

**Confirmation Letter from the
Ministry of Natural Resources and
Forestry**

June 16, 2017

Kevin Campbell, Senior Developer
Barlow Energy Centre Limited Partnership
53 Jarvis Street
Toronto, Ontario
M5C 2H2

RE: NHA Confirmation for the Barlow Solar Energy Centre

Dear Mr Campbell:

In accordance with the Ministry of the Environment and Climate Change's (MOECC's) Renewable Energy Approvals (REA) Regulation (O.Reg.359/09), the Ministry of Natural Resources and Forestry (MNRF) has reviewed the Barlow Solar Energy Centre Natural Heritage Assessment and Environmental Impact Study for the Barlow Solar Energy Centre in the Township of South Stormont, United Counties of Stormont, Dundas and Glengarry submitted by Kevin Campbell on June 15, 2017.

In accordance with Section 28(2) and 38(2)(b) of the REA regulation, MNRF provides the following confirmations following review of the natural heritage assessment:

1. The MNRF confirms that the determination of the existence of natural features and the boundaries of natural features was made using applicable evaluation criteria or procedures established or accepted by MNRF.
2. The MNRF confirms that the site investigation and records review were conducted using applicable evaluation criteria or procedures established or accepted by MNRF, if no natural features were identified.
3. The MNRF confirms that the evaluation of the significance or provincial significance of the natural features was conducted using applicable evaluation criteria or procedures established or accepted by MNRF.
4. The MNRF confirms that the project location is not in a provincial park or conservation reserve.
5. The MNRF confirms that the environmental impact study report has been prepared in accordance with procedures established by the MNRF.

In accordance with Section 28(3)(c) and 38(2)(c), MNRF also offers the following comments in respect of the project.

Preconstruction Monitoring

In accordance with Appendix D of MNRF's NHA Guide, a commitment has been made to complete pre-construction assessment(s) of habitat use for the following candidate significant wildlife habitat;

i) Amphibian Movement Corridor (amc1)

MNRF has reviewed and confirmed the assessment methods and the range of mitigative options. Pending completion of the assessments and determination of significance, the appropriate mitigation is expected to be implemented, as committed to in the Environmental Impact Study.

This confirmation letter is valid for the project as proposed in the natural heritage assessment and environmental impact study, including those sections describing the Environmental Effects Monitoring Plan and Construction Plan Report. Should any changes be made to the proposed project that would alter the NHA, MNRF may need to undertake additional review of the NHA.

Where specific commitments have been made by the applicant in the NHA/EIS with respect to project design, construction, rehabilitation, operation, mitigation, or monitoring, MNRF expects that these commitments will be considered in MOECC's Renewable Energy Approval decision and, if approved, be implemented by the applicant.

In accordance with S.12 (1) of the Renewable Energy Approvals Regulation, this letter must be included as part of your application submitted to the MOECC for a Renewable Energy Approval.

Please be aware that your project may be subject to additional legislative approvals as outlined in the Ministry of Natural Resources and Forestry's *Approvals and Permitting Requirements Document*. These approvals are required prior to the construction of your renewable energy facility.

If you wish to discuss any part of this confirmation or additional comments provided, please contact Mike Poskin, Renewable Energy Coordinator at 705-755-1362 or mike.poskin@ontario.ca.

Sincerely,



Erin Cotnam
Regional Land Use Planning Supervisor, MNRF

cc Mike Poskin, Regional Operations Division, MNRF
Mohsen Keyvani, Environmental Approvals Branch, MOECC
Nicole Kopysh, Project Manager, Stantec

Natural Heritage Assessment and Environmental Impact Study

**Barlow Solar Energy Centre
Natural Heritage Assessment
and Environmental Impact
Study**

FINAL REPORT



Prepared for:
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File No. 160960879
June 15, 2017

**BARLOW SOLAR ENERGY CENTRE
NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

This document entitled Barlow Solar Energy Centre Natural Heritage Assessment and Environmental Impact Study was prepared by Stantec Consulting Ltd. ("Stantec") for the account of Barlow Energy Centre Limited Partnership (the "Client"). In connection with the Client's application for a Renewable Energy Approval, this document may be reviewed and used by the following entities in the normal course of their review and approval process: (a) the MOECC; (b) the MNRF; (c) the MTCS; and (d) the Environmental Review Tribunal. Except as set forth in (a) through (d) above, any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others, unless otherwise stated therein. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

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Abbreviations

ac	alternating current
ANSI	Area of Natural and Scientific Interest
DEM	Digital Elevation Model
ELC	Ecological Land Classification
EEMP	Environmental Effects Monitoring Plan
EIS	Environmental Impact Study
EOS	Evaluation of Significance
GIS	Geographic Information System
ha	hectare
Hydro One	Hydro One Networks Inc.
km	kilometre
LIO	Land Information Ontario
LRP	Large Renewable Procurement
LUF	Adjacent and Watershed Land Use
MOECC	Ministry of Environment and Climate Change
MNRF/MNR	Ministry of Natural Resources and Forestry
MW	megawatt
NHA	Natural Heritage Assessment
NHAG	Natural Heritage Assessment Guide
NHIC	Natural Heritage Information Centre
O. Reg.	Ontario Regulation

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OWES	Ontario Wetland Evaluation System
PV	photovoltaic
PCC	Point of Common Coupling
PSW	Provincially Significant Wetland
PUT	Pollutant Uptake Factor
RRCA	Raisin Region Conservation Authority
REA	Renewable Energy Approval
SARA	Species at Risk Act
SWH	Significant Wildlife Habitat
SWHTG	Significant Wildlife Habitat Technical Guide
SWHMIST	Significant Wildlife Habitat Mitigation Support Tool
TNPI	Trans-Northern Pipelines Inc.
WCEFA	Wetland Characteristics and Ecological Functions Assessment
WIF	Watershed Improvement Factor
ZOI	Zone of Investigation

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Introduction
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1.0 INTRODUCTION

1.1 BACKGROUND

Barlow Energy Centre Limited Partnership (the Proponent), is proposing the development of a 10 megawatt alternating current (MWac) solar energy generating facility, known as the Barlow Solar Energy Centre (the Project) approximately 10 kilometres (km) west of the city centre of Cornwall in the Township of South Stormont, United Counties of Stormont, Dundas and Glengarry, Ontario. The Point of Common Coupling will be located adjacent to the Project Location, within the road allowance of Cornwall Centre Road, in the City of Cornwall, Ontario. The Project will require a Renewable Energy Approval (REA) as per Ontario Regulation (O. Reg.) 359/09 - Renewable Energy Approvals under Part V.0.1 of the Act, under the *Environmental Protection Act* (MOECC 2009, amended 2016).

The Proponent is proposing to develop, construct and operate the Project on approximately 38 hectares (ha; 94 acres) of land in response to the Government of Ontario's Large Renewable Procurement (LRP) initiative to promote the development of renewable electricity in the province.

The Proponent has retained Stantec Consulting Ltd. (Stantec) to prepare a REA application, as required under O. Reg. 359/09. The proposed solar PV distribution grid connected system would be considered a Class 3 Solar Facility under O. Reg. 359/09, s. 4.

1.2 PROJECT LOCATION AND ZONE OF INVESTIGATION

The Project will be located on parts of lots 20 and 21, Concession 4 on privately-owned land, leased for a period of 20 or more years. The Project Location is bounded to the south by Cornwall Centre Road, and to the west, north and east by undeveloped woodlands and scrubland. A Trans-Northern Pipeline Inc. (TNPI) pipeline and Hydro One Networks Inc. (Hydro One) transmission line bisect the Project. A map showing the location of the Project is provided in **Figure 1, Appendix A**.

The term "Project Location" is defined by O. Reg. 359/09 as:

"a part of land and all or part of any building or structure in, on or over which a person is engaging in or proposes to engage in the project and any air space in which a person is engaging in or proposes to engage in the project" (MOECC 2009, amended 2016).

For the purposes of this Project, the "Project Location" includes the footprint of all facility components (i.e., buildable area), plus any temporary work or storage locations. The boundary of the Project Location is used for defining setback and site investigation distances according to O. Reg. 359/09. All construction vehicles, personnel, and installation activities would be confined

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to this designated area. Installation activities related to the connection line at the Point of Common Coupling (PCC) would be contained within the boundaries of the municipal road allowance.

As required by O. Reg. 359/09, a "Zone of Investigation" (ZOI) has been identified around the outer limits of the Project Location. The ZOI was measured 50 m from the Project Location, as described above. The Project Location and ZOI are shown on **Figures 2, Appendix A**. Although natural features within the Project Location and 50 m are identified below in accordance with the requirements of the Natural Heritage Assessment Guide for Renewable Energy Projects (NHAG), the records review was conducted within a larger area (e.g. ~1 km for LIO layers and 10x10 km squares for wildlife atlases).

1.3 REPORT REQUIREMENTS

This Natural Heritage Assessment and Environmental Impact Study (NHA/EIS) is intended to satisfy the requirements outlined within O. Reg. 359/09 (s. 24 through 28, 37, and 38) and is to be submitted as a component of the REA application. The Project Location and its ZOI are not located within the Niagara Escarpment Plan, the Oak Ridges Moraine Conservation Plan Area, the Lake Simcoe Protection Plan or the Protected Countryside of the Greenbelt Plan.

A NHA is required to determine whether any of the following features exist in and/or within the Project Location and the ZOI:

- Wetlands
- Coastal wetlands
- Life Science Areas of Natural and Scientific Interest (ANSIs)
- Earth Science ANSIs
- Woodlands
- Wildlife habitat
- Provincial Parks and Conservation Reserves

This report identifies the existence and boundaries of all natural features in and within the Project Location and ZOI based on a review of background records and field investigations. As natural features are located within the ZOI, this report provides an evaluation of significance (EOS) for each identified feature based on either an existing Ministry of Natural Resources and Forestry (MNRF) designation of the feature, or by using evaluation criteria or procedures established or accepted by the MNRF.

