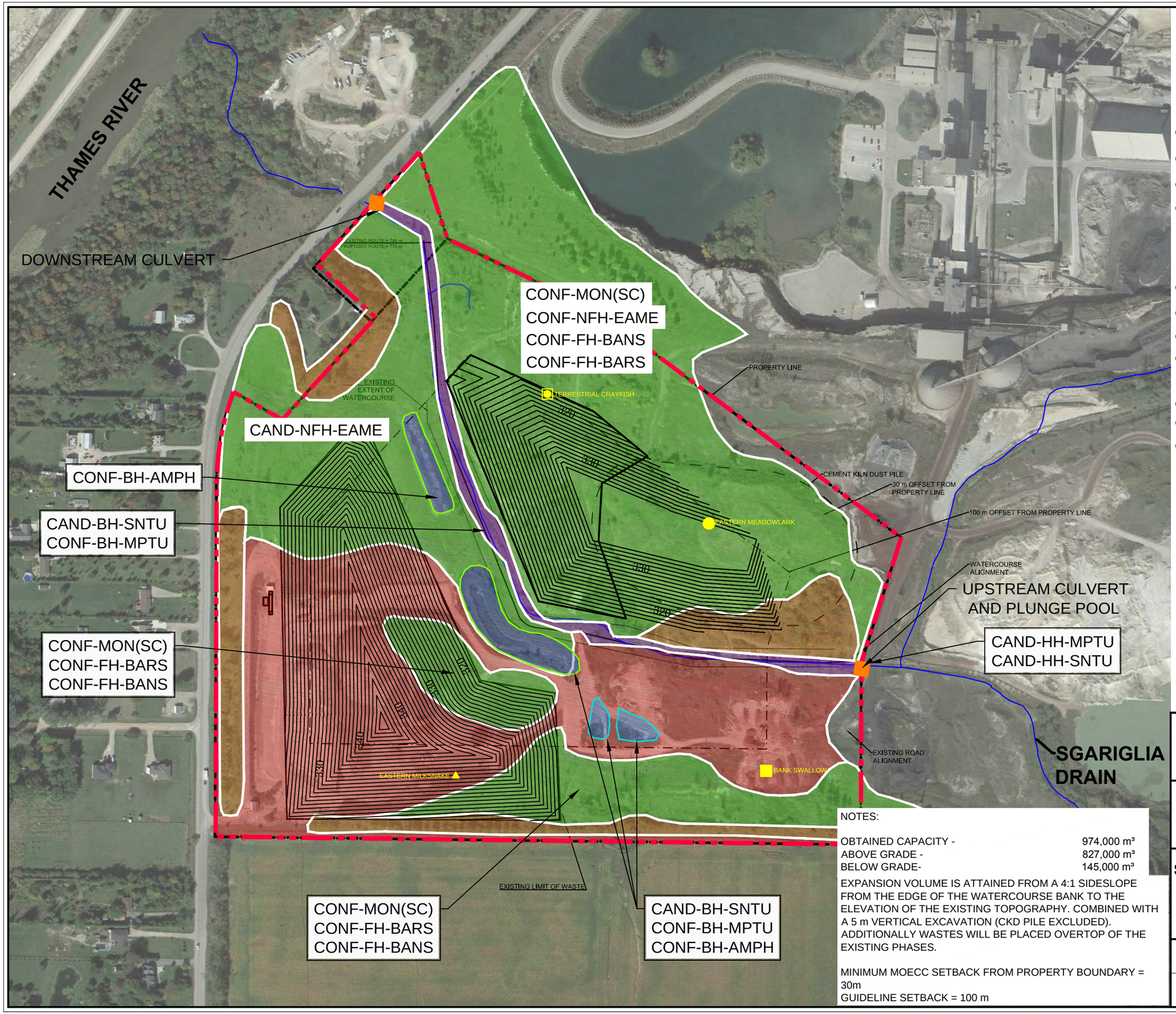
BURNSIDE

Client
THE CORPORATION OF THE TOWN OF ST. MARYS

Figure Title
ST. MARYS FUTURE SOLID WASTE DISPOSAL NEEDS ENVIRONMENTAL ASSESSMENT
ALTERNATIVE METHOD 4 - NEW LANDFILL FOOTPRINT

Drawn	Checked	Date	Figure No.
AE/CD	HM	September 2016	9
Scale		Project No.	
1:4,000		300032339	

File: W:\WORKING DIRECTORY FILENET 032339 - St Marys\032339 NEA Alternative Method 4.dwg Date Plotted: September 1, 2016 - 2:16 PM



LEGEND

SPECIES AT RISK CONFIRMED IN 2015

- EASTERN MEADOWLARK (THR)
- BANK SWALLOW (THR)

HABITAT FOR ENDANGERED AND THREATENED SPECIES

CAND-NFH-EAME	CANDIDATE NESTING/FORAGING HABITAT FOR EASTERN MEADOWLARK
CONF-NFH-EAME	CONFIRMED NESTING/FORAGING HABITAT FOR EASTERN MEADOWLARK
CONF-FH-BARS	CONFIRMED FORAGING HABITAT FOR BARN SWALLOW
CONF-FH-BANK	CONFIRMED FORAGING HABITAT FOR BANK SWALLOW

SIGNIFICANT WILDLIFE HABITAT

- TERRESTRIAL CRAYFISH CONFIRMED IN 2015
- EASTERN MILKSNAKE CONFIRMED IN 2015

CAND-HH-MPTU	CANDIDATE HIBERNATION HABITAT FOR MIDLAND PAINTED TURTLE
CAND-HH-SNTU	CANDIDATE HIBERNATION HABITAT FOR SNAPPING TURTLE
CONF-MON(SC)	CONFIRMED HABITAT FOR MONARCH (SPECIAL CONVERN)
CAND-RH	CANDIDATE REPTILE HIBERNACULUM (ENTIRE SITE IS CONSIDERED "CANDIDATE")

OTHER WILDLIFE HABITAT FEATURES

CAND-BH-SNTU	CANDIDATE BASKING HABITAT FOR SNAPPING TURTLE
CONF-BH-MPTU	CONFIRMED BASKING HABITAT FOR MIDLAND PAINTED TURTLE
CONF-BH-AMPH	CONFIRMED AMPHIBIAN BREEDING HABITAT

ELC CLASSIFICATION

- CULTURAL
- MEADOW
- WETLAND
- CONSTRUCTED
- OTHER

- WATERCOURSE
- STORMWATER MANAGEMENT BASIN
- WET DEPRESSION

N

0 40 80 160 240 320

Metres

NOTES:

OBTAINED CAPACITY -	974,000 m³
ABOVE GRADE -	827,000 m³
BELOW GRADE-	145,000 m³

EXPANSION VOLUME IS ATTAINED FROM A 4:1 SIDESLOPE FROM THE EDGE OF THE WATERCOURSE BANK TO THE ELEVATION OF THE EXISTING TOPOGRAPHY. COMBINED WITH A 5 m VERTICAL EXCAVATION (CKD PILE EXCLUDED). ADDITIONALLY WASTES WILL BE PLACED OVERTOP OF THE EXISTING PHASES.

MINIMUM MOECC SETBACK FROM PROPERTY BOUNDARY = 30m
GUIDELINE SETBACK = 100 m

BURNSIDE

Client
THE CORPORATION OF THE TOWN OF ST. MARYS

Figure Title
ST. MARYS FUTURE SOLID WASTE DISPOSAL NEEDS ENVIRONMENTAL ASSESSMENT
ALTERNATIVE METHOD 5 - COMBINATION OF VERTICAL EXPANSION AND SEPARATE DEVELOPMENT OF A NEW LANDFILL FOOTPRINT

Drawn	Checked	Date	Figure No.
AE/CD	HM	September 2016	10
Scale		Project No.	
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7.4.1 Summary of Evaluation of Relative Impacts on Aquatic Habitat

Alternative Method 1	Alternative Method 2	Alternative Method 3	Alternative Method 4	Alternative Method 5
Least amount of potential impact to existing aquatic habitat. Relatively minor earthworks related to the existing landfill footprint, south of the watercourse.	Significant amount of impact to existing aquatic habitat. Direct removal of aquatic habitat (watercourse and stormwater basins). Earthworks related to horizontal expansion. Creation of new watercourse alignment and extensive monitoring is likely required.	Significant amount of impact to existing aquatic habitat. Direct removal of aquatic habitat (watercourse and stormwater basins). Earthworks related to horizontal and vertical expansion. Creation of new watercourse alignment and extensive monitoring is likely required.	Low amount of potential impact to existing aquatic habitat. Earthworks related to a new landfill footprint, north of the watercourse.	Medium-Low amount of potential impact to existing aquatic habitat. Earthworks related to a new landfill footprint, north of the watercourse, and vertical expansion of existing landfill. Larger amount of earthworks than compared to Alternative Method 4, increasing potential for erosion and sediment control issues.
5 Low impact	1 High impact	1 High impact	5 Low impact	4 Medium-low impact

8.0 Potential Impacts and Mitigation

The potential impacts, mitigation measures, and recommended monitoring activities as they pertain to the proposed construction works of the Alternative Methods discussed above in Section 7.0, are outlined in Appendix H of this Report. Mitigation measures are necessary prior to project implementation to reduce the potential impacts associated with the proposed works. Additionally, recommended monitoring activities help to confirm the mitigation measures are working effectively throughout their use.

Potential Impacts to On-site Study Area

Depending on the chosen Preferred Alternative Method, potential impacts to the On-site Study Area includes direct removal of existing vegetation and some wetland communities, removal of SAR and their habitat, temporary and/or permanent displacement of wildlife species and their habitat, and the removal and realignment of the existing watercourse to accommodate the Preferred Alternative Method.

Species at Risk listed as Endangered or Threatened that may be directly or indirectly impacted by the chosen Preferred Alternative Method within the Study Area include Eastern Meadowlark, Barn Swallow, and Bank Swallow. Significant Wildlife Habitat within the Study Area includes candidate reptile (snake) hibernaculum, confirmed Terrestrial Crayfish habitat, and confirmed habitat for a Special Concern species, Monarch, as well as Eastern Milksnake (formerly listed as Special Concern). Depending on the chosen Preferred Alternative Method, the proposed construction works and/or operational phase of the landfill may temporarily or permanently damage or destroy SAR habitat that is protected under the ESA 2007.

Potential Impacts to Study Area Vicinity

The Study Area Vicinity features a mosaic of intensive agricultural farming operations (i.e., annual row crops), intensive aggregate/extraction operations, residential rural homes, small isolated woodlands, cultural meadow habitat, a coniferous plantation, and a portion of the Thames River riparian corridor.

As stated above, the majority of the potential impacts from the proposed expansion of the landfill will likely be restricted to the On-site Study Area. However, fish and wildlife species present in the Thames River (downstream), including known SAR, could potentially be affected indirectly as a result of proposed alterations of, and potential leachate contamination to, the On-site watercourse. These impacts may be temporary (i.e., during expansion construction works) or more permanent (i.e., leachate migration[3]) during the operational phase of the landfill.

As mentioned above, the tables displayed in Appendix H describe the anticipated potential impacts, mitigation measures, and monitoring activities for the proposed works related to the Alternative Methods discussed in Section 7.0 of this Report.

Based on the existing conditions assessment and impacts analysis that has been completed for the Project, a number of measures are suggested below to remove or minimize the potential for adverse effects to the natural heritage features and functions

[3] The Hydrogeology Study (under separate cover) considers and discusses the potential for leachate impacts on groundwater and surface water.

identified in the On-site Study Area and Study Area Vicinity. In instances where adverse effects are unavoidable, mitigation and restoration measures have been prescribed as summarized below, in the following sections.

8.1 Vegetation Communities

In addition to the mitigation measures Appendix H of this Report, the following specific activities are recommended to be undertaken prior to the Construction Phase:

- Opportunities for vegetation preservation should be investigated in conjunction with the refinement of the grading plan; and,
- Opportunities for the reduction of woody vegetation loss should also be investigated.

8.2 Wildlife Habitat and Species at Risk

The following is a summary of recommendations that pertain to the protection of wildlife habitat and all SAR in the Study Area before, during or after the Construction Phase:

- Ensure that timing for construction works adhere to recommended avoidance windows for wildlife habitat and SAR, as well as breeding birds, as outlined in Appendix H.
- Educational material shall be provided by a Biologist with an expertise in SAR to construction personnel prior to commencement of the Construction Phase to assist personnel in identifying SAR species, should they be encountered. These materials shall also include protocols to be followed to prevent contravention of the ESA 2007, should a SAR species be encountered.
- An Environmental Inspector shall be engaged during the Construction Phase to supervise Contractors while working adjacent to sensitive natural features, wildlife habitat or to advise if wildlife is encountered within the construction limits to ensure that protection measures are implemented, maintained and repaired and remedial measures are initiated where warranted.
- Given the proximity of the Study Area to the Thames River and the known presence of SAR reptiles in the general area, exclusion fencing shall be erected around active work areas, such as temporary storage/equipment areas and soil stockpiles.
- The proposed works on the Site are eligible for exemptions under O. Reg. 242/08 Section 23.2 of the ESA 2007 for Eastern Meadowlark. Specific conditions must be met prior to, and during, development activities that will damage or destroy Eastern Meadowlark habitat. Consultation with the local district of the MNRF will be required prior to construction.

8.3 Fish and Fish Habitat

Upon completion of the detail design phase, all of the work near and in-water should be evaluated, and compliance with the *Fisheries Act* will be required. Since it is anticipated that potential impacts to downstream fish and fish habitat can be mitigated by the measures presented in Appendix H of this Report, a DFO Self-Assessment will be necessary, and should be completed by a qualified professional, as described in the *Fisheries Act*.

9.0 Summary of Conclusions and Recommendations

The Town is conducting an Individual Environmental Assessment to review alternative means to managing solid waste in the Town over a 40 year planning period. The landfill is nearing its approved fill capacity and a new means to manage post-diversion solid waste is required. This Report summarizes existing aquatic and terrestrial features present within the On-site Study Area based on field investigations in 2014 and 2015 and assesses the potential impacts of the Alternative Method for the landfill expansion on the existing natural environment.

In order to understand the potential impacts of the Design Alternative Methods for the landfill expansion on adjacent lands, characterization of aquatic and terrestrial features within the Study Area Vicinity was based on a review of background reports, natural heritage databases, and Agency consultation. Generally, private lands outside of the On-site Study Area were not accessible for targeted field investigations. Therefore, a roadside investigation and air photo review was also conducted to generally characterize natural heritage features in the Study Area Vicinity.

The On-site Study Area supports SAR habitat for species listed as Endangered or Threatened under the ESA 2007 including Eastern Meadowlark, Barn Swallow, and Bank Swallow. Significant Wildlife Habitat within the On-site Study Area includes candidate reptile hibernaculum, confirmed terrestrial crayfish habitat, and confirmed habitat for a Special Concern species, Monarch, as well as Eastern Milksnake (listed as Special Concern under COSEWIC and SARA). None of the vegetation or wetland communities present within the On-site Study Area are considered significant. The On-site watercourse is considered to be indirect fish habitat and contributes to the water quantity and quality of downstream environments (Thames River).

The Study Area Vicinity supports potential SAR habitat within the Thames River riparian corridor for fish and wildlife species. However, with the application of the mitigation measures outlined in this Report, no impacts to these species in the Study Area Vicinity are anticipated as part of the proposed works.

The Alternative Methods proposed have different impacts on vegetation communities, terrestrial wildlife habitat and aquatic habitat, respectively. From a vegetation and

terrestrial wildlife habitat perspective, Alternative Method 5 has the greatest impact on overall vegetation removal and confirmed critical wildlife habitat (i.e., SAR and SWH). Conversely, Alternative Method 1 has the lowest impact on overall vegetation removals because it is located mainly within the active portion of the landfill which is absent of tree canopy cover. While Alternative Method 2 will remove the existing watercourse, it will be realigned north of its existing location. Because this Alternative Method does not impact confirmed critical wildlife habitat, it is ranked as having the lowest impact on confirmed critical wildlife habitat.

From an aquatic habitat perspective, Alternative Methods 2 and 3 have the greatest impact on aquatic features because the existing watercourse will be removed and realigned.

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[THE DIFFERENCE IS OUR PEOPLE]

Appendix A

Screening Tables

300032339 St. Marys Landfill Expansion Environmental Assessment
Appendix A: Screening for Potential Species at Risk and Species of Conservation Concern within the On-site Study Area and Study Area Vicinity

COMMON NAME **(Source)	SCIENTIFIC NAME	Provincial S-RANK[1]	Provincial SARO Status[2]	COSEWIC[3]	Federal SARA Status[3]	Federal SARA Schedule[4]	Habitat Description[5]	Habitat Potential Present Or Confirmed Within On-site Study Area?	Habitat Potential Present Or Confirmed Within Study Area Vicinity?	Species Observed During On-site Field Surveys?
BIRDS										
Bald Eagle (Source: MNRF)	*Haliaeetus leucocephalus*	S2N,S4B	SC	-	-	-	Typically nests in large, "supercanopy" trees found near shorelines of lakes or large rivers, often on forested islands. In southern Ontario, many pairs remain on territory year-round. Strong fidelity to nest sites, which are often used from year to year.	No potential breeding or roosting habitat present.	High potential winter/roosting/ breeding habitat present along the Thames River corridor.	Yes. Flyover only.
Canada Warbler (Source: MNRF)	*Cardellina canadensis*	S4B	SC	THR	THR	1	Usually nests in moist coniferous-deciduous forests with well-developed understorey, especially in low-lying areas such as cedar woods or alder swamps.	No potential breeding habitat present.	Low potential based on lack of suitable habitat features present.	No.
Common Nighthawk (Source: MNRF)	*Chordeiles minor*	S4B	SC	THR	THR	1	Nests in open habitats, in forests and in urban areas. It prefers rock outcrops, alvars, sand barrens, bogs, fens, and in forests, openings created by clearcuts and burns. In southern Ontario, grasslands, agricultural fields, gravel pits, prairies, and alvars and at airports. In cities, it nests mostly on flat, graveled roofs but occasionally on railways and footpaths. As an aerial insectivore, they are often observed over water bodies such as rivers and wetlands/treatment ponds where they forage for insects.	Low to Moderate potential breeding habitat present. High potential foraging habitat over Study Area given presence of other aerial insectivores during breeding bird surveys (i.e., swallows) and proximity of Study Area to Thames River. According to the OBBA 2001-2005, this species is rare to	Low to Moderate potential breeding habitat present. The St Marys Cement property may provide suitable habitat, but may also be too disturbed.	No.

COMMON NAME **(Source)	SCIENTIFIC NAME	Provincial S-RANK[1]	Provincial SARO Status[2]	COSEWIC[3]	Federal SARA Status[3]	Federal SARA Schedule[4]	Habitat Description[5]	Habitat Potential Present Or Confirmed Within On-site Study Area?	Habitat Potential Present Or Confirmed Within Study Area Vicinity?	Species Observed During On-site Field Surveys?
								locally uncommon south of the Shield.		
Eastern Wood-pewee (Source: OBBA)	*Contopus virens*	S4B	SC	SC	-	-	Prefers open space near the nest in the form of forest edges, clearings, roadways, and water. Does not require large areas of woods but occurs less frequently in woodlots surrounded by development than in those without.	Low potential breeding habitat present.	High potential breeding habitat present.	No.
Golden-winged Warbler (Source: MNRF)	*Vermivora chrysoptera*	S4B	SC	THR	THR	1	Successional scrub habitats surrounded by forests that are used for foraging and song posts.	Low potential breeding habitat present.	Low potential breeding habitat present.	No.
Red-headed Woodpecker (Source: MNRF)	*Melanerpes erythrocephalus*	S4B	SC	THR	THR	1	Breeds in open woodland and woodland edges, especially oak savannah and riparian forest. These habitats can occur in parks, golf courses, cemeteries, private woodlands, etc. Existence of large, dead, weathered trees or live trees with large dead branches important characteristic of habitat.	Low to Moderate potential breeding habitat present.	Low to Moderate potential breeding habitat present.	No.
Wood Thrush (Source: OBBA)	*Hylocichla mustelina*	S4B	SC	THR	-	-	Inhabits and breeds in woodlands ranging from small (3 ha) and isolated to large and contiguous. The presence of tall trees and a thick understorey are usually prerequisites for site occupancy.	No potential breeding habitat present.	Moderate potential breeding habitat present.	
INSECTS										
Monarch (Source: MNRF)	*Danaus plexippus*	S2N,S4B	SC	SC	SC	1	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. The largest threat to Ontario Monarchs	Confirmed. Milkweed and other nectar-producing wildflowers present in all cultural meadow habitats in the On-site Study Area.	High potential habitat present.	Yes.

COMMON NAME **(Source)	SCIENTIFIC NAME	Provincial S-RANK[1]	Provincial SARO Status[2]	COSEWIC[3]	Federal SARA Status[3]	Federal SARA Schedule[4]	Habitat Description[5]	Habitat Potential Present Or Confirmed Within On-site Study Area?	Habitat Potential Present Or Confirmed Within Study Area Vicinity?	Species Observed During On-site Field Surveys?
							is habitat loss and fragmentation at overwintering sites in central Mexico where forests are being logged and converted into agricultural fields and pastures. Widespread pesticide and herbicide use throughout the Monarch's range may also limit recovery. (http://www.ontario.ca/page/monarch)			
West Virginia White (Source: MNRF)	*Pieris virginiensis*	S3	SC	-	-	-	Rich, moist, deciduous woodlots. Larva feed exclusively on the leaves of toothwort. (http://www.gbbr.ca/our-environment/species-at-risk/insects/west-virginia-white-butterfly) According to NHIC, exact number of Element Occurrences (EOs) is not known, although during an intensive survey in 1990, this species was recorded in a total of 64 sites. Abundance estimates indicate that this species is not uncommon within its favoured locations. Found in localized colonies (with three centres of abundance) throughout southern Ontario, associated with mature, rich deciduous forest. Threatened by loss of or alteration to its habitat. (https://www.ontario.ca/page/get-natural-heritage-information)	No potential habitat present.	Low to Moderate potential present.	No.
FISH										
Northern Brook Lamprey (Source: MNRF)	*Ichthyomyzon fossor*	S3	SC	SC	SC	1	Inhabits clear, coolwater streams. The larval stage requires soft substrates such as silt and sand for burrowing	No potential habitat present.		No.

COMMON NAME **(Source)	SCIENTIFIC NAME	Provincial S-RANK[1]	Provincial SARO Status[2]	COSEWIC[3]	Federal SARA Status[3]	Federal SARA Schedule[4]	Habitat Description[5]	Habitat Potential Present Or Confirmed Within On-site Study Area?	Habitat Potential Present Or Confirmed Within Study Area Vicinity?	Species Observed During On-site Field Surveys?
							which are often found in the slow-moving portions of a stream. Adults are found in areas associated with spawning, including fast flowing riffles comprised of rock or gravel. In Ontario, it lives in rivers draining into Lakes Superior, Huron and Erie, and the Ottawa River. (https://www.ontario.ca/page/northern-brook-lamprey)			
PLANTS										
Lizard's-tail (Source: NHIC)	*Saururus cernuus*	S3	-	-	-	-	Edges of streams and rivers; low wet woods. (https://www.ontario.ca/page/get-natural-heritage-information)	No potential habitat present.	High potential habitat present along the Thames River corridor.	No.
Shining-branch Hawthorn (Source: NHIC)	*Crataegus magniflora*	S3	-	-	-	-	Thickets, fencerows, roadsides, fields, pastures; borders of forests, stream banks.	Generally, suitable habitat features are present for this species; however, low to moderate potential habitat present given that this species is considered provincially rare and none were recorded during ELC surveys in 2015.	Generally, suitable habitat features are present for this species; however, low to moderate potential habitat present given that this species is considered provincially rare.	No.
REPTILES & AMPHIBIANS										
Eastern Milksnake (Source: MNRF)	*Lampropeltis triangulum*	S4	-	SC	SC	1	Habitat generalist. Found in wide variety of habitats, from open woodlands, bogs, swamps, woodland edges, marshes,	Confirmed refuge habitat in the Study Area. High potential	High potential refuge/oviposition/hibernation	Yes. Three live

COMMON NAME **(Source)	SCIENTIFIC NAME	Provincial S-RANK[1]	Provincial SARO Status[2]	COSEWIC[3]	Federal SARA Status[3]	Federal SARA Schedule[4]	Habitat Description[5]	Habitat Potential Present Or Confirmed Within On-site Study Area?	Habitat Potential Present Or Confirmed Within Study Area Vicinity?	Species Observed During On-site Field Surveys?
							lakeshores, old fields, pastures, farmyards, parks, gardens. Often in or near farm outbuildings, barns, and sheds, and are attracted to piles of rocks, logs, firewood, or building materials, or any place that offers shelter to snakes and their prey (rodents).	for oviposition/hibernation habitat present in the On-site Study Area.	habitat present based on rural landscape and confirmed observation in the On-site Study Area.	individuals observed in the On-Study Area in 2015.
Eastern Ribbonsnake (Source: MNRF)	*Thamnophis sauritus*	S4	SC	SC	SC	1	Semi-aquatic. Typically found along edges of lakes, ponds, bogs, streams, and marshes near forests, especially where there are clumps of grasses, cattails or sedges and scattered low shrubbery. Sunny sites preferred over shaded ones, but sometimes occur in the more open portions of swamps or near woodland ponds. May rely on forested areas to provide upland habitats that it uses for overwintering and birthing sites.	No to Low potential habitat present.	Low to Moderate potential habitat present. The Thames River corridor may contain suitable microhabitat for this species.	No.
Northern Map Turtle (Source: MNRF)	*Graptemys geographica*	S3	SC	SC	SC	1	Highly aquatic. Inhabit slow moving water in larger lakes, rivers, reservoirs, oxbow sloughs, and open marshes, including some of the bays and inlets of the Great Lakes themselves with soft mud to sand, gravel, or marl bottom substrates. Less common in smaller lakes and streams; juveniles may reside in small ponds. Require high-quality water that supports the female's mollusc prey.	No to Low potential basking/nesting/hibernation habitat present. The watercourse located within the landfill site outlets on the west side into the Thames River; however, the "hanging" culvert where this watercourse outlets to the Thames River is a barrier to both fish and likely turtles. The water "cascades"	High potential habitat present. Confirmed records from the Thames River.	No.

COMMON NAME **(Source)	SCIENTIFIC NAME	Provincial S-RANK[1]	Provincial SARO Status[2]	COSEWIC[3]	Federal SARA Status[3]	Federal SARA Schedule[4]	Habitat Description[5]	Habitat Potential Present Or Confirmed Within On-site Study Area?	Habitat Potential Present Or Confirmed Within Study Area Vicinity?	Species Observed During On-site Field Surveys?
								down from a steep slope into the Thames River.		
Spiny Softshell Turtle (Source: MNRF)	*Apalone spinifera*	S3	THR	END	THR	1	Primarily inhabits riverine and lake habitats, but may also be found seasonally in lake marsh areas, streams and oxbows. Prefers areas with mudflats, sandbars, soft substrate, aquatic vegetation, and areas to bask. Nesting habitat consists of sand beaches, gravel bars and/or sand bars; clay/soil and pasture lands are infrequently used. Hibernation habitat includes deeper pools that do not freeze. (S. Gillingwater. 2004. Stewardship of the Spiny Softshell Turtle)	No to Low potential basking/nesting/hibernation habitat present. Given the large perched culvert located at the downstream end of the landfill watercourse at Water Street South (i.e., draining into the Thames River), this culvert is considered a significant barrier for these two highly aquatic turtle species to access the watercourse present within the On-site Study Area.	High potential habitat present. Confirmed records from the Thames River.	No.
Snapping Turtle (Source: MNRF)	*Chelydra serpentina*	S3	SC	SC	SC	1	Generally inhabit shallow waters where they can hide under the soft mud and leaf litter. Nesting sites usually occur on gravely or sandy areas along watercourses or wetlands. Snapping Turtles often take advantage of man-made structures for nest sites, including roads (especially gravel shoulders), dams and aggregate pits.	Moderate to High potential basking/hibernation habitat present. Given presence of Midland Painted Turtle in watercourse located within the landfill site and the Stormwater Management Basin B	High potential habitat present.	No.

COMMON NAME **(Source)	SCIENTIFIC NAME	Provincial S-RANK[1]	Provincial SARO Status[2]	COSEWIC[3]	Federal SARA Status[3]	Federal SARA Schedule[4]	Habitat Description[5]	Habitat Potential Present Or Confirmed Within On-site Study Area?	Habitat Potential Present Or Confirmed Within Study Area Vicinity?	Species Observed During On-site Field Surveys?
								in 2015, it is assumed suitable basking/hibernation habitat may also be present at these locations for Snapping Turtle given similar habitat preferences. Soil composition at the landfill is mostly compact and comprised of large rocks and gravel – not ideal conditions for turtle nesting. Suitable nesting habitat is likely found on adjacent lands in close proximity to the landfill (i.e., shoreline of Thames River). May use On-site Study Area as movement corridor to access suitable sites on adjacent lands.		

** Sources: Natural Heritage Information Centre (NHIC) database of records searched online on January 20, 2016 at: http://www.giscoeapp.lrc.gov.on.ca/Mamnh/Index.html?site=MNR_NHLUPS_NaturalHeritage&viewer=NaturalHeritage&locale=en-US);
Correspondence with MNRF Guelph District, 2015.
OBBA – Ontario Breeding Bird Atlas (2001-2005)
ORAA – Ontario Reptile and Amphibian Atlas

[1]S-Ranks (provincial)
Provincial (or Subnational) ranks are used by the Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. These ranks are not legal designations. Provincial ranks are assigned in a manner similar to that described for global ranks, but consider only those factors within the political boundaries of Ontario (Please refer to: http://explorer.natureserve.org/nsranks.htm)

SX — Presumed Extirpated - Species or community is believed to be extirpated from the province. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.

SH — Possibly Extirpated (Historical) - Species or community occurred historically in the province, and there is some possibility that it may be rediscovered. Its presence may not have been verified in the past 20–40 years. A species or community could become SH without such a 20-40 year delay if the only known occurrences in a province were destroyed or if it had been extensively and unsuccessfully looked for. The SH rank is reserved for species or communities for which some effort has been made to relocate occurrences, rather than simply using this status for all elements not known from verified extant occurrences.
S1 — Critically Imperiled - Critically imperiled in the province or state because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the province.
S2 — Imperiled - Imperiled in the province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the province.
S3 — Vulnerable - Vulnerable in the province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
S4 — Apparently Secure - Uncommon but not rare; some cause for long-term concern due to declines or other factors.
S5 — Secure - Common, widespread, and abundant in the province.
SNR — Unranked - Province conservation status not yet assessed.
SU — Unrankable - Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
SNA — Not Applicable - A conservation status rank is not applicable because the species is not a suitable target for conservation activities.
S#S# — Range Rank - A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).
S#? – Inexact or Uncertain - Denotes inexact or uncertain numeric rank.

Breeding Status Qualifiers
B – Breeding Conservation status refers to the breeding population of the species in the nation or state/province.
N – Nonbreeding Conservation status refers to the non-breeding population of the species in the province.
M – Migrant species occurring regularly on migration at particular staging areas or concentration spots where the species might warrant conservation attention. Conservation status refers to the aggregating transient population of the species in the province.

[2]SARO *Endangered Species Act, 2007*
(provincial status from http://www.ontario.ca/environment-and-energy/how-species-risk-are-listed#section-3)
The provincial review process is implemented by the MNR's Committee on the Status of Species at Risk in Ontario (COSSARO).

Extinct - A species that no longer exists anywhere.
Extirpated (EXT) - Lives somewhere in the world, and at one time lived in the wild in Ontario, but no longer lives in the wild in Ontario.
Endangered (END) - Lives in the wild in Ontario but is facing imminent extinction or extirpation.
Threatened (THR) - Lives in the wild in Ontario, is not endangered, but is likely to become endangered if steps are not taken to address factors threatening it.
Special concern (SC) - Lives in the wild in Ontario, is not endangered or threatened, but may become threatened or endangered due to a combination of biological characteristics and identified threats.
Not at Risk (NAR) - A species that has been evaluated and found to be not at risk.
Data Deficient (DD) - A species for which there is insufficient information for a provincial status recommendation.