An EIS is required to identify and assess any negative environmental effects and identify mitigation measures for significant natural features within the Project Location or ZOI as per O.

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Reg. 359/09, s.38. The results of the NHA/EIS must be consolidated into a report and submitted to the MNRF for confirmation in advance of submission of the REA application to the Ministry of Environment and Climate Change (MOECC). Written confirmation from the MNRF, as well as any written comments received from the MNRF, must be submitted along with the NHA and EIS to the MOECC as part of the REA application.

1.4 GUIDANCE DOCUMENTS

During the preparation of this report, several guidance documents were referenced to ensure compliance with current standards and agency requirements. These documents include:

- Natural Heritage Assessment Guide for Renewable Energy Projects (NHAG) – Second Edition (MNR, 2012)
- Significant Wildlife Habitat Technical Guide (SWHTG) (MNR, 2000); including, the Criteria Schedule for EcoRegion 6E (MNRF, 2015)
- Significant Wildlife Habitat Mitigation Support Tool (SWHMIST) (MNR, 2014b)
- Natural Heritage Reference Manual – Second Edition (MNR, 2010)
- Ontario Wetland Evaluation System (OWES), Southern Manual (MNR, 2014a)

Records Review
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2.0 RECORDS REVIEW

2.1 METHODS

This Records Review report was prepared in accordance with O. Reg. 359/09, s. 25 (3). There are no planning boards, local roads boards, or Local Services boards applicable to the Records Review.

Background data was collected and reviewed to identify natural features located within the Project Location or within the ZOI. Documents reviewed and agencies contacted as part of the Records Review included but were not limited to:

Crown in Right of Canada

- Environment Canada. 2011. Species at Risk Act (SARA) Registry online database. Accessed June, 2016. Available:
<https://www.registrelep-sararegistry.gc.ca/default.asp?lang=En&n=24F7211B-1>

Provincial

- Ministry of Natural Resources and Forestry. Requested background information from the MNRF Kemptville District Information Request Services (September, 2016).
- Natural Heritage Information Centre (NHIC) database. 2015. Natural Areas and Species records search. <https://www.ontario.ca/page/natural-heritage-information-centre>.
- Ministry of Natural Resources and Forestry. 2016. Land Information Ontario (LIO) digital mapping of natural heritage features. These included the following layers:
 - ANSI Data Layer (2016)
 - Conservation Reserve Regulated Data Layer (2016)
 - Wooded Area Data Layer (2016)
 - Wetland Area Data Layer (2016)
 - Waterbody Data Layer (2016)
 - Watercourse Data Layer (2016)
 - Provincial Park Regulated Data Layer (2016)
 - Significant Ecological Area Data Layer (2015)

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Conservation Authority

- Raisin Region Conservation Authority (RRCA). Requested mapping showing regulated areas within the Project location and ZOI.

Local and Upper-Tier Municipalities / Municipal Planning Authority

- City of Cornwall. 2004. Official Plan and associated schedules.
- United Counties of Stormont, Dundas and Glengarry. 2009. Official Plan and associated schedules.

Other Data Sources

- Important Bird Areas Database. Online data accessed 2016. Bird Studies Canada and BirdLife International.
- Various wildlife atlases (Atlas of the Mammals of Ontario, Dobbyn 1994; Ontario Herpetofaunal Atlas, Ontario Nature, 2016; Ontario Breeding Bird Atlas, Cadman et al. 2007).
- Ontario Parks Planning and Management Information (<https://www.ontarioparks.com/park-locator>).

The information received from each source and the way it was used to identify natural features, provincial parks or conservation reserves that exist in or within the Project Location and ZOI are detailed below (**Section 2.2**).

2.2 RESULTS

The results of the Records Review were used to determine whether natural features are within the Project Location and/or ZOI. The location and boundaries of natural features documented within the ZOI are described in the following sections and shown on **Figure 2, Appendix A**. No natural features were identified within the Project Location.

2.2.1 Wetlands

Key information sources reviewed to identify wetlands include consultation with the MNRF Kemptville District, Land Information Ontario (LIO) mapping and the Natural Heritage Information Centre (NHIC), the City of Cornwall Official Plan (2004), and the United Counties of Stormont, Dundas and Glengarry Official Plan (2009). This review identified four wetlands within the ZOI as shown on **Figure 2, Appendix A**. No wetlands were identified within the Project Location.

Provincially Significant Wetlands

No Provincially Significant Wetlands (PSW) were identified within the Project Location or ZOI.

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Other/ Locally Significant Wetlands

No Locally Significant Wetlands were identified within the Project Location or ZOI.

Unevaluated Wetlands

Four unevaluated wetlands were identified within the ZOI during the Records Review to the north and west of the Project Location, and south of Cornwall Centre Road, as shown on **Figure 2, Appendix A** (LIO, 2016). None were identified within the Project Location.

2.2.2 Woodlands

Woodlands are defined as treed areas, woodlots or forested areas other than cultivated fruit, nut orchards, or Christmas tree plantations that are located east and south of the Canadian Shield (MNR, 2012).

The Project is located within the Upper St. Lawrence section of the Great Lakes – St. Lawrence Forest Region (Rowe, 1972), within the subregion known as Ecoregion 6E-12 (Cornwall). This region is dominated by sugar maple and beech with various associates of basswood, white ash, yellow birch, red maple, bur and red oak, basswood and largetooth aspen. Other locally occurring tree species include white oak, red ash, grey birch, rock elm, blue-beech and bitternut hickory. In the contemporary landscape, white elm dominates while butternut, eastern cottonwood, and slippery elm are sporadically distributed in river valleys. On fertile, fine-textured lowland soils, pure stand of black maple and silver maple have been reported. Hardwood swamp types dominated with black ash are frequent on poorly-drained depressions (Rowe, 1972).

A review of aerial photos and the City of Cornwall Official Plan (2004) and the United Counties of Stormont, Dundas and Glengarry Official Plan (2009) indicate that the Project area is located in a rural area that is predominantly agricultural, with portions of wooded areas. The United Counties of Stormont, Dundas and Glengarry Official Plan (2009) states that 33% of the land base consists of wooded areas.

LIO mapping identifies no woodlands within the Project Location and nine (9) within the ZOI (LIO, 2016). Three of the woodlands are identified as significant ecological areas (LIO, 2015).

All woodlands identified through the records review are shown in **Figure 2, Appendix A**. The occurrence, classification (as per Ecological Land Classification (ELC)) and boundaries of these features as well as any additional woodland have been verified during the Site Investigation.

2.2.3 Wildlife Habitat

Wildlife habitat is defined as an area where plants, animals and other organisms live, including areas where species concentrate at a vulnerable point in their life cycle and that are important

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to migratory and non-migratory species (O. Reg. 359/09). The Significant Wildlife Habitat (SWH) Ecoregion 6E Criterion Schedule (MNRF, 2015) groups wildlife habitat into four categories:

- seasonal concentration areas of animals
- rare vegetation communities or specialized habitat for wildlife
- habitat for species of conservation concern
- animal movement corridors.

Unlike other natural features such as woodlands, ANSIs or wetlands, known occurrence and location information for many components of SWH are often not available on a site-specific basis. As a result, background information that is available for the greater local landscape has been compiled and is used to identify known SWH, and inform the potential for candidate SWH (**Table B1, Appendix B**). Using this information, a preliminary assessment was conducted to identify if wildlife habitat features are present within the Project Location or ZOI to determine whether the area contains candidate SWH. Site-specific information gathered during the Site Investigation is required to determine whether the habitat to support SWH is present within the Project Location or ZOI.

Wildlife records from within the range of the Project were compiled from available literature and resources including the Atlas of the Mammals of Ontario (Dobbyn, 1994), Ontario Reptile and Amphibian Atlas (Ontario Nature, 2016), Ontario Breeding Bird Atlas (Cadman et al. 2007), the NHIC database (2016), background information from the Information Request Services (MNRF, 2016) and LIO mapping of known wildlife features (LIO, 2016).

Based on a review of background resources, 99 species of birds, 20 species of mammals, 10 species of amphibians, and six species of reptiles are known to occur within the range of the Project (**Appendix C**). Exact locations of species occurrences are not available from these atlases and instead, are recorded within 10 x 10 km squares. The potential for species to be present within the Project Location will be limited by the habitat suitability and availability supported by the Project's local landscape. Therefore, the identified species recorded from these databases may not occur within the Project Location or ZOI.

Known wildlife habitat components identified through the records review are detailed in **Table B1, Appendix B**. A summary of the record review results is provided in **Table 2.1**.

The occurrence and boundaries of candidate SWH within the Project Location and the ZOI were identified during the Site Investigation and outlined in Section 3.2.

2.2.4 Areas of Natural and Scientific Interest (ANSIs)

MNRF identifies two types of ANSIs: Life Science and Earth Science. Life Science ANSIs are significant representative areas of Ontario's biodiversity and natural landscapes, while Earth

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Science ANSIs are geological in nature and consist of significant representative examples of bedrock, fossils and landforms in Ontario.

The background review did not identify any Life Science or Earth Science ANSIs within the Project Location or ZOI and has not be carried forward to Site Investigations (LIO, 2016; NHIC, 2015; MNRF, 2016).

2.2.5 Provincial Parks and Conservation Reserves

There were no provincial parks or conservation reserves identified within the ZOI or Project Locations through the Records Review (LIO, 2016; NHIC, 2015; Ontario Parks, 2016).

2.2.6 Summary of Natural Features and Boundaries Identified

A summary of known natural features identified through the Records Review as occurring in the the Project Location and/or ZOI are provided in **Table 2.1**, below. No known features were identified within the Project Location.