[3]SARA (Federal *Species at Risk Act*) Status and Schedule (includes COSEWIC Status)
The Act establishes Schedule 1, as the official list of wildlife species at risk. It classifies those species as being either Extirpated, Endangered, Threatened, or Special Concern. Once listed, the measures to protect and recover a listed wildlife species are implemented.
Extinct - A wildlife species that no longer exists.
Extirpated (EXT) - A wildlife species that no longer exists in the wild in Canada, but exists elsewhere.
Endangered (END) - A wildlife species facing imminent extirpation or extinction.
Threatened (THR) - A wildlife species that is likely to become an endangered if nothing is done to reverse the factors leading to its extirpation or extinction.
Special Concern (SC) - A wildlife species that may become threatened or endangered because of a combination of biological characteristics and identified threats.
Data Deficient (DD) - A category that applies when the available information is insufficient (a) to resolve a wildlife species' eligibility for assessment or (b) to permit an assessment of the wildlife species' risk of extinction.
Not At Risk (NAR) - A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.

[4]SARA Schedule
Schedule 1: is the official list of species that are classified as extirpated, endangered, threatened, and of special concern.
Schedule 2: species listed in Schedule 2 are species that had been designated as endangered or threatened, and have yet to be re-assessed by COSEWIC using revised criteria. Once these species have been re-assessed, they may be considered for inclusion in Schedule 1.
Schedule 3: species listed in Schedule 3 are species that had been designated as special concern, and have yet to be re-assessed by COSEWIC using revised criteria. Once these species have been re-assessed, they may be considered for inclusion in Schedule 1.

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

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

[5]Sources:

Birds – As referenced in table; all others: Cadman, M.D. et al. 2007. Atlas of the Breeding Birds of Ontario, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature, Toronto, xxii + 706 pp.; McCracken, J.D., et al. 2013. Recovery Strategy for the Bobolink (*Dolichonyx oryzivorus*) and Eastern Meadowlark (*Sturnella magna*) in Ontario. Ontario Recovery Strategy Series. Prepared for the Ontario Ministry of Natural Resources, Peterborough, Ontario. viii + 88 pp.

Fish – As referenced in table.

Insects – As referenced in table; all others: Paulson, D. 2011. Dragonflies and Damselflies of the East. Princeton University Press, Princeton, NJ.

Mammals – Fraser, E., et al. 2007. Photo Field Guide to the Bats of Ontario. Published by St. Thomas Field Naturalist Club Inc., St. Thomas, ON. 40 pp.; COSEWIC. 2013. COSEWIC Assessment and Status Report on the Little Brown Myotis *Myotis lucifugus*, Northern Myotis *Myotis septentrionalis* and Tri-colored Bat *Perimyotis subflavus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. Xxiv + 93 pp. (www.registrelep-sararegistry.gc.ca/default_e.cfm); Environment Canada. 2015. Recovery Strategy for Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*) and Tri-colored Bat (*Perimyotis subflavus)* in Canada [Proposed]. *Species at Risk Act* Recovery Strategy Series. Environment Canada, Ottawa. Ix + 110 pp.

Molluscs - As referenced in table.

Plants - As referenced in table; all others: Michigan Flora Found Online at http://michiganflora.net/search.aspx; Newcomb, L. 1977. Newcomb's Wildflower Guide. Little, Brown and Company. New York, NY; Newmaster, S.G., et al. 1997. Wetland Plants of Ontario. Lone Pine Publishing, Edmonton, AB.

Reptiles/Amphibians - As referenced in table; all others: Ontario Reptile and Amphibian Atlas (ORAA) found online at: http://www.ontarionature.org/protect/species/reptiles_and_amphibians/index.php; Harding, J.H., 1997. Amphibians and Reptiles of the Great Lakes Region. The University of Michigan Press. Ann Arbor, Michigan; Gillingwater, S. and MacKenzie, A. S. 2015. Photo Field Guide to the Reptiles and Amphibians of Ontario. Published by St. Thomas Field Naturalist Club Inc., St. Thomas, ON. 144 pp.

300032339 St Marys Landfill Expansion Environmental Assessment
Appendix A: Significant Wildlife Habitat Screening within the On-site Study Area and Study Area Vicinity – Ecoregion 6E Criteria (2015)

Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Potential Presence in the On-site Study Area	Potential Presence in the Study Area Vicinity (1,000 m radius from On-site Study Area)
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria		
Seasonal Concentration Areas of Animals						
Waterfowl Stopover and Staging Areas (Terrestrial) **Rationale**: Habitat important to migrating waterfowl.	American Black Duck Wood Duck Green-winged Teal Blue-winged Teal Mallard Northern Pintail Northern Shoveler American Wigeon Gadwall	CUM1 CUT1 - Plus evidence of annual spring flooding from melt water or run-off within these Ecosites.	Fields with sheet water during Spring (mid-March to May). • Fields flooding during spring melt and run-off provide important invertebrate foraging habitat for migrating waterfowl. • Agricultural fields with waste grains are commonly used by waterfowl, these are not considered SWH unless they have spring sheet water available.	Studies carried out and verified presence of an annual concentration of any listed species, evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects: • Any mixed species aggregations of 100 or more individuals required. • The flooded field ecosite habitat plus a 100-300 m radius area, dependant on local site conditions and adjacent land use is the significant wildlife habitat. • Annual use of habitat is documented from information sources or field studies (annual use can be based on studies or determined by past surveys with species numbers and dates). • SWHMiST Index #7 provides development effects and mitigation measures.	No potential. No flooded fields present On-site.	No to Low Potential. Agricultural fields with waste grains are present. No CUM1 or CUT1 ecosites present.
Waterfowl Stopover and Staging Areas (Aquatic) **Rationale:**	Canada Goose Cackling Goose Snow Goose American Black Duck	MAS1 MAS2 MAS3 SAS1	• Ponds, marshes, lakes, bays, coastal inlets, and watercourses	Studies carried out and verified presence of: • Aggregations of 100 or more of listed species for 7 days,	No potential. No marshes or swamps are present. Stormwater basins	No to Low potential. The Thames River within the Study Area Vicinity does not

Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Potential Presence in the On-site Study Area	Potential Presence in the Study Area Vicinity (1,000 m radius from On-site Study Area)
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria		
Important for local and migrant waterfowl populations during the spring or fall migration or both periods combined. Sites identified are usually only one of a few in the eco-district.	Northern Pintail Northern Shoveler American Wigeon Gadwall Green-winged Teal Blue-winged Teal Hooded Merganser Common Merganser Lesser Scaup Greater Scaup Long-tailed Duck Surf Scoter White-winged Scoter Black Scoter Ring-necked duck Common Goldeneye Bufflehead Redhead Ruddy Duck Red-breasted Merganser Brant Canvasback Ruddy Duck	SAM1 SAF1 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7	used during migration. Sewage treatment ponds and storm water ponds do not qualify as a SWH, however a reservoir managed as a large wetland or pond/lake does qualify. • These habitats have an abundant food supply (mostly aquatic invertebrates and vegetation in shallow water)	results in >700 waterfowl use days. • Areas with annual staging of ruddy ducks, canvasbacks, and redheads are SWH. • The combined area of the ELC ecosites and a 100 m radius area is the SWH. • Wetland area and shorelines associated with sites identified within the SWHTG Appendix K are significant wildlife habitat. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. • Annual Use of Habitat is Documented from Information Sources or Field Studies (Annual can be based on completed studies or determined from past surveys with species numbers and dates recorded). • SWHMiST Index #7 provides development effects and mitigation measures.	onsite do not qualify. The narrow strip of riparian vegetation doesn not provide suitable conditions.	appear to be suitable based on aerial photo interpretation..
Shorebird Migratory Stopover Area **<u>Rationale</u>**: High quality shorebird stopover habitat is extremely rare and typically has a long history of	Greater Yellowlegs Lesser Yellowlegs Marbled Godwit Hudsonian Godwit Black-bellied Plover American Golden-Plover Semipalmated Plover Solitary Sandpiper Spotted Sandpiper Semipalmated Sandpiper	BBO1 BBO2 BBS1 BBS2 BBT1 BBT2 SDO1 SDS2 SDT1 MAM1 MAM2 MAM3	• Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats. • Great Lakes	Studies confirming: • Presence of 3 or more of listed species and > 1000 shorebird use days during spring or fall migration period. (shorebird use days are the accumulated number of shorebirds counted per day over the course of the fall or spring migration	No potential. No marshes or swamps are present. Stormwater basins On-site do not qualify. The narrow strip of riparian vegetation does not provide suitable conditions.	No to Low potential. The Thames River within the Study Area Vicinity may provide minimal habitat for migrating shorebirds on the gravel-vegetated sandbars present within the Study Area Vicinity, but would not meet “significant” criteria.

Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Potential Presence in the On-site Study Area	Potential Presence in the Study Area Vicinity (1,000 m radius from On-site Study Area)
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria		
use.	Pectoral Sandpiper White-rumped Sandpiper Baird's Sandpiper Least Sandpiper Purple Sandpiper Stilt Sandpiper Short-billed Dowitcher Red-necked Phalarope Whimbrel Ruddy Turnstone Sanderling Dunlin	MAM4 MAM5	coastal shorelines, including groynes and other forms of armour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October. • Sewage treatment ponds and storm water ponds do not qualify as a SWH.	period). • Whimbrel stop briefly (<24 hrs) during spring migration, any site with >100 Whimbrel used for 3 years or more is significant. • The area of significant shorebird habitat includes the mapped ELC shoreline ecosites plus a 100 m radius area. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" • SWHMiST Index #8 provides development effects and mitigation measures.		
Raptor Wintering Area **<u>Rationale</u>**: Sites used by multiple species, a high number of individuals and used annually are most significant	Rough-legged Hawk Red-tailed Hawk Northern Harrier American Kestrel Snowy Owl **<u>Special Concern:</u>** Short-eared Owl Bald Eagle	<u>Hawks/Owls:</u> Combination of ELC Community Series; need to have present one Community Series from each land class; <u>Forest:</u> FOD, FOM, FOC. <u>Upland</u>: CUM; CUT; CUS; CUW. <u>Bald Eagle:</u> Forest	• The habitat provides a combination of fields and woodlands that provide roosting, foraging and resting habitats for wintering raptors. • Raptor wintering sites (hawk/owl) need to be > 20 ha with a combination of forest and upland Least disturbed sites, idle/fallow or lightly grazed field/meadow	Studies confirm the use of these habitats by: • One or more Short-eared Owls or; One or more Bald Eagles or; At least 10 individuals and two of the listed hawk/owl species. • To be significant a site must be used regularly (3 in 5 years) for a minimum of 20 days by the above number of birds. • The habitat area for an Eagle winter site is the shoreline forest ecosites directly adjacent to the prime hunting area. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power	No potential. No suitable forest communities or large waterbodies are present On-site.	High potential for Bald Eagle along the Thames River. For other raptor species listed, agricultural lands are likely too intensely farmed and no idle/fallow or lightly grazed fields are present.

Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Potential Presence in the On-site Study Area	Potential Presence in the Study Area Vicinity (1,000 m radius from On-site Study Area)
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria		
		community Series: FOD, FOM, FOC, SWD, SWM or SWC on shoreline areas adjacent to large rivers or adjacent to lakes with open water (hunting area).	(>15ha) with adjacent woodlands. • Field area of the habitat is to be wind swept with limited snow depth or accumulation. • Eagle sites have open water, large trees and snags available for roosting	Projects." • SWHMiST Index #10 and #11 provides development effects and mitigation measures.		
Bat Hibernacula **<u>Rationale</u>**: Bat hibernacula are rare habitats in all Ontario landscapes.	Big Brown Bat Tri-coloured Bat	Bat Hibernacula may be found in these ecosites: CCR1 CCR2 CCA1 CCA2 (Note: buildings are not considered to be SWH)	• Hibernacula may be found in caves, mine shafts, underground foundations and Karsts. • Active mine sites should not be considered as SWH • The locations of bat hibernacula are relatively poorly known.	• All sites with confirmed hibernating bats are SWH. • The habitat area includes a 200 m radius around the entrance of the hibernaculum for most development types and 1000 m for wind farms. • Studies are to be conducted during the peak swarming period (Aug. – Sept.). Surveys should be conducted following methods outlined in the "Bats and Bat Habitats: Guidelines for Wind Power Projects". • SWHMiST Index #1 provides development effects and mitigation measures.	No potential.	No potential.
Bat Maternity Colonies **<u>Rationale:</u>** Known locations of forested bat maternity colonies are extremely rare in all	Big Brown Bat Silver-haired Bat	Maternity colonies considered SWH are found in forested Ecosites.	• Maternity colonies can be found in tree cavities, vegetation and often in buildings buildings are not considered to be	• Maternity Colonies with confirmed use by; – >10 Big Brown Bats – >5 Adult Female Silver-haired Bats • The area of the habitat includes the entire woodland	No potential. No forest communites are present On-site.	Moderate potential along the Thames River where deciduous forest is present, and in anthropogenic sites.

Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Potential Presence in the On-site Study Area	Potential Presence in the Study Area Vicinity (1,000 m radius from On-site Study Area)
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria		
Ontario landscapes.		All ELC Ecosites in ELC Community Series: FOD FOM SWD SWM	SWH). • Maternity roosts are not found in caves and mines in Ontario. • Maternity colonies located in Mature deciduous or mixed forest stands with >10/ha large diameter (>25 cm dbh) wildlife trees. • Female Bats prefer wildlife tree (snags) in early stages of decay, class 1-3 or class 1 or 2. • Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in tree cavities and small hollows. Older forest areas with at least 21 snags/ha are preferred.	or a forest stand ELC Ecosite or an Ecoelement containing the maternity colonies. • Evaluation methods for maternity colonies should be conducted following methods outlined in the “Bats and Bat Habitats: Guidelines for Wind Power Projects”. • SWHMiST Index #12 provides development effects and mitigation measures.		
Turtle Wintering Areas **<u>Rationale:</u>** Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant.	Midland Painted Turtle **<u>Special Concern:</u>** Northern Map Turtle Snapping Turtle	Snapping and Midland Painted Turtles; ELC Community Classes; SW, MA, OA and SA, ELC Community	• For most turtles, wintering areas are in the same general area as their core habitat. Water has to be deep enough not to freeze and have soft mud	• Presence of 5 over-wintering Midland Painted Turtles is significant. • One or more Northern Map • Turtle or Snapping Turtle over- wintering within a wetland is significant. • The mapped ELC ecosite area with the over wintering	One Midland Painted Turtle was observed in the watercourse on May 27, 2015, which may be indicate hibernation habitat; however this watercourse and the man-made ponds within the landfill site are not considered SWH.	Moderate to High potential. Suitable habitat is likely present in the Thames River or the ponds located upstream outside of the On-site Study Area.

Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Potential Presence in the On-site Study Area	Potential Presence in the Study Area Vicinity (1,000 m radius from On-site Study Area)
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria		
		Series; FEO and BOO Northern Map Turtle; Open Water areas such as deeper rivers or streams and lakes with current can also be used as over-wintering habitat.	substrates. • Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate Dissolved Oxygen. • Man-made ponds such as sewage lagoons or storm water ponds should not be considered SWH.	turtles is the SWH. If the hibernation site is within a stream or river, the deep-water pool where the turtles are over wintering is the SWH. • Over wintering areas may be identified by searching for congregations (Basking Areas) of turtles on warm, sunny days during the fall (Sept. – Oct.) or spring (Mar. – May). • Congregation of turtles is more common where wintering areas are limited and therefore significant. • SWHMiST Index #28 provides development effects and mitigation measures for turtle wintering habitat.	Suitable habitat is likely present in the Thames River or the ponds located upstream outside of the On-site Study Area.	
Reptile **Hibernaculum** **Rationale**: Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant.	**Snakes**: Eastern Gartersnake Northern Watersnake Northern Red-bellied Snake Northern Brownsnake Smooth Green Snake Northern Ring-necked Snake **Special Concern**: Milksnake Eastern Ribbonsnake **Lizard**: **Special Concern** (Southern Shield population): Five-lined Skink	For all snakes, habitat may be found in any ecosite other than very wet ones. Talus, Rock Barren, Crevice, Cave, and Alvar sites may be directly related to these habitats. Observations or congregations of snakes on sunny warm	• For snakes, hibernation takes place in sites located below frost lines in burrows, rock crevices and other natural or naturalized locations. The existence of features that go below frost line; such as rock piles or slopes, old stone fences, and abandoned	Studies confirming: • Presence of snake hibernacula used by a minimum of five individuals of a snake sp. or; individuals of two or more snake spp. • Congregations of a minimum of five individuals of a snake sp. or; individuals of two or more snake spp. near potential hibernacula (e.g., foundation or rocky slope) on sunny warm days in Spring (Apr/May) and Fall (Sept/Oct) • Note: If there are Special Concern Species present,	Moderate to High potential. Eastern Gartersnake, Dekay's Brownsnake and Eastern Milksnake observed during field investigations in May-July under cover materials. Therefore, it may be assumed that the landfill likely contains hibernacula (i.e., areas of broken rock due to previous excavations on the Site as well as animal burrows may provide access to sites below the frost line).	Moderate to High potential given the rural landscape setting.

Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Potential Presence in the On-site Study Area	Potential Presence in the Study Area Vicinity (1,000 m radius from On-site Study Area)
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria		
		days in the spring or fall is a good indicator. For Five-lined Skink, ELC Community Series of FOD and FOM and Ecosites: FOC1, FOC3	crumbling foundations assist in identifying candidate SWH. • Areas of broken and fissured rock are particularly valuable since they provide access to subterranean sites below the frost line. • Wetlands can also be important over-wintering habitat in conifer or shrub swamps and swales, poor fens, or depressions in bedrock terrain with sparse trees or shrubs with sphagnum moss or sedge hummock groundcover. • Five-lined skink prefer mixed forests with rock outcrop openings providing cover rock overlaying granite bedrock with fissures.	then site is SWH. • Note: Sites for hibernation possess specific habitat parameters (e.g. temperature, humidity, etc.) and consequently are used annually, often by many of the same individuals of a local population (i.e., strong hibernation site fidelity). Other critical life processes (e.g., mating) often take place in close proximity to hibernacula. The feature in which the hibernacula is located plus a 30 m radius area is the SWH. • SWHMiST Index #13 provides development effects and mitigation measures for snake hibernacula. • Presence of any active hibernaculum for skink is significant. • SWHMiST Index #37 provides development effects and mitigation measures for five- lined skink wintering habitat.		
Colonially - Nesting Bird Breeding Habitat (Bank and Cliff)	Cliff Swallow Northern Rough-winged Swallow (this species is not colonial but can be found in Cliff Swallow colonies)	Eroding banks, sandy hills, borrow pits, steep slopes,	• Any site or areas with exposed soil banks, undisturbed or	Studies confirming: • Presence of 1 or more nesting sites with 8 or more cliff swallow pairs and/or	No potential. Although man-made exposed banks are present, natural features providing this type of	Low potential. Man-made features are present at the St. Marys Cement property but natural features

Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Potential Presence in the On-site Study Area	Potential Presence in the Study Area Vicinity (1,000 m radius from On-site Study Area)
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria		
Rationale: Historical use and number of nests in a colony make this habitat significant. An identified colony can be very important to local populations. All swallow population are declining in Ontario.		and sand piles. Cliff faces, bridge abutments, silos, barns. Habitat found in the following ecosites: CUM1 CUT1 CUS1 BLO1 BLS1 BLT1 CLO1 CLS1 CLT1	naturally eroding that is not a licensed/permitted aggregate area. • Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, soil or aggregate stockpiles. • Does not include a licensed/permitted Mineral Aggregate Operation.	rough- winged swallow pairs during the breeding season. • A colony identified as SWH will include a 50 m radius habitat area from the peripheral nests. • Field surveys to observe and count swallow nests are to be completed during the breeding season. Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. • SWHMiST Index #4 provides development effects and mitigation measures.	habitat are not.	are not present. There are no obvious exposed eroding banks or steep slopes along the Thames River in the Study Area Vicinity.
Colonially - Nesting Bird Breeding Habitat (Tree/Shrubs) **Rationale:** Large colonies are important to local bird population, typically sites are only known colony in area and are used annually.	Great Blue Heron Black-crowned Night - Heron Great Egret Green Heron	SWM2 SWM3 SWM5 SWM6 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7 FET1	• Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used. • Most nests in trees are 11 to 15 m from ground, near the top of the tree.	Studies confirming: • Presence of 5 or more active nests of Great Blue Heron or other listed species. • The habitat extends from the edge of the colony and a minimum 300 m radius or extent of the Forest Ecosite containing the colony or any island <15.0 ha with a colony is the SWH. • Confirmation of active heronries are to be achieved through site visits conducted during the nesting season (April to August) or by evidence such as the	No potential. These ecosites are not present.	Low potential. Based on aerial photo interpretation and ELC site reconnaissance, it does not appear that these ecosites are present.

Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Potential Presence in the On-site Study Area	Potential Presence in the Study Area Vicinity (1,000 m radius from On-site Study Area)
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria		
				presence of fresh guano, dead young and/or eggshells. • SWHMiST Index #5 provides development effects and mitigation measures.		
Colonially - Nesting Bird Breeding Habitat (Ground) **<u>Rationale:</u>** Colonies are important to local bird population, typically sites are only known colony in area and are used annually.	Herring Gull Great Black-backed Gull Little Gull Ring-billed Gull Common Tern Caspian Tern Brewer's Blackbird	Any rocky island or peninsula (natural or artificial) within a lake or large river (two-lined on a 1;50,000 NTS map). Close proximity to watercourses in open fields or pastures with scattered trees or shrubs (Brewer's Blackbird) MAM1 – 6; MAS1 – 3; CUM, CUT CUS	• Nesting colonies of gulls and terns are on islands or peninsulas associated with open water or in marshy areas. • Brewers Blackbird colonies are found loosely on the ground in low bushes in close proximity to streams and irrigation ditches within farmlands.	Studies confirming: • Presence of > 25 active nests for Herring Gulls or Ring-billed Gulls, >5 active nests for Common Tern or >2 active nests for Caspian Tern. • Presence of 5 or more pairs for Brewer's Blackbird. • Any active nesting colony of one or more Little Gull, and Great Black-backed Gull is significant. • The edge of the colony and a minimum 150 m radius area of habitat, or the extent of the ELC ecosites containing the colony or any island <3.0 ha with a colony is the SWH. • Studies would be done during May/June when actively nesting. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects". • SWHMiST Index #6 provides development effects and mitigation measures.	No potential.	No potential.
Migratory Butterfly Stopover Areas **<u>Rationale:</u>**	Painted Lady Red Admiral <u>Special Concern</u>	Combination of ELC Community Series; need to	A butterfly stopover area will be a minimum of 10 ha in size with a combination of field	Studies confirm: • The presence of Monarch Use Days (MUD) during fall migration (Aug/Oct). MUD is	No potential. The Site is not within 5 km of Lake Ontario.	No potential.

Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Potential Presence in the On-site Study Area	Potential Presence in the Study Area Vicinity (1,000 m radius from On-site Study Area)
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria		
Butterfly stopover areas are extremely rare habitats and are biologically important for butterfly species that migrate south for the winter.	Monarch	have present one Community Series from each land class: <u>Field</u>: CUM CUT CUS <u>Forest</u>: FOC FOD FOM CUP Anecdotally, a candidate site for butterfly stopover will have a history of butterflies being observed.	and forest habitat present, and will be located within 5 km of Lake Ontario. • The habitat is typically a combination of field and forest, and provides the butterflies with a location to rest prior to their long migration south. • The habitat should not be disturbed, fields/meadows with an abundance of preferred nectar plants and woodland edge providing shelter are requirements for this habitat. • Staging areas usually provide protection from the elements and are often spits of land or areas with the shortest distance to cross the Great Lakes.	based on the number of days a site is used by Monarchs, multiplied by the number of individuals using the site. Numbers of butterflies can range from 100-500/day, significant variation can occur between years and multiple years of sampling should occur. • Observational studies are to be completed and need to be done frequently during the migration period to estimate MUD. • MUD of >5000 or >3000 with the presence of Painted Ladies or Red Admiral's is to be considered significant. • SWHMiST Index #16 provides development effects and mitigation measures.		
Landbird Migratory Stopover Areas **<u>Rationale:</u>** Sites with a high diversity of species as	All migratory songbirds. Canadian Wildlife Service Ontario website: http://www.ec.gc.ca/nature/default.asp?lang=En&n=421B7A9D-1	All Ecosites associated with these ELC Community Series; FOC FOM FOD SWC	Woodlots need to be >10 ha of Lake Ontario. • If multiple woodlands are located along the	Studies confirm: • Use of the habitat by >200 birds/day and with >35 spp with at least 10 bird spp. recorded on at least 5 different survey dates. This	No potential. The Site is not within 5 km of Lake Erie or Lake Ontario.	No potential.

Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Potential Presence in the On-site Study Area	Potential Presence in the Study Area Vicinity (1,000 m radius from On-site Study Area)
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria		
well as high numbers are most significant.	All migrant raptors species: Ontario Ministry of Natural Resources: Fish and Wildlife Conservation Act, 1997. Schedule 7: Specially Protected Birds (Raptors)	SWM SWD	shoreline those Woodlands <2 km from Lake Ontario are more significant. • Sites have a variety of habitats; forest, grassland and wetland complexes. • The largest sites are more significant Woodlots and forest fragments are important habitats to migrating birds, these features located along the shore and located within 5km of Lake Ontario are Candidate SWH.	abundance and diversity of migrant bird species is considered above average and significant. • Studies should be completed during spring (Apr./May) and fall (Aug/Oct) migration using standardized assessment techniques. Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. • SWHMiST Index #9 provides development effects and mitigation measures.		
Deer Yarding Areas **<u>Rationale</u>:** Winter habitat for deer is considered to be the main limiting factor for northern deer populations. In winter, deer congregate in “yards” to survive severe winter conditions. Deer yards typically have a long history of annual use by deer, yards	White-tailed Deer	Note: OMNRF to determine this habitat. ELC Community Series providing a thermal cover component for a deer yard would include; FOM, FOC, SWM and SWC. Or these ELC	• Deer yarding areas or winter concentration areas (yards) are areas deer move to in response to the onset of winter snow and cold. This is a behavioural response and deer will establish traditional use areas. The yard is composed of two	No Studies Required: • Snow depth and temperature are the greatest influence on deer use of winter yards. Snow depths > 40 cm for more than 60 days in a typically winter are minimum criteria for a deer yard to be considered as SWH. • Deer Yards are mapped by OMNRF District offices. Locations of Core or Stratum 1 and Stratum 2 Deer yards considered significant by OMNRF will be available at	No potential. No deer yards identified by the MNRF.	No potential. No deer yards identified by the MNRF.

Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Potential Presence in the On-site Study Area	Potential Presence in the Study Area Vicinity (1,000 m radius from On-site Study Area)
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria		
typically represent 10-15% of an areas summer range.		Ecosites; CUP2 CUP3 FOD3 CUT	areas referred to as Stratum I and Stratum II. Stratum II covers the entire winter yard area and is usually a mixed or deciduous forest with plenty of browse available for food. Agricultural lands can also be included in this area. Deer move to these areas in early winter and generally, when snow depths reach 20 cm, most of the deer will have moved here. If the snow is light and fluffy, deer may continue to use this area until 30 cm snow depth. In mild winters, deer may remain in the Stratum II area the entire winter. • The Core of a deer yard (Stratum I) is located within the Stratum II area and is critical for deer survival in	local MNRF offices or via Land Information Ontario (LIO). • Field investigations that record deer tracks in winter are done to confirm use (best done from an aircraft). Preferably, this is done over a series of winters to establish the boundary of the Stratum I and Stratum II yard in an "average" winter. MNRF will complete these field investigations. • If a SWH is determined for Deer Wintering Area or if a proposed development is within Stratum II yarding area then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule. • SWHMiST Index #2 provides development effects and mitigation measures.		

Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Potential Presence in the On-site Study Area	Potential Presence in the Study Area Vicinity (1,000 m radius from On-site Study Area)
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria		
			areas where winters become severe. It is primarily composed of coniferous trees (pine, hemlock, cedar, spruce) with a canopy cover of more than 60%. • OMNRF determines deer yards following methods outlined in “Selected Wildlife and Habitat Features: Inventory Manual". • Woodlots with high densities of deer due to artificial feeding are not significant.			
Deer Winter Congregation Areas **<u>Rationale:</u>** Deer movement during winter in the southern areas of Ecoregion 6E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands to reduce or avoid the impacts of	White-tailed Deer	All Forested Ecosites with these ELC Community Series: FOC FOM FOD SWC SWM SWD Conifer plantations much smaller	• Woodlots will typically be >100 ha in size. Woodlots <100 ha may be considered as significant based on MNRF studies or assessment. • Deer movement during winter in the southern areas of Ecoregion 6E are	Studies confirm: • Deer management is an MNRF responsibility, deer winter congregation areas considered significant will be mapped by MNRF. • Use of the woodlot by white-tailed deer will be determined by MNRF, all woodlots exceeding the area criteria are significant, unless determined not to be significant by MNRF. • Studies should be completed	No potential. No deer wintering areas identified by the MNRF.	No potential. No deer wintering areas identified by the MNRF.

Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Potential Presence in the On-site Study Area	Potential Presence in the Study Area Vicinity (1,000 m radius from On-site Study Area)
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria		
winter conditions cxlviii.		than 50 ha may also be used.	not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands. • If deer are constrained by snow depth refer to the Deer Yarding Area habitat within Table 1.1 of this Schedule. • Large woodlots > 100 ha and up to 1500 ha are known to be used annually by densities of deer that range from 0.1-1.5 deer/ha. • Woodlots with high densities of deer due to artificial feeding are not significant.	during winter (Jan/Feb) when >20 cm of snow is on the ground using aerial survey techniques, ground or road surveys. or a pellet count deer density survey. • If a SWH is determined for Deer Wintering Area or if a proposed development is within Stratum II yarding area then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule. • SWHMiST Index #2 provides development effects and mitigation measures.		
Rare Vegetation Communities						
Cliffs and Talus Slopes **<u>Rationale:</u>** Cliffs and Talus Slopes are extremely rare habitats in Ontario.		Any ELC Ecosite within Community Series: TAO, CLO,TAS, CLS, TAT, CLT	Most cliff and talus slopes occur along the Niagara Escarpment. A Cliff is vertical to near vertical bedrock >3 m in height.	• Confirm any ELC Vegetation Type for Cliffs or Talus Slopes. • SWHMiST Index #21 provides development effects and mitigation measures.	No potential. Ecosite not present.	No potential. Ecosite not present.

Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Potential Presence in the On-site Study Area	Potential Presence in the Study Area Vicinity (1,000 m radius from On-site Study Area)
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria		
			A Talus Slope is rock rubble at the base of a cliff made up of coarse rocky debris			
Sand Barren **<u>Rationale:</u>** Sand barrens are rare in Ontario and support rare species. Most Sand Barrens have been lost due to cottage development and forestry		ELC Ecosites: SBO1 SBS1 SBT1 Vegetation cover varies from patchy and barren to continuous meadow (SBO1), thicket-like (SBS1), or more closed and treed (SBT1). Tree cover always ≤ 60%.	A sand barren area >0.5 ha in size· Sand Barrens typically are exposed sand, generally sparsely vegetated and caused by lack of moisture, periodic fires and erosion. Usually located within other types of natural habitat such as forest or savannah. Vegetation can vary from patchy and barren to tree covered, but less than 60%	• Confirm any ELC Vegetation Type for Sand Barrens • Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotic sp.). • SWHMiST Index #20 provides development effects and mitigation measures.	No potential. Ecosite not present.	No potential. Ecosite not present.
Alvar **<u>Rationale:</u>** Alvars are extremely rare habitats in Ecosregion 6E. Most alvars in Ontario are in Ecoregions 6E and 7E. Alvars in 6E are small and highly localized just north of the Palaeozoic-Precambrian contact.		ALO1 ALS1 ALT1 FOC1 FOC2 CUM2 CUS2 CUT2-1 CUW2	An Alvar site > 0.5 ha in size. An alvar is typically a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil. The hydrology of alvars is complex, with alternating	• Field studies that identify four of the five Alvar Indicator Species at a Candidate Alvar site is Significant. • Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotic sp.). • The alvar must be in excellent condition and fit in with surrounding landscape with few conflicting land uses • SWHMiST Index #17	No potential. Ecosite not present.	No potential. Ecosite not present.

Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Potential Presence in the On-site Study Area	Potential Presence in the Study Area Vicinity (1,000 m radius from On-site Study Area)
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria		
		Five Alvar Indicator Species: *Carex crawei* *Panicum philadelphicum* *Eleocharis compressa* *Scutellaria parvula* *Trichostema brachiatum* These indicator species are very specific to Alvars within Ecoregion 6E.	periods of inundation and drought. Vegetation cover varies from sparse lichen-moss associations to grasslands and shrublands and comprising a number of characteristic or indicator plants. Undisturbed alvars can be phyto- and zoogeographically diverse, supporting many uncommon or are relict plant and animals species. Vegetation cover varies from patchy to barren with a less than 60% tree cover.	provides development effects and mitigation measures.		
Old Growth Forest **<u>Rationale:</u>** Due to historic logging practices, extensive old growth forest is rare in the Ecoregion. Interior habitat provided by old growth forests is required by many wildlife species.		Forest Community Series: FOD FOC FOM SWD SWC SWM	Woodland areas 30 ha or greater in size or with at least 10 ha interior habitat assuming 100 m buffer at edge of forest Old Growth forests are characterized by heavy mortality or turnover of over-storey trees resulting in a mosaic of gaps that encourage development of a multi-layered canopy and an	Field Studies will determine: • If dominant trees species of the are >140 years old, then the area containing these trees is Significant Wildlife Habitat. • The forested area containing the old growth characteristics will have experienced no recognizable forestry activities (cut stumps will not be present). • The area of forest ecosites combined or an eco-element within an ecosite that contains the old growth characteristics is the SWH.	No potential. Ecosite not present.	No potential. Forest communities along the Thames River do not appear to exhibit old growth characteristics based on site reconnaissance.

Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Potential Presence in the On-site Study Area	Potential Presence in the Study Area Vicinity (1,000 m radius from On-site Study Area)
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria		
			abundance of snags and downed woody debris.	• Determine ELC vegetation types for the forest forest area containing the old growth characteristics. • SWHMiST Index #23 provides development effects and mitigation measures.		
Savannah **<u>Rationale:</u>** Savannahs are extremely rare habitats in Ontario.		TPS1 TPS2 TPW1 TPW2 CUS2	No minimum size to site. Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH. A Savannah is a tallgrass prairie habitat that has tree cover between 25 – 60%.	Field studies confirm one or more of the Savannah indicator species listed in Appendix N should be present. Note: Savannah plant spp. list from Ecoregion 6E should be used. • Area of the ELC Ecosite is the SWH. • Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotic sp.). • SWHMiST Index #18 provides development effects and mitigation measures.	No potential. Ecosite not present.	No potential. Ecosite not present.
Tallgrass Prairie **<u>Rationale:</u>** Tallgrass Prairies are extremely rare habitats in Ontario.		TPO1 TPO2	No minimum size to site. Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH. A Tallgrass Prairie has ground cover dominated by prairie grasses.	Field studies confirm one or more of the Prairie indicator species listed in Appendix N should be present. Note: Prairie plant spp. list from Ecoregion 6E should be used. • Area of the ELC Ecosite is theSWH. • Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotic sp.). • SWHMiST Index #19	No potential. Ecosite not present.	No potential. Ecosite not present.

Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Potential Presence in the On-site Study Area	Potential Presence in the Study Area Vicinity (1,000 m radius from On-site Study Area)
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria		
			An open Tallgrass Prairie habitat has < 25% tree cover.	provides development effects and mitigation measures.		
Other Rare Vegetation Communities **<u>Rationale:</u>** Plant communities that often contain rare species which depend on the habitat for survival.		Provincially Rare S1, S2 and S3 vegetation communities are listed in Appendix M of the SWHTG. Any ELC Ecosite Code that has a possible ELC Vegetation Type that is Provincially Rare is Candidate SWH.	ELC Ecosite codes that have the potential to be a rare ELC Vegetation Type as outlined in Appendix M The OMNRF/NHIC will have up to date listing for rare vegetation communities. Rare Vegetation Communities may include beaches, fens, forest, marsh, barrens, dunes and swamps.	Field studies should confirm if an ELC Vegetation Type is a rare vegetation community based on listing within Appendix M of SWHTG. • Area of the ELC Vegetation Type polygon is the SWH. • SWHMiST Index #37 provides development effects and mitigation measures.	No potential.	No potential. MNRF did not identify any additional rare vegetation communities.
Specialized Habitat for Wildlife						
Waterfowl Nesting Area **<u>Rationale:</u>** Important to local waterfowl populations, sites with greatest number of species and highest number of individuals are significant.	American Black Duck Northern Pintail Northern Shoveler Gadwall Blue-winged Teal Green-winged Teal Wood Duck Hooded Merganser Mallard	All upland habitats located adjacent to these wetland ELC Ecosites are Candidate SWH: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 MAM1 MAM2 MAM3 MAM4 MAM5 MAM6	A waterfowl nesting area extends 120 m from a wetland (> 0.5 ha) or a wetland (>0.5ha) and any small wetlands (0.5ha) within 120 m or a cluster of 3 or more small (<0.5 ha) wetlands within 120 m of each individual wetland where waterfowl nesting is	Studies confirmed: • Presence of 3 or more nesting pairs for listed species excluding Mallards, or; • Presence of 10 or more nesting pairs for listed species including Mallards. • Any active nesting site of an American Black Duck is considered significant. • Nesting studies should be completed during the spring	No potential.	No potential.

Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Potential Presence in the On-site Study Area	Potential Presence in the Study Area Vicinity (1,000 m radius from On-site Study Area)
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria		
		SWT1 SWT2 SWD1 SWD2 SWD3 SWD4 Note: includes adjacency to Provincially Significant Wetlands	known to occur. • Upland areas should be at least 120 m wide so that predators such as racoons, skunks, and foxes have difficulty finding nests. • Wood Ducks and Hooded Mergansers utilize large diameter trees (>40 cm dbh) in woodlands for cavity nest sites.	breeding season (April - June). Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects” • A field study confirming waterfowl nesting habitat will determine the boundary of the waterfowl nesting habitat for the SWH, this may be greater or less than 120 m from the wetland and will provide enough habitat for waterfowl to successfully nest. • SWHMiST Index #25 provides development effects and mitigation measures.		
Bald Eagle and Osprey Nesting, Foraging and Perching Habitat **<u>Rationale:</u>** Nest sites are fairly uncommon in Eco-region 6E and are used annually by these species. Many suitable nesting locations may be lost due to increasing shoreline development pressures and scarcity of habitat.	Osprey **Special Concern** Bald Eagle	ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas – rivers, lakes, ponds and wetlands	Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water. • Osprey nests are usually at the top a tree whereas Bald Eagle nests are typically in super canopy trees in a notch within the tree’s canopy. • Nests located on man-made objects are not to be included as	Studies confirm the use of these nests by: • One or more active Osprey or Bald Eagle nests in an area. • Some species have more than one nest in a given area and priority is given to the primary nest with alternate nests included within the area of the SWH. • For an Osprey, the active nest and a 300 m radius around the nest or the contiguous woodland stand is the SWH, maintaining undisturbed shorelines with large trees within this area is important. • For a Bald Eagle the active	No potential.	Moderate potential. There is some potential for Bald Eagle and Osprey to be nesting along the Thames River. Flyover observation of Bald Eagle was recorded during breeding bird surveys conducted within the On-site Study Area.

Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Potential Presence in the On-site Study Area	Potential Presence in the Study Area Vicinity (1,000 m radius from On-site Study Area)
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria		
			SWH (e.g. telephone poles and constructed nesting platforms).	nest and a 400-800 m radius around the nest is the SWH. cvi, ccvii Area of the habitat from 400-800 m is dependent on site lines from the nest to the development and inclusion of perching and foraging habitat. • To be significant a site must be used annually. When found inactive, the site must be known to be inactive for >3 years or suspected of not being used for >5 years before being considered not significant. • Observational studies to determine nest site use, perching sites and foraging areas need to be done from mid March to mid August. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" • SWHMiST Index #26 provides development effects and mitigation measures.		
Woodland Raptor Nesting Habitat **<u>Rationale:</u>** Nests sites for these species are rarely identified; these area sensitive habitats and are often used annually by these species.	Northern Goshawk Cooper's Hawk Sharp-shinned Hawk Red-shouldered Hawk Barred Owl Broad-winged Hawk	May be found in all forested ELC Ecosites. May also be found in SWC, SWM, SWD and CUP3	All natural or conifer plantation woodland/forest stands >30ha with >10 ha of interior habitat. Interior habitat determined with a 200 m buffer • Stick nests found in a variety of	Studies confirm: • Presence of 1 or more active nests from species list is considered significantcxlviii. • Red-shouldered Hawk and Northern Goshawk – A 400 m radius around the nest or 28 ha area of habitat is the SWH. (the 28 ha habitat area would be	No potential.	Low potential. Forested communities are not of sufficient size to meet the criteria for significance.

Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Potential Presence in the On-site Study Area	Potential Presence in the Study Area Vicinity (1,000 m radius from On-site Study Area)
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria		
			intermediate-aged to mature conifer, deciduous or mixed forests within tops or crotches of trees. Species such as Coopers hawk nest along forest edges sometimes on peninsulas or small off-shore islands. • In disturbed sites, nests may be used again, or a new nest will be in close proximity to old nest.	applied where optimal habitat is irregularly shaped around the nest) • Barred Owl – A 200m radius around the nest is the SWH • Broad-winged Hawk and Coopers Hawk,– A 100m radius around the nest is the SWH. • Sharp-Shinned Hawk – A 50 m radius around the nest is the SWH. • Conduct field investigations from mid-March to end of May. The use of call broadcasts can help in locating territorial (courting/nesting) raptors and facilitate the discovery of nests by narrowing down the search area. • SWHMiST Index #27 provides development effects and mitigation measures.		
Turtle Nesting Areas **<u>Rationale:</u>** These habitats are rare and when identified will often be the only breeding site for local populations of turtles.	Midland Painted Turtle <u>Special Concern Species:</u> Northern Map Turtle Snapping Turtle	Exposed mineral soil (sand or gravel) areas adjacent (<100 m) or within the following ELC Ecosites: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1	• Best nesting habitat for turtles are close to water and away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals. • For an area to function as a turtle- nesting area, it must	Studies confirm: • Presence of 5 or more nesting Midland Painted Turtles. • One or more Northern Map Turtle or Snapping Turtle nesting is a SWH. • The area or collection of sites within an area of exposed mineral soils where the turtles nest, plus a radius of 30-100m around the nesting area dependant on slope, riparian vegetation	Low potential. Soil composition at the landfill is mostly compact and comprised of large rocks and gravel – not ideal conditions for turtle nesting. Suitable nesting habitat is likely found on adjacent lands in close proximity to the landfill (i.e., shoreline of Thames River). No evidence of nesting observed during field investigations.	High potential. Lands adjacent to the Thames River may provide suitable habitat conditions.

Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Potential Presence in the On-site Study Area	Potential Presence in the Study Area Vicinity (1,000 m radius from On-site Study Area)
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria		
		BOO1 FEO1	provide sand and gravel that turtles are able to dig in and are located in open, sunny areas. Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH. • Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used.	and adjacent land use is the SWH. • Travel routes from wetland to nesting area are to be considered within the SWH as part of the 30-100m area of habitat. • Field investigations should be conducted in prime nesting season typically late spring to early summer. Observational studies observing the turtles nesting is a recommended method. • SWHMiST Index #28 provides development effects and mitigation measures for turtle nesting habitat.		
Seeps and Springs **<u>Rationale:</u>** Seeps/Springs are typical of headwater areas and are often at the source of coldwater streams.	Wild Turkey Ruffed Grouse Spruce Grouse White-tailed Deer Salamander spp.	Seeps/Springs are areas where ground water comes to the surface. Often they are found within headwater areas within forested habitats. Any forested Ecosite within the headwater areas of a stream could have seeps/springs.	Any forested area (with <25% meadow/field/pasture) within the headwaters of a stream or river system. • Seeps and springs are important feeding and drinking areas especially in the winter will typically support a variety of plant and animal species.	Field Studies confirm: • Presence of a site with 2 or more seeps/springs should be considered SWH. • The area of a ELC forest ecosite or an ecoelement within ecosite containing the seeps/springs is the SWH. The protection of the recharge area considering the slope, vegetation, height of trees and groundwater condition need to be considered in delineation the habitat. • SWHMiST Index #30 provides development effects and mitigation	No potential. No seeps or springs were observed and no forested communities are present On-site.	Low potential. The Study Area Vicinity is not within a headwater area.

Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Potential Presence in the On-site Study Area	Potential Presence in the Study Area Vicinity (1,000 m radius from On-site Study Area)
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria		
				measures		
Amphibian Breeding Habitat (Woodland). **<u>Rationale:</u>** These habitats are extremely important to amphibian biodiversity within a landscape and often represent the only breeding habitat for local amphibian populations	Eastern Newt Blue-spotted Salamander Spotted Salamander Gray Treefrog Spring Peeper Western Chorus Frog Wood Frog	All Ecosites associated with these ELC Community Series; FOC FOM FOD SWC SWM SWD Breeding pools within the woodland or the shortest distance from forest habitat are more significant because they are more likely to be used due to reduced risk to migrating amphibians	• Presence of a wetland, pond or woodland pool (including vernal pools) >500 m^2 (about 25 m diameter) ccvii within or adjacent (within 120 m) to a woodland (no minimum size). Some small wetlands may not be mapped and may be important breeding pools for amphibians. • Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat.	Studies confirm: • Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog species with at least 20 individuals (adults or eggs masses) lxxi or 2 or more of the listed frog species with Call Level Codes of 3. • A combination of observational study and call count surveys cviii will be required during the spring (March-June) when amphibians are concentrated around suitable breeding habitat within or near the woodland/wetlands. • The habitat is the wetland area plus a 230 m radius of woodland area. If a wetland area is adjacent to a woodland, a travel corridor connecting the wetland to the woodland is to be included in the habitat. • SWHMiST Index #14 provides development effects and mitigation measures.	No potential. There are no forest communities On-site.	Moderate potential. No breeding pools were observed during the ELC site reconnaissance but there is potential for some vernal pools to be present within woodlands along the Thames River.
Amphibian Breeding Habitat (Wetlands) **<u>Rationale:</u>** Wetlands supporting breeding for these amphibian	Eastern Newt American Toad Spotted Salamander Four-toed Salamander Blue-spotted Salamander Gray Treefrog	ELC Community Classes SW, MA, FE, BO, OA and SA. Typically these	• Wetlands >500 m^2 (about 25 m diameter), supporting high species diversity are significant;	Studies confirm: • Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog/toad species with	No potential. Wetland features On-site do not meet the criteria for significant.	Low potential for wetland amphibian breeding habitat that would fit the criteria for significant.

Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Potential Presence in the On-site Study Area	Potential Presence in the Study Area Vicinity (1,000 m radius from On-site Study Area)
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria		
species are extremely important and fairly rare within Central Ontario landscapes.	Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog Mink Frog Bullfrog	wetland ecosites will be isolated (>120m) from woodland ecosites, however larger wetlands containing predominantly aquatic species (e.g. Bull Frog) may be adjacent to woodlands.	some small or ephemeral habitats may not be identified on MNRF mapping and could be important amphibian breeding habitats. • Presence of shrubs and logs increase significance of pond for some amphibian species because of available structure for calling, foraging, escape and concealment from predators. • Bullfrogs require permanent water bodies with abundant emergent vegetation.	at least 20 individuals (adults or eggs masses) or 2 or more of the listed frog/toad species with Call Level Codes of 3 or; Wetland with confirmed breeding Bullfrogs are significant. • The ELC ecosite wetland area and the shoreline are the SWH. • A combination of observational study and call count surveys cviii will be required during the spring (March-June) when amphibians are concentrated around suitable breeding habitat within or near the wetlands. • If a SWH is determined for Amphibian Breeding Habitat (Wetlands) then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule. • SWHMiST Index #15 provides development effects and mitigation measures.		
Woodland Area-Sensitive Bird Breeding Habitat **<u>Rationale</u>:** Large, natural blocks of mature woodland habitat within the settled areas of	Yellow-bellied Sapsucker Red-breasted Nuthatch Veery Blue-headed Vireo Northern Parula Black-throated Green Warbler Blackburnian Warbler Black-throated Blue Warbler	All Ecosites associated with these ELC Community Series; FOC FOM FOD SWC SWM SWD	• Habitats where interior forest breeding birds are breeding, typically large mature (>60 yrs old) forest stands or woodlots >30 ha. • Interior forest habitat is at least	Studies confirm: • Presence of nesting or breeding pairs of 3 or more of the listed wildlife species. • Note: any site with breeding Cerulean Warblers or Canada Warblers is to be considered SWH. • Conduct field investigations in spring and early summer	No potential. No forested communities are present On-site.	No to Low potential. No forested communities with sufficient interior habitat is present.

Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Potential Presence in the On-site Study Area	Potential Presence in the Study Area Vicinity (1,000 m radius from On-site Study Area)
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria		
Southern Ontario are important habitats for area sensitive interior forest song birds.	Ovenbird Scarlet Tanager Winter Wren **Special Concern:** Cerulean Warbler Canada Warbler		200 m from forest edge habitat.	when birds are singing and defending their territories. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects". • SWHMiST Index #34 provides development effects and mitigation measures.		
Habitat for Species of Conservation Concern (not including Endangered or Threatened Species)						
Marsh Breeding Bird Habitat **<u>Rationale:</u>** Wetlands for these bird species are typically productive and fairly rare in Southern Ontario landscapes.	American Bittern Virginia Rail Sora Common Moorhen American Coot Pied-billed Grebe Marsh Wren Sedge Wren Common Loon Sandhill Crane Green Heron Trumpeter Swan **Special Concern:** Black Tern Yellow Rail	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SAS1 SAM1 SAF1 FEO1 BOO1 For Green Heron: All SW, MA and CUM1 sites.	• Nesting occurs in wetlands. • All wetland habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present. • For Green Heron, habitat is at the edge of water such as sluggish streams, ponds and marshes sheltered by shrubs and trees. Less frequently, it may be found in upland shrubs or forest a considerable distance from water.	Studies confirm: • Presence of 5 or more nesting pairs of Sedge Wren or Marsh Wren or or 1 pair of Sandhill Cranes; or breeding by any combination of 5 or more of the listed species. • Note: any wetland with breeding of 1 or more Black Terns, Trumpeter Swan, Green Heron or Yellow Rail is SWH. • Area of the ELC ecosite is the SWH. • Breeding surveys should be done in May/June when these species are actively nesting in wetland habitats. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects". • SWHMiST Index #35 provides development effects and mitigation measures.	No potential. No suitable vegetation communities are present.	Low potential. Green Heron was observed during breeding bird surveys in the On-site Study Area as a flyover observation; therefore, there may be suitable breeding habitat within 1,000 m radius of the On-site Study Area.

Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Potential Presence in the On-site Study Area	Potential Presence in the Study Area Vicinity (1,000 m radius from On-site Study Area)
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria		
Open Country Bird Breeding Habitat **<u>Rationale:</u>** This wildlife habitat is declining throughout Ontario and North America. Species such as the Upland Sandpiper have declined significantly the past 40 years based on CWS (2004) trend records.	Upland Sandpiper Grasshopper Sparrow Vesper Sparrow Northern Harrier Savannah Sparrow **Special Concern** Short-eared Owl	CUM1 CUM2	• Large grassland areas (includes natural and cultural fields and meadows) >30 ha. • Grasslands not Class 1 or 2 agricultural lands, and not being actively used for farming (i.e. no row cropping or intensive hay or livestock pasturing in the last 5 years). • Grassland sites considered significant should have a history of longevity, either abandoned fields, mature hayfields and pasturelands that are at least 5 years or older. • The Indicator bird species are area sensitive requiring larger grassland areas than the common grassland species.	Field Studies confirm: • Presence of nesting or breeding of 2 or more of the listed species. • A field with 1 or more breeding Short-eared Owls is to be considered SWH. • The area of SWH is the contiguous ELC ecosite field areas. • Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" • SWHMiST cxlix Index #32 provides development effects and mitigation measures.	No potential. While Savannah Sparrow was recorded during breeding bird surveys in the On-site Study Area, habitat within the landfill is not sufficient to meet the criteria for significant.	Low potential. Agricultural lands are too intensely farmed to provide suitable habitat. Some cultural meadows are present on the St. Marys Cement property which could potentially provide suitable habitat, however unlikely to meet the criteria for significant.
Shrub/Early Successional Bird Breeding Habitat **<u>Rationale:</u>**	**Indicator Spp:** Brown Thrasher Clay-coloured Sparrow	CUT1 CUT2 CUS1 CUS2 CUW1	• Large field areas succeeding to shrub and thicket habitats>10ha in	Field Studies confirm: • Presence of nesting or breeding of 1 of the indicator species and at least 2 of the	No potential. While there are pockets of shrub/early successional habitat within the landfill, they do not	No potential. No shrub/early successional habitat that meets the criteria for significant is present within the

Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Potential Presence in the On-site Study Area	Potential Presence in the Study Area Vicinity (1,000 m radius from On-site Study Area)
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria		
This wildlife habitat is declining throughout Ontario and North America. The Brown Thrasher has declined significantly over the past 40 years based on CWS (2004) trend records cxcix.	**Common Spp.** Field Sparrow Black-billed Cuckoo Eastern Towhee Willow Flycatcher **Special Concern:** Yellow-breasted Chat Golden-winged Warbler	CUW2 Patches of shrub ecosites can be complexed into a larger habitat for some bird species	size. • Shrub land or early successional fields, not class 1 or 2 agricultural lands, not being actively used for farming (i.e. no row-cropping, haying or live-stock pasturing in the last 5 years). • Shrub thicket habitats (>10 ha) are most likely to support and sustain a diversity of these species. • Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or pasturelands.	common species. • A habitat with breeding Yellow- breasted Chat or Golden-winged Warbler is to be considered as Significant Wildlife Habitat. • The area of the SWH is the contiguous ELC ecosite field/thicket area. • Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. • SWHMiST cxlix Index #33 provides development effects and mitigation measures.	meet the criteria for significant.	Study Area Vicinity.
Terrestrial Crayfish **<u>Rationale:</u>** Terrestrial Crayfish are only found within SW Ontario in Canada and their habitats are very rare. ccii	Chimney or Digger Crayfish (*Fallicambarus fodiens*) Devil Crayfish or Meadow Crayfish (*Cambarus Diogenes*)	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 MAS1 MAS2 MAS3 SWD SWT SWM	Wet meadow and edges of shallow marshes (no minimum size) should be surveyed for terrestrial crayfish. • Constructs burrows in marshes, mudflats, meadows, the ground can’t be too moist. Can	Studies Confirm: • Presence of 1 or more individuals of species listed or their chimneys (burrows) in suitable meadow marsh, swamp or moist terrestrial sites. • Area of ELC ecosite or an ecoelement area of meadow marsh or swamp within the larger ecosite area is the SWH. • Surveys should be done	Confirmed. Terrestrial crayfish chimneys were observed in July northwest of the capped cement kiln dust pile (see Figure 3). There are very shallow depressions in this area of the landfill where drainage is poor and phragmite is thriving (even though this is a raised area of the landfill). Soil at the outer edges of these phragmite pockets is wet and	Moderate to High potential. No marsh or swamp communities were observed in the Study Area Vicinity but small depressions could be present. Given the presence of terrestrial crayfish within the On-site Study Area, they are assumed to be present in the broader vicinity.

Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Potential Presence in the On-site Study Area	Potential Presence in the Study Area Vicinity (1,000 m radius from On-site Study Area)
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria		
		CUM1 with inclusions of above meadow marsh or swamp ecosites can be used by terrestrial crayfish.	often be found far from water. • Both species are a semi- terrestrial burrower which spends most of its life within burrows consisting of a network of tunnels. Usually the soil is • not too moist so that the tunnel is well formed.	April to August in temporary or permanent water. Note the presence of burrows or chimneys are often the only indicator of presence, observance or collection of individuals is very difficult. • SWHMiST Index #36 provides development effects and mitigation measures.	slightly mucky.	
Special Concern and Rare Wildlife Species **<u>Rationale:</u>** These species are quite rare or have experienced significant population declines in Ontario.	All Special Concern and Provincially Rare (S1-S3, SH) plant and animal species. Lists of these species are tracked by the Natural Heritage Information Centre.	All plant and animal element occurrences (EO) within a 1 or 10 km grid. Older element occurrences were recorded prior to GPS being available, therefore location information may lack accuracy.	When an element occurrence is identified within a 1 or 10 km grid for a Special Concern or provincially Rare species; linking candidate habitat on the site needs to be completed to ELC Ecosites.	Studies Confirm: • Assessment/inventory of the site for the identified special concern or rare species needs to be completed during the time of year when the species is present or easily identifiable. • The area of the habitat to the finest ELC scale that protects the habitat form and function is the SWH, this must be delineated through detailed field studies. The habitat needs be easily mapped and cover an important life stage component for a species e.g., specific nesting habitat or foraging habitat. • SWHMiST cxlix Index #37 provides development effects and mitigation measures.	Confirmed. Eastern Milksnake (formerly listed as Special Concern) was observed during field investigations using woody debris as a refugue/thermoregulating site. Monarch was also observed during field investigations, however the On-site Study Area is not considered significant due to the nature of its operations.	High potential. Special Concern reptile species such as Northern Map Turtle, Snapping Turtle, as well as birds such as Eastern Wood-pewee are likely present based on the presence of suitable habitat.

Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Potential Presence in the On-site Study Area	Potential Presence in the Study Area Vicinity (1,000 m radius from On-site Study Area)
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria		
Animal Movement Corridors						
Amphibian Movement Corridors **Rationale:** Movement corridors for amphibians moving from their terrestrial habitat to breeding habitat can be extremely important for local populations.	Eastern Newt American Toad Spotted Salamander Four-toed Salamander Blue-spotted Salamander Gray Treefrog Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog Mink Frog Bullfrog	Corridors may be found in all ecosites associated with water. Corridors will be determined based on identifying the significant breeding habitat for these species in Table 1.1	Movement corridors between breeding habitat and summer habitat Movement corridors must be determined when Amphibian breeding habitat is confirmed as SWH from Table 1.2.2 (Amphibian Breeding Habitat –Wetland) of this Schedule.	• Field Studies must be conducted at the time of year when species are expected to be migrating or entering breeding sites. • Corridors should consist of native vegetation, with several layers of vegetation. • Corridors unbroken by roads, waterways or bodies, and undeveloped areas are most significant • Corridors should have at least 15m of vegetation on both sides of waterwaycxlix or be up to 200m widecxlix of woodland habitat and with gaps <20m. • Shorter corridors are more significant than longer corridors, however amphibians must be able to get to and from their summer and breeding habitat • SWHMiST Index #40 provides development effects and mitigation measures	No potential. Given the marginal habitat available for amphibians and the highly disturbed nature of the landfill, significant amphibian movement corridors are not present.	Moderate to High potential. Movement corridors may be present along the Thames River corridor.
Deer Movement Corridors **Rationale:** Corridors important for all species to be able to access seasonally important life-cycle habitats or to access	White-tailed Deer	Corridors may be found in all forested ecosites. A Project Proposal in Stratum II Deer Wintering Area	Movement corridor must be determined when Deer Wintering Habitat is confirmed as SWH from Table 1.1 of this schedule. • A deer wintering habitat identified	• Studies must be conducted at the time of year when deer are migrating or moving to and from winter concentration areas. • Corridors that lead to a deer wintering habitat should be unbroken by roads and residential areas.	No potential. No deer wintering areas identified by the MNRF; therefore, deer movement corridors not expected.	No potential. No deer wintering areas identified by the MNRF; therefore, deer movement corridors not expected.

Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Potential Presence in the On-site Study Area	Potential Presence in the Study Area Vicinity (1,000 m radius from On-site Study Area)
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria		
new habitat for dispersing individuals by minimizing their vulnerability while travelling.		has potential to contain corridors.	by the OMNRF as SWH in Table 1.1 of this Schedule will have corridors that the deer use during fall migration and spring dispersion. • Corridors typically follow riparian areas, woodlots, areas of physical geography (ravines, or ridges).	• Corridors should be at least 200 m wide with gaps <20 m and if following riparian area with at least 15 m of vegetation on both sides of waterway. • Shorter corridors are more significant than longer corridors, SWHMiST Index #39 provides development effects and mitigation measures.		
Significant Wildlife Habitat Exceptions for Ecodistricts within EcoRegion 6E						
6E-14 **Rationale:** The Bruce Peninsula has an isolated and distinct population of black bears. Maintenance of large woodland tracts with mast-producing tree species is important for bear	**Mast Producing Areas** Black Bear	All Forested habitat represented by ELC Community Series: FOM FOD	Woodland ecosites >30 ha with mast-producing tree species, either soft (cherry) or hard (oak and beech), Black bears require forested habitat that provides cover, winter hibernation sites, and mast- producing tree species. • Forested habitats need to be large enough to provide cover and protection for black bears	All woodlands >30 ha with a 50% composition of these ELC Vegetation Types are considered significant: FOM1-1 FOM2-1 FOM3-1 FOD1-1 FOD1-2 FOD2-1 FOD2-2 FOD2-3 FOD2-4 FOD4-1 FOD5-2 FOD5-3 FOD5-7 FOD6-5 SWHMiST Index #3 provides development effects and mitigation measures.	No potential. Site not on the Bruce Peninsula.	No potential. Site not on the Bruce Peninsula.

Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Potential Presence in the On-site Study Area	Potential Presence in the Study Area Vicinity (1,000 m radius from On-site Study Area)
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria		
6E- 17 **Rationale:** Sharp-tailed grouse only occur on Manitoulin Island in Eco- region 6E, Leks are an important habitat to maintain their population	**Lek** Sharp-tailed Grouse	CUM CUS CUT	• The lek or dancing ground consists of bare, grassy or sparse shrubland. There is often a hill or rise in topography. • Leks are typically a grassy field/meadow >15 ha with adjacent shrublands and >30 ha with adjacent deciduous woodland. Conifer trees within 500 m are not tolerated. Grasslands (field/meadow) are to be >15 ha when adjacent to shrubland and >30 ha when adjacent to deciduous woodland. • Grasslands are to be undisturbed with low intensities of agriculture (light grazing or late haying). • Leks will be used annually if not destroyed by cultivation or invasion by woody	Studies confirming lek habitat are to be completed from late March to June. • Any site confirmed with sharp-tailed grouse courtship activities is considered significant. • The field/meadow ELC ecosites plus a 200 m radius area with shrub or deciduous woodland is the lek habitat. • SWHMiST cxlix Index #32 provides development effects and mitigation measures.	No potential. Site not on Manitoulin Island.	No potential. Site not on Manitoulin Island.

Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Potential Presence in the On-site Study Area	Potential Presence in the Study Area Vicinity (1,000 m radius from On-site Study Area)
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria		
			plants or tree planting.			