Table 2.1: Summary of Natural Features Identified in Records Review for the Project Location and ZOI

Feature	Carried Forward to Site Investigation (Y/N)	Known Recorded Information in the ZOI	Known Recorded Information within the Project Location
Wetlands	Y	4 unevaluated wetlands	No records
Woodlands	Y	9 wooded areas	No records
Wildlife Habitat	Y	No records	No records
Areas of Natural and Scientific Interest (ANSIs): <ul style="list-style-type: none"> • Life Science ANSI • Earth Science ANSI 	N	No records	No records
Specified provincial plan areas	N	No records	No records
Provincial Parks and Conservation Reserves	N	No records	No records

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Site Investigations
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3.0 SITE INVESTIGATIONS

Site investigations were conducted to confirm the presence and boundaries of natural features within the Project Location and associated ZOI following guidance and protocols as recommended in MNRF's NHAG (2012). Determinations made based on the site investigations include:

1. whether the results of the record review are correct or require correction, and identifying any required corrections
2. whether any additional natural features exist, other than those that were identified in the records review
3. the boundaries of any natural feature located within 50 m of the Project Location.

3.1 METHODS

Site investigations detailed the current conditions within the Project Location and ZOI. Survey dates, times, duration, field personnel and weather conditions are presented in **Table B2, Appendix B** with field notes provided in **Appendix D**. Qualifications for personnel involved in conducting the site investigation are provided in **Appendix E**. Land access was available for all land parcels where Project components are proposed, and all areas within the Project Location and ZOI were traversed on foot during site investigations as further described below.

All site investigations were carried out in accordance with O. Reg. 359/09 and the NHAG (MNR, 2012), using guidance provided in the SWHTG (MNRF, 2000) and the SWH Ecoregion 6E Criterion Schedule (MNRF, 2015). Site investigations included ELC and OWES (Ontario Wetland Evaluation System) methodology.

3.1.1 Alternative Site Investigation Methods

Site investigations were conducted for all areas within the ZOI except where private property was adjacent to Project Location and access was not granted. Stantec and the Proponent worked collaboratively to identify land access requirements and the Client directly contacted landowners in early June to request access for the purpose of site investigations. Sites were not accessed in cases where permission was denied or a response was not received. In these cases, it was necessary to conduct Alternative Site Investigations, as described in Part IV, Section 26 of O. Reg. 359/09.

Alternative Site Investigation methods were used when assessing natural features south of Cornwall Centre Road. This area was assessed from the side of the road where access was available (i.e. the municipal road allowance). Vegetation communities in these natural areas

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were identified to the lowest nested ELC community unit possible using the ELC for Southern Ontario.

3.1.2 Vegetation Community and Vascular Plants Assessment

ELC of the Project Location and the ZOI was conducted by Stantec in 2016.

Vegetation communities were delineated on aerial photographs and confirmed in the field on June 7, 2016 and April 10, 2017. Vascular plant species lists were recorded separately for each community. Community characterizations were based on the ELC system (Lee et al., 2008). English colloquial names and scientific binomials of plant species generally follow Newmaster et al. (1998).

3.1.3 Wetland Confirmation and Delineation

Wetlands are defined as features that are swamp, marsh, bog, or fen that are seasonally or permanently covered by shallow water or have the water table close to the surface, and have hydric soils and vegetation dominated by hydrophytic or water-tolerant plants (MNR, 2012). Wetlands were identified during ELC surveys and were further evaluated using OWES.

Wetland boundaries were initially identified based on ELC mapping. All wetland and fresh-moist upland communities (ELC criteria) were used to identify known and potential wetland communities. The location of the boundaries of wetlands were verified and delineated in the field using OWES- methods by a certified OWES evaluator (**Appendix E**). Survey information (i.e., survey times, weather conditions and field personnel) is provided in **Table B2, Appendix B**.

3.1.4 Woodlands

Woodlands include treed areas, woodlots, or forested areas, other than cultivated fruit or nut orchards or plantations established for the purpose of producing Christmas trees (MNR, 2012).

The limits of all woodlands that occur, or partially occur, within the ZOI were delineated through aerial photo interpretation and confirmed during site investigations. Woodlands were delineated using the driplines of the trees. Information regarding woodland size, ecological function and uncommon characteristics was collected during the ELC survey and through GIS analysis. Treed areas identified during vegetation surveys were compared to the definition of woodlands provided in O. Reg. 359/09 to delineate the limits of woodlands. In accordance to the NHAG (MNR, 2012), bisecting openings of 20 m or less were not considered to divide woodlands into two.

3.1.5 Wildlife and Wildlife Habitat

Wildlife habitat assessment surveys were undertaken on June 7, 2016 in conjunction with ELC survey. Presence or absence of wildlife habitat features as identified within the MNR's SWH

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Criteria Schedules (2015) was recorded along with a description of the attributes and location of each feature identified. These details are described in **Table B1, Appendix B**.

Methods used to identify the presence of each candidate wildlife habitat type are provided in **Table B1, Appendix B**. Survey information (i.e., survey times, weather conditions and field personnel) is provided in **Table B2, Appendix B**.

In accordance with Appendix D of the NHAG, most wildlife habitat types that are identified within 50 m of the Project Location of a Solar Project can be considered "Generalized Candidate SWH" and treated as significant without requiring species-specific surveys to confirm significance (MNR, 2012). This is because the type of Project components used in Solar Projects does not have an operational impact on this type of habitat. These habitats have been assessed for the potential to occur within 50 m of the Project Location based on landscape and geography (specifically the ELC assessment). Those that have the potential to occur based on this assessment are treated as Generalized Candidate SWH, as detailed in **Table B1, Appendix B**. However, some SWH are an exception to this and need to be individually identified or delineated, including:

- Seasonal Concentration Areas
 - Colonial Birds (ground) - Terns
 - Colonial Birds (trees and shrubs) - Herons
 - Reptile Hibernacula
- Animal Movement Corridors
 - Amphibian Movement Corridors
 - Deer Movement Corridors

All candidate wildlife habitats occurring at the Project Location have been individually identified, delineated and confirmed.

3.2 RESULTS

The Project Location is located completely within active agriculture. At the time of the Site Investigation, the Project Location was planted as corn. The ZOI is comprised primarily of natural vegetation consisting of deciduous forest, woodland, thicket, and swamp, as described in Sections 3.2.1 to 3.2.2. The ZOI, Project Location, and ELC delineations are shown on **Figure 3, Appendix A**.

Field notes for the site investigations are provided in **Appendix D**.

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A list of all wildlife features confirmed during the site investigation in the Project Location and ZOI is provided in **Table B1, Appendix B**, and natural features and their boundaries are shown on **Figure 4, Appendix A**.

Each vegetation community within the ZOI and Project Location is described in **Table B3, Appendix B** and shown on **Figure 3, Appendix A**.

No rare vegetation communities were identified within the Project Location and ZOI.

3.2.1 Wetlands

The site investigation confirmed the presence of the four wetlands within the ZOI identified during the Records Review. However, the boundaries for the wetlands to the northwest and west of the Project Location were connected based on the site investigation outcomes. As a result, these two wetlands in the records review became the same feature. Additionally, three other wetlands were observed north of the Project Location during the site investigation that were not previously identified in the records review, which is discussed in **Table 3.1** and shown on **Figure 4, Appendix A** (i.e., total of 6 wetlands). Wetlands within the ZOI are typically deciduous lowlands and swamps with swamp thickets. The wetland features were 5 m or further from the Project Location. No wetlands were located within the Project Location.

The presence of wetlands and boundaries present during the site investigation are shown on **Figure 4, Appendix A**.

Descriptions of these features are provided in **Table B4, Appendix B**.

An EOS is required for all wetlands identified through the site investigation.

3.2.2 Woodlands

A total of 5 woodland features were identified within the ZOI during the site investigation, as shown on **Figure 4 (Appendix A)**. No additional woodlands not previously identified in the Records Review were located during the site investigation. However, woodland boundaries were corrected based on the site investigation and guidance from the NHAG (MNR, 2012) for determining woodland boundaries. Therefore, the original 9 woodlands features became 5 features as discussed in **Table 3.1**. The woodland features were 5 m or further from the Project Location. No woodlands were located within the Project Location.

Table B5, Appendix B includes a description of the attributes, composition and function for each of the woodlands identified as occurring in the ZOI during the site investigation.

An EOS is required for all woodlands identified through the site investigation.

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3.2.3 Wildlife and Wildlife Habitat

The results of the site investigation for wildlife habitat are detailed in **Table B1, Appendix B**.

No candidate SWH features were identified at the Project Location.

In accordance with Appendix D of the NHAG (MNR, 2012), wildlife habitats within the ZOI that are not required to be identified or delineated individually but have the potential to occur based on landscape and geography (i.e. ELC assessment) are considered to be existing, and are identified in **Table B1, Appendix B** (see section 3.1.5). These habitats are grouped and are referred to as “Generalized Candidate SWH”. The location and boundaries of Generalized Candidate SWH is shown on **Figure 4, Appendix A**. The Generalized Candidate SWH features were 5 m or further from the Project Location. No Generalized Candidate SWH were located within the Project Location.

Candidate significant wildlife habitat for an amphibian movement corridor (specific to bullfrog) was identified in the ZOI. A candidate amphibian movement corridor was identified between two open aquatic areas that provide candidate significant wildlife habitat for bullfrog (see Table B1, Appendix B and Figure 4, Appendix A). Amphibian movement corridors must be individually identified, delineated, and can not be classified as Generalized Candidate SWH. Candidate wildlife habitat for animal movement corridors is carried forward to the Evaluation of Significance.

3.3 SITE INVESTIGATION RESULTS SUMMARY

Corrections made to the records review as a result of the site investigation are shown in **Table 3.1**.