BURNSIDE

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Appendix B

ELC Photo Pages

Photo 1: ELC Community MEGM3 Dry-Fresh Graminoid Meadow Undulating topography (May 8, 2015)

Photo 2: ELC Community MEGM3 Dry-Fresh Graminoid Meadow Looking Towards Capped Cement Kiln Dustpile (June 4, 2015)

Photo 3: ELC Community SWTM3 Willow Mineral Deciduous Thicket Swamp Existing Watercourse (August 21, 2015)

Photo 4: ELC Community MASM1 Graminoid Mineral Shallow Marsh Existing Watercourse (June 4, 2015)

Photo 5: ELC Community CUH Cultural Hedgerow
Located along the south property limit (August 21, 2015)

Photo 6: ELC Community CUW Cultural Woodlot
(June 4, 2015)

Photo 7: Stormwater Basin/Pond – Central Portion of Landfill (July 3, 2015)

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Appendix C

Breeding Bird Surveys and Photos

300032339 St. Marys Landfill Expansion Environmental Assessment
Appendix C: Breeding Bird Survey Summary Table – June 4, June 22, July 3, 2015

Surveys Conducted by: Hannah Maciver		PROVINCIAL	PROVINCIAL	FEDERAL	FEDERAL	FEDERAL	PROVINCIAL	Total Recorded	Highest Recorded Breeding Evidence	Comments
COMMON NAME	***SCIENTIFIC NAME***	***SRANK[1]***	***SARO (Endangered Species Act, 2007)[2]***	***COSEWIC[3]***	***SARA (Species at Risk Act)[3]***	***SARA Schedule[4]***	***MNR Area Sensitive Species[5]***			
American Crow	*Corvus brachyrhynchos*	S5B						2	X - Observed	Scavenging at active fill area.
American Goldfinch	*Carduelis tristis*	S5B						30	P - Probable	
American Redstart	*Setophaga ruticilla*	S5B					Yes	1	S - Possible	
American Robin	*Turdus migratorius*	S5B						23	CF - Confirmed	
Bald Eagle	*Haliaeetus leucocephalus*	S2N,S4B	SC					1	X - Observed	Immature; flyover.
Baltimore Oriole	*Icterus galbula*	S4B						5	S - Possible	
Bank Swallow	*Riparia riparia*	S4B	THR	THR				25	AE – Confirmed	One pair confirmed within study limits entering and entering excavated nest site on June 4, 2015; additional individuals observed foraging overhead over open areas of landfill site from May to July, 2015.
Barn Swallow	*Hirundo rustica*	S4B	THR	THR				10	X – Observed	Foraging overhead; no nest sites observed within study limits.
Black-capped Chickadee	*Poecile atricapillus*	S5						12	S - Possible	
Blue Jay	*Cyanocitta cristata*	S5						3	S - Possible	
Brown-headed Cowbird	*Molothrus ater*	S4B						8	D - Probable	
Canada Goose	*Branta canadensis*	S5						3	H – Possible	
Carolina Wren	*Thryothorus ludovicianus*	S4						1	S - Possible	
Cedar Waxwing	*Bombycilla cedrorum*	S5B						11	S - Possible	
Chipping Sparrow	*Spizella passerina*	S5B						4	S - Possible	
Cliff Swallow	*Petrochelidon pyrrhonota*	S4B						6	X - Observed	Foraging overhead.
Common Grackle	*Quiscalus quiscula*	S5B						30	CF – Confirmed	
Common Yellowthroat	*Geothlypis trichas*	S5B						13	S - Possible	
Eastern Kingbird	*Tyrannus tyrannus*	S4B						3	S - Possible	
Eastern Meadowlark	*Sturnella magna*	S4B	THR	THR			Yes	1	T - Probable	One singing male observed on June 4, 22, and July 3, 2015 (PC 5). One singing male also heard and observed on May 8, 2015 during other field investigations (PC1) – assumed to be the same individual heard during breeding bird surveys seeking out territory upon arrival on breeding grounds.

Surveys Conducted by: Hannah Maciver		**PROVINCIAL**	**PROVINCIAL**	**FEDERAL**	**FEDERAL**	**FEDERAL**	**PROVINCIAL**	**Total Recorded**	**Highest Recorded Breeding Evidence**	**Comments**
COMMON NAME	***SCIENTIFIC NAME***	***SRANK[1]***	***SARO (Endangered Species Act, 2007)[2]***	***COSEWIC[3]***	***SARA (Species at Risk Act)[3]***	***SARA Schedule[4]***	***MNR Area Sensitive Species[5]***			
Eastern Phoebe	*Sayornis phoebe*	S5B						4	FY - Confirmed	
European Starling	*Sturnus vulgaris*	SNA						64	CF - Confirmed	
Field Sparrow	*Spizella pusilla*	S4B						29	S - Possible	
Gray Catbird	*Dumetella carolinensis*	S4B						3	S - Possible	
Great Blue Heron	*Ardea herodias*	S4						2	X - Observed	Flyover.
Green Heron	*Butorides virescens*	S4B						2	X – Observed	Flyover.
House Sparrow	*Passer domesticus*	SNA						8	S - Possible	
Indigo Bunting	*Passerina cyanea*	S4B						2	S - Possible	
Killdeer	*Charadrius vociferus*	S5B,S5N						6	A - Probable	
Mallard	*Anas platyrhynchos*	S5						3	H – Possible	
Mourning Dove	*Zenaida macroura*	S5						8	S - Possible	
Northern Cardinal	*Cardinalis cardinalis*	S5						1	S - Possible	
Northern Flicker	*Colaptes auratus*	S4B						1	S - Possible	
Red-winged Blackbird	*Agelaius phoeniceus*	S4						69	CF - Confirmed	
Ring-billed Gull	*Larus delawarensis*	S5B,S4N						32	X - Observed	Flyover and scavenging at active fill area.
Savannah Sparrow	*Passerculus sandwichensis*	S4B					Yes	3	S - Possible	
Song Sparrow	*Melospiza melodia*	S5B						26	S - Possible	
Spotted Sandpiper	*Actitis macularia*	S5						9	A - Probable	
Turkey Vulture	*Cathartes aura*	S5B						54	X – Observed	Flyover and scavenging at active fill area.
Warbling Vireo	*Vireo gilvus*	S5B						6	S - Possible	
Wild Turkey	*Meleagris gallopavo*	S5						7	FY - Confirmed	
Willow Flycatcher	*Empidonax traillii*	S5B						6	S - Possible	
Yellow Warbler	*Dendroica petechia*	S5B						12	S - Possible	
TOTAL SPECIES:	***43***									

[1]**S-Ranks (provincial)**
Provincial (or Subnational) ranks are used by the Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. These ranks are not legal designations. Provincial ranks are assigned in a manner similar to that described for global ranks, but consider only those factors within the political boundaries of Ontario (Please refer to: http://explorer.natureserve.org/nsranks.htm)

SX — Presumed Extirpated - Species or community is believed to be extirpated from the province. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.
SH — Possibly Extirpated (Historical) - Species or community occurred historically in the province, and there is some possibility that it may be rediscovered. Its presence may not have been verified in the past 20–40 years. A species or community could become SH without such a 20-40 year delay if the only known occurrences in a province were destroyed or if it had been extensively and unsuccessfully looked for. The SH rank is reserved for species or communities for which some effort has been made to relocate occurrences, rather than simply using this status for all elements not known from verified extant occurrences.
S1 — Critically Imperiled - Critically imperiled in the province or state because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the province.
S2 — Imperiled - Imperiled in the province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the province.
S3 — Vulnerable - Vulnerable in the province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
S4 — Apparently Secure - Uncommon but not rare; some cause for long-term concern due to declines or other factors.
S5 — Secure - Common, widespread, and abundant in the province.
SNR — Unranked - Province conservation status not yet assessed.
SU — Unrankable - Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
SNA — Not Applicable - A conservation status rank is not applicable because the species is not a suitable target for conservation activities.
S#S# — Range Rank - A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).
S#? – Inexact or Uncertain - Denotes inexact or uncertain numeric rank.

Breeding Status Qualifiers
B – Breeding Conservation status refers to the breeding population of the species in the nation or state/province.

N – Nonbreeding Conservation status refers to the non-breeding population of the species in the province.
M – Migrant species occurring regularly on migration at particular staging areas or concentration spots where the species might warrant conservation attention. Conservation status refers to the aggregating transient population of the species in the province.

[2]**SARO *Endangered Species Act, 2007***
(provincial status from http://www.ontario.ca/environment-and-energy/how-species-risk-are-listed#section-3)
The provincial review process is implemented by the MNRF's Committee on the Status of Species at Risk in Ontario (COSSARO).

Extinct - A species that no longer exists anywhere.
Extirpated (EXT) - Lives somewhere in the world, and at one time lived in the wild in Ontario, but no longer lives in the wild in Ontario.
Endangered (END) - Lives in the wild in Ontario but is facing imminent extinction or extirpation.
Threatened (THR) - Lives in the wild in Ontario, is not endangered, but is likely to become endangered if steps are not taken to address factors threatening it.
Special concern (SC) - Lives in the wild in Ontario, is not endangered or threatened, but may become threatened or endangered due to a combination of biological characteristics and identified threats.
Not at Risk (NAR) - A species that has been evaluated and found to be not at risk.
Data Deficient (DD) - A species for which there is insufficient information for a provincial status recommendation.

[3]**SARA (Federal *Species at Risk Act*) Status and Schedule (includes COSEWIC Status)**
The Act establishes Schedule 1, as the official list of wildlife species at risk. It classifies those species as being either Extirpated, Endangered, Threatened, or Special Concern. Once listed, the measures to protect and recover a listed wildlife species are implemented.

Extinct - A wildlife species that no longer exists.
Extirpated (EXT) - A wildlife species that no longer exists in the wild in Canada, but exists elsewhere.
Endangered (END) - A wildlife species facing imminent extirpation or extinction.
Threatened (THR) - A wildlife species that is likely to become an endangered if nothing is done to reverse the factors leading to its extirpation or extinction.
Special Concern (SC) - A wildlife species that may become threatened or endangered because of a combination of biological characteristics and identified threats.
Data Deficient (DD) - A category that applies when the available information is insufficient (a) to resolve a wildlife species' eligibility for assessment or (b) to permit an assessment of the wildlife species' risk of extinction.
Not At Risk (NAR) - A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.

[4]**SARA Schedule**
Schedule 1: is the official list of species that are classified as extirpated, endangered, threatened, and of special concern.
Schedule 2: species listed in Schedule 2 are species that had been designated as endangered or threatened, and have yet to be re-assessed by COSEWIC using revised criteria. Once these species have been re-assessed, they may be considered for inclusion in Schedule 1.
Schedule 3: species listed in Schedule 3 are species that had been designated as special concern, and have yet to be re-assessed by COSEWIC using revised criteria. Once these species have been re-assessed, they may be considered for inclusion in Schedule 1.

The Act establishes Schedule 1 as the official list of wildlife species at risk. However, please note that while Schedule 1 lists species that are extirpated, endangered, threatened and of special concern, the prohibitions do not apply to species of special concern. Species that were designated at risk by COSEWIC prior to October 1999 (Schedule 2 & 3) must be reassessed using revised criteria before they can be considered for addition to Schedule 1 of SARA. After they have been assessed, the Governor in Council may on the recommendation of the Minister, decide on whether or not they should be added to the List of Wildlife Species at Risk.

[5]Source: Ontario Ministry of Natural Resources. 2000. *Significant Wildlife Habitat Technical Guide* & Appendices.

Ontario Breeding Bird Atlas 2001-2005 Breeding Evidence Codes

OBSERVED

X Species observed in its breeding season (no breeding evidence).

POSSIBLE

H Species observed in its breeding season in suitable nesting habitat.

S Singing male(s) present, or breeding calls heard, in suitable nesting habitat in breeding season.

PROBABLE

P Pair observed in suitable nesting habitat in nesting season.

T Permanent territory presumed through registration of territorial behaviour (song, etc.) on at least two days, a week or more apart, at the same place.

D Courtship or display, including interaction between a male and a female or two males, including courtship feeding or copulation.

V Visiting probable nest site

A Agitated behaviour or anxiety calls of an adult.

B Brood Patch on adult female or cloacal protuberance on adult male.

N Nest-building or excavation of nest hole.

CONFIRMED

DD Distraction display or injury feigning.

NU Used nest or egg shells found (occupied or laid within the period of the survey).

FY Recently fledged young (nidicolous species) or downy young (nidifugous species), including incapable of sustained flight.

AE Adult leaving or entering nest sites in circumstances indicating occupied nest.

FS Adult carying fecal sac.

CF Adult carying food for young.

NE Nest containing eggs.

NY Nest with young seen or heard.

Appendix C: 300032339 St Marys Landfill Expansion Environmental Assessment

Details of Breeding Bird Surveys Conducted by Burnside Staff

June 4, 2015	**Breeding Bird Survey #1**
Time (24h): 0630-1030	Air Temp (°C): 10-18
Sky Code[1]: 0	Wind Scale[2]: 0-1
June 22, 2015	**Breeding Bird Survey #2**
Time (24h): 06450-1034	Air Temp (°C): 15-23
Sky Code[1]: 1	Wind Scale[2]: 0
July 3, 2015	**Breeding Bird Survey #3**
Time (24h): 0711-1030	Air Temp (°C): 11-18
Sky Code[1]: 0-1	Wind Scale[2]: 0-2

[1] NAAMP/Beaufort Sky Codes: 0=clear (no cloud cover); 1=partly cloudy (scattered or broken) or variable; 2=cloudy or overcast; 3=sandstorm, duststorm or blowing snow; 4=fog, smoke, thick dust, or haze; 5=drizzle or light rain; 6=rain; 7=snow or snow/rain mix; 8=showers; 9=thunderstorms.

[2] Beaufort Wind Scale: 0=calm, smoke rises vertically (0-2 km/hr); 1=light air movement, smoke drifts (3-5); 2=slight breeze, wind felt on face; leaves rustle (6-11); 3=gentle breeze, leaves & twigs in constant motion (12-19); 4=moderate breeze, small branches moving, raises dust & loose paper (20 to 30); 5=fresh breeze, small trees begin to sway (31-39); 6=strong breeze, large branches in motion (40 to 50).

Photo 1: Eastern Meadowlark Point Count Station 1
June 4, 2015

Photo 2: Eastern Meadowlark Point Count Station 2
June 4, 2015

Photo 3: Eastern Meadowlark Point Count Station 3
June 4, 2015

Photo 4: Eastern Meadowlark Point Count Station 4
June 4, 2015

Photo 5: Eastern Meadowlark Point Count Station 5
June 4, 2015

Photo 6: Eastern Meadowlark Point Count Station 6
June 4, 2015

BURNSIDE

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Appendix D

Amphibian Breeding Call Surveys

Amphibian Data Form

Return by 31 July to Aquatic Surveys Officer, Bird Studies Canada, P.O. Box 160, Port Rowan, Ontario, Canada, N0E 1M0
Please write legibly (in pen).

Observer: Chris Pfohl / Devin Soeting	
Route name: St. Marys Landfill	

Date (dd-mm-yr): 30-04-14	Visit No. 1	
Start time (24 hr clock): 2030	Finish time (24 hr clock): 2130	
Beaufort Wind Scale No.: 1	Cloud Cover (10ths): 10/10ths	Air Temp (°C or °F): 8
Precipitation (check one): None/dry:____ Damp/Haze/Fog: ✓ Drizzle:____ Rain:____		
Has the habitat on your route changed from previous years: Yes:____ No: ✓ Not applicable:____		
Remarks: Previous rain event, first time on-site		

CALL LEVEL CODES
Code 1: Calls not simultaneous, number of individuals can be accurately **counted**
Code 2: Some calls simultaneous, number of individuals can be reliably **estimated**
Code 3: Full chorus, calls continuous and overlapping, number of individuals cannot be reliably estimated

Amphibian Species Codes

Species	Code
American Toad	AMTO
Blanchard's Cricket Frog	BCFR
Bullfrog	BULL
Chorus Frog	CHFR
Cope's Gray Treefrog	CGTR
Fowler's Toad	FOTO
Gray Treefrog	GRTR
Green Frog	GRFR
Mink Frog	MIFR
Northern Leopard Frog	NLFR
Pickerel Frog	PIFR
Spring Peeper	SPPE
Wood Frog	WOFR

24 Hour Time

12 Hour	*24 Hour*
1:00 PM	1300
2:00 PM	1400
3:00 PM	1500
4:00 PM	1600
5:00 PM	1700
6:00 PM	1800
7:00 PM	1900
8:00 PM	2000
9:00 PM	2100
10:00 PM	2200
11:00 PM	2300
12:00 PM	2400

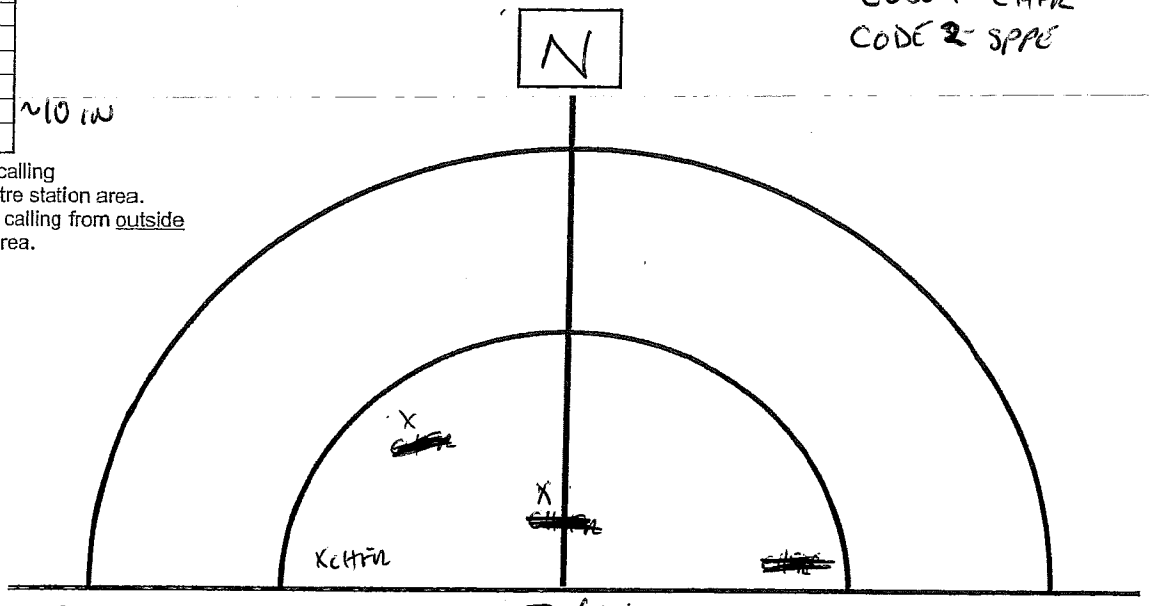
Station A

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR	~~~	
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE	5 ~~~	
WOFR		

~10 IN

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

~~CODE 1 CHFR~~
CODE 2 SPPE



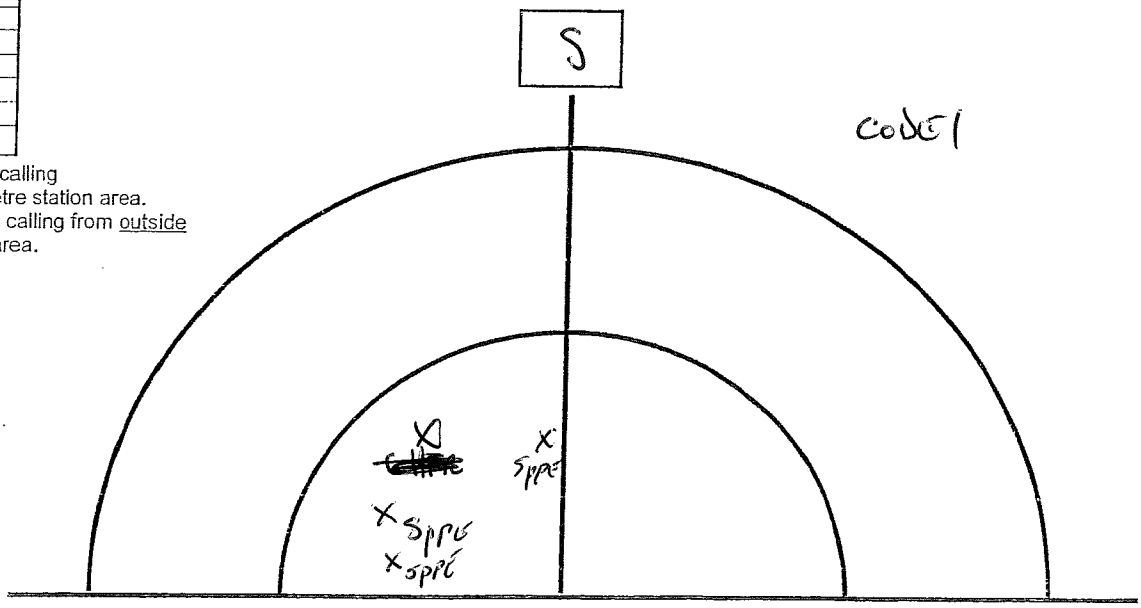
17T 0487611
4787052 6.3m acc.

Station B

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR	~~~	
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE	3	
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

CODE 1



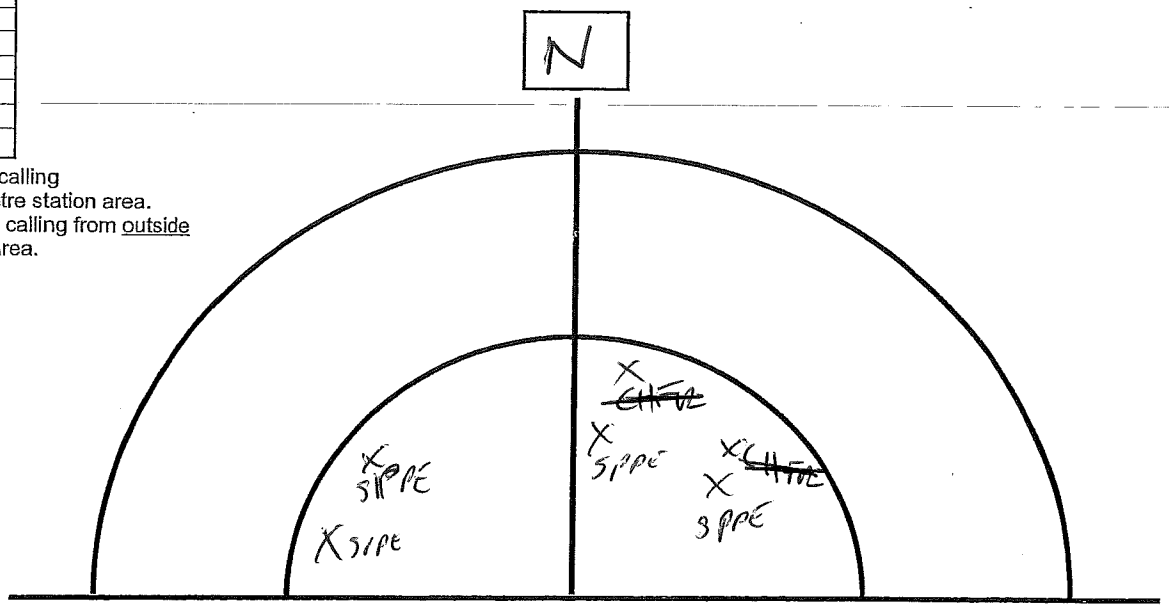
17T 0487578 3.1m acc
4787063

Station C

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR	~~✓~~	
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE	5?0	
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

CODE 2



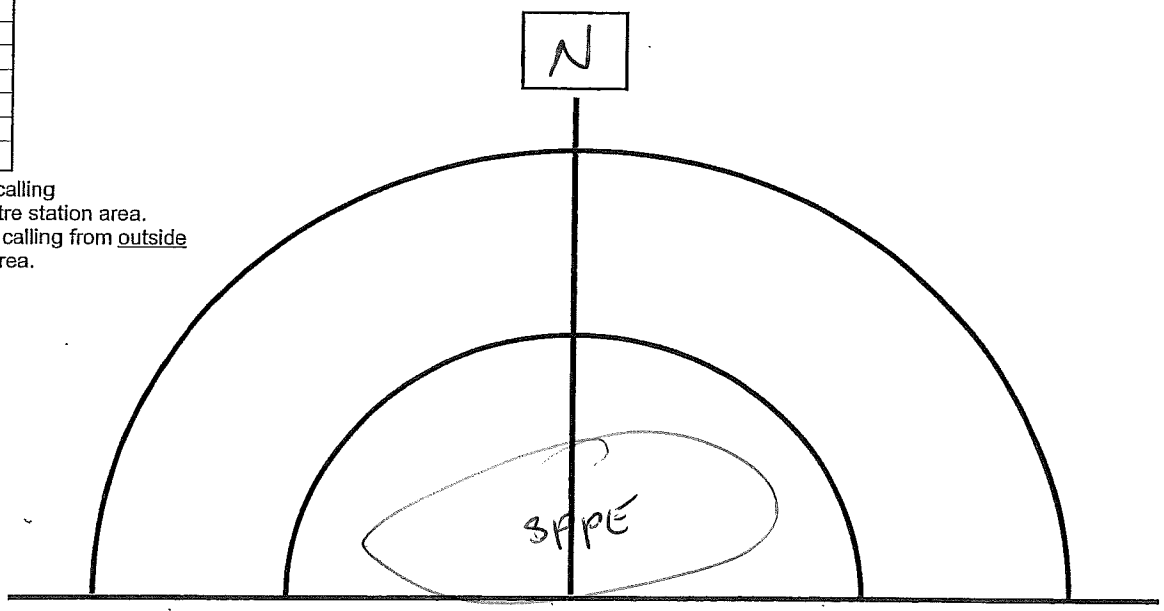
17T 0487436 5.4m Acc.
4787127

Station D

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE	✓	
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

CODE 3



17T 0487385 4.3m Acc.
4787202

Amphibian Data Form

Return by 31 July to Aquatic Surveys Officer, Bird Studies Canada, P.O. Box 160, Port Rowan, Ontario, Canada, N0E 1M0
Please write legibly (in pen).

Observer: Chris Pfohl	
Route name: St. Mary's Landfill	

Date (dd-mm-yr): 20-05-19	Visit No.: 2	
Start time (24 hr clock): 2115	Finish time (24 hr clock): 2215	
Beaufort Wind Scale No.: 3	Cloud Cover (10ths): 10/10ths	Air Temp (°C or °F): 10°C
Precipitation (check one): None/dry:____	Damp/Haze/Fog: ✓	Drizzle:____ Rain:____
Has the habitat on your route changed from previous years: Yes:____	No:____	Not applicable: ✓
Remarks: Previous rain event @ 1800hrs		

CALL LEVEL CODES
Code 1: Calls not simultaneous, number of individuals can be accurately **counted**
Code 2: Some calls simultaneous, number of individuals can be reliably **estimated**
Code 3: Full chorus, calls continuous and overlapping, number of individuals cannot be reliably estimated

Amphibian Species Codes

Species	Code
American Toad	AMTO
Blanchard's Cricket Frog	BCFR
Bullfrog	BULL
Chorus Frog	CHFR
Cope's Gray Treefrog	CGTR
Fowler's Toad	FOTO
Gray Treefrog	GRTR
Green Frog	GRFR
Mink Frog	MIFR
Northern Leopard Frog	NLFR
Pickerel Frog	PIFR
Spring Peeper	SPPE
Wood Frog	WOFR

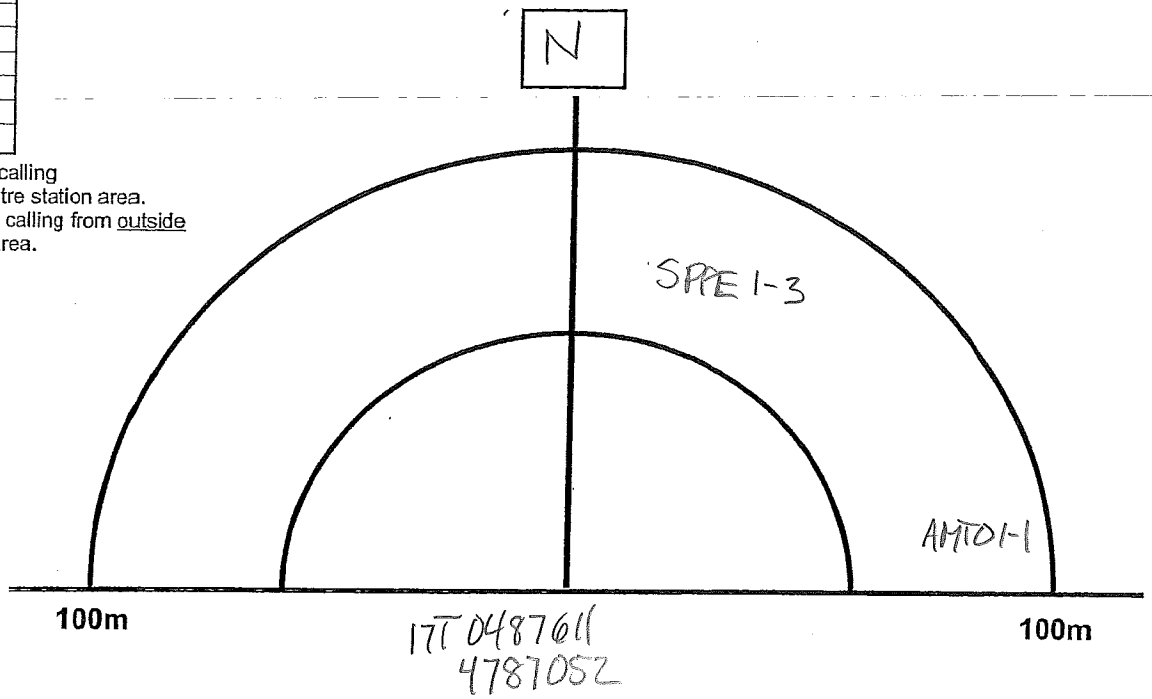
24 Hour Time

12 Hour	*24 Hour*
1:00 PM	1300
2:00 PM	1400
3:00 PM	1500
4:00 PM	1600
5:00 PM	1700
6:00 PM	1800
7:00 PM	1900
8:00 PM	2000
9:00 PM	2100
10:00 PM	2200
11:00 PM	2300
12:00 PM	2400

Station A

Species	In*	Out**
AMTO	✓	
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE	✓	
WOFR		

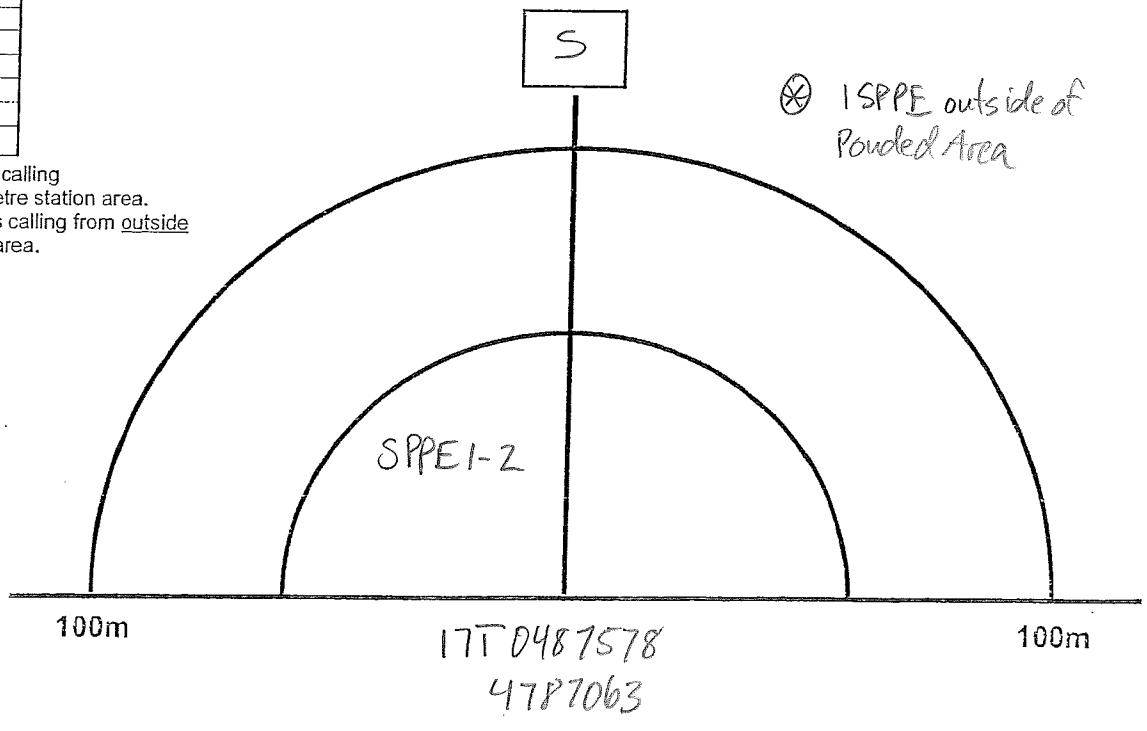
* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.



Station B

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE	✓	
WOFR		

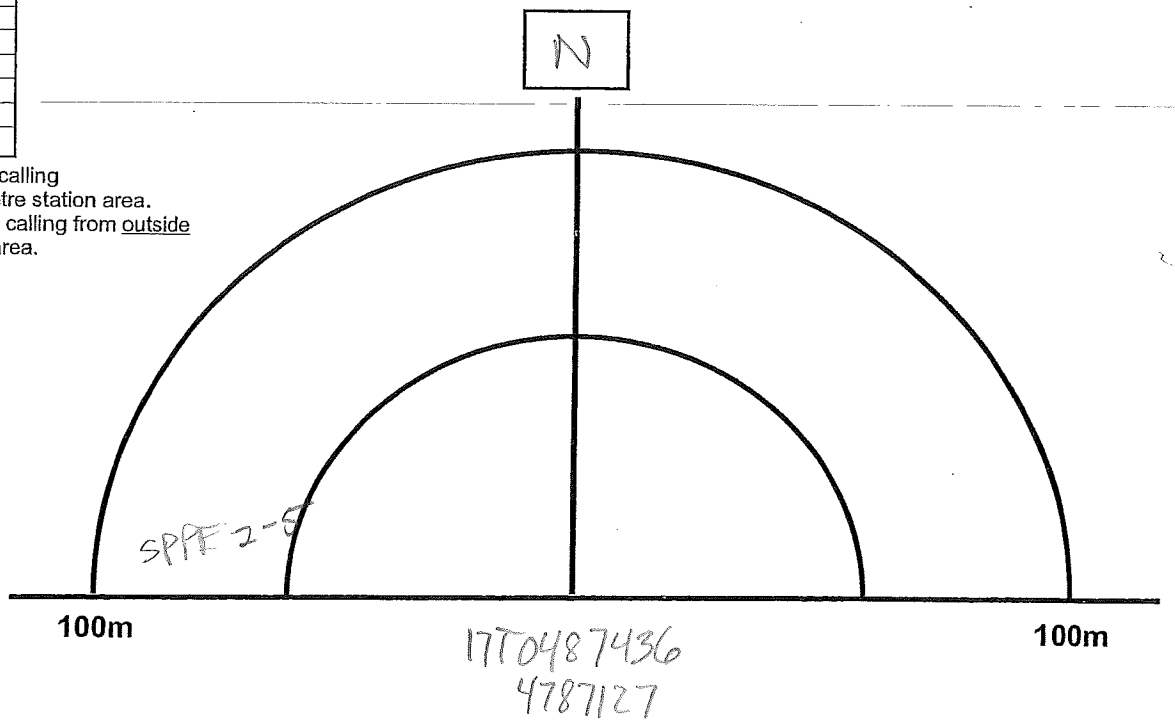
* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.



Station C

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE	✓	
WOFR		

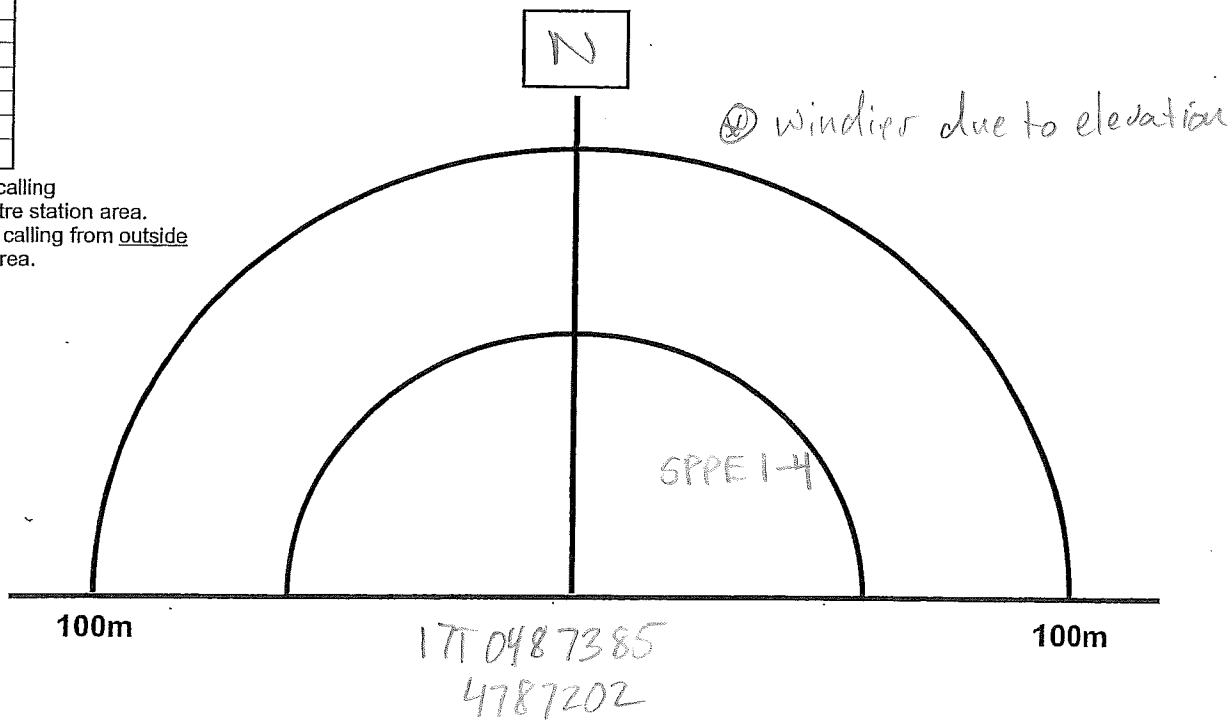
* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.



Station D

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE	✓	
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.



Amphibian Data Form

Return by 31 July to Aquatic Surveys Officer, Bird Studies Canada, P.O. Box 160, Port Rowan, Ontario, Canada, N0E 1M0
Please write legibly (in pen).

Observer:	Chris Pfahl
Route name:	St. Mary's Landfill

Date (dd-mm-yr): 24/06/14	Visit No.: 3	
Start time (24 hr clock): 2115	Finish time (24 hr clock): 2215	
Beaufort Wind Scale No.: 2	Cloud Cover (10ths): 10/10th	Air Temp (°C or °F): 20°C
Precipitation (check one): None/dry:____	Damp/Haze/Fog: ✓	Drizzle:____ Rain:____
Has the habitat on your route changed from previous years: Yes:____	No:____	Not applicable:____
Remarks: Humid, previous rain event		

CALL LEVEL CODES
Code 1: Calls not simultaneous, number of individuals can be accurately **counted**
Code 2: Some calls simultaneous, number of individuals can be reliably **estimated**
Code 3: Full chorus, calls continuous and overlapping, number of individuals cannot be reliably estimated

Amphibian Species Codes

Species	Code
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Bullfrog	BULL
Chorus Frog	CHFR
Cope's Gray Treefrog	CGTR
Fowler's Toad	FOTO
Gray Treefrog	GRTR
Green Frog	GRFR
Mink Frog	MIFR
Northern Leopard Frog	NLFR
Pickerel Frog	PIFR
Spring Peeper	SPPE
Wood Frog	WOFR

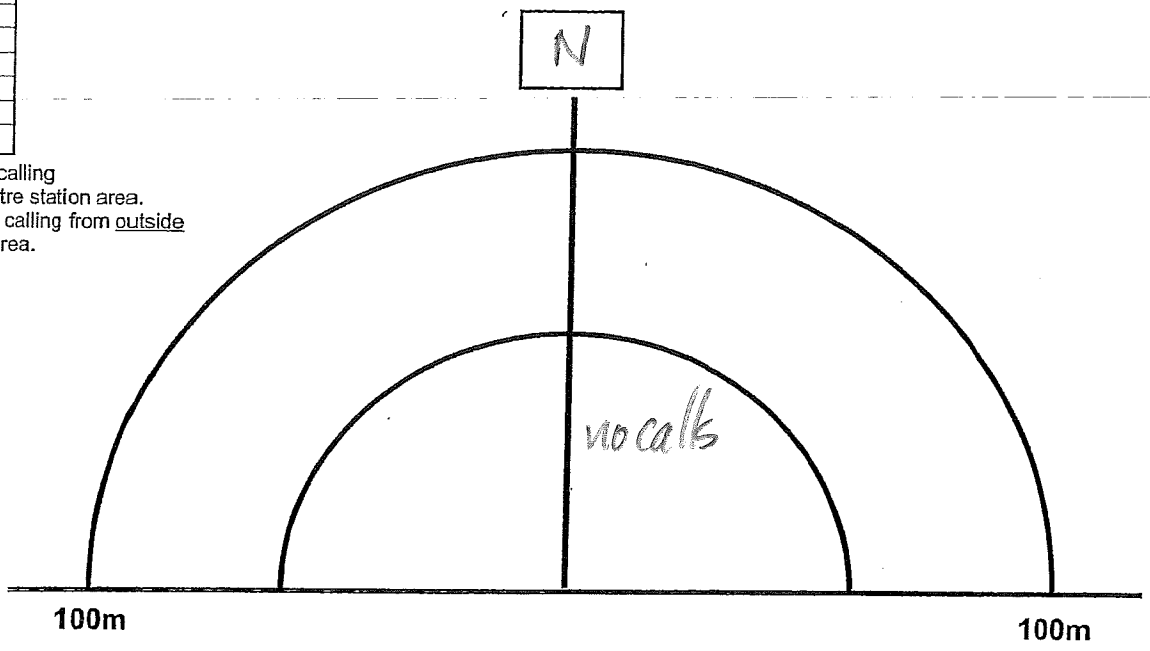
24 Hour Time

12 Hour	*24 Hour*
1:00 PM	1300
2:00 PM	1400
3:00 PM	1500
4:00 PM	1600
5:00 PM	1700
6:00 PM	1800
7:00 PM	1900
8:00 PM	2000
9:00 PM	2100
10:00 PM	2200
11:00 PM	2300
12:00 PM	2400

Station A

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

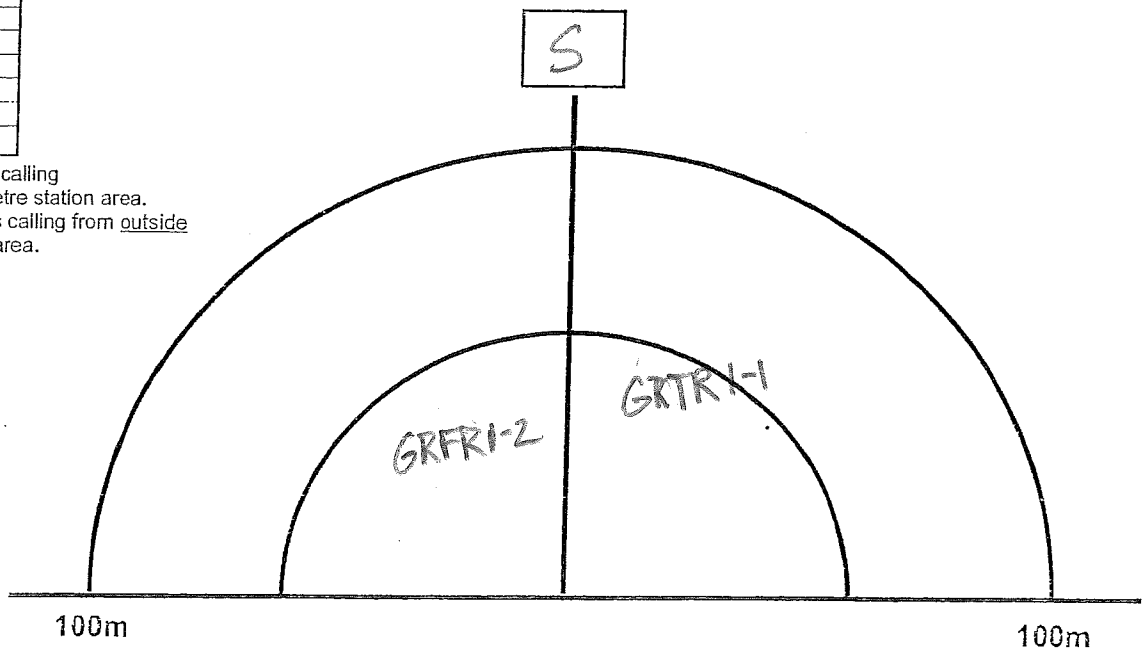
* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.



Station B

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR	✓	
GRFR	✓	
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

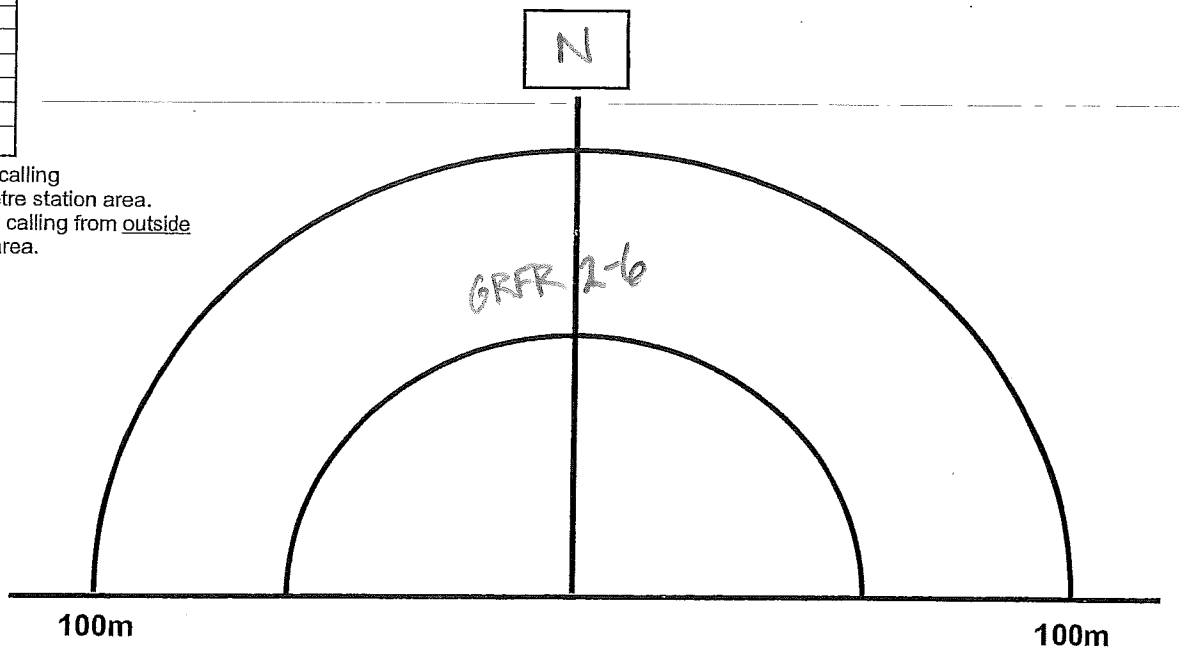
* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.



Station C

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR	✓	
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

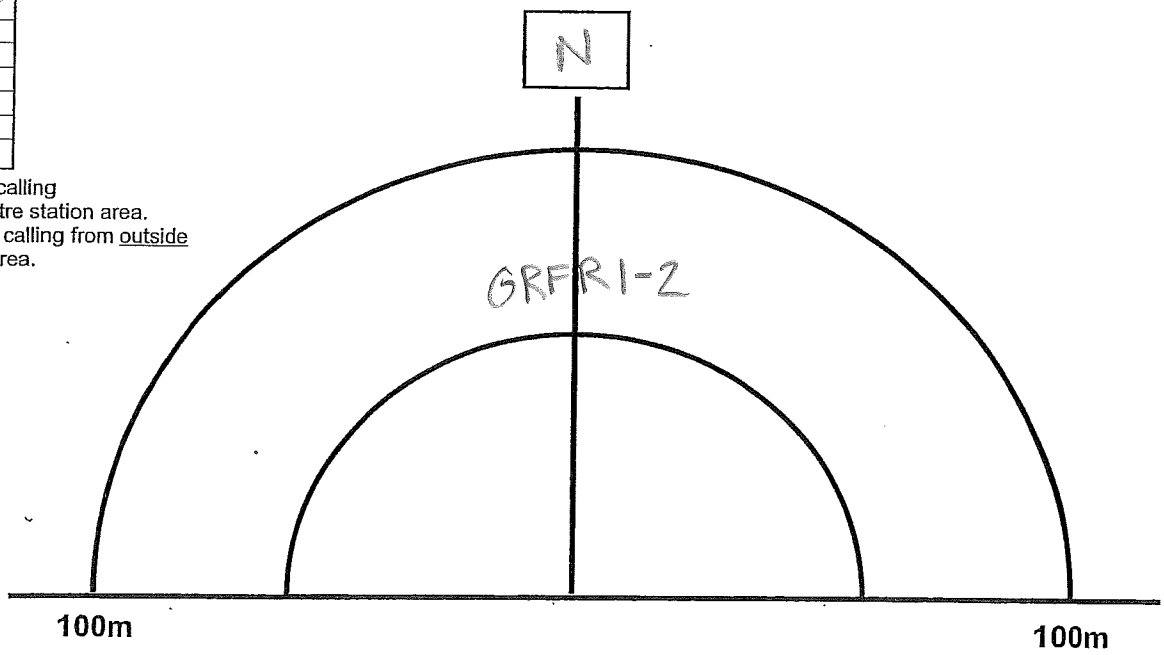
* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.



Station D

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR	✓	✓
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.



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Appendix E

Wildlife Scientific Collection Permit and Snake Survey Photos

Ministry of Natural Resources and Forestry

Guelph District
1 Stone Road West
Guelph, Ontario
N1G 4Y2

Ministère des ressources naturelles et des forêts

Telephone: (519) 826-4955
Facsimile: (519) 826-4929

Ontario

June 11, 2015

Ms. Hannah Maciver
R.J. Burnside & Associates Limited
292 Speedvale Avenue West, Unit 20
Guelph, ON N1H 1C4

RE: Wildlife Scientific Collectors Authorization #1080066

Dear Ms. Maciver,

As requested, I am sending a Wildlife Scientific Collectors Authorization. This authorization is valid until September 1, 2015. Please ensure you and your assistants read and adhere to all condition within this agreement including the Schedule A. Kindly return the signed license and Schedule A to me by fax, email, or mail prior to commencement of any work. You are expected to have this documentation with you when you are in the areas indicated with your application.

If you have any questions please don't hesitate to contact Kathy Richardson at 905-562-1177

Sincerely,

Gina Artuso
Ministry of Natural Resources
A/Resources Clerk
519 826-4933
Email; gina.artuso@ontario.ca

encl

Ontario

Ministry of Natural Resources

Ministère des Richesses naturelles

Wildlife Scientific Collector's Authorization
Autorisation pour faire la collecte scientifique d'animaux sauvages

AuthorizationNo. / N° d'autorisation	Local Reference No. / N° de référence local	Issuer Account No. / N° de compte du délivreur de permis
1080066	7200	10002401

This authorization is issued under Section 39 of the Fish and Wildlife Conservation Act, 1997 to:
Cette autorisation est délivrée en vertu de l'article 39 de la Loi sur la protection du poisson et de la faune de 1997 à:

Name of Authorization holder / *Nom du titulaire de l'autorisation*	Last Name / Nom de famille	First Name / Prénom	Middle Name / Second Prénom
	Ms. MACIVER	HANNAH	

Name of Business/Organization/Affiliation (if applicable)
Nom de l'entreprise/de l'organisme/de l'affiliation (le cas échéant)

R.J. BURNSIDE and ASSOCIATES LIMITED

Mailing address of Authorization holder / *Adresse postale du titulaire de l'autorisation*	Street Name & No./PO Box/RR#/Gen. Del./ N° rue/C.P./R.R./poste restante		
	292 SPEEDVALE AVENUE		
	City/Town/Municipality / Ville/village/municipalité	Province/State / Province/État	Postal Code/Zip Code / Code Postal/Zip
	GUELPH	ON	N1H 1C4

This authorization permits the above-named person to:
Cette autorisation permet à la personne nommée ci-haut de:

☐ **Capture wildlife of the species and sex, in the numbers, and in the area set out be below.**
Capturer les espèces d'animaux sauvages selon le nombre et le sexe indiqués ci-dessous dans les lieux indiqués ci-dessous

and/or / et/ou

☐ Keep game wildlife or specially protected wildlife in captivity for the purposes of education or science.
Garder des animaux sauvages spécialement protégés et du gibier sauvage en captivité à des fins éducatives et scientifiques

☒ Release the captured wildlife in the area of capture, if the captured wildlife is not to be removed from that area
Remettre en liberté les animaux sauvages capturés dans la zone de capture si les animaux captures ne doivent pas être enlevés de cette zone

OR / OU

☐ **Capture and kill wildlife of the species and sex, in the numbers, and in the area set out be below.**
Capturer et tuer les espèces d'animaux sauvages selon le nombre et le sexe indiqués ci-dessous dans les lieux indiqués ci-dessous

Species / Especés	Sex / Sexe	Numbers / Nombre	Location / Endroit
Eastern Milksnake			Town of St. Marys landfill site
Dekay's Brown Snake			Town of St. Marys landfill site
Eastern Gartersnake			Town of St. Marys landfill site
Red-bellied Snake			Town of St. Marys landfill site

Yes/Oui

☐ Additional list attached / Liste additionnelle ci-jointe

Authorization Dates / *Dates d'autorisation*	Effective Date / Date d'entrée en vigueur (YYYY-MM-DD)	Expiry Date / Date d'expiration (YYYY-MM-DD)
	2015-06-11	2015-09-01

Authorization conditions / **Conditions de l'autorisation**

This authorization is subject to the conditions contained in Schedule A if included./Cette autorisation doit respecter les conditions de l'annexe A si celle-ci est jointe.

Yes/Oui	No/Non	
☒	☐	Schedule A included. / Annexe A ci-jointe

Authorized by (please print) / Autorisé par (veuillez écrire en caractères d'imprimerie)	Signature of Authorizer / Signature de la personne chargée d'autoriser	Date of Issue/Date de délivrance (YYYY-MM-DD)
IAN THORNTON, Resource Operations Supervisor		2015-06-11

Signature of Authorization holder / Signature du titulaire de l'autorisation	Date (YYYY-MM-DD)
Hanna Maciver	2015-06-11

Personal information contained on this form is collected under the authority of the Fish and Wildlife Conservation Act, 1997 and will be used for the purpose of licencing, identification, enforcement, resource management and customer service surveys. Please direct further inquiries to the District Manager of the MNR issuing district.

Les renseignements personnels dans ce formulaire sont recueillis conformément à la Loi sur la protection du poisson de la faune, 1997, et ils seront utilisés aux fins de délivrance de permis, d'identification, d'application des règlements, de gestion des ressources et de sondage sur les services a la clientèle. Veuillez communiquer avec le chef du district du MRN qui délivré le permis si vous avez des questions.

Wildlife Scientific Collector's Authorization
Autorisation pour faire la collecte scientifique d'animaux sauvages
Schedule A – Authorization conditions
Annexe A - Conditions de l'autorisation

Authorization No 1080066

This authorization is subject to the conditions listed below.

1. This authorization is valid only for the persons, species, numbers, areas and calendar year indicated. A written report covering the operation of the preceding year must be submitted to the authorization issuer within 30 days of the termination date, but in no case later than January 31 next following the year of issue. The report shall contain a statement outlining the objectives of the operations, the methods used, the number and species of wildlife caught and their fate as well as a map indicating where the collections took place. An analysis is not required. The submission of a satisfactory report is a prerequisite to any subsequent renewals.
2. Before carrying out any operation under the authorization in any area the authorized person shall inform the Area Supervisor of his or her intentions at least a week before commencing work and include information as to the type of operation, location, duration, and the name or names of personnel involved. The forgoing does not apply to the collection of road killed specimens of a type indicated on the authorization.
3. When possible, all wildlife captured under this authorization shall be released alive in the area of capture. When further examination of the animal is necessary in the laboratory permission must be obtained as part of this authorization under section 40(2)(c) of the Fish and Wildlife Conservation Act. Where furbearing mammals are collected the authorized person must contact the issuing office and make arrangements to pay the royalty. Dead animals which are no longer required must be cremated or buried. The authorized person will inform the issuer of any burial site. Any animal suspected of being infected with a communicable disease shall be incinerated in a facility approved under the Environmental Protection Act for that purpose.
4. A copy of the original authorization must be carried by the authorized person when working at the designated sites. An assistant of the authorized person who is carrying out activities under this authorization during the absence of the authorized person shall carry a copy of the authorization on his or her person.
5. All collection gear shall be clearly marked with the authorized person's name and the organization's name.
6. This authorization is not valid in Provincial Parks, park reserves, National Parks, Conservation Areas, Crown game preserves or sanctuaries established under the Migratory Birds Convention Act without written permission from the authorized person in charge of the area concerned.
7. Capture gear shall be inspected regularly and live holding traps must be inspected at least once daily.
7b) Gear to be used: 1m x 1m wooden cover boards for snake present/absence surveys – approx.. 30 boards.
8. This authorization does not allow access to any property without permission of the landowner.
9. Sections 5 and 6 of the Fish and Wildlife Conservation Act 1997, and the provisions of the regulations relating to open seasons and bag limits do not apply to a person capturing or killing wildlife under this authorization.
10. **Assistants covered under this agreement are: Tricia Radburn, Kevin Butt, Ashley Gallagher, Chris Pfohl, and Devin Soeting.**
11. Non-native reptiles and amphibians that are collected must not be released.
12. The capture of any threatened or endangered species must be reported immediately to the Ministry of Natural Resources (Graham Buck at 519 826-4505, or Art Timmerman at 519 826-4935).

d'autorisation. 1080066

Cette autorisation doit se conformer aux conditions ci-dessous.
1. Cette autorisation n'est valide que pour les personnes, espèces, nombres, zones et année civile indiqués. Un rapport écrit portant sur les activités de l'année précédente doit être soumis au délivreur de l'autorisation dans les 30 jours suivant la date d'expiration et jamais plus tard que le 31 janvier qui suit la date de délivrance. Le rapport devra comprendre une déclaration décrivant les objectifs des activités, les méthodes utilisées, le nombre et les espèces d'animaux sauvages capturés et leur destination finale ainsi qu'une carte montrant l'emplacement des collectes. Une analyse n'est pas requise. La présentation d'un rapport satisfaisant est une condition préalable pour obtenir un renouvellement de l'autorisation.
2. Avant de réaliser toute activité visée par l'autorisation dans toute zone, la personne autorisée doit aviser le superviseur de la zone de ses intentions au moins une semaine avant de commencer ses activités et il doit fournir des renseignements sur le type d'activité, l'emplacement, la durée et le nom de toutes les personnes impliquées. Cette condition ne s'applique pas à la collecte de spécimens tués sur la route s'il s'agit d'une espèce mentionnée dans l'autorisation.
3. Lorsque cela est possible, tous les animaux sauvages capturés en vertu de cette autorisation doivent être remis en liberté dans la zone de capture. Lorsqu'un examen ultérieur d'un animal dans un laboratoire est nécessaire, il faut obtenir une permission à cet effet dans le cadre de cette autorisation, conformément à l'alinéa 40(2)(c) de la Loi sur la protection du poisson et de la faune. Lorsque des mammifères à fourrure sont récoltés, la personne autorisée doit communiquer avec le bureau qui délivre l'autorisation et prendre des dispositions pour payer les redevances afférentes. Les animaux morts qui ne sont plus utiles doivent être incinérés ou enterrés. La personne autorisée avisera le délivreur de l'autorisation de tout lieu d'enterrement. Tout animal qui pourrait avoir été infecté d'une maladie transmissible devra être incinéré dans une installation approuvée à cette fin, conformément à la Loi sur la protection de 'environnement.
4. Le titulaire de l'autorisation doit avoir en sa possession un exemplaire de l'autorisation originale lorsqu'il travaille dans les endroits désignés. Si un adjoint du titulaire de l'autorisation réalise des activités visées par l'autorisation en l'absence du titulaire de l'autorisation, il devra avoir un exemplaire de l'autorisation en sa possession.
5. Tout le matériel de collecte doit indiquer bien clairement le nom du titulaire de l'autorisation et de son organisme.
6. Cette autorisation n'est pas valide dans les parcs provinciaux, les réserves de parcs, les parcs nationaux, les zones de protection de la nature, les réserves de chasse de la Couronne et les réserves naturelles établies en vertu de la Loi sur la Convention concernant les oiseaux migrateurs sans la permission écrite de la personne autorisée qui est responsable de la zone en question.
7. Tout le matériel de collecte doit être inspecté régulièrement et les viviers doivent être inspectés au moins une fois par jour.
8. Cette autorisation ne permet pas au titulaire d'avoir accès à une propriété privée sans la permission du propriétaire foncier.
9. Les articles 5 et 6 de la Loi sur la protection du poisson et de la faune de 1997 et les dispositions des règlements se rapportant aux saisons de chasse et aux limites de prise ne s'appliquent pas à la personne qui capture ou tue des animaux sauvages en vertu de cette autorisation.