Table 3.1: Summary of Corrections to Records Review

Feature	Records Review Results	Correction made as a result of site investigation
Wetlands in the Project Location	No locally significant, provincially significant or unevaluated wetlands occur	Confirmed the Project Location is not within any wetlands
Wetlands in the ZOI	No locally significant or provincially significant wetlands occur Four unevaluated wetlands identified	Three additional wetlands identified within ZOI (we01, we02 and we06). Two unevaluated wetlands to the northwest and west were determined to be one feature (we03)

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Table 3.1: Summary of Corrections to Records Review

Feature	Records Review Results	Correction made as a result of site investigation
		Presence of remaining unevaluated wetlands confirmed (we04 and we05) Boundaries amended based on ground truthing by Stantec
Woodlands in Project Location	No woodlands	Confirmed no woodlands in the Project Location
Woodlands in ZOI	Nine woodlands	No additional woodlands identified during the site investigation Three woodlands to the north and east of the Project location became one feature (wo01) Three woodlands to the northwest and west of the Project location became one feature (wo02) Presence of remaining woodlands confirmed (wo03, wo04 and wo05) Boundaries amended based on ground truthing by Stantec
Wildlife Habitat in Project Location	None	Confirmed no wildlife habitat in the Project Location
Wildlife Habitat in ZOI	None	Areas within ZOI contain Generalized Candidate SWH A candidate amphibian movement corridor (amc01) occurs in the ZOI

No natural features were identified within the Project Location. The following features were identified within the ZOI, and are carried forward to the EOS:

- Wetlands (we01, we02, we03, we04, we05, we06)
- Woodlands (wo01, wo02, wo03, wo04, wo05)
- Generalized Candidate SWH
- Candidate amphibian movement corridor (amc01)

4.0 EVALUATION OF SIGNIFICANCE

Natural heritage information collected from the Records Review and Site Investigation were analyzed to determine the significance of existing natural heritage features. For all natural features existing in or within the ZOI and/or the Project Location, a determination was made of whether the natural feature is provincially significant, significant, not provincially significant or not significant.

Natural heritage information collected from the Project Location and ZOI was evaluated to confirm potential significance. The provincial status of vegetation communities was based on data obtained from the database of the Natural Heritage Information Centre (NHIC, 2017).

The following sections describe the natural features present within the ZOI and/or the Project Location that require an EOS.

4.1 METHODS

4.1.1 Wetlands

A method for Wetland Characteristics and Ecological Functions Assessment (WCEFA) was developed by the MNR to provide a set of evaluation criteria focused on wetland attributes relevant to the completion of an EIS for renewable energy projects. The criteria to be evaluated are presented in Appendix C of the NHAG (MNR, 2012).

Each of the six wetlands that occurred within the ZOI were assessed using the WCEFA to determine the potential impacts created by installation of solar panels, construction of their access roads, and associated infrastructure (project components).

Data is based on GIS analysis, imagery interpretation, agricultural soil mapping, and on-site field investigations. The criteria and procedures found within Appendix C of the NHAG (MNR, 2012) are based on sections of the OWES – Southern Edition (MNR, 2014) and are provided in **Table B6 (Appendix B)**. Although this procedure does not evaluate the significance of these wetlands, it provides a procedure by which the significance of these wetlands can be assumed and their functions assessed based on the criteria established within the OWES manual. Specifically, these criteria were addressed in the following manner:

Biological Component

Wetland Size: This characteristic is based on the overall size of the contiguous wetland, including areas that are within but extend outside of ZOI. Data based on field surveys and/or imagery interpretation. (OWES Section 1.3)

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Wetland Type: The overall dominant wetland type in the contiguous unit is provided. Data based on field surveys and/or aerial photo interpretation. (OWES Section 1.1.2)

Site Type: The wetland site type is provided. Data based on field surveys and/or aerial photo interpretation. (OWES Section 1.1.3)

Vegetation Forms: Based on ELC data, vegetation forms that were dominant, abundant, or occasional will be provided using OWES descriptors (e.g. "h" indicates deciduous trees). (OWES Section 1.2.2)

Proximity to Other Wetlands: The distance to the next closest wetland unit is provided. Adjacent wetland data may refer to agency wetland mapping or wetlands that were identified based on imagery interpretation. Data based on field surveys and/or imagery interpretation. (OWES Section 1.2.4)

Interspersion: When feasible, interspersion maps will be created and the total number of points provided. In some cases, this assessment may be based estimates of total interspersion points, with due consideration given to the size and complexity of the wetland type delineations. Data based on field surveys and/or imagery interpretation. (OWES Section 1.2.5)

Open Water Types: The open water type number (page 52 of the OWES manual) is listed in the Table; data will be based on field surveys and/or imagery interpretation. (OWES Section 1.2.6)

Hydrological Component

Flood Attenuation: The general proximity of the wetland within the local watershed is stated, indicating if it is headwater, mid-reach, or lower-reach. The wetland catchment area is also provided, where data will typically derive from Digital Elevation Model (DEM) mapping and resulting flow accumulations. Where this is not possible, data will derive from interpretation of topographic mapping.

Water Quality Improvement (Short Term):

- *Watershed Improvement Factor (WIF)* – this is based on presence/absence of specific site types (e.g. palustrine wetlands with no inflow and intermittent outflow, or riverine wetlands with permanent inflow and outflow). This data is derived from field surveys where possible, or flow accumulation and water course mapping [OWES Section 3.2.1]
- *Catchment Land Use Factor (LUF)* – estimated percent of land use and land use type within the catchment area (i.e., agricultural, urban or forested) is included (data derived from field surveys and/or imagery interpretation [OWES Section 3.2.1])
- *Pollutant Uptake Factor (PUT)* – this is based on the single *most* dominant vegetation form observed within the wetland community (data derived from field surveys where possible [OWES Section 3.2.1]), described as:

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- high proportion of emergent, submergent, and/or floating vegetation.
- a high proportion of live trees, shrubs, herbs, or mosses.
- a high proportion of wetland with little or no vegetation.

Water Quality Improvement (Long Term Nutrient Trap): Wetlands with a retentive capacity for nutrients (e.g., those with organic soils) provide protection for recharging groundwater. A characterization of wetland type and soil conditions is provided. Data based on field surveys where possible, or agricultural soil series mapping (OWES Section 3.2.2):

- *Water Quality Improvement (Groundwater Discharge):* OWES establishes eight indicators of hydrological discharge (OWES Section 3.2.3). When available, data indicative of groundwater discharge was provided.
- *Shoreline Erosion Control:* Shoreline wetlands provide a measure of protection from shoreline erosion caused by flowing water or waves. A description of the dominant shoreline vegetation is provided based on field surveys and/or imagery interpretation (OWES Section 3.4)
- *Groundwater Recharge (Site Type):* Site type is provided, where data is based on field surveys where possible (OWES Section 3.5.1)
- *Groundwater Recharge (Soils):* Soil type was indicated for each wetland unit, based on field surveys or agricultural soil mapping. (OWES Section 3.5.2)

Special Features

Species Rarity: All rare species observed during field surveys or species known to be present were documented. Data based on field surveys, review of background materials (including any existing wetland evaluations), and correspondence with agencies where possible (OWES Section 4.1.2).

Significant Features and Habitats: All known significant features and habitats present in the wetland are documented. Features/Habitat of interest includes Colonial Waterbird Habitat, Winter Wildlife Cover, Waterfowl Staging and/or Moulting Areas, Waterfowl Breeding, and Migratory Passerine, Shorebird, or Raptor Stopover Areas. Data based on field surveys, background data, and correspondence with agencies where possible (OWES Section 4.2). Information on significant deeryards, obtained from LIO mapping, was also reviewed.

Fish Habitat: This provides presence/absence data of fish species observed during field surveys; if surveys indicate that fish were observed (regardless of species), the wetland is considered to provide suitable fish habitat. (OWES Section 4.2.6)

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4.1.2 Woodlands

An assessment of woodland significance was applied to each of the five woodlands identified within the ZOI, using the guidance and criteria outlined in the NHAG (MNR, 2012). Criteria to be used to evaluate the significance of woodlands include woodland size, interior, and proximity to other natural features, linkages, water protection, diversity, and uncommon characteristics.

Woodlands are to be assessed within the context of the regional landscape and standards for each criterion vary based on the percentage of woodland cover in the municipality where the Project is proposed. The Project is located in the Township of South Stormont within the United Counties of Stormont, Dundas and Glengarry, with a reported percent forest cover value of 28% (Counties of Stormont, Dundas and Glengarry Draft Official Plan, 2016). As per the NHAG (MNR, 2012), woodlands are considered significant if they are greater than 20 ha in size in areas where woodland cover is between 16-30%.

The 20 ha size threshold was combined with other criteria appearing the NHAG to assess significance of all woodlands identified within the ZOI of the Project Location, as described below. A summary of these criteria and the results from this assessment are discussed further in **Table B7, Appendix B.**

Woodland Size: woodlands are considered significant if they are greater than 20 ha.

Woodland Interior: woodlands are considered significant if they have interior habitat greater than 2 ha (defined as more than 100 m from the edge).

Proximity to other significant woodlands or habitats: woodlands are considered significant if they are located within 30 m of an identified significant feature or fish habitat and the woodland is 4 ha or larger.

Linkages: woodlands are considered significant if they are located between two other significant features each of which is within 120 m and the woodland is 4 ha or larger.

Water Protection: woodlands are considered significant if they are located within 50 m of a sensitive hydrological feature (i.e., fish habitat, groundwater discharge, headwater area) and the woodland is 2 ha or larger.

Woodland diversity: woodlands are considered significant if they have an area dominated by native woodland species and the woodland is 4 ha or larger.

Uncommon characteristics: woodlands are considered significant if they have uncommon species composition, cover type, age or structure or are older than 100 years old and the woodland is 2 ha or larger.

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Woodlands that meet the minimum standard for any one of these criteria are considered significant.

4.1.3 Wildlife and Wildlife Habitat

In accordance with Appendix D of the NHAG (MNR, 2012), Generalized Candidate SWH is treated as significant.

Also, in accordance with Appendix D of the NHAG (MNR, 2012) the candidate amphibian movement corridor is treated as significant, however a study of habitat use will be undertaken as part of the EIS, prior to any development.

4.2 RESULTS

4.2.1 Wetlands

The WCEFA assessment results for the six wetlands within the ZOI are presented in **Table B6, Appendix B**. All wetlands are considered significant and are carried forward to the EIS.

Significant wetlands are shown on **Figure 5, Appendix A** and summarized in **Table 4.1**.

4.2.2 Woodlands

Results of the evaluation of significant woodlands are provided in **Table B7, Appendix B**. Four of the five woodlands met the criteria for significance based on criteria standards within the NHAG (MNR, 2012), including Features: wo01-03, wo05. These features are shown on **Figure 5, Appendix A**, summarized in **Table 4.1**, and included in the EIS.

4.2.3 Wildlife and Wildlife Habitat

Generalized Candidate SWH and the candidate amphibian movement corridor are treated as significant and an EIS is required. All Generalized Candidate SWH and the candidate amphibian movement corridor are shown on **Figure 5, Appendix A**.

4.3 SUMMARY

This NHA was undertaken to identify natural features found within the Project Location and within the ZOI and to evaluate their significance. Significant features as per results of the EOS and their respective closest distances to project components and Project Location are summarized in **Table 4.1**. No significant features occurred within the Project Location.

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Table 4.1: Summary of Significant Natural Features Carried Forward to EIS

Feature ID	Feature Type	Distance to Project Component at closest point (m)	Distance to Project Location (m)	Project Component in Feature
we1	Wetland	Solar Panel Area – 21	12	None
we2	Wetland	Solar Panel Area – 15	5	None
we3	Wetland	Solar Panel Area – 15	5	None
we4	Wetland	Parking / Laydown Area – 52	35	None
we5	Wetland	Point of Common Coupling / Connection on Line – 17	11	None
we06	Wetland	Solar Panel Area - 28	13	None
wo1	Woodland	Solar Panel Area – 15	5	None
wo2	Woodland	Solar Panel Area – 15	5	None
wo3	Woodland	Parking / Laydown Area – 32	15	None
wo5	Woodland	Point of Common Coupling / Connection on Line – 17	11	None
GH	Generalized Candidate Significant Wildlife Habitat	Solar Panel Area - 15	5	None
amc01	Amphibian Movement Corridor	Solar Panel Area – 43	30	None

4.4 QUALIFICATIONS

The following Stantec personnel were responsible for the application of evaluation criteria and procedures:

- Melissa Straus, Terrestrial Ecologist (EOS)
- Brian Miller, Terrestrial Ecologist (wetland EOS; OWES Certified)
- Anna Corrigan, Terrestrial Ecologist (EOS)

Curricula vitae are provided in **Appendix E**.

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5.0 ENVIRONMENTAL IMPACT STUDY

Section 38 of O. Reg. 359/09 requires that an EIS be prepared for the construction of any solar project components proposed in or within 50 m of significant natural features (e.g., earth and life science ANSI, woodlands, wildlife habitat) or within 50 m of a PSW, provincial park, or conservation reserve. The purpose of an EIS is to identify and assess any potential negative environmental effects of the Project on the natural features throughout its lifecycle (e.g., construction, operation, and decommissioning). Potential negative effects are avoided or minimized through the provisioning of detailed mitigation measures.

The primary mitigation measure employed to reduce impacts to the form and function of natural features was avoidance. Modifications to the site plan resulting from outcomes of the site investigation and EOS led to siting all project components outside of natural features and entirely within actively cultivated agricultural land.

Despite siting the Project entirely within agricultural lands, significant natural heritage features occur on the adjacent lands within the ZOI, summarized in **Table 4.1**, and include:

- Significant Wetlands (we01-06)
- Significant Woodlands (wo01-03, wo05)
- Generalized Candidate SWH (GH)
- Amphibian Movement Corridor (amc01)

The NHAG (MNR, 2012), the SWHTG (MNR, 2000), and the SWHMiST (MNRF, 2014b) were used to assist in the evaluation of impacts and mitigation measures.

5.1 SUMMARY OF PROJECT COMPONENTS

This section provides a description of the design of the main facility components identified in **Figures 3-6, Appendix A**.

Construction is proposed to begin in early 2018 with culvert installation followed by the bulk of construction occurring in the spring/summer/fall of 2018. Temporary work space reclamation, final grading, and commercial operation are anticipated fall 2018.

Tree planting along Cornwall Centre Road will be completed following construction, in the spring of 2019, to eventually provide a visual buffer to the site. Raisin Region Conservation Authority will be consulted to determine the appropriate species to plant in the area.

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5.1.1 Solar Panels

The Project will include the installation of approximately 30,000 to 50,000 solar panels. The exact make and model of the solar panels will be determined at a later date, but are anticipated to have a rated power of 300-420 W per panel and measure approximately 2 m long by 1 m wide. Each solar panel will be mounted on a galvanized steel and/or aluminum rack system that is positioned approximately 0.5 to 1.5 m above finished grade either at an angle between 20 and 40 degrees (fixed tilt) or with a +/- 60-degree range of motion (single axis tracking). The bottom of the solar panels in a fixed tilt racking system would be elevated at a height at least 30 cm above the floodplain. Solar panels in the single axis tracking system would be elevated at a height of at least 30 cm above the floodplain while the panels are in a table position (i.e. flat horizontal position) as the panels would be manually placed in this position in the event of a flood event. Fixed tilt panels would be installed in rows facing south and the tracking system would be tracking east/west on a north/south axis.

If any solar panels are damaged during operation of the Project, it is possible that they may be replaced with a different panel make and/or model available at the time.

The racks and solar panels will be supported using one, or a combination, of the following types of foundations:

- generic helical pier, consisting of a central shaft with a circular helical steel blade welded at the bottom
- machine augured holes and poured concrete footings for the galvanized-steel rack upright support posts
- machine augured holes and compacted stone screenings as footings for the galvanized-steel rack upright support posts.

Areas beneath and surrounding the solar panels that are not occupied by gravel road or project infrastructure will be vegetated with native species.

5.1.2 Access Roads

Existing provincial and county roads will be used to transport project-related components, equipment and personnel to the Project Location. An existing entrance from Cornwall Centre Road is anticipated to be used for permanent primary access to the facility for the duration of the operational life of the Project. The entire length of the existing access road into the facility will be upgraded from dirt to gravel, as described below. A second gravel access road from Cornwall Centre Road, west of the existing primary access road, is being proposed during construction. At the end of construction, the secondary access road will be removed and included in the tree planting area. Additional access roads may be considered as the Project design evolves.

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During upgrading of the primary access road and construction of the secondary access road, topsoil will be stripped along the road allowance, stockpiled and reused to the extent possible for site landscaping. The roadbed will be constructed from gravel and graded to facilitate drainage. The road will be approximately 4 m wide with an additional 1 m of compacted shoulders on each side for a total width of 6 m. Road construction will require excavators, dump trucks and compaction equipment.

An upgraded entrance culvert may be required within the road allowance of Cornwall Centre Road for the primary access road. Additionally, installation of a temporary entrance culvert within the road allowance of Cornwall Centre Road will be required to facilitate construction of the secondary access road. New or upgraded entrance culverts will be installed by the Proponent and/or general contractor. Entrance culverts will be installed between July 16th and March 14th in accordance with the appropriate MNRF in-water timing windows (work is not permitted from March 15th to July 15th). Permits for each temporary entrance culvert will be required from the Township of South Stormont, the City of Cornwall, and the RRCA under O. Reg. 175/06. Culvert installation activities will conform to Ontario Provincial Standard Specification (OPSS) 421– Construction Specification for Pipe Culvert Installation in Open Cut.

The proposed grassed laneways between each row of solar panels (within each solar unit) will not require any upgrades or construction preparation other than general site grading or seeding, as required.

Since the solar panels are mounted above the ground, infiltration of water through vegetation and the underlying subsurface material will be maintained. Surface drainage will continue to be directed to existing receiving systems (drainage paths, roadside ditches, etc.). Since the existing drainage conditions will not change a general area-wide stormwater system is not required. The small increase in runoff from the gravel access roads will be attenuated and filtered through local ditches and no constructed catch basins or other management techniques are required.

5.1.3 Inverters and Step-Up Transformers

Four inverter step-up transformers and inverters will be located within the Project Location. The specifications of the inverters will be determined by the Proponent during the detailed design phase. In accordance with the specifications, the manufacturer of the inverters and inverter step-up transformers will be selected by Proponent or the general contractor during the detailed design phase. The inverters, inverter step-up transformers, and ancillary equipment such as switches, fuses and surge arresters will be delivered to the Project Location by truck and will be either fully assembled upon delivery, or will be assembled at the Project Location.

The stations will likely rest on an elevated platform at least 30 cm above the floodplain and supported by helical piles or concrete piers.

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5.1.4 Substation

A main power transformer is being considered for this Project. The project will require a 44 kV substation comprised of circuit breakers, disconnect switches, surge arresters, station service transformer for auxiliary services, and, revenue metering equipment. In the event that a main power transformer is included in the final design, the voltage will be raised from 27.6kV / 34.5 kV to 44 kV at the substation. A separate chain link fence will be installed around the perimeter of the substation site. The control building may be located inside the fenced area of the substation, or may be located outside of the fenced area of the substation (but within the perimeter fence) to provide office space for maintenance personnel. All equipment will be preassembled before it is transported to the Project Location.