Signature of authorization holder / Signature du titulaire de l'autorisation **Date**

Daniel Lacivell 2015-06-11

Photo 1: Snake Coverboard Placement - Unit 1 (S1-S4)
May 8, 2015

hoto 2: Snake Coverboard Placement - Unit 2 (S5-S8)
May 8, 2015

Photo 3: Snake Coverboard Placement - Unit 3 (S9-S13)
May 8, 2015

Photo 4: Snake Coverboard Placement - Unit 4 (S14-S17)
May 8, 2015

Photo 5: Snake Coverboard Placement - Unit 5 (S18-S21)
May 8, 2015

Photo 6: Snake Coverboard Placement - Unit 6 (S22-S24)
May 8, 2015

Photo 7: Snake Coverboard Placement - Unit 7 (S25-S27)
May 8, 2015

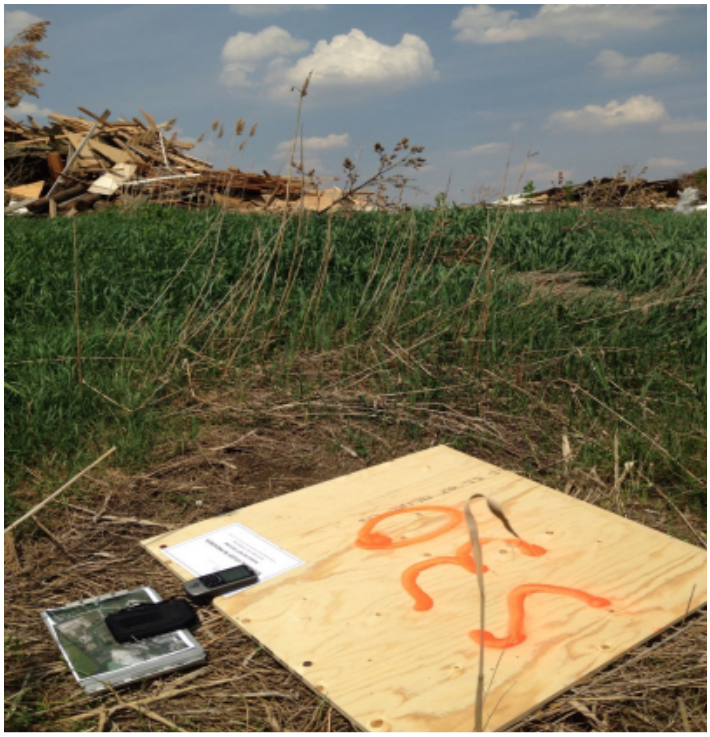

Photo 8: Snake Coverboard Placement - Unit 8 (S28-S30)
May 8, 2015

Photo 9: Cover Material Where Eastern Milksnake Observed at Unit 8
June 4, 2015

Photo 10: Eastern Milksnake Under Woody Debris at Unit 8
June 4, 2015

Photo 11: Eastern Gartersnake Under Coverboard Material
June 4, 2015

Photo 12: Dekay's Brownsnake Under Coverboard Material
July 3, 2015

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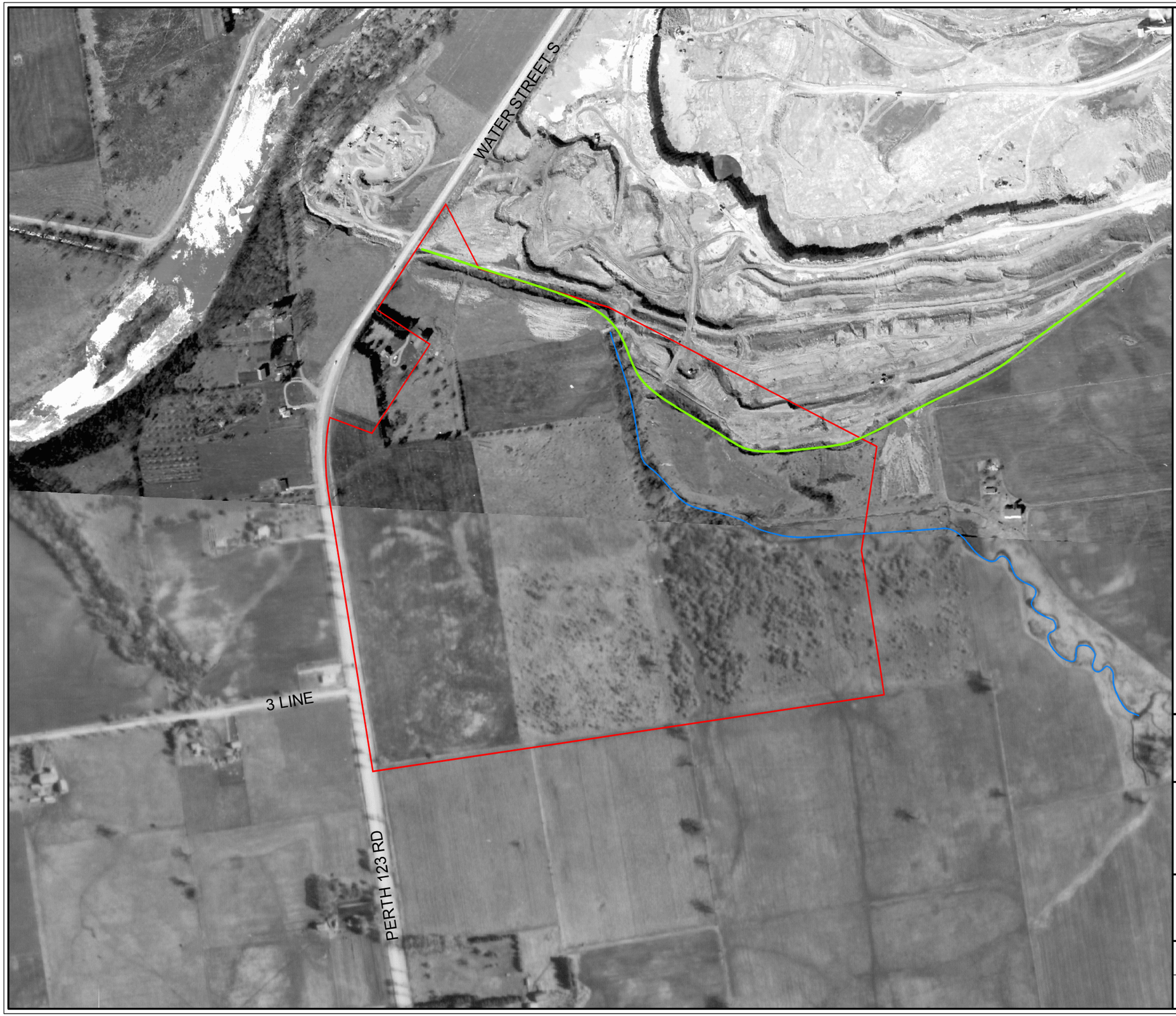
Appendix F

Aquatic Assessment Survey Notes and Photos, and Historic Aerial Photos



LEGEND

- PROPERTY BOUNDARY
- SOUTHERN EXTENT OF QUARRYING
- WATERCOURSE

Sources:
1. 1963 airphoto obtained from National Airphoto Library

N

0 50 100 200 300 400

Metres

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Client / Report

TOWN OF ST MARYS

ENVIRONMENTAL ASSESSMENT
HYDROGEOLOGICAL STUDY

Figure Title

1963 AIR PHOTO

Drawn	Checked	Date	Figure No.
SK	CM	March 2016	**A-2**
Scale		Project No.	
1:5,000		300032339	

File Name: 032339 2016 EA HG STUDY APPENDIX A.dwg Date Plotted: February 25, 2016 - 7:10 PM

LEGEND

- PROPERTY BOUNDARY
- FORMER WATERCOURSE
- NEW WATERCOURSE

Sources:

1. 1978 airphoto obtained from National Airphoto Library

N

0 50 100 200 300 400

Metres

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Client / Report

TOWN OF ST MARYS

Figure Title

1978 AIR PHOTO

Drawn	Checked	Date	Figure No.
SK	CM	March 2016	
Scale		Project No.	
1:5,000		300032339	

File Name: 032339 2016 EA HG STUDY APPENDIX A.dwg Date Plotted: February 25, 2016 - 7:09 PM

GENERAL INFORMATION

PROJECT #:	PROJECT DESCRIPTION:	DAY:	MONTH:	YEAR:
300032389	ST. MARYS LANDFILL	30	APRIL	2014

Is STREAM REALIGNMENT required for this section:

Yes No (Unknown)

COLLECTORS:	WEATHER CONDITIONS:	TIME STARTED:	TIME FINISHED:
DEVIN S. CHRIS D.	OVERCAST/RAIN 8°C	13:10	14:50

PHOTOS NUMBERS AND DESCRIPTIONS:

LOCATION

NAME OF WATERBODY:	DRAINAGE SYSTEM:	CROSSING #:	STATION #:
UNNAMED TRIBUTARY OF THE THAMES	THAMES		

LOCATION OF CROSSING:

ST. MARYS LANDFILL SITE

UTM EASTING & NORTHING:	MTO CHAINAGE:
17T 487803 mE, 4787159 N	
TOWNSHIP: PERTH SOUTH	**MNR DISTRICT:** Guelph

LAND USE AND POLLUTION

SURROUNDING LAND USE:	SOURCES OF POLLUTION:
LANDFILL & QUARRY	LANDFILL ACTIVITIES / LEACHATE, Agriculture upstream, ST. MARYS CEMENT FILL / STOCKPILES

EXISTING STRUCTURE TYPE

Bridge	Box Culvert	Open Foot Culvert	CSP	N/A

Other Describe: @ END OF SITE = CONCRETE PIPE Size (w x h) m2 ~1.6m DIA.

SECTION TYPE AND MORPHOLOGY

SECTION IDENTIFIER:	SECTION LOCATION: (include on habitat map)
1	Approx. 80m west of Quarry property

TYPE:	Stream / river	Channelized	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:
	✓		✓			

TOTAL SECTION LENGTH (m):	CURRENT VELOCITY (m/s):
20	0.5 m/s

SUB-SECTION(S)	Run	Pool	Riffle	Flats	Inside culvert	Other
Percentage of area	100%					
mean depth wetted (m)	~0.6m					
mean width wetted (m)	~2.3 m					
Mean bankfull width (m)	~2.5m					
Mean bankfull depth(m)	~0.8					
Substrate	N/A silty by edge					

Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Si	Clay Cl	Muck Mu	Detritus D

* High water at this time - hard to determine substrate

BANK STABILITY

	Stable	Slightly Unstable	Moderately Unstable	Unstable
Left Upstream Bank	✓			
Right Upstream Bank	✓			

HABITAT

IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Large Woody Debris	Organic debris	Vascular plants	None
				Instream ✓ 5-10 %	15%	Instream	✓
				Overhanging 10%		Overhanging	

SHORE COVER (% stream shaded):	100 – 90 %	90 – 60%	60- 30%	30 – 1%	None
				~20%	

VEGETATION TYPE (%):	Submergent	Floating	Emergent	None
			30-40%	
Predominant Species			CAT-TAIL / REED CANARY GRASS	

MIGRATORY OBSTRUCTIONS:	None	Seasonal ✓ - VEGETATION	Permanent
POTENTIAL CRITICAL HABITAT LIMITING:	Spawning	Evidence of Groundwater	Other

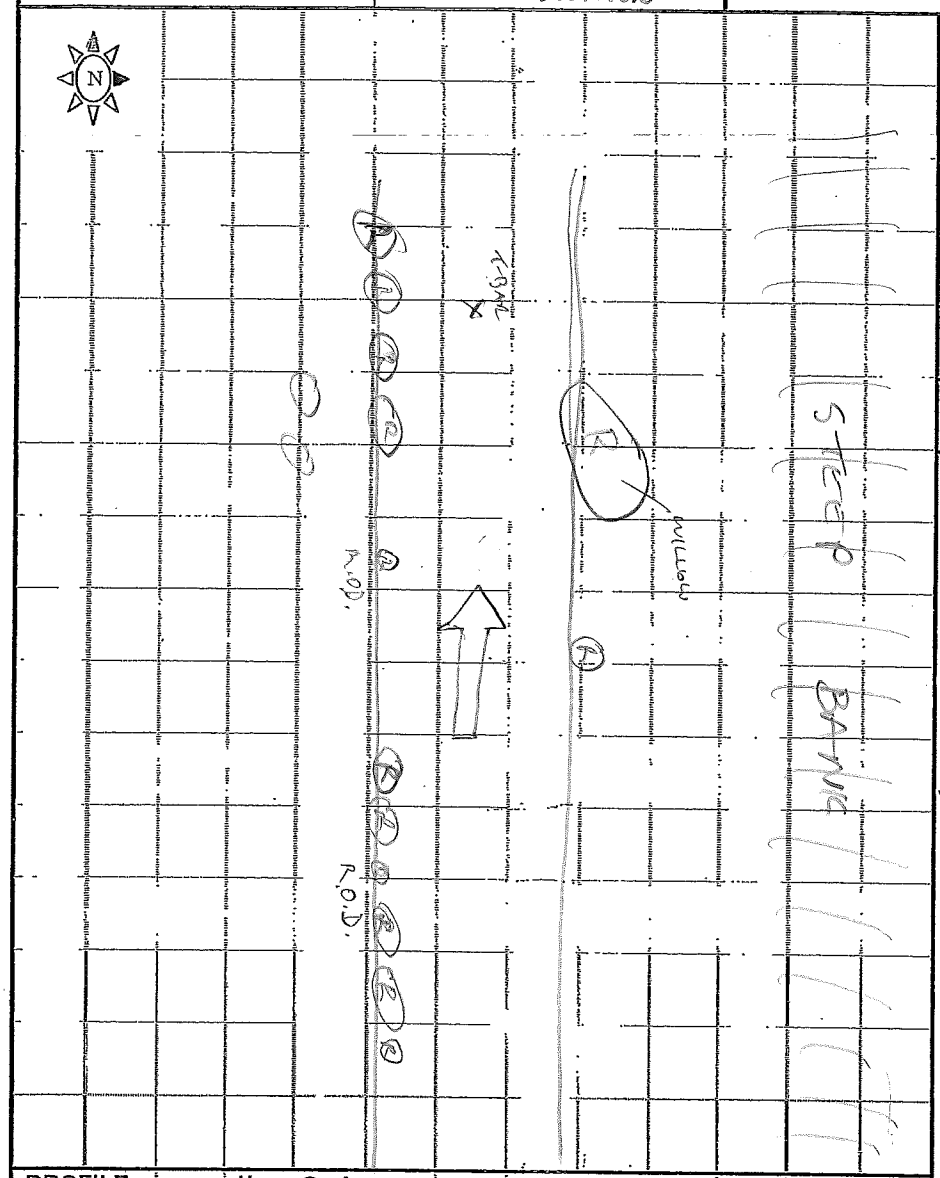
POTENTIAL ENHANCEMENT OPPORTUNITIES:

COMMENTS :

HIGH WATER DURING THIS VISIT
VISIBILITY LOW IN STREAM
- APPEARS TO BE ~~HIGH GRADE~~ / ACTIVELY ERODING IN SOME PORTIONS - ESPECIALLY BANKS
- NO FISH OBSERVED, BUT POTENTIAL HABITAT EXISTS

Additional Notes Appended? (No) Yes number of pages _____

SECTION IDENTIFIER:	SECTION LOCATION:	SECTION LENGTH (m):	SCALE (cm / m):
1	~80 m west of QUARRY LOCATION	20m	



PROFILE: Horz. Scale Vert. Scale

PROJECT #: 300032339

MAPPER: Devin S.

NAME OF WATERBODY: UNNAMED TRIBUTARY OF THE THAMES

CROSSING #:

STATION #:

DATE: DD-MMM-YY 30-APR-14

LEGEND

10d depth (cm)
6w width

➡ Riffle
⇨ Run/Glide
◯ Pool
▥ Island/Bar

▒ Fine Substrate
Gravel Substrate
oOooO Cobble /Boulder
*** Debris

CT Cattail
SV/FV Submerg/Float Veg

EV Emergent Vegetation
W Watercress

Fe Iron Staining
/////// Eroded Bank

XXX Riprap / Other Stabilization

◯ Instream Log/Tree
^^^ Dam/Weir/Obstruction

® Riparian Tree

├► Seep/Spring
-------- Undercut Bank

— Barrier to Fish Movement
-S- Seasonal Barrier

-x--x- Fence line
└┘ Culvert

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Appendix G

Site Photos

Photo 1: Confirmed Eastern Meadowlark Nesting Habitat
June 4, 2015

Photo 2: View of Active Landfill and Surrounding Vegetation within Inactive Portion of Landfill
June 4, 2015

Photo 3: Leaf and Yard Waste Composting Site – Topsoil Stockpile
Location of Bank Swallow Nesting Attempt
June 4, 2015

Photo 4: Possible Bank Swallow Nest Excavation Attempt at Spoilpile
Typical Compact Soil Conditions at Landfill
July 3, 2015

Photo 5: Typical Compact Soil Conditions at Landfill
July 3, 2015

Photo 6: Example of Small Landfill Ponds with Cattail Vegetation - Muskrat Lodge
June 4, 2015

Photo 7: View of Stormwater Basin/Pond in Central Portion of Landfill
June 4, 2015

Photo 8: Canine Tracks Observed Throughout Landfill
June 4, 2015

Photo 9: Evidence of Wild Turkey Nesting at Landfill
June 22, 2015

Photo 10: White-tailed Deer Tracks Abundant at Landfill
June 22, 2015

Photo 11: Midland Painted Turtle Basking at Existing Watercourse
May 27, 2015

Photo 12: Midland Painted Turtle Basking at Stormwater Basin/Pond
July 3, 2015

Photo 13: Site of Terrestrial Crayfish Burrows
July 3, 2015

Photo 14: Terrestrial Crayfish Burrow
July 3, 2015

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Appendix H

Impacts and Mitigation Table

300032339 St Marys Landfill Expansion Environmental Assessment

Appendix H

Construction Phase: Potential Environmental Impacts, Mitigation Measures and Recommended Monitoring Activities for the Design Alternative Methods within the On-site Study Area

Environmental Component	Potential Impacts	Mitigation Measures	Recommended Monitoring Activities	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Soils	a) Potential for delays to Project schedule and impacts to Project cost due to the removal or relocation of contaminated soils from the Study Area. b) Soil compaction from construction equipment. c) Loss of soils due to erosion during construction. d) Soil quality impacts due to potential fuel and oil spills. All Alternatives.	a) A Soil Management Plan (SMP) shall be prepared by a Qualified Professional as defined in Ontario Regulation 153/04 for managing soil materials on-site (includes excavation, location of stockpiles, reuse, and off-site disposal). Option to reuse/dispose of soil within the Project lands shall be the explored first. The Town should be notified well in advance of soil materials being arranged for transport on/off-site. b) Soils compacted in temporary construction areas that are to be naturalized shall be rehabilitated as soon as possible after construction. c) Erosion and sedimentation plans shall be developed as noted below. d) A Construction Emergency Response and Communications Plan shall be developed and followed throughout the construction phase (includes spill response plans).	a) & b) An Environmental Inspector shall regularly monitor construction activities to confirm the requirements outlined in the SMP are followed. c) Certified Inspectors of Sediment and Erosion Control personnel are required to inspect, and suggest and confirm, the repair of ESC measures as needed. d) None required.	X	X	X	X	X
Vegetation	a) Direct effects, including removal of trees, shrubs, and groundcover vegetation will be required to accommodate landfill expansion. b) Indirect effects to vegetation communities and species: Encroachment into driplines, water balance, dust, etc. c) Invasive species establishment. All Alternatives.	a) Revegetation of areas with native groundcover vegetation species as portions of the landfill are closed. Installation of woody plants adjacent to the realigned watercourse (Alternative Methods 2 and 3) to enhance watercourse shading, fish and wildlife habitat, as well as improve tree cover within the watershed. b) Exclusion fencing to prevent soil compaction and incidental encroachment (equipment laydown, etc.) c) Invasive species management recommended. Revegetate disturbed areas as soon as possible to minimize potential for reseeding of non-native and/or invasive species.	a) Post-construction monitoring by an Environmental Inspector who shall regularly monitor for vegetation success. Replacements may be necessary where vegetation does not survive. b) & c) None Required.	X	X	X	X	X

Environmental Component	Potential Impacts	Mitigation Measures	Recommended Monitoring Activities	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Surface Water	Potential for sediments to enter the watercourse as a result of the following Project activities: a) Site clearing; b) Stockpiling; c) Cut/fill activities; d) Excavation (including potential to encounter contaminated materials); e) Construction (including soil compaction); and f) Stormwater management. g) Potential for localized water quality impacts as a result of spills, discharge and dumping of materials, fluids and other wastes from operations or maintenance work into natural features or habitat. All Alternatives.	a) The Town is required to comply with the Ontario Water Resources Act, R.S.O. 1990, c. O.40 with respect to the quality of water discharging into natural receivers. The footprint of disturbed areas shall be minimized to the extent possible. For example, vegetated buffers shall be left in place adjacent to watercourses/waterbodies to the maximum extent possible. b) An Erosion and Sediment Control (ESC) Plan shall be developed in consultation with the UTRCA. Implementation of the ESC measures shall conform to recognized standard specifications such as Ontario Provincial Standards Specification (OPSS) and the requirements of the UTRCA. Stockpiled material shall be stored at least 30 m from any waterway to prevent the discharge of deleterious substances into the water. c) ESC measures (silt curtains, silt fence, temporary sedimentation basins) shall be installed and maintained during the construction phase and until the site has been stabilized. ESC measures shall be inspected daily to confirm they are functioning and are maintained as required. If control measures are not functioning properly, no further work will occur until the problem is resolved. d) Any temporary mitigation measures shall be installed prior to the commencement of any site clearing, grubbing, excavation, filling or grading works and shall be inspected and maintained on a regular basis, prior to and after runoff events. e) Wet weather restrictions shall be applied during site preparation and excavation. Whereby work will be avoided near watercourses during periods of excessive precipitation and/or excessive snow melt; and All equipment fueling and maintenance shall be carried out at a minimum distance of 30 metres from the water to prevent the discharge of deleterious substances into the waterway. f) The Contractor shall develop spill prevention and contingency plans for the construction phase of the Project. Personnel shall be	a) & b) A qualified Environmental Inspector shall regularly monitor construction activities to confirm the requirements outlined in the SMP are followed. c) Certified Inspectors of Sediment and Erosion Control personnel are required to inspect, suggest and confirm, the repair of ESC measures as needed. d) e), f) & g) A qualified Environmental Inspector shall regularly monitor construction activities to confirm the requirements outlined in the ESC Plans are followed.	X	X	X	X	X

Environmental Component	Potential Impacts	Mitigation Measures	Recommended Monitoring Activities	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
		trained in how to apply the plans and the plans shall be reviewed to strengthen their effectiveness and continuous improvement. Spills shall be immediately contained and cleaned up in accordance with provincial regulatory requirements and the contingency plan. A hydrocarbon spill response kit will be on site at all times during the work. Spills will be reported to the Ontario Spills Action Centre at 1 800-268-6060.						
Hydrology	Potential impacts to hydrology of new watercourse and conveyance capacity – Alternatives 2 & 3.	Impacts to hydrology shall be reviewed during the detailed design phase of the Project. Improvements shall be made where possible and necessary, noting potential operational constraints as a result of hydrologic impacts.	Post-construction (as-built) monitoring requirements may be required.		X	X		
Fish and Fish Habitat	Potential impacts to downstream fish habitat from water quality and quantity impairments as a result of near and in-water construction works (sediment loading; fuels and lubricants from machinery; contaminated sediment from landfill) – All Alternatives.	• ESC Plans shall be developed as noted above; • Watercourse base flow will be continued downstream throughout construction to provide habitat to fish downstream; • Compliance with the Ontario Water Resources Act, 1990 shall be maintained with respect to the quality of water discharging into natural receivers. Sediment and erosion control measures (such as silt fence barriers, etc.) shall be installed and maintained during the work phase and until the site has been stabilized. Control measures shall be inspected daily to ensure they are functioning and are maintained as required. If control measures are not functioning properly, no further work will occur until the problem is resolved. All temporary ESC measures shall be installed in accordance with recognized provincial standards. Extra silt fence/turbidity curtain shall be stored on-site, should additional sediment control be required; • The Contractor(s) shall minimize any in-water operation of heavy equipment and minimize operation of the same on the banks of the watercourse. All equipment fueling and maintenance shall be done at least 30 m away from the edge of the water to prevent the discharge of deleterious substances into the water; • Any stockpiled material shall be stored and stabilized away from the watercourse. All	• Certified Inspectors of Sediment and Erosion Control personnel are required to inspect, suggest and confirm, the repair of ESC measures as needed. • An Environmental Inspector shall regularly monitor construction activities to confirm the requirements outlined in the SMP are followed.	X	X	X	X	X

Environmental Component	Potential Impacts	Mitigation Measures	Recommended Monitoring Activities	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
		materials and equipment used for the purpose of site preparation and Project completion shall be operated and stored in a manner that prevents any deleterious substance (e.g., petroleum products, silt, etc.) from entering the water; • Erosion and sedimentation control plans and a spills response plan shall be developed and shall include, but not be limited to, the details described in the Surface Water/Hydrology, above; • All disturbed areas at the work site shall be stabilized immediately and re-vegetated as soon as conditions allow; • In-water works timing windows shall be followed to avoid/minimize interference with potential downstream spawning fish species. Prior to conducting near or in-water works, an assessment of all near and in-water works will be undertaken by a qualified professional Ecologist (as described in the Fisheries Act) to determine potential Fisheries Act requirements. DFO shall be consulted where appropriate; and • The UTRCA shall be consulted during detailed design with regard to potential works within flood regulated areas.						
Wildlife and Wildlife Habitat (General)	Potential for disturbance or destruction of migratory breeding birds and their habitat by the landfill expansion (prohibitions under the MBCA, 1994) – All Alternatives.	• To reduce the risk of contravening the MBCA, 1994, timing constraints shall be applied to avoid vegetation clearing (including grubbing) and/or structure works (construction, maintenance) during the breeding bird period - broadly from end of March to end of August for most species (regardless of the calendar year); • Active nests (nests with eggs or young birds) of protected migratory birds, including SAR protected under the ESA, 2007, cannot be destroyed at any time of the year. The destruction of inactive nests for some species may also be prohibited (e.g., Barn Swallow, Osprey, Great Blue Heron); and • If a nesting migratory bird (or SAR protected under ESA, 2007) is identified within or adjacent to the construction site and the construction activities are such that continuing construction in that area would result in a	• An Avian Biologist may be required on-site as needed should a nesting migratory bird (or SAR protected under ESA, 2007) be identified within or adjacent to the construction site. • The Avian Biologist may be required to confirm the presence and identification of an active nest and/or breeding bird (i.e., Eastern Meadowlark, Bank Swallow), prior to contacting MNRF for further advice.	X	X	X	X	X

Environmental Component	Potential Impacts	Mitigation Measures	Recommended Monitoring Activities	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
		contravention of the MBCA, 1994 or ESA, 2007, all activities will stop and the Contract Administrator (with assistance from an Avian Biologist) shall discuss mitigation measures with the Town. The MNRF and Environment Canada shall be contacted to discuss mitigation options. The Contractor Administrator shall instruct the Contractor on how to proceed based on the mitigation measures established through discussions with the Town, the MNRF and/or Environment Canada.						
Wildlife and Wildlife Habitat (General)	a) Temporary displacement of, and disturbance to, wildlife and wildlife habitat during the construction phase (i.e., vegetation removals, noise, light trespass), including SAR. Development in these habitats may limit wildlife movement and reduce useable habitat. b) Some wildlife habitat may be removed as a result of the proposed activities. All Alternatives.	a) In the event that an animal encountered during construction does not move from the construction zone, the Contract Administrator will be notified. If the construction activities are such that continuing construction in the area would result in harm to wildlife, construction activities in that location will temporarily stop and the MNRF shall be contacted for direction; a) If temporary perimeter exclusion fencing is used at a location, it shall be installed to allow wildlife to leave the fenced area during vegetation clearing. Once the work area has been cleared, it can be securely fenced to prevent wildlife from returning; a) In the event that SAR are found within the study limits all activities will stop and mitigation options shall be discussed with the Town, whereby an MNRF SAR Biologist may be contacted for advice as these animals are protected under ESA 2007; a) Educational material shall be provided by a Biologist to construction personnel prior to commencement of construction works to assist personnel in identifying SAR species, should they be encountered. These materials shall also include protocols to be followed to prevent contravention of the ESA 2007, should a SAR species be encountered; b) Avoid vegetation clearing during sensitive times of the year for local wildlife, such as spring and early summer (when many animals bear their young or migrate between wintering and summer habitats).	• A Biologist may be required on-site as needed should a species that is protected under the ESA 2007 be identified within or adjacent to the construction site. • The Biologist may be required to confirm the presence and identification of a particular species prior to contacting the MNRF for further advice.	X	X	X	X	X

Environmental Component	Potential Impacts	Mitigation Measures	Recommended Monitoring Activities	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Wildlife and Wildlife Habitat Removal of Confirmed Midland Painted Turtle Basking Habitat/Movement Corridor; Potential Snapping Turtle Basking Habitat/Movement Corridor; and, Confirmed Amphibian Breeding Habitat	a) Removal of turtle basking habitat and movement corridor (watercourse realignment and/or storm water basin) – Alternatives 2 and 3. b) Removal of amphibian breeding habitat (storm water basin and wetted areas) – Alternatives 2 and 3. c) Mortality from construction activities - Alternatives 2 and 3.	a) and b) • Midland Painted Turtle is the only turtle in Ontario that is not listed provincially or federally as “at risk” but all reptiles are considered vulnerable to habitat removal activities due to slow reproductive rates and susceptibility to predation and mortality. Snapping Turtle is listed as Special Concern under the ESA 2007; • Educational material shall be provided by a Biologist to construction personnel prior to commencement of construction works to assist personnel in identifying SAR turtle species, should they be encountered. These materials shall also include protocols to be followed to prevent contravention of the ESA 2007, should SAR be encountered; • Prior to construction works commencing, and prior to emergence from hibernation (i.e., early spring), exclusion fencing shall be installed along the watercourse and stormwater basins to prevent any turtles from attempting to access these habitats within the Study Area during construction works. Please refer to MNRF Best Practices Technical Note Reptile and Amphibian Exclusion Fencing (Version 1.1) July 2013 for more details: http://files.ontario.ca/environment-and-energy/species-at-risk/mnr_sar_tx_rptl_amp_fnc_en.pdf. • Given the proximity of the Study Area to the Thames River and the known presence of SAR reptiles in the general area, exclusion fencing shall also be erected around active work areas, such as temporary storage/equipment areas. Equipment refueling shall be excluded from areas that have the potential for transfer of materials to the watercourse and storm water basins via surface water drainage; and • If designated areas are created during construction for the stockpiling of materials, especially fill, soil and gravel, the Contractor shall install exclusion fencing around the perimeter of these areas to prevent any turtle species from entering the area and attempting to nest (turtles are attracted to these materials for nesting).	• A Biologist may be required on-site as needed should a species that is protected under the ESA 2007 be identified within or adjacent to the construction site. • The Biologist may be required to confirm the presence and identification of a particular species prior to contacting the MNRF for further advice. • Fencing should be monitored on a regular basis to ensure there is no damage that may result in a decrease in function or opportunities for injury or death to wildlife species.		X	X		

Environmental Component	Potential Impacts	Mitigation Measures	Recommended Monitoring Activities	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
		c) Should nesting features be identified during construction works, consultation with the MNRF may be warranted to confirm appropriate mitigation measures are in place to protect this feature.						
Disturbance to Potential Midland Painted Turtle Hibernation Habitat	Direct removal of potential hibernation habitat within existing watercourse. – Alternatives 2 and 3.	• In-water works should be avoided during the turtle hibernation period (i.e., October to May); • If works cannot be avoided during winter months, MNRF should be consulted prior to in-water works for appropriate mitigation measures related to hibernating turtles; and • In the event that SAR are found within the study limits all activities will stop and mitigation options shall be discussed with the Town, whereby an MNRF SAR Biologist may be contacted for advice as these animals are protected under ESA 2007.	• Subject to MNRF consultation. • Should in-water works be conducted during the winter months, a Biologist may be required on-site during in-water works to inspect the substrate for turtles during construction works. Re-location of turtles may be required pending MNRF consultation.		X	X		
Removal of Habitat for Endangered and Threatened Species								
Eastern Meadowlark (Confirmed) Bank Swallow (Confirmed) Barn Swallow (Confirmed)	a) Eastern Meadowlark: • Direct removal of Category 1, and 2 habitat within ELC community MEGM3 – Alternatives 4 and 5; and • Direct removal of Category 3 habitat (although in subsequent years this area may be used by a nesting pair) – Alternatives 1, 2, 3, and 5. b) Bank Swallow: • Potential removal of nesting habitat at any temporary stockpile/compost pile locations should nesting be confirmed within the Study Area during the active breeding window for this species immediately prior to construction works (i.e., May to August). Based on field observations in 2015, potential nesting habitat could potentially be affected by Alternatives 2 and 3; and • Direct removal of foraging habitat confirmed within the Study Area (specifically, ELC community	a) Eastern Meadowlark: • Specific development exemptions for Eastern Meadowlark are addressed under the ESA, 2007 in Ontario Regulation 242/08 Section 23.2. Mitigation and compensation requirements are outlined under this Regulation. b) Bank Swallow: • Avoid the creation of temporary vertical or near-vertical spoil piles within the landfill that are prone to frequent disturbance from landfill operations in order to reduce the chance of attracting nesting Bank Swallow; and • If construction activities occur during the breeding bird window, and breeding evidence is observed (i.e., excavated nests, adults on nest, young on nest), construction activities must stop in the location where evidence is observed and a no-disturbance 50 m setback from the nesting site shall be placed around the site until no further evidence of breeding is observed.	• An Avian Biologist may be required on-site should a nesting migratory bird (or SAR protected under ESA, 2007) be identified within or adjacent to the construction site as per details outlined under Construction Mitigation. • The Avian Biologist may be required to confirm the presence and identification of an active nest and/or breeding bird prior to contacting the MNRF for further advice.	X	X	X	X