The substation access will be accessible from the permanent site access road, not a separate access. A small permanent parking area will be constructed adjacent to the substation. To prepare for construction of the substation and parking area, topsoil will be stripped, stockpiled and reused to the extent possible during site landscaping. Excavations of approximately 1-2 m depth will be required for the equipment and building foundations and for underground utilities. The entire substation area will be raised approximately 1 m with fill material to elevate the ground level a minimum of 30 cm above the floodplain. The fill material will either be sourced on site or from a nearby quarry. Equipment used will be dump trucks, excavators, bull dozers, and compactors.

Concrete construction would include the installation of the footings for the control building, equipment pad and supports. Excavations will be backfilled using granular fill and excavated materials.

The equipment will be supported by either cast-in place slab-on-grade concrete pads or structural steel piers and the entire fenced area will be graded and overlaid with a clear stone granular material. The specific make of the electrical equipment will be selected by the Proponent or general contractor during the detailed design phase and based on specifications provided by the Proponent. The equipment in the substation will also provide a supervisory control and data acquisition (SCADA) system for protection, control and monitoring of the substation and the facility.

5.1.5 Operations and Maintenance Storage Area

The operations and maintenance storage area may be comprised of one or two 40 foot storage containers installed within the raised substation area to elevate the containers 30 cm above the floodplain level and upon an area of compacted gravel or set upon a concrete pad and will include a locking door. The storage containers will be used to store equipment and spare parts used for maintenance activities. Spill response and containment materials will also be stored.

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During construction of the operations and maintenance storage area, topsoil will be stripped, stockpiled and reused to the extent possible during site landscaping. Gravel, if required, will be laid and compacted. The depth of gravel will vary dependent upon site conditions/requirements at the time of construction.

5.1.6 Perimeter Fence

A 1.8 m high steel chain link fence topped with barbed wire will be constructed around the entire perimeter of the facility to prevent trespassing and vandalism and provide safety to the public. Manual locking gates will be installed at the facility entrances located at the proposed permanent access road.

Installation of the fence will require the use of a skid steer and auger to excavate holes for the fence posts. The fence posts will be secured into the ground using cement. The perimeter fencing will be installed near the end of construction after the solar equipment is installed.

The perimeter fence will be installed at or within the boundary of the Project Location shown in **Figure 6, Appendix A**.

5.1.7 Construction Staging and Temporary Construction Areas

There will be two construction staging areas; a 1.1 ha (2.8 acre) area east of the Hydro One corridor, and a 1.6 ha (4 acre) area west of the Hydro One corridor, as shown on **Figure 6 (Appendix A)**. The construction staging areas will be laid with compacted gravel and will support the following construction operations:

- portable construction trailer(s) for Project management offices
- parking areas for the general contractor and subcontractors and other Project personnel;
- portable generators
- equipment storage and maintenance area
- truck unloading and loading area
- approved temporary fuel tanks, in properly contained spill containment structures
- disposal facilities for various solid wastes
- temporary toilet facilities – self-contained with no on-site disposal (additional facilities will be located throughout the Project Location)
- water and rinsing facilities

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- laydown area for panels, inverters, inverter step-up transformers, electrical cabling and other Project components
- laydown areas for small scale solar materials, and equipment
- laydown areas for electrical power collection materials

During construction of the temporary staging area, topsoil within both areas will be stripped, stockpiled and reused to the extent possible for site landscaping. Gravel will be laid and compacted. Once construction is complete, the temporary staging area will be removed and restored as outlined in Section 2.2.5 in the Construction Plan Report.

5.1.8 Construction Timeline and Activities

Construction activities leading up to Project operations are anticipated to take approximately 8-10 months. The exact calendar dates of construction activities are yet to be determined and will be based on the timing of the REA approval. Upon award of the construction contract, the selected general contractor will be required to provide an updated schedule.

The main construction activities will be timed to avoid early spring so that vehicles do not negatively impact the ground through soil rutting if the ground is too wet/soft.

Entrance culverts will be installed between July 16th and March 14th in accordance with the appropriate MNRF in-water timing windows (work is not permitted from March 15th to July 15th). Permitting will be discussed with the RRCA. The removal of trees during construction is not anticipated. A description of the main construction activities is provided below.

Phase Details Sequence	Estimated Schedule
1. Surveying	Summer 2016 to Spring 2017
2. Culverts (in-water works)	Q1 2018 (before March 15 th)
3. Delivery of construction materials, storage materials, site preparation	Q2 2018
4. Solar panel delivery and installation	Q2-Q3 2018
5. Installation of collector cables	Q2-Q3 2018
6. Installation of interconnect facility	Q2-Q3 2018
7. Reclamation of temporary work areas, final grading, topsoil replacement	Q4 2018
8. Project Performance Testing	Q4 2018

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Phase Details Sequence	Estimated Schedule
9. Commercial Operation	Q4 2018
10. Tree planting along Cornwall Centre Road	Q2 2019

5.2 POTENTIAL IMPACTS OF THE PROJECT

The following sections, in accordance with O. Reg. 359/09, detail potential negative impacts of the Project on the adjacent significant natural heritage features.

The Project Location is located completely within active agriculture land. At the time of the Site Investigation, the Project Location was planted as corn. The ZOI is comprised primarily of natural vegetation consisting of deciduous forest, woodland, thicket, and swamp, as described in Sections 3.2.1 to 3.2.2. Natural features found in the ZOI include six wetlands, four woodlands, generalized candidate significant wildlife habitat and a candidate amphibian movement corridor. Significant natural features are shown on **Figure 5, Appendix A**.

5.2.1 Significant Wetlands

No significant wetlands occur within the Project Location, with six (we1-6, **Figure 5, Appendix A**) occurring within the ZOI. Wetland units ranged in size from 0.5 ha to 31.5 ha and were comprised primarily of wooded lowlands and swamps interspersed with swamp thickets and divided by roadways and transmission corridors. The description, characteristics and ecological functions of each wetland are provided in **Tables B4 and B6, Appendix B**.

No components of the Project Location are located within the significant wetland boundaries as identified and confirmed through site investigations. As the Project Location and all construction and operational activities are sited outside all significant wetland boundaries, there will be no direct loss of significant wetland habitat or function as a result of the Project.

Most solar panels have been set back approximately 30 m from wetland boundaries along the eastern, southern, western and north-western sides of the Project. Along the south boundary of we02 solar panels occur 15 m from the wetland boundary. At their closest point, solar panels will be located 15 m from we02 and we03, and 21 m from we01. We01 is separated from the Project location by an unmaintained road (see **Figure 3, Appendix A**). We04 and we05 are separated from the Project by Cornwall Centre Road, with the closest project component consisting of the PCC/Connection Line 17 m from we05, and the parking/laydown area 52 m from we04. The perimeter fence will be placed within the Project Location to enclose the solar

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panels. It is expected to be placed approximately 5 m from the solar panels, so would generally be installed approximately 25 m from wetland boundaries, and approximately 10 m from the southern boundary of we02. Areas beneath and surrounding the solar panels that are not occupied by gravel road or project infrastructure will be vegetated with native species.

Installation of the fence will be the closest construction activity in proximity to the wetlands we1-we03 and we06 (ranging from approximately 10-25 m from wetlands). Installation of the fence is completed using a skid steer and auger to excavate holes for the fence posts. The fence will be installed at some point between following site preparation and after the solar equipment is installed. Construction activities to install the fence are considered very short term (i.e. likely to be completed within approximately a one week period) and localized.

The majority of construction activities at the site will occur more than 30 m from wetland boundaries (i.e. access roads and most of the solar panel areas occur more than 30 m from wetland boundaries). All construction activities will occur within the existing agricultural field and demarcation of the work area as well as the installation of silt fencing at locations where construction will occur within 30 m of significant natural features will be used to delineate the construction work envelope. Ongoing inspection will occur to ensure all construction works stay within the demarcated area. Construction activities during the installation of the project are anticipated to have a low magnitude of effect as construction will be a single frequency event, short term in duration (i.e. the entire construction phase is 8-10 months and construction activities are staged as described in Section 5.1.8), there are will be no direct loss of habitat and indirect effects will be mitigated through the measures indicated below.

There will be no clearing of trees in any of the wetland features that could result in wetland desiccation or drying. The risk of accidental intrusion and vegetation removal will be minimized through demarcation of work areas, as described below. The type of construction proposed involves works having little or minimal impact to pervious areas and precludes the potential for effects associated with changes in water balance (i.e., surface and ground water changes).

Indirect effects resulting from construction activities, such as dust generation, sedimentation and erosion will be short term, temporary in duration and mitigated through the use of standard site control measures specified below. With the implementation of specified mitigation measures outlined below, no significant adverse residual effects from waste material disposal or accidental spills are anticipated.

The Proponent, in consultation with the general contractor, will prepare a Construction Environmental Management Plan (CEMP) prior to the initiation of any construction activities occurring within the Project Location. The CEMP will be the controlling plan for all construction activities, and will be designed to minimize potential adverse environmental effects. The CEMP will be based on the environmental effects and mitigation measures identified in this report, and other related reports submitted as part of the REA application.

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During operation there may be occasional maintenance activities required, but this will occur outside of all wetland boundaries. Maintenance activities are expected to be only required occasionally and will be short term in duration. Potential for impacts such as dust and spills are considered low from maintenance activities. Since the solar panels are mounted above the ground and the underlying land is to be planted with native vegetation species, infiltration of water through vegetation and the underlying subsurface material will be maintained and no negative effects to the hydrological functions provided by the wetlands are expected as a result of operation of the Project.

Decommissioning of the Project is expected to experience similar impacts to those described above during construction.

Mitigation Measures

Avoidance is the main strategy used to minimize impacts to wetland habitat within 50 m of the Project Location. All components of the Project are sited outside the wetland feature boundaries. Standard best management practices will be applied to all construction activities:

- No development will be permitted within the significant wetland boundaries.
- The edge of the work zone (i.e., Project Location) will be flagged or staked in the field prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid these sensitive areas and to assist with the proper field installation of erosion and sediment controls.
- Silt barriers (e.g., fencing) will be erected along the edge of the construction area where wetland boundaries are located within 30 m of construction areas. These barriers will be monitored weekly during construction and after periods of high precipitation and bi-weekly following construction and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation.
- Environmental inspectors will ensure construction vehicles and personnel stay within the construction envelope, thereby limiting the disturbance of natural vegetation.
- Accidental damage to trees, or unexpected vegetation removal, may require re-planting of similar, native species. If re-planting is required, MNRF will be consulted on the appropriate action(s) to be taken.
- All refueling activities will occur more than 30 m from all wetlands. In the event of an accidental spill, the Ministry of Environment and Climate Change (MOECC) Spills Action Centre will be contacted and emergency spill procedures implemented immediately.
- Any fuel storage and activities with the potential for contamination will occur in properly protected and sealed areas greater than 30 m from a wetland.
- In the case of dewatering, mitigation as detailed in Section 5.3.1 will be followed.

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5.2.2 Significant Woodlands

No significant woodlands occur within the Project Location, with four (wo01-03, wo05, **Figure 5, Appendix A**) occurring within the ZOI. Significant woodland features ranged in size from 4.9 ha to 50.6 ha and were comprised of upland forests, swamps, and more open woodlands divided by roadways, transmission corridors and thickets. The description, characteristics and ecological functions of each woodland are provided in **Tables B5 and B7, Appendix B**.

No project components are located within significant woodlands. As the Project Location and all construction and operational activities are sited outside of significant woodland boundaries, there will be no direct loss of significant woodland habitat or function to these features as a result of the Project.

Wo01-03 are located 15-32 m from solar panel areas and within 5-15 m of the Project Location. As detailed above with wetlands, wo05 is separated from the Project by Cornwall Centre Road, and is 11 m away from the Project Location.

Most solar panels have been set back approximately 30 m from woodland boundaries along the eastern, southern, western and north-western sides of the Project. Along the northwestern corner of wo01 solar panels occur 15 m from the woodland boundary. At their closest point, solar panels will be located 15 m from wo01 and wo02. Wo05 is separated from the Project by Cornwall Centre Road, with the closest project component consisting of the PCC/Connection Line 17 m from wo05. The perimeter fence will be placed within the Project Location to enclose the solar panels. It is expected to be placed approximately 5 m from the solar panels, so would generally be installed approximately 25 m from woodland boundaries, and approximately 10 m from the northwestern corner of wo01. Areas beneath and surrounding the solar panels that are not occupied by gravel road or project infrastructure will be vegetated with native species.

Installation of the fence will be the closest construction activity in proximity to the woodlands wo01 and wo02 (ranging from approximately 10-25 m from wetlands). Installation of the fence is completed using a skid steer and auger to excavate holes for the fence posts. The fence will be installed at some point between following site preparation and after the solar equipment is installed. Construction activities to install the fence are considered very short term (i.e. likely to be completed within approximately a one week period) and localized.

The majority of construction activities at the site will occur more than 30 m from woodland boundaries (i.e. access roads and most of the solar panel areas occur more than 30 m from woodland boundaries). All construction activities will occur within the existing agricultural field and there will be no clearing of trees in any of the woodland features. The risk of accidental intrusion and vegetation removal will be minimized through demarcation of work area as well as the installation of silt fencing to delineate the construction work envelope where construction will occur within 30 m of significant natural features. The type of construction proposed involves

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works having little or minimal impact to pervious areas and precludes the potential for effects associated with changes in water balance (i.e., surface and ground water changes).

Construction activities during the installation of the project are anticipated to have a low magnitude of effect as construction will be a single frequency event, short term in duration (i.e. the entire construction phase is 8-10 months and construction activities are staged as described in Section 5.1.8), there are will be no direct loss of habitat and indirect effects will be mitigated through the measures indicated below.

Indirect effects resulting from construction activities, such as dust generation, sedimentation and erosion will be short term, temporary in duration and mitigated through the use of standard site control measures specified below. With the implementation of specified mitigation measures outlined below, no significant adverse residual effects from waste material disposal or accidental spills are anticipated.

The Proponent, in consultation with the general contractor, will prepare a Construction Environmental Management Plan (CEMP) prior to the initiation of any construction activities occurring within the Project Location. The CEMP will be the controlling plan for all construction activities, and will be designed to minimize potential adverse environmental effects. The CEMP will be based on the environmental effects and mitigation measures identified in this report, and other related reports submitted as part of the REA application.

During operation there may be occasional maintenance activities required, but this will occur outside of all woodland boundaries. Maintenance activities are expected to be only required occasionally and will be short term in duration. During operation there is the potential for spills and contamination to the woodland. Accidental spills area anticipated to occur infrequently and be spatially limited.

Decommissioning of the facility is expected to impose similar impacts to those described above during construction.

Mitigation Measures

The following mitigation measures will be implemented for significant woodlands:

- No development will occur within the woodland boundary.
- The edge of the work zone (i.e., Project Location) will be flagged or staked in the field prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid these sensitive areas and to assist with the proper field installation of erosion and sediment controls.
- Silt barriers (e.g., fencing) will be erected along the edge of the construction area where woodland boundaries are located within 30 m of construction areas. These barriers will be monitored weekly during construction and after periods of high precipitation and bi-

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weekly following construction and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation.

- Environmental inspectors will ensure construction vehicles and personnel stay within the construction envelope, thereby limiting the disturbance of natural vegetation.
- All refueling activities will occur more than 30 m from the woodlands. In the event of an accidental spill, the MOECC Spills Action Centre will be contacted and emergency spill procedures will be implemented immediately.
- All maintenance activities, vehicle refueling or washing, as well as the storage of chemical and construction equipment will be located more than 30m from significant woodlands.
- Accidental damage to trees, or unexpected vegetation removal, may require re-planting of similar, native species. If re-planting is required, MNRF will be consulted on the appropriate action(s) to be taken.
- Storage of fuel and activities with the potential to cause contamination will occur in properly protected and sealed areas greater than 30 m from woodland boundaries.

5.2.3 Generalized Candidate Significant Wildlife Habitat

Generalized Candidate SWH is located outside the Project Location but within the ZOI within 15 m in proximity to solar panel area and 5 m to the Project Location (**Figure 5, Appendix A**). Generalized candidate SWH with the potential to occur and treated as existing are detailed in **Table B1, Appendix B**.

As the Project components and all construction and operational activities are sited outside of the boundaries of these features, there will be no direct loss of Generalized Candidate SWH or function to these features as a result of the Project.

Potential negative effects from construction activities could include habitat avoidance/disturbance caused by noise.

At their closest point, generalized candidate significant wildlife habitats occur 5 m from the Project Location and 15 m from solar panel areas. The 50 m ZOI measured from the Project Location primarily includes the edges of the habitat features (see **Figure 6, Appendix A**). Most of the area contained within the generalized candidate significant wildlife habitat features occurs greater than 50 m from the Project Location (see **Figure 5, Appendix A**).

Given the spatial separation between construction and the generalized candidate significant wildlife habitat features (i.e. 5 - 35 m at the closest point, with most of the habitat occurring more than 50 m from the closest point of potential construction activities) species such as interior breeding birds will be spatially separated from the closest point of construction activities. Species that inhabit edges are generally considered less susceptible to disturbance and given

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the existing rural and agricultural land uses currently occurring adjacent to these features, and their location adjacent to existing roads, they are not considered highly sensitive to temporary disturbances (Samia et al., 2015).

Solar panels and the perimeter fence are the closest project components to the generalized candidate significant wildlife habitat. Construction activities related to these components include installation of the solar panel racks, placement of solar panels, installation of cables and the installation of the perimeter fence. The perimeter fence may affect animal movement patterns, however the potential for animal movement through the site is expected to be low and small mammals, amphibians and reptiles can pass through the fence.

Installation of the fence will be completed using a skid steer and auger to excavate holes for the fence posts. Solar panel racking will be placed using a forklift and installed primarily by manual labour using hand tools. Then the panels will be mounted, connected and cabling will be laid. There will be some limited activity required by trucks (i.e. pouring cement for fence posts, installation of cabling, delivery of components).

Work required to complete these activities are expected to be completed in Q2 and Q3 but will be staged (i.e. work will be undertaken at different parts of the site as construction progresses). The exact location of construction activities (and potential sources of noise) within the project location may vary depending on the activity and some parts of the site will only have activity for about one month of the entire duration. These activities are considered short term (i.e. will only occur for a limited time period and are intermittent) and localized. The activities are considered low to medium intensity activities and the kind of equipment required is not considered to generate loud noise emissions.

Indirect impacts resulting from construction activities, such as noise, dust generation, sedimentation and erosion are expected to be short term (i.e. one breeding season or less), intermittent, temporary in duration and mitigated through the use of standard site control measures. Disturbance impacts from operation of a solar facility on resident wildlife are considered negligible.

Additional mitigation measures for noise during the construction phase of the project are outlined in Section 3.4.2 in the Construction Plan Report, including that all engines associated with construction equipment will be equipped with mufflers and/or silencers in accordance with regulatory requirements of the *Occupational Health and Safety Act* and that noise levels arising from equipment will also be compliant with sound levels established by the MOECC.

Impacts occurring during the decommissioning of the facility are similar to those described above during construction, comprised predominantly of short term disturbances associated with noise. Mitigation measures for all phases of the Project are detailed below.