Environmental Component	Potential Impacts	Mitigation Measures	Recommended Monitoring Activities	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
	MEGM3) - Alternatives 1, 3, 4 and 5. c) Barn Swallow: • Direct removal of foraging habitat confirmed within the Study Area (specifically, ELC community MEGM3) - Alternatives 1, 3, 4 and 5.	c) Barn Swallow: • Avoid direct removal of foraging habitat for Barn Swallow within the Study Area, if possible; and • Foraging habitat for Barn Swallow is not included in the development exemptions in Ontario Regulation 242/08 (nesting habitat only). Therefore, destruction of foraging habitat is dealt with on a case-by-case basis with MNRF. All species: • Please refer to the Wildlife and Wildlife Habitat (General) section above; specifically, migratory breeding birds; • Receive general habitat protection under the ESA, 2007 - prohibitions apply to the species and their habitat (specifically killing, harming, harassing and habitat destruction); and, • Educational material shall be provided by a Biologist to construction personnel prior to commencement of construction works to assist personnel in identifying SAR species, should they be encountered. These materials shall also include protocols to be followed to prevent contravention of the ESA, 2007, should a SAR species be encountered.						
Impacts to Significant Wildlife Habitat (Confirmed/Candidate)								
1. Disturbance/Removal of Habitat for Seasonal Concentration of Animals								
Snake Hibernaculum (Candidate)	Potential for disturbance to this feature in the Study Area during construction works (e.g., drilling, grading, digging) if habitat present – All Alternatives.	• In consultation with the MNRF, additional monitoring during the appropriate season by a Biologist may be warranted prior to the commencement of construction to confirm key areas where SWH may be impacted by construction activities; • Avoid intrusive construction activities (to the extent practical) into areas where there may be potential habitat for snake hibernacula; • Should snake hibernacula features be identified during construction works, consultation with the MNRF may be warranted to confirm appropriate mitigation measures are in place to protect this feature;	• A Biologist may be required on-site as needed to advise on potential SWH sites. • A Biologist may be required on-site as needed should a species that is protected under the ESA, 2007 be identified within or adjacent to the construction site. • The Biologist may be required to confirm the presence and identification of a	X	X	X	X	X

Environmental Component	Potential Impacts	Mitigation Measures	Recommended Monitoring Activities	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
		• Educational material shall be provided by a Biologist to construction personnel prior to commencement of construction works to assist personnel in identifying SAR, should they be encountered. These materials shall also include protocols to be followed to prevent contravention of the ESA 2007, should SAR be encountered; • If the construction activities are such that continuing construction in the area would result in harm to wildlife, construction activities in that location will temporarily stop and the MNRF shall be contacted for direction; and • In the event that SAR is found within the study limits, all activities will stop and mitigation options shall be discussed with the Town, whereby an MNRF SAR Biologist may be contacted for advice.	particular species prior to contacting the MNRF for further advice.					
2. Disturbance/Removal of Habitat for Species of Conservation Concern (not including Endangered or Threatened Species)								
Terrestrial Crayfish (Confirmed)	• Direct removal of terrestrial crayfish habitat and possible extirpation of local population as shown on Figures 6-10 – Alternatives 2, 4 and 5; • Heavy machinery may cause sufficient soil compression to damage or destroy burrows and subterranean tunnels; and • Construction works will likely alter the habitat's hydrology; therefore, ecological function may be reduced or lost.	• Consultation with MNRF prior to construction activities should occur in order to determine whether this population is considered "significant" given the historical disturbance to the existing property and ongoing disturbance as an active landfill; and • Should this population be considered by the MNRF as "significant", MNRF will provide guidance on appropriate mitigation measures suitable to the proposed expansion activities.	Subject to MNRF consultation.		X		X	X
Special Concern and Rare Wildlife Species Monarch (Confirmed Habitat)	• Direct removal of potential breeding/foraging habitat located within ELC community MEGM3 as a result of vegetation removals – Alternatives 1, 2, 3, 4, and 5.	• Vegetation removals shall occur during the fall and winter periods outside of the growing season for Milkweed, the larval plant of Monarch. Compensatory plantings/seed mixes should include plant species for butterflies, including milkweed species.	No monitoring required.	X	X	X	X	X

Environmental Component	Potential Impacts	Mitigation Measures	Recommended Monitoring Activities	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
3. Disturbance/Removal of Habitat for Eastern Milksnake								
Eastern Milksnake, listed as Special Concern under COSEWIC and SARA(Confirmed Refuge Habitat)	• Encroachment/disturbance into potential oviposition/refuge/foraging/ hibernation habitat. A location for Eastern Milksnake refuge habitat confirmed in 2015 – Alternatives 1, 3 and 5 would directly remove this habitat. • Mortality from construction activities, including road mortality.	• Avoid construction activities in the southern portion of the landfill that will remove the location of Eastern Milksnake refuge habitat that was confirmed in 2015 as well as any other potential habitats related to this species survival such as foraging, oviposition, hibernation, etc. (see Figure 5) – Alternatives 1, 3 and 5; • See Snake Hibernaculum above.	• A Biologist may be required on-site as needed should a species that is protected under the ESA, 2007 be identified within or adjacent to the construction site. • The Biologist may be required to confirm the presence and identification of a particular species prior to contacting the MNRF for further advice.	X		X		X

Operational Phase: Potential Environmental Impact, Mitigation Measures and Monitoring Activities

Environmental Component	Potential Impacts	Mitigation Measures	Recommended Monitoring Activities	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Vegetation, Terrestrial, Aquatic, Wildlife Habitat	a) Discharge and dumping of materials, fluids and other wastes from operations or maintenance work into natural features or habitat. b) Potential incidents of wildlife fatalities or injuries (including SAR) due to use of machinery and equipment (including road mortality). All Alternatives.	a) All waste materials to be managed using best management practices (e.g., daily cover, cell fencing to prevent windblown waste, etc.). Should designated natural areas be encroached upon, appropriate consultation should be sought to determine next steps (e.g., waste removal and additional mitigation measures). b) Machinery and equipment to be located on designated areas/roadways only. Staff to be trained on avoidance and prevention of encounters with wildlife and preferred habitat (e.g., potential basking lands).	a) Long term effects of operational activities shall be included as a component of regular inspections completed by qualified environmental monitors. If impacts are noted, review agencies and permitting authorities should be contacted for consultation on appropriate next steps. b) Pre-operational survey for SAR and wildlife. Findings will be reported to staff and MNRF.	X	X	X	X	X
Surface Water	a) Potential degradation of water quality due to accidental spills or releases, and leachate. b) Potential deposition of sediment into watercourses through erosion and during operational /maintenance activities. All Alternatives.	a) Spill contingency and response plans, spill response training, proper notification procedures and necessary cleanup materials and equipment shall be developed and implemented by the Town, during the operations phase. Spills with the potential to create an impact to the environment will be reported to the MOECC as required by the provincial spills legislation. Materials used during the operations phase of the Project shall be stored in appropriate containers within a secure storage area, a minimum 30 metres away from sensitive environments (i.e., watercourses, wetlands, etc.). b) Where reasonable, retaining walls and other ESC measures will be employed to minimize potential slumping, erosion, and deposition. During maintenance activities where excavation is proposed, work sites will be isolated from nearby watercourses using silt fence and appropriate ESC measures will be employed.	a) Environmental inspections should take place to monitor and confirm that activities do not impact surface water quality and that chemical/fuel storage and usage is conducted properly. Surface water quality monitoring may be required in aquatic features on-site during the operation phase of the project as directed by the MOECC. b) Certified Inspectors of Sediment and Erosion Control personnel are required to inspect, and suggest and confirm, the repair of ESC measures as needed. Inspections shall ensure proper spill containment and response kits are on-hand.	X	X	X	X	X

Environmental Component	Potential Impacts	Mitigation Measures	Recommended Monitoring Activities	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Fish and Fish Habitat	Potential impact to downstream fish habitat due to accidental spills or releases of sediment into watercourses during operations and maintenance activities. All Alternatives.	• Spill contingency and response plans, spills response training, proper notification procedures and necessary cleanup materials and equipment shall be developed by the Town for implementation during the operations and maintenance phase. All spills that could potentially have an adverse environmental effect, are outside the normal course of events, or are in excess of the prescribed regulatory levels will be reported to the Ontario Spills Action Centre at 1-800-268-6060; and • Erosion and Sediment Control plans will be developed by the Town for implementation during the operations and maintenance phase.	• Environmental inspections should take place to monitor and confirm that activities do not impact fish and fish habitat and that chemical/fuel storage and usage is conducted properly. • In the case of a spill or release that causes an impact to fish or fish habitat, monitoring requirements would be prescribed on a case-by-case basis by a professional Aquatic Ecologist, and, where necessary, the DFO.	X	X	X	X	X
Species at Risk Bank Swallow	Potential for attracting nesting Bank Swallow. All Alternatives.	• Avoid the creation of temporary vertical or near-vertical spoil piles within the landfill that are prone to frequent disturbance from landfill operations in order to reduce the chance of attracting nesting Bank Swallow. • If operational activities occur during the breeding bird window, and breeding evidence is observed (i.e., excavated nests, adults on nest, young on nest), activities should stop in the location where evidence is observed and a no-disturbance 50 m setback from the nesting site shall be placed around the site until no further evidence of breeding is observed.	No monitoring required.	X	X	X	X	X

Decommissioning Phase: Potential Environmental Impact, Mitigation Measures and Monitoring Activities

Environmental Component	Potential Impacts	Mitigation Measures	Recommended Monitoring Activities	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Vegetation, Terrestrial, Aquatic Wildlife and Habitat	a) Discharge and dumping of materials, fluids and other wastes from decommissioning into natural features or habitat. b) Potential wildlife fatalities or injuries (including SAR) due to decommissioning activities (including road mortality). All Alternatives.	a) All materials to be managed using best management practices (e.g., daily cover, ESC measures, etc.). Erosion and Sediment Control plans will be developed by the Town for implementation during the decommissioning phase. b) Machinery and equipment to be located on designated areas/roadways only. Staff to be trained on avoidance and prevention of encounters with wildlife and preferred habitat (e.g., potential basking lands).	a) and b) • An Environmental Inspector shall be onsite to monitor decommissioning activities. If impacts are noted, review agencies and permitting authorities should be contacted for consultation on appropriate next steps. • Monitoring should be completed for a minimum of 3 years post construction by a Biologist.	X	X	X	X	X
Surface Water	a) Potential degradation of water quality due to accidental spills or releases. b) Potential deposition of sediment into watercourses through erosion and during decommissioning activities. All Alternatives.	a) Spill contingency and response plans, spill response training, proper notification procedures and necessary cleanup materials and equipment shall be developed and implemented by the Town during the decommissioning phase. Spills with the potential to create an impact to the environment will be reported to the MOECC as required by the provincial spills legislation. Materials used during the decommissioning phase of the Project shall be stored in appropriate containers within a secure storage area, a minimum 30 metres away from sensitive environments (i.e., watercourses, wetlands, etc.). b) Where reasonable, retaining walls and other ESC measures will be employed to minimize potential slumping, erosion, and deposition. During decommissioning activities where excavation is proposed, work sites will be isolated from nearby watercourses using silt fence and appropriate ESC measures will be employed.	a) and b) • An Environmental Inspector shall regularly monitor construction to confirm that activities do not impact surface water quality and that chemical/fuel storage and usage is conducted properly. • Certified Inspectors of Sediment and Erosion Control personnel are required to inspect, and suggest and confirm, the repair of ESC measures as needed.	X	X	X	X	X

Environmental Component	Potential Impacts	Mitigation Measures	Recommended Monitoring Activities	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Fish and Fish Habitat	Potential impact to downstream fish habitat due to accidental spills or releases of sediment into watercourses during decommissioning activities. All Alternatives.	a) Spill contingency and response plans, spills response training, proper notification procedures and necessary cleanup materials and equipment shall be developed by the Town for implementation during the operations and maintenance phase. All spills that could potentially have an adverse environmental effect, are outside the normal course of events, or are in excess of the prescribed regulatory levels would be reported to the Ontario Spills Action Centre at 1-800-268-6060. b) Erosion and Sediment Control plans will be developed by the Town for implementation during the decommissioning phase.	a) An Environmental Inspector shall regularly monitor construction to confirm that activities do not impact downstream fish and fish habitat and that chemical/fuel storage and usage is conducted properly. b) In the case of a spill or release that causes an impact to fish or fish habitat, monitoring requirements would be prescribed on a case-by-case basis by a professional Aquatic Ecologist, and, where necessary, the DFO.	X	X	X	X	X

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix I

Agency Record of Correspondence

Hannah Maciver

From: Tricia Radburn
Sent: Friday, June 03, 2016 1:05 PM
To: Hannah Maciver
Subject: FW: St. Marys Landfill EA Request for Information
Attachments: 032339_Town of St. Mary's Notice of Commencement.pdf; MNRF Guelph District - Perth South SAR List.xlsx; MNRF Guelph District - St Marys SAR List.xlsx

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From: Marriott, David (MNRF) [mailto:David.Marriott@ontario.ca]
Sent: Tuesday, February 24, 2015 3:02 PM
To: Tricia.Radburn@rjburnside.com
Cc: Timmerman, Art (MNRF); Buck, Graham (MNRF)
Subject: FW: St. Marys Landfill EA Request for Information

Hi Tricia,

The Ministry of Natural Resources and Forestry (MNRF) Guelph District Office has had an opportunity to review the natural heritage information and records for the St. Marys Landfill on-site study area, and the areas in the vicinity of the site. It is understood that the Town is undertaking an individual Environmental Assessment (EA) for the project, and will be completed in accordance with the reporting requirements under the *Environmental Assessment Act.* It is also understood that the existing landfill site at 1221 Water Street South is nearing its approved capacity. The purpose of the EA will be to review options to manage solid waste over the next 40 years. Based on the Notice of Commencement attached, the MNRF can provide the following information and comments for the project team's consideration.

The Ministry has developed a web application (Make a Map) that can make custom maps of select natural heritage features (https://www.ontario.ca/environment-and-energy/make-natural-heritage-area-map). This includes, provincial wetland and Areas of Natural Scientific Interest (ANSI) mapping, and tracked species information from the Natural Heritage Information Center (NHIC) etc. It is recommended that this application be reviewed by the project team.

ANSI

The St. Marys Cement Co provincially significant earth science ANSI is within the vicinity of the on-site study area (on the opposite side of the Thames River). The boundary for this feature can be mapped by using the above noted 'Make a Map' application.

Fisheries

MNRF staff notes that fisheries surveys/habitat assessments have been completed for the Thames River, and for the unnamed tributary crossing the on-site study area (at the crossing of Water Street South).

It is recommended that the project team contact Art Timmerman (Management Biologist) at (519) 826-4935 or art.timmerman@ontario.ca to review the fisheries information available for the on-site study area, and the areas in the vicinity of the site.

Species at Risk

There are several aquatic species at risk (SAR) known within the vicinity of the on-site study area, within the Thames River. This includes, listed mussels (Wavy-rayed Lampmussel, Rainbow Mussel, and Rayed Bean), Black Redhorse, Spiny Softshell, Bald Eagle, Map Turtle, and Snapping Turtle. It is recommended that the EA demonstrate that there will be no negative impacts to these species or their habitats.

There are no known SAR records for the on-site study area. Please be advised however, that because the province has not been surveyed comprehensively for the presence of listed species, the absence of a record is not an appropriate indicator for the absence of SAR from an area. To determine the presence of SAR for a given study area, the District's recommended approach includes the following:

I. Habitat Inventory

MNRF staff recommends undertaking a comprehensive botanical inventory of the entire area that may be subject to direct and indirect impacts from the proposed activity. The vegetation communities should be classified as per the "Ecological Land Classification (ELC) for Southern Ontario" system, to either the "Ecosite" or "Vegetation Type" level. With respect to aquatic habitats in the study area, we recommend you collect data on the physical characteristics of the waterbodies and inventory the riparian zone vegetation, so that these habitats can be classified as per the Aquatic Ecosites described in the ELC manual.

II. Potential Species at Risk within the Study Area

A list of SAR that have the potential to occur in the area can be produced by cross-referencing the ecosites described during the habitat inventory with the habitat descriptions of SAR known to occur within the planning area. The list of SAR known to occur in St. Marys and Perth South is attached for your reference. The species-specific COSEWIC status reports (www.cosewic.gc.ca) are a good source of information on habitat needs and will be helpful in determining the suitability of the study areas ecosites for a given species.

Please note that the Species at Risk in Ontario list (SARO) is a living document and is amended periodically as a result of species assessment and re-assessments conducted by the Committee on the Status of Species at Risk in Ontario (COSSARO). The SARO list can be accessed on the webpage https://www.ontario.ca/environment-and-energy/species-risk-ontario-list.

COSSARO also maintains a list of species to be assessed in the future. It is recommended to take COSSARO's list of anticipated assessments into consideration, especially when the proposed start date of the activity is more than 6 months away, or the project will be undertaken over a period greater than 6 months. The list can be viewed at http://www.ontario.ca/environment-and-energy/help-protect-species-risk.

SAR habitat prescribed under regulation can be accessed on the Environmental Registry and searching for postings related to Ontario Regulation 242/08 under the *Endangered Species Act*.

III. Species at Risk Surveys

Ministry staff are of the opinion that each SAR identified under Step II should be surveyed for, regardless of whether or not the species has been previously recorded in the area. The survey report should describe how each SAR was surveyed for, and provide a rationale for why certain species were not afforded a survey (e.g. habitat within the study area is not suitable for a specific SAR). Please note that some targeted surveys may require provincial authorizations.

Other information

It is recommended that you contact the local conservation authority and municipality for any additional information or records for the study area.

I hope this is of assistance.

Dave

Dave Marriott
District Planner
Ministry of Natural Resources and Forestry, Guelph District
1 Stone Road West
Guelph ON, N1G 4Y2
(P) 519-826-4926
(F) 519-826-6849
email: david.marriott@ontario.ca

From: Tricia Radburn [mailto:Tricia.Radburn@rjburnside.com]
Sent: February 20, 2015 11:47 AM
To: Marriott, David (MNRF)
Subject: Fw: St. Marys Landfill EA Request for Information

Sorry I didn't include the attachment.

Tricia

----- Forwarded by Tricia Radburn/RJB on 02/20/2015 11:46 AM -----

From: Tricia Radburn/RJB
To: david.marriott@ontario.ca
Date: 02/20/2015 11:40 AM
Subject: St. Marys Landfill EA Request for Information

Dave,

I hope all is well with you and your family. I am now back to work after my maternity leave and am getting involved in EA work once again. Attached is the Notice of Study Commencement for the St. Marys Landfill Individual EA. A copy has also been mailed to you. At this time, we are requesting any information the MNR may have regarding the existing St. Marys landfill site, including records of species at risk, ANSIs or any other natural features.

We are also requesting information on procedures for assessing the significance of features, specifically Significant Wildlife Habitat. We note that the draft Ecoregion Criteria Schedules are no longer available online. If you would like us to follow the schedules, could you please forward us a copy of the most recent version?

Any other information, concerns or recommendations you have that may be of relevance to the study would be greatly appreciated.

Kind Regards,

PERTH - SOUTH

Jump to: List of Municipalities

Species At Risk Designations
ENDANGERED
THREATENED
SPECIAL CONCERN
EXTIRPATED

BIRDS		ESA Protection	Key Habitats Used By Species	Timing Of Life History Events	How to Conduct a Proper Survey
Bald Eagle (*Haliaeetus leucocephalus*)	Known to Occur	*N/A*	prefers deciduous and mixed-deciduous forest; and habitat close to water bodies such as lakes and rivers; They roost in super canopy trees such as Pine	Breed and Nest - April or May Some Migrate South when water bodies freeze over	Follow Breeding Bird Survey Protocol
Barn Swallow (Hirundo rustica)	Known to Occur	*Species and General Habitat Protection*	prefers farmland; lake/river shorelines; wooded clearings; urban populated areas; rocky cliffs; and wetlands. They nest inside or outside buildings; under bridges and in road culverts; on rock faces and in caves etc.	Migrate South before Winter	Follow Breeding Bird Survey Protocol
Bobolink (*Dolichonyx oryzivorus*)	Known to Occur	*Species and General Habitat Protection*	generally prefers open grasslands and hay fields. In migration and in winter uses freshwater marshes and grasslands	Migrate South for the Winter	Contact MNR Guelph District SAR Bio to obtain a copy of the protocol
Canada Warbler (*Cardellina canadensis*; formerly *Wilsonia canadensis*)	Known to Occur	*N/A*	Generally prefers wet coniferous, decediuous and mixed forest types, with a dense shrub layer. Nests on the ground, on logs or hummocks, and uses dense shrub layer to conceal the nest.	Migrate South for the Winter Arrive in Ontario Early May	Follow Breeding Bird Survey Protocol
Chimney Swift (*Chaetura pelagica*)	Known to Occur	*Species and General Habitat Protection*	historically found in deciduous and coniferous, usually wet forest types, all with a welldeveloped, dense shrub layer; now most are found in urban areas in large uncapped chimneys	Nesting - Late April to Mid- May Migrate South in September or Early October	Consult: Chimney Swift Monitoring Protocol. Bird Studies Canada, March 2009
Common Nighthawk (*Chordeiles minor*)	Known to Occur	*N/A*	generally prefer open, vegetation-free habitats, including dunes, beaches, recently harvested forests, burnt-over areas, logged areas, rocky outcrops, rocky barrens, grasslands, pastures, peat bogs, marshes, lakeshores, and river banks. This species also inhabits mixed and coniferous forests. Can also be found in urban areas (nest on flat roof-tops)	Migrate South for the Winter	Contact MNR Guelph District SAR Bio to obtain a copy of the protocol
Eastern Meadowlark (*Sturnella Magna*)	Known to Occur	*Species and General Habitat Protection*	generally prefers grassy pastures, meadows and hay fields. Nests are always on the ground and usually hidden in or under grass clumps.	Migrate South for the Winter	Contact MNR Guelph District SAR Bio to obtain a copy of the protocol
Eastern Whip-poor-will *(Caprimlugus vociferus)*	Known to Occur	*Species and General Habitat Protection*	generally prefer semi-open deciduous forests or patchy forests with clearings; areas with little ground cover are also preferred; In winter they occupy primarily mixed woods near open areas.	Nesting: May - July	Contact MNR Guelph District SAR Bio to obtain a copy of the protocol
Golden-winged Warbler (Vermivora chrysoptera)	Suspected to Occur	*N/A*	generally prefer areas of early successional vegetation, found primarily on field edges, hydro or utility right-of-ways, or recently logged areas.	Migrate South for the Winter	Follow Breeding Bird Survey Protocol
Least Bittern *(Ixobrychus exilis)*	Suspected to Occur	*Species and General Habitat Protection*	generally located near pools of open water in relatively large marshes and swamps that are dominated by cattail and other robust emergent plants	Migrate South for the Winter	Follow Marsh Monitoring Protocol; 10 day window of male calling (variable timing). Does not respond well to playback. Very difficult to detect.
Northern Bobwhite (Colinus virginianus)	Historically Known to Occur	*Species and General Habitat Protection*	generally inhabits a variety of edge and grassland type - habitats including non-intensively farmed agricultural lands.	Acitve Year Round	Follow Breeding Bird Survey Protocol
Red-Headed Woodpecker *(Melanerpes erythrocephalus)*	Known to Occur	*N/A*	generally prefer open oak and beech forests, grasslands, forest edges, orchards, pastures, riparian forests, roadsides, urban parks, golf courses, cemeteries, as well as along beaver ponds and brooks	Active from May to September	Follow Breeding Bird Survey Protocol

FISH		ESA Protection	Key Habitats Used By Species	Timing Of Life History Events	How to Conduct a Proper Survey
Black Redhorse *(Moxostoma duquesnei)*	Known to Occur	*Species and General Habitat Protection*	generally lives in moderately sized rivers and streams, with generally moderate to fast currents	Active Year Round	For information please contact your local MNR office, DFO, and Lakes and Rivers
Northern Brook Lamprey (Ichthyomyzon fossor)	Historically Known to Occur	*N/A*	generally inhabits small rivers and clear streams of varying sizes. Adults spawn in gravelly riffles.	Active Year Round	For information please contact your local MNR office, DFO, and Lakes and Rivers
Redside Dace *(Clinostomus elongatus)*	Known to Occur	*Species Protection and **Habitat Regulation***	generally found in pools and slow-moving areas of small headwater streams with a moderate to high gradien	Spawning occurs in May	Contact MNR Guelph District SAR Bio to obtain a copy of the protocol
Silver Shiner *(Notropis photogenis)*	Known to Occur	*Species and General Habitat Protection*	generally prefer moderate to large, deep, relatively clear streams with swift currents, and moderate to high gradients	Spawning occurs in May and June	For information please contact your local MNR office, DFO, and Lakes and Rivers

INSECTS		ESA Protection	Key Habitats Used By Species	Timing Of Life History Events	How to Conduct a Proper Survey
Monarch Butterfly *(Danaus plexippus)*	Known to Occur	*N/A*	exist primarily wherever milkweed and wildflowers exist; abandoned farmland, along roadsides, and other open spaces	Migrate South for the Winter Usually in Late September and October	• Watch for adults along roadsides and in open fields • Caterpillars feed on milkweeds: Common milkweed grows in open disturbed habitats (fields, roadsides, etc) and swamp milkweed grows in wet habitats (along streams, lakes, marshes) • Adults can be spotted from a distance; caterpillars must be looked for carefully on the host plant.
West Virginia White (Pieris virginiensis)	Known to Occur	*N/A*	generally prefer moist, deciduous woodlands. The larvae feed only on the leaves of the two-leaved toothwort (Cardamine diphylla), which is a small, spring-blooming plant of the forest floor.	Adult butterfly emerges from pupa in late March; flies only in April and May	• Watch for adults within moist, deciduous woodlands • Caterpillars feed on the two-leaved toothwort: Toothwort grows in damp, open, rich hardwood woodlands and blooms from April to June. • Adults can be spotted from a distance; caterpillars must be looked for carefully on the host plant.

MAMMALS		ESA Protection	Key Habitats Used By Species	Timing Of Life History Events	How to Conduct a Proper Survey
Little Brown Myotis (Myotis lucifugus)	Suspected to Occur	*Species and General Habitat Protection*	Overwintering habitat: Caves and mines that remain above 0; Maternal Roosts: Often associated with buildings (attics, barns etc.). Occasionally found in trees (25-44 cm dbh).	Hibernates in caves and mines during winter	Contact MNR Guelph District SAR Bio to obtain a copy of the protocol

Northern Myotis (Myotis septentrionalis)	**Suspected to Occur**	*Species and General Habitat Protection*	Overwintering habitat: Caves and mines that remain above 0; Maternal Roosts: Often asssociated with cavities of large diameter trees (25-44 cm dbh). Occasionally found in structures (attics, barns etc.)	Hibernates in caves and mines during winter	Contact MNR Guelph District SAR Bio to obtain a copy of the protocol

MOLLUSCS		ESA Protection	**Key Habitats Used By Species**	**Timing Of Life History Events**	**How to Conduct a Proper Survey**
Rainbow Mussel *(Villosa iris)*	**Known to Occur**	*Species and General Habitat Protection*	most abundant in shallow, well- oxygenated reaches of small- to medium-sized rivers and sometimes lakes, on substrates of cobble, gravel, sand and occasionally mud	Active Year Round	Please reference: Mackie, G, T.J Morris, and D Ming. **"Protocol for the Detection and Relocation of Freshwater Mussel Species at Risk in Ontario Great Lakes Area (OGLA)."** Fisheries and Oceans Canada. (2008): Print.
Wavy-rayed lampmussel *(Lampsilis fasciola)*	**Known to Occur**	*Species and General Habitat Protection*	generally inhabit clear rivers and streams of a variety of sizes, where the water flow is steady and the substrate is stable	Active Year Round	Please reference: Mackie, G, T.J Morris, and D Ming. **"Protocol for the Detection and Relocation of Freshwater Mussel Species at Risk in Ontario Great Lakes Area (OGLA)."** Fisheries and Oceans Canada. (2008): Print.

MOSSES		ESA Protection	**Key Habitats Used By Species**	**Timing Of Life History Events**	**How to Conduct a Proper Survey**

PLANTS		ESA Protection	**Key Habitats Used By Species**	**Timing Of Life History Events**	**How to Conduct a Proper Survey**
American Ginseng *(Panax quinquefolius)*	**Suspected to Occur**	*Species and General Habitat Protection*	grows in rich, moist, undisturbed and relatively mature deciduous woods in areas of neutral soil (such as over limestone or marble bedrock).	Flowering begins in June and continues until August; The fruit develop from July to August and ripen in August and September	• Walk slowly and systematically in grid fashion, pausing to scan for plants every 5 meters • Use a plant field guide to distinguish from similar species
Butternut *(Juglans cinerea)*	**Known to Occur**	*Species and General Habitat Protection*	generally grows in rich, moist, and well-drained soils often found along streams. It may also be found on well-drained gravel sites, especially those made up of limestone. It is also found, though seldomly, on dry, rocky and sterile soils. In Ontario, the Butternut generally grows alone or in small groups in deciduous forests as well as in hedgerows	Flowers from April to June. Fruits reach maturity during the month of September or October	Walk slowly and systematically in grid fashion through suitable habitat pausing every 30 meters for a detailed scan of trees within sight. Areas with dense foliage or many saplings will require a more intensive survey to detect sapling butternut and yearlings Look for distinctive fruit on the ground

REPTILES		ESA Protection	**Key Habitats Used By Species**	**Timing Of Life History Events**	**How to Conduct a Proper Survey**
Eastern Ribbonsnake *(Thamnophis sauritus)*	**Suspected to Occur**	*N/A*	generally occur along the edges of shallow ponds, streams, marshes, swamps, or bogs bordered by dense vegetation that provides cover. Abundant exposure to sunlight is also required, and adjacent upland areas may be used for nesting.	Hibernate: October - April Mating: Early Spring Hatching: Early Fall (September)	Contact MNR Guelph District SAR Bio to obtain a copy of the protocol
Milksnake *(Lampropeltis triangulum)*	**Known to Occur**	*N/A*	generally occur in rural areas, where it is most frequently reported in and around buildings, especially old structures. It is also found in a wide variety of habitats, from prairies, pastures, and hayfields, to rocky hillsides and a wide variety of forest types. They must also be in proximity of water, and suitable locations for basking and egg-laying.	Active at dawn and dusk in the spring and fall, and at night in the summer. Hibernate: Late October to Early May	Contact MNR Guelph District SAR Bio to obtain a copy of the protocol
Northern Map Turtle *(Graptemys geographica)*	**Suspected to Occur**	*N/A*	generally inhabits both lakes and rivers, showing a preference for slow moving currents, muddy bottoms, and abundant aquatic vegetation. These turtles need suitable basking sites (such as rocks and logs) and exposure to the sun for at least part of the day.	Active: At night Hibernate: October - April Hatching: Late August - Early September	• scan shoreline in spring and partially submerged logs/rocks in summer for basking turtles • Be aware that map turtles do not allow as close of approach as other turtles before leaving a basking site • Snorkel in desired aquatic habitat! • Nesting season: search suitable habitat for nests
Snapping Turtle *(Chelydra serpentina)*	**Known to Occur**	*N/A*	generally inhabit shallow waters where they can hide under the soft mud and leaf litter. Nesting sites usually occur on gravely or sandy areas along streams. Snapping Turtles often take advantage of man-made structures for nest sites, including roads (especially gravel shoulders), dams and aggregate pits.	Nesting: Late May and June Hibernate: October - April	• Scan offshore rocks and logs for basking turtles (10am-2pm) • Snorkel in desired aquatic habitat! • Nesting Season: Search known or preferred nesting habitat areas for females
Spiny Softshell *(Apalone spinifera)*	**Known to Occur**	*Species and General Habitat Protection*	generally prefer marshy creeks, swift-flowing rivers, lakes, impoundments, bays, marshy lagoons, ditches and ponds near rivers	Lay eggs in June or July Hibernate over winter	• Best time to survey is during nesting season when females are active laying eggs • Visual searches should be conducted in appropriate habitat

Jump to: **List of Municipalities**

ST. MARY'S

Jump to: List of Municipalities

Species At Risk Designations
ENDANGERED
THREATENED
SPECIAL CONCERN
EXTIRPATED

BIRDS		ESA Protection	Key Habitats Used By Species	Timing Of Life History Events	How to Conduct a Proper Survey
Barn Swallow (Hirundo rustica)	**Known to Occur**	*Species and General Habitat Protection*	prefers farmland; lake/river shorelines; wooded clearings; urban populated areas; rocky cliffs; and wetlands. They nest inside or outside buildings; under bridges and in road culverts; on rock faces and in caves etc.	Migrate South before Winter	Follow Breeding Bird Survey Protocol
Bobolink (*Dolichonyx oryzivorus*)	**Suspected to Occur**	*Species and General Habitat Protection*	generally prefers open grasslands and hay fields. In migration and in winter uses freshwater marshes and grasslands	Migrate South for the Winter	Contact MNR Guelph District SAR Bio to obtain a copy of the protocol
Canada Warbler (*Cardellina canadensis*; formerly *Wilsonia canadensis*)	**Suspected to Occur**	*N/A*	Generally prefers wet coniferous, decediuous and mixed forest types, with a dense shrub layer. Nests on the ground, on logs or hummocks, and uses dense shrub layer to conceal the nest.	Migrate South for the Winter Arrive in Ontario Early May	Follow Breeding Bird Survey Protocol
Chimney Swift (*Chaetura pelagica*)	**Known to Occur**	*Species and General Habitat Protection*	historically found in deciduous and coniferous, usually wet forest types, all with a welldeveloped, dense shrub layer; now most are found in urban areas in large uncapped chimneys	Nesting - Late April to Mid- May Migrate South in September or Early October	Consult: Chimney Swift Monitoring Protocol. Bird Studies Canada, March 2009
Common Nighthawk (*Chordeiles minor*)	**Suspected to Occur**	*N/A*	generally prefer open, vegetation-free habitats, including dunes, beaches, recently harvested forests, burnt-over areas, logged areas, rocky outcrops, rocky barrens, grasslands, pastures, peat bogs, marshes, lakeshores, and river banks. This species also inhabits mixed and coniferous forests. Can also be found in urban areas (nest on flat roof-tops)	Migrate South for the Winter	Contact MNR Guelph District SAR Bio to obtain a copy of the protocol
Eastern Meadowlark (*Sturnella Magna*)	**Known to Occur**	*Species and General Habitat Protection*	generally prefers grassy pastures, meadows and hay fields. Nests are always on the ground and usually hidden in or under grass clumps.	Migrate South for the Winter	Contact MNR Guelph District SAR Bio to obtain a copy of the protocol
Red-Headed Woodpecker *(Melanerpes erythrocephalus)*	**Suspected to Occur**	*N/A*	generally prefer open oak and beech forests, grasslands, forest edges, orchards, pastures, riparian forests, roadsides, urban parks, golf courses, cemeteries, as well as along beaver ponds and brooks	Active from May to September	Follow Breeding Bird Survey Protocol

FISH		ESA Protection	Key Habitats Used By Species	Timing Of Life History Events	How to Conduct a Proper Survey

INSECTS		ESA Protection	Key Habitats Used By Species	Timing Of Life History Events	How to Conduct a Proper Survey
Monarch Butterfly *(Danaus plexippus)*	**Known to Occur**	*N/A*	exist primarily wherever milkweed and wildflowers exist; abandoned farmland, along roadsides, and other open spaces	Migrate South for the Winter Usually in Late September and October	• Watch for adults along roadsides and in open fields • Caterpillars feed on milkweeds: Common milkweed grows in open disturbed habitats (fields, roadsides, etc) and swamp milkweed grows in wet habitats (along streams, lakes, marshes) • Adults can be spotted from a distance; caterpillars must be looked for carefully on the host plant.
West Virginia White (Pieris virginiensis)	**Known to Occur**	*N/A*	generally prefer moist, deciduous woodlands. The larvae feed only on the leaves of the two-leaved toothwort (Cardamine diphylla), which is a small, spring-blooming plant of the forest floor.	Adult butterfly emerges from pupa in late March; flies only in April and May	• Watch for adults within moist, deciduous woodlands • Caterpillars feed on the two-leaved toothwort: Toothwort grows in damp, open, rich hardwood woodlands and blooms from April to June. • Adults can be spotted from a distance; caterpillars must be looked for carefully on the host plant.

MAMMALS		ESA Protection	Key Habitats Used By Species	Timing Of Life History Events	How to Conduct a Proper Survey

MOLLUSCS		ESA Protection	Key Habitats Used By Species	Timing Of Life History Events	How to Conduct a Proper Survey

MOSSES		ESA Protection	Key Habitats Used By Species	Timing Of Life History Events	How to Conduct a Proper Survey

PLANTS		ESA Protection	Key Habitats Used By Species	Timing Of Life History Events	How to Conduct a Proper Survey
Butternut *(Juglans cinerea)*	**Suspected to Occur**	*Species and General Habitat Protection*	generally grows in rich, moist, and well-drained soils often found along streams. It may also be found on well-drained gravel sites, especially those made up of limestone. It is also found, though seldomly, on dry, rocky and sterile soils. In Ontario, the Butternut generally grows alone or in small groups in deciduous forests as well as in hedgerows	Flowers from April to June. Fruits reach maturity during the month of September or October	Walk slowly and systematically in grid fashion through suitable habitat pausing every 30 meters for a detailed scan of trees within sight. Areas with dense foliage or many saplings will require a more intensive survey to detect sapling butternut and yearlings Look for distinctive fruit on the ground

REPTILES		ESA Protection	Key Habitats Used By Species	Timing Of Life History Events	How to Conduct a Proper Survey
Eastern Ribbonsnake *(Thamnophis sauritus)*	**Suspected to Occur**	*N/A*	generally occur along the edges of shallow ponds, streams, marshes, swamps, or bogs bordered by dense vegetation that provides cover. Abundant exposure to sunlight is also required, and adjacent upland areas may be used for nesting.	Hibernate: October - April Mating: Early Spring Hatching: Early Fall (September)	Contact MNR Guelph District SAR Bio to obtain a copy of the protocol
Milksnake *(Lampropeltis triangulum)*	**Suspected to Occur**	*N/A*	generally occur in rural areas, where it is most frequently reported in and around buildings, especially old structures. It is also found in a wide variety of habitats, from prairies, pastures, and hayfields, to rocky hillsides and a wide variety of forest types. They must also be in proximity of water, and suitable locations for basking and egg-laying.	Active at dawn and dusk in the spring and fall, and at night in the summer. Hibernate: Late October to Early May	Contact MNR Guelph District SAR Bio to obtain a copy of the protocol
Northern Map Turtle *(Graptemys geographica)*	**Known to Occur**	*N/A*	generally inhabits both lakes and rivers, showing a preference for slow moving currents, muddy bottoms, and abundant aquatic vegetation. These turtles need suitable basking sites (such as rocks and logs) and exposure to the sun for at least part of the day.	Active: At night Hibernate: October - April Hatching: Late August - Early September	• scan shoreline in spring and partially submerged logs/rocks in summer for basking turtles • Be aware that map turtles do not allow as close of approach as other turtles before leaving a basking site • Snorkel in desired aquatic habitat! • Nesting season: search suitable habitat for nests

Snapping Turtle *(Chelydra serpentina)*	**Known to Occur**	*N/A*	generally inhabit shallow waters where they can hide under the soft mud and leaf litter. Nesting sites usually occur on gravely or sandy areas along streams. Snapping Turtles often take advantage of man-made structures for nest sites, including roads (especially gravel shoulders), dams and aggregate pits.	Nesting: Late May and June Hibernate: October - April	• Scan offshore rocks and logs for basking turtles (10am-2pm) • Snorkel in desired aquatic habitat! • Nesting Season: Search known or preferred nesting habitat areas for females
Spiny Softshell *(Apalone spinifera)*	**Historically Known to Occur**	*Species and General Habitat Protection*	generally prefer marshy creeks, swift-flowing rivers, lakes, impoundments, bays, marshy lagoons, ditches and ponds near rivers	Lay eggs in June or July Hibernate over winter	• Best time to survey is during nesting season when females are active laying eggs • Visual searches should be conducted in appropriate habitat

Jump to: **List of Municipalities**

Hannah Maciver

From: Tricia Radburn
Sent: Friday, June 03, 2016 1:05 PM
To: Hannah Maciver
Subject: FW: snake survey protocols
Attachments: Eastern Ribbonsnake Survey Protocol May 2012 Guelph District.doc; Milksnake Survey Protocol Guelph District_2013.doc

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From: Buck, Graham (MNRF) [mailto:Graham.Buck@ontario.ca]
Sent: Thursday, April 02, 2015 3:30 PM
To: Tricia Radburn
Subject: RE: snake survey protocols

Here you go.

Graham Buck
Management Biologist
Ministry of Natural Resources and Forestry
1 Stone Road West
Guelph ON
N1G 4Y2
519 826 4505
graham.buck@ontario.ca

From: Tricia Radburn [mailto:Tricia.Radburn@rjburnside.com]
Sent: March-26-15 3:02 PM
To: Buck, Graham (MNRF)
Subject: snake survey protocols

Graham,

R.J. Burnside & Associates are conducting and EA for the St. Marys landfill site. We have received information from Dave Marriott that Milksnake and Eastern Ribbonsnake could potentially be present.

Could you please provide us with the appropriate survey protocol for these species?

Thanks.

BURNSIDE

Tricia Radburn M.Sc.(Pl), MCIP, RPP
Senior Environmental Planner

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292 Speedvale Ave. West, Unit 20
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tricia.radburn@rjburnside.com
Office: 519-823-4995
Direct Line: 226-486-1778

www.rjburnside.com

Eastern Ribbonsnake Survey Protocol- MNR Guelph District

(current April 2012; Protocol may change over time if new information becomes available)

Eastern Ribbonsnake habitat should be identified using a two-step process:

- Prior to site visits, identify potential habitat using aerial photographs, orthophotos or other available land cover information (such as Ecological Land Classification maps). Small wetlands, swamps and some other classes of wetlands may be difficult to identify using maps, depending on the scale and resolution of the map. For this reason, lowland areas that may contain wetland habitat should also be included.

- A site visit should be carried out to assess potential habitat identified in step 1 and to confirm the presence of suitable habitat. If detailed maps or other habitat information is not available for a site, the entire site should be thoroughly searched to identify suitable habitat.

Conducting visual encounter surveys (walking transects and watching for snakes moving around or basking) is the most effective method of confirming the presence of Eastern Ribbonsnake within suitable habitat. Cover board surveys, whereby artificial cover is installed within the study area in the hopes of attracting snakes seeking shelter is not an appropriate survey method for this species.

1. Survey Technique:

Visual Encounter Search

Set up walking transects along shoreline and wetland edges so as to comprehensively cover suitable habitat within the study area. In the case of rivers and lakes, searches should be limited to within 5 m of the water's edge. In the case of wetlands, the entire wetland should be searched with the exception of open water areas.
Record the location of each transect on a map. Conduct the surveys during the appropriate period and weather conditions (see below), and record the dates, times and weather conditions for each survey.
Walk each transect, looking for snakes that may be basking, moving, or that have been flushed by the surveyor.
Record locations (UTM coordinates) of snake observations and photograph individual animals if possible. Also photograph dead specimens.

2. Survey Period:

Eastern Ribbonsnake cannot be detected during the winter season, as they hibernate underground during this period. Surveys should take place between late April and late June. Detectability is greatly reduced in late summer and autumn.

In Guelph District, surveys should occur no earlier than April 1st and no later than October 15th, though these dates are subject to change depending on seasonal weather patterns in a given year.

3. Survey Conditions:

Searches should only occur on sunny days when air temperature is between 8ºC and 25ºC.

4. Search Effort Required to Determine Probable Absence:

A minimum of three surveys at least two weeks apart and spread over the targeted survey period is recommended. For the purposes of this section, one survey is the amount of effort required to thoroughly search all suitable habitat. If the site is large, several site visits or trips may be required to adequately cover the entire area and complete one survey. If the species is not observed with this search effort and all conditions of this protocol have been followed, the species is unlikely to be present.

It is not appropriate to draw conclusions about the absence of the species from a site if surveys occur outside of the specified survey period outlined above.

5. Required Authorizations and Approvals:

Due to its status as a Species of Species Concern, no authorization is required to survey for Eastern Ribbonsnake under the *Ontario Endangered Species Act, 2007.* An authorization under the *Ontario Fish and Wildlife Conservation Act* is not required for a Visual Encounter Survey.

Milksnake Survey Protocol- MNR Guelph District

(current June 2013; Protocol may change over time if new information becomes available)

Milksnake habitat should be identified using a two-step process:

- Prior to site visits, identify potential habitat using aerial photographs, orthophotos or other available land cover information (such as Ecological Land Classification maps).
- A site visit should be carried out to assess potential habitat identified in step 1 and to confirm the presence of suitable habitat. If detailed maps or other habitat information is not available for a site, the entire site should be thoroughly searched to identify suitable habitat.

Milksnake seek refuge from the elements under various shelters such as rocks, logs, and other objects that can provide cover. Actively searching for the species by looking under and turning over potential cover objects by hand is the most effective method of confirming the presences of this species within suitable habitat. This species is rarely encountered moving around or basking, so visual encounter surveys (walking transects and watching for snakes moving around or basking) are not effective.

An active hand search can be supplemented by a cover board survey, whereby artificial cover (1m x1m wooden boards) is installed within the study area in the hopes of attracting Milksnake seeking shelter. Cover boards should be placed along farm field edges, manure piles, compost piles, near rock piles, woody debris piles, old foundations, and natural or artificial fractures in bedrock or karst features.

N.B.
Milksnakes will typically not be detected under boards until after the boards have been in place for 2-3 years. Negative results from cover board surveys are therefore inconclusive for the first two years of the survey.

1. Survey Technique:

Active Hand Search

Set up walking transects of the appropriate length and spacing so as to comprehensively cover suitable habitat within the study area. Record the location of each transect on a map. Conduct the surveys during the appropriate period and weather conditions (see below), and record the dates, times and weather conditions for each survey. Walk the line transects for the predetermined distance, thoroughly searching by hand all types of cover found within the specified width of each transect. Flip cover objects over towards you. Always replace the cover object carefully to the way it was found, to minimize disturbance of the microhabitat under it. All potential cover sites must be checked.
Record locations (UTM coordinates) of snake observations and photograph individual animals if possible. Also photograph dead specimens.

N.B. Do not flip the same cover objects repeatedly (e.g. every day), to minimize disturbance to the site and the snakes. It is recommended that a cover object remain undisturbed for a minimum of at least two weeks between examinations.

2. Survey Period:

Milksnake cannot be detected during the winter season, as they hibernate underground during this period. Surveys should take place between late April and late June. Detectability is greatly reduced in late summer and autumn.

In Guelph District, surveys should occur no earlier than April 1st and no later than October 15th, though these dates are subject to change depending on seasonal weather patterns in a given year.

3. Survey Conditions:

Searches should occur on sunny days when air temperature is between 8ºC and 25ºC, or if overcast, when temperature is above 15ºC.

Surveys should not be conducted on rainy days.

4. Search Effort Required to Determine Probable Absence:

A minimum of three surveys at least two weeks apart and spread over the targeted survey period is recommended. For the purposes of this section, one survey is the amount of effort required to thoroughly search all suitable habitat. If the site is large, several site visits or trips may be required to adequately cover the entire area and complete one survey.
It is not appropriate to draw conclusions about the absence of the species from a site if surveys occur outside of the specified survey period outlined above.

5. Required Authorizations and Approvals:

- Authorization under the *Fish and Wildlife Conservation Act*: not required for active hand search, but **required for a cover board survey**
- Authorization under the *Endangered Species Act, 2007*: not required
- Approval of an Animal Care Protocol: not required

Hannah Maciver

From: Tricia Radburn
Sent: Friday, June 03, 2016 1:05 PM
To: Hannah Maciver
Subject: FW: Request for Fish Records- St. Marys

From: Timmerman, Art (MNRF) [mailto:art.timmerman@ontario.ca]
Sent: Friday, April 10, 2015 11:44 AM
To: Tricia Radburn
Subject: RE: Request for Fish Records- St. Marys

Tricia, the records are a bit vague. My guess is that the fish were caught below the culvert. Above the culvert the creek was described as a "weed and cattail filled channel, some murky water, no flow".

Art Timmerman
Management Biologist
Ontario Ministry of Natural Resources and Forestry
Guelph District

519-826-4935

From: Tricia Radburn [mailto:Tricia.Radburn@rjburnside.com]
Sent: Wednesday, April 08, 2015 9:01 AM
To: Timmerman, Art (MNRF)
Cc: Chris Pfohl
Subject: RE: Request for Fish Records- St. Marys

Art,

Thank you for the information you provided regarding the tributary that runs through the St. Marys landfill site.

You mentioned that the tributary contains minnows. Do you have any specific species information? Also, do you know if the records are from below or above the perched culvert under Water St. (to the west of the landfill)? This culvert is a significant barrier to fish movement which likely prevents fish from the Thames travelling up this tributary. It would be helpful to know if your records are from above or below this barrier.

Thanks so much.

BURNSIDE

Tricia Radburn M.Sc.(Pl), MCIP, RPP
Senior Environmental Planner

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Guelph, Ontario N1H 1C4

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From: "Timmerman, Art (MNRF)" <art.timmerman@ontario.ca>
To: Tricia Radburn <Tricia.Radburn@rjburnside.com>
Date: 03/02/2015 10:31 AM
Subject: RE: Request for Fish Records- St. Marys

FYI Tricia:

Tributary – minnows abundant

North Thames River – smallmouth bass, rock bass, common shiner, white sucker, greenside darter, pumpkinseed, central stoneroller, spotfin shiner, common carp, striped shiner, rosyface shiner, mimic shiner, bluntnose minnow, blacknose dace, johnny darter blackside darter, northern pike, largemouth bass, creek chub, northern hog sucker

Art Timmerman
Management Biologist
Ontario Ministry of Natural Resources and Forestry
Guelph District

519-826-4935

From: Tricia Radburn [mailto:Tricia.Radburn@rjburnside.com]
Sent: Friday, February 27, 2015 4:01 PM
To: Timmerman, Art (MNRF)
Subject: Request for Fish Records- St. Marys

Mr. Timmerman,

R. J. Burnside & Associates Limited is conducting an Environmental Assessment on behalf of the Town of St. Marys to review the Town's landfill and consider options for managing solid waste in the future. There is an unnamed watercourse which runs through the landfill property and crosses Water St. before emptying into the Thames River. We have received correspondence from Dave. Marriott which notes that you may have fish collection records for the watercourse at its crossing with Water St.

We would appreciate a copy of any fish records/habitat assessments you may have for this area.

A copy of the Notice of Commencement is attached which shows the Study Area.

Thanks so much.

Tricia Radburn M.Sc.(Pl), MCIP, RPP
Senior Environmental Planner

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Hannah Maciver

From: Tricia Radburn
Sent: Thursday, May 21, 2015 8:55 AM
To: Hannah Maciver
Subject: Fw: St. Marys Future Solid Waste Disposal Needs Indiviudal EA- Ecological Work Plan for review
Attachments: Sgarglia Drain Fish.pdf

FYI..

----- Forwarded by Tricia Radburn/RJB on 05/21/2015 08:55 AM -----

From: "Karen Winfield" <winfieldk@thamesriver.on.ca>
To: "Tricia Radburn" <Tricia.Radburn@rjburnside.com>, david.marriott@ontario.ca
Cc: "Dave Blake" <dblake@town.stmarys.on.ca>, "Jamie Hollingsworth" <Jamie.Hollingsworth@rjburnside.com>
Date: 05/20/2015 05:51 PM
Subject: Re: St. Marys Future Solid Waste Disposal Needs Indiviudal EA- Ecological Work Plan for review

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Hi Tricia,

I'm going to apologize to you in advance. Instead of us providing formal comments on your request.... as we generally try to do.... it is "summer busy" here and hoping we can just send you our ecologist's comments in an "informal" copy-and-paste manner to expedite getting this out to you in a timely manner. (Comments from our terrestrial ecologist, aquatic biologist and snake/reptile biologist are below as well as the fish sampling records (attached pdf.) we have for the Sgarglia Municipal Drain.)

****

- use the more recent ELC classification for vegetation communities not described under the 1998 system. Especially since the newer system has more descriptions of human-dominated landscapes / communities.

- list of plants should be broken out by vegetation community, not an overall list. All significant species (plants and animals) should be identified on a map

- precursory field surveys for bat roosts, bat maternity colonies or and woodland amphibian breeding habitat (may require additional monitoring stations). If these surveys are unnecessary (based on preliminary ELC work), some explanation is required.

- We have the watercourse on site listed as the Sgarglia Drain. Of interest, we found smallmouth bass downstream indicating it supplies nursery habitat for the N Thames bass population. I don't think this would extend on to the site as I seem to recall a fairly major perched culvert or similar at Water St. Largemouth Bass found upstream are probably from a pond upstream of the site.

- They list Redside Dace as a potential SAR but there are no records for this species in the Thames that I am aware of.

- Not sure whether it is within the bounds of this type of study but would a water quality component, benthic and water chemistry, to see what the drain is contributing to the N Thames be appropriate?

- The proposed site is adjacent to known softshell habitat, including a movement corridor and relatively close to the only known oviposition (nesting) site upstream of London. Likely not an issue if the river, or shoreline, is not influenced in any way from this proposal.

- On page 32, 34, 40, 43 softshells are not generally found along swift flowing rivers, but rather slow flowing rivers and basking surveys should be conducted from mid May to mid June for best results, though turtles may move over 30 km between nesting and hibernation sites, so just because they are not seen, does not mean they will not be there at some point during the year. Since they bask infrequently after mid June, they may be difficult to detect. Additionally, they are quite shy and fast, so abandon basking sites quickly. When in low densities, as they are in the St. Mary's area, they are hard to detect.

- Regarding the suggested surveys for milksnake. Searching cover boards 3 times per year is not adequate for presence/absence. It is a tool, but just because a snake is not seen, does not mean it is not there. Our cover material survey work has shown that, in some cases, milksnakes may be seen once every 4 or 5 years, despite frequent work in the area. They are cryptic and easily missed.

- Basking surveys for snapping turtles are not the best way. Moving slowly through thick mud and vegetation with chest waders, looking for evidence of nesting (including predated eggs) are usually more productive. But as with all of the reptile surveys suggested, these are only good for determining presence, NOT for determining absence due to cryptic behaviour and in some cases low population density.

- Page 13 and page 48 (Milksnake survey protocol)

Again, probable absence can not be determined based on the existing survey protocol in most cases. In a well established area in London, known for milksnakes, they are seen very infrequently despite yearly work by herpetologists. Based on the survey protocol presented in this document, this known milksnake population in London ON would likely qualify as a site with "probable absence". This would also hold true for sites I work on in Oxford and Norfolk County. Such a determination should be avoided when it comes to very cryptic species (most snakes), or species at risk that are often in low densities. I realize this is pretty standard, but it is not based on fact and search effort to determine probable absence could only be done if the site is in very poor condition with almost no areas for the snakes to hide or with no, or almost no, natural features. I agree presence surveys can be done, but in the case of absence, the wording should focus on the results of the surveys, not suggesting absence, but rather no snakes found at this time (if that is the case).

****

Hope this helps.

Thank-you,

Karen Winfield
Land Use Regulations Officer
1424 Clarke Road London, Ontario, N5V 5B9
519.451.2800 Ext. 237 | Fax: 519.451.1188

winfieldk@thamesriver.on.ca

UPPER THAMES RIVER
CONSERVATION AUTHORITY

>>> Tricia Radburn <Tricia.Radburn@rjburnside.com> 4/24/2015 10:36 AM >>>
Good morning,

R.J. Burnside & Associates Limited is working on behalf of the Town of St. Marys to complete an Individual Environmental Assessment to study various options for managing the Town's solid waste over the next 40 years. The Terms of Reference was approved by the Minister of the Environment and Climate Change in December, 2014 and the EA work program is now underway. Details can be found here: http://townofstmarys.com/living/living.aspx?id=9840

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The TOR committed to preparing detailed Work Plans for various disciplines for review by agencies and interested Aboriginal communities prior to the initiation of fieldwork. We have attached a draft Ecological Work Plan outlining our proposed work at the site.

We would appreciate any comments or questions you may have regarding our proposed methodology and scope of work, as outlined in the Work Plan.

Kind Regards,

BURNSIDE

Tricia Radburn M.Sc.(Pl), MCIP, RPP
Senior Environmental Planner

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292 Speedvale Ave. West, Unit 20
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Direct Line: 226-486-1778
www.rjburnside.com

**********(*See attached file: Sgarglia Drain Fish.pdf)*

UTRCA Fish Sampling Records

Location		Species at Risk (SAR) Status		Provincial Status		Site Number	Sample Date
Species (Common Name)	**Scientific Name**	**COSEWIC**	**SARA**	**ESA 2007**	**SRank**	**Abundanc**	**Distribution**
Sgarglia Drain							
Water Street at Cement Plant			UTM x: 487260	UTM y: 4787562		3111-UT	10/28/2011
Bluntnose Minnow	*Pimephales notatus*				S5	Abundant	widespread
Central Stoneroller	*Campostoma anomalum*				S4	Abundant	widespread
Common Shiner	*Luxilus cornutus*				S5	Abundant	widespread
Rosyface Shiner	*Notropis rubellus*				S4	Abundant	widespread
Smallmouth Bass	*Micropterus dolomieu*				S5	Abundant	widespread
Spotfin Shiner	*Cyprinella spiloptera*				S4	Abundant	widespread
Striped Shiner	*Luxilus chrysocephalus*				S4	Abundant	widespread
White Sucker	*Catostomus commersoni*				S5	Abundant	widespread
Sgarglia Drain							
1908 James St S. S of St Marys			UTM x: 489295	UTM y: 4787061		3112-UT	10/28/2011
Largemouth Bass	*Micropterus salmoides*				S5	Abundant	widespread

Location		Species at Risk (SAR) Status			Provincial Status		Site Number	Sample Date
Species (Common Name)	**Scientific Name**	**COSEWIC**	**SARA**	**ESA 2007**	**SRank**		**Abundanc**	**Distribution**

COSEWIC Status: The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assesses species for their consideration for legal protection and recovery (or management) under the Species at Risk Act (SARA).

Extinct: A wildlife species that no longer exists.
Extirpated: A wildlife species no longer existing in the wild in Canada, but exists elsewhere.
Endangered: A wildlife species facing imminent extirpation or extinction.
Threatened: A wildlife species likely to become endangered if limiting factors are not reversed.
Special Concern: A wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
Not at Risk: A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.
Data Deficient: A category that applies when the available information is insufficient (a) to resolve a wildlife species' eligibility for assessment or (b) to permit an assessment of the wildlife species' risk of extinction.

Reference: www.cosewic.gc.ca (current to November 2011)

SARA Status: The federal at risk designation for species under the Species at Risk Act (SARA)
Reference: www.sararegistry.gc.ca (current to December 2011)

ESA 2007 / SARO Status: Species at Risk in Ontario (SARO) are designated by the Ontario Ministry of Natural Resources (OMNR) in accordance with the provincial Endangered Species Act (ESA) through the Committee on the Status of Species at Risk in Ontario (COSSARO).

Extirpated: A native species that no longer exists in the wild in Ontario but still occurs elsewhere.
Endangered: A native species facing imminent extinction or extirpation in Ontario.
Threatened: A native species that is at risk of becoming endangered in Ontario.
Special Concern: A native species that is sensitive to human activities or natural events which may cause it to become endangered or threatened.

Reference: www.ontario.ca/speciesatrisk (current to January 2012)

Provincial Rank (SRANK): Provincial (or Subnational) ranks are used by the Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. These ranks are assigned to consider only those factors within the political boundaries of Ontario.

SX Presumed Extirpated: Species or community is believed to be extirpated from the nation or state/province. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.
SH Possibly Extirpated (Historical): Species or community occurred historically in the nation or state/province, and there is some possibility that it may be rediscovered. Its presence may not have been verified in the past 20-40 years. A species or community could become NH or SH without such a 20-40 year delay if the only known occurrences in a nation or state/province were destroyed or if it had been extensively and unsuccessfully looked for. The NH or SH rank is reserved for species or communities for which some effort has been made to relocate occurrences, rather than simply using this status for all elements not known from verified extant occurrences.
S1 Critically Imperiled: Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.
S2 Imperiled: Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.
S3 Vulnerable: Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
S4 Apparently Secure: Uncommon but not rare; some cause for long-term concern due to declines or other factors.
S5 Secure: Common, widespread, and abundant in the nation or state/province.
SNR Unranked: Nation or state/province conservation status not yet assessed.
SU Unrankable: Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
SNA Not Applicable: A conservation status rank is not applicable because the species is not a suitable target for conservation activities.
S#S# Range Rank: A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).

Reference: http://nhic.mnr.gov.on.ca/MNR/nhic/nhic.cfm (current to March 2012)

Abundance: Refers to the relative abundance or common occurrence of the species found within the waters of the Thames River watershed based on sampling results. Consideration was given to accurately reflect the species presence within the watershed due to the sampling capture method, effort, and biases, difficulty in capturing certain species and anecdotal reporting.
Abundant: Greater than 50 sample records in the database
Common: Between 15 and 50 sample records in the database
Historical: . species that have been previously recorded in the Thames
Rare: Less than 5 sample records in database
Uncommon: Between 5 and 15 sample records in database

Distribution: Indicates whether species are sampled throughout the watershed or restricted to specific locales.

Prepared - Wednesday, May 13, 2015

Hannah Maciver

From: Tricia Radburn
Sent: Friday, June 03, 2016 1:04 PM
To: Hannah Maciver
Subject: FW: St. Marys Future Solid Waste Disposal Needs Indiviudal EA- Ecological Work Plan for review
Attachments: Species at Risk Bat Surveys for Buildings and Isolated Trees.pdf; Bat and Bat Habitat Surveys of Treed Habitats - Guelph.pdf

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From: Marriott, David (MNRF) [mailto:David.Marriott@ontario.ca]
Sent: Monday, June 01, 2015 2:07 PM
To: Tricia Radburn
Subject: RE: St. Marys Future Solid Waste Disposal Needs Indiviudal EA- Ecological Work Plan for review

Hi Tricia,

I apologize for the delay in responding.

MNRF staff have had an opportunity to review the 'Ecological Work Plan' for the St. Marys Future Waste Disposal Environmental Assessment (EA), and can offer the following comments for consideration:

- Bank Swallow was listed as threatened under the *Endangered Species Act* (ESA) in June 2014, and the species received individual and general habitat protection at the time of listing. Given the history of the site (e.g. licensed under the *Aggregate Resources Act*), there may be the potential for the species' habitat to be on or adjacent to the site. However, the breeding bird surveys that are already proposed in the Work Plan will detect the species if they are in the area.

- It is understood that the Work Plan has screened out the potential for listed bat habitat to be on the site. MNRF staff notes that habitat for Little Brown Myotis (endangered) includes tree cavities as maternal roost habitat (woodlands and isolated trees), and forest edges and hedgerows as movement and foraging habitats. From the 2010 air-photo there appears to be isolated trees and hedgerows on the site. If there are any cavity trees that may be impacted by the project, it is recommended that the trees be surveyed to ensure they are not habitat for listed bats. The MNRF Guelph District's recommended survey protocols for listed bats are attached for your reference.

Thanks

Dave

Dave Marriott
District Planner
Ministry of Natural Resources and Forestry, Guelph District
1 Stone Road West
Guelph ON, N1G 4Y2
(P) 519-826-4926
(F) 519-826-6849
email: david.marriott@ontario.ca

From: Tricia Radburn [mailto:Tricia.Radburn@rjburnside.com]
Sent: April 24, 2015 10:37 AM
To: Marriott, David (MNRF); winfieldk@thamesriver.on.ca
Cc: Jamie Hollingsworth; Dave Blake
Subject: St. Marys Future Solid Waste Disposal Needs Indiviudal EA- Ecological Work Plan for review

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