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Mitigation Measures

The following mitigation measures will be applied for Generalized Candidate SWH:

- Mitigation measures for the significant wetland and woodland features will be applied as outlined above, as Generalized Candidate SWH is contained within these features.
- To the extent possible, construction activities within 30 m of Generalized Candidate SWH will occur during daylight hours to avoid excessive noise and/or light disturbances.

5.2.4 Amphibian Movement Corridor

A candidate amphibian movement corridor for bullfrog was identified within the ZOI. The habitat is being treated as significant for the purposes of the NHA/EIS and as required by Appendix D of the NHAG, this EIS includes:

- a commitment to undertake studies to determine actual use of the habitat prior to development and a description of the methodology to be used
- identification of the potential negative effects to habitat use, considering the range of possible outcomes from the habitat use studies.

5.2.4.1 Habitat Use Study

Amphibian movement corridors are determined where amphibian breeding habitat (wetland) is confirmed. Therefore, pre-development studies will be used to determine habitat use by bullfrog in the open aquatic ecosites.

Habitat use surveys will consist of visual assessments and auditory surveys of the two open aquatic ecosites. Up to three surveys will be conducted between mid May to late June to coincide with the optimal timing for bullfrogs (MNR, 2000). Surveys will be spaced apart throughout the survey period. If presence of bullfrog is confirmed on a survey, subsequent surveys will not be completed. All surveys will be conducted by qualified ecologists.

Prior to dusk, the surveyor will traverse the perimeter of each open aquatic feature looking for visual evidence of bullfrogs including adults, tadpoles or egg masses. After dusk, the surveyor will conduct auditory surveys. Auditory surveys will be conducted following the protocols identified in the Marsh Monitoring Program Manual (Bird Studies Canada, 2008). One survey station will be located at each of the open aquatic areas. Given the relatively small size of each of the features (70 m by 30 m and 30 m by 10 m) one survey station will provide auditory coverage of the entire feature. These surveys start at least one-half hour after sunset and finish before midnight. Efforts will be made to conduct the surveys under appropriate weather conditions. Ideal calling conditions consist of winds less than level three on the Beaufort scale and warm, damp nights with light rain or fog. For each survey, the surveyor will observe for 3 minutes at each station,

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recording presence or absence of bullfrog, and the approximated level of calling heard by each individual(s).

All calling activity will be ranked using one of the following three abundance code categories:

- Level 1 - indicates that individuals can be counted and calls are not simultaneous
- Level 2 - indicates that individuals are still distinguishable with some simultaneous calling
- Level 3 - indicates a full chorus where calls are continuous and overlapping.

Additional information will be recorded including:

- weather conditions (temperature, wind speed (on a Beaufort scale), % cloud cover, and presence of any precipitation)
- date and time of day
- duration of survey
- GPS coordinates of the point location; and
- the name of the observer conducting the field work.

The amphibian breeding habitats (wetland) will be considered significant wildlife habitat for bullfrog if the presence of bullfrog is confirmed during the habitat use study. There are two possible outcomes associated with the habitat use studies:

- If habitat use surveys confirm the significance of the candidate significant wildlife habitat for amphibian breeding (wetlands) for bullfrog in one or both of the open aquatic features, the associated amphibian movement corridor will conservatively be considered to be significant. In this case, mitigation measures as identified below will be applied.
- If habitat use surveys do not confirm use of either of the open aquatic areas by bullfrog, the mitigation measures outlined below will not be required.

5.2.4.2 Potential Negative Effects and Mitigation Measures

At its closest point the amphibian movement corridor is 30 m from the Project Location and 43 m from solar panels. The closest project component will be the perimeter fence which is expected to be placed approximately 5 m from the solar panels, so would generally be installed approximately 38 m from the amphibian movement corridor. Bullfrogs are highly aquatic and use permanent waterbodies for breeding, foraging and overwintering. A study of bullfrog home range and movements found an average activity radius of 8.6 ft (Currie and Bellis, 1969), however movement between aquatic habitats has been documented (Raney 1940, Willis et al 1956, Ingram and Raney 1943). Where movement has been documented it has usually occurred just after dark during or after a rain (Raney, 1940) and has been primarily documented from end of June to August (Willis et al 1956, Raney 1940, Ingram and Raney 1943).

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As the Project components and all construction and operational activities are sited outside of the amphibian movement corridor, the associated breeding ponds and the natural habitat that surround the ponds and corridor, there will not be disruption to the linkages between ponds and summer habitat or winter range/habitat. There will be no direct loss of function to these features as a result of the Project.

The existing natural habitat and separation distance between the project and the movement corridor is considered to reduce the potential for negative effects to bullfrog movement.

During construction, there will be increased traffic and the potential for accidental spills within the Project Location. Indirect impacts resulting from construction activities, such as noise, dust generation, sedimentation and erosion are expected to be short term, temporary in duration and mitigated through the use of standard site control measures (i.e. installation of silt fencing). Potential effects from construction would be limited for construction activities that occur outside of the period when bullfrogs may be using the movement corridor. For any construction activities that may occur during the period bullfrogs may be using the corridor (i.e. in July and August) potential effects are considered mitigable as a result of the separation distance between the corridor and closest potential point of activities (i.e. at least 30 m) as well as the implementation of mitigation measures below. Specifically, the installation of silt fencing will reduce the potential for indirect impacts to the corridor by creating a barrier for sediment, contaminants and dust to the feature as well as enabling individuals to continue to safely move between the components of their habitat by restricting any potential for movement into the construction area. Impacts occurring during the decommissioning of the facility are similar to those described above during construction, comprised predominantly of short term disturbances.

During operation, solar panels are the closest project component to the corridor and are 43 m at their closest point from the amphibian movement corridor. Roads, which can have potential effects to amphibian movement corridors as a result of fragmentation or mortality risk, are also expected to be sited more than 43 m at their closest point from the amphibian movement corridor and as a result are not predicted to result in negative effects on the amphibian movement corridor habitat or its ecological function. Avoidance or disturbance effects (i.e. reduced use of the amphibian movement corridor) due to operation of the facility is not predicted. A perimeter fence will be installed around the facility which will ensure there is no infringement into adjacent habitats during operation of the facility.

If habitat use surveys confirm the significance of the candidate significant wildlife habitat for amphibian breeding (wetlands) for bullfrog, the associated amphibian movement corridor will conservatively be considered to be significant and the following mitigation measures will be applied:

- For any construction activities that are required in July and August within 30 m of the SWD02 and FOMM9 communities that contain the amphibian movement corridor, silt barriers will be

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erected along the edge of the work zone to prevent bullfrog access. These barriers will be monitored daily in July and August and properly maintained.

- For any construction activities that are required in July and August, no construction activities will be conducted from dusk to dawn within 30 m of the SWD02 and FOMM9 communities that contain the amphibian movement corridor.
- Inspectors will ensure construction vehicles and personnel stay within the construction envelope, thereby limiting the disturbance of natural vegetation.
- All refuelling will occur more than 30 m away from the identified amphibian movement corridor. In the event of an accidental spill, the MOECC Spills Action Centre will be contacted and emergency spill procedures implemented immediately.
- Any fuel storage and activities with the potential for contamination will occur in properly protected and sealed areas.

If habitat use studies reveal that the candidate wildlife habitat is not being used by bullfrogs, these mitigation measures will not be required.

5.2.5 Best Management Practices and Other General Construction Mitigation

5.2.5.1 Dewatering

Dewatering is currently not anticipated, however, if it is determined during detailed design that dewatering will be required, the following best management practices detailed below will be implemented prior, during, and after dewatering activities.

Prior to Dewatering:

- During site preparation, silt fencing or sediment controls will be included to retain sediments on site so they do not enter any significant natural feature. All sediment control structures will be inspected regularly, and repaired/maintained as necessary.
- The area to be used for dewatering will be clearly marked with flagging and/or snow-fencing prior to work commencing.

During Dewatering:

- Minimize the length of time that the excavation is open and monitor seepage.
- Set back discharge locations at least 30 m from significant natural features and direct water away from significant natural features and not directly into wetlands.
- The specific locations for directing treated groundwater discharge will be selected in the field at the time of construction, but will generally be limited to existing drainage ditching or agricultural fields. This will involve input from a qualified fisheries biologist (in the case of drains) or spread across the buildable area and appropriate energy dissipation techniques will be used to reduce the potential for erosion and scouring.

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- Piping will be free of leaks and will be properly anchored to prevent bouncing and snaking during surging.
- The rate of discharge will be monitored to ensure no erosion or flooding occurs. If energy dissipation measures are found to be inadequate, the rate of dewatering will be reduced or ceased until satisfactory mitigation measures are in place.
- Groundwater discharge will undergo appropriate water quality and temperature controls, as required, and will be directed through a sediment filter (i.e., filter bag), sediment basin or other appropriate device capable of handling the anticipated volumes of water, before being discharged to the environment.
- The use of sediments bags (or filter rings) will be used as appropriate to filter out suspended sediment prior to discharge. Any sediment bags or filter rings will be monitored during pumping to ensure their efficacy, with any clogging or failures to be rectified immediately.

Post-Dewatering:

- After the staging area and dewatering work area is no longer required, any remaining disturbed soils will be returned to pre-disturbance conditions and/or reseeded.

Further dewatering recommendations will be reviewed upon the completion of the detailed engineering design.

5.3 MONITORING PLAN

O. Reg. 359/09 requires that applicants prepare an Environmental Effects Monitoring Plan (EEMP) as part of the Design and Operations Report (under separate cover). Due to the siting of all Project components outside of natural features, potential impacts are restricted to indirect effects during construction and decommissioning of the Project. No significant adverse residual effects on significant natural features are anticipated as a result of operation of the facility and therefore no monitoring or contingency measures during operation have been identified in the Design and Operations Report specific to significant natural features.

A construction-phase monitoring program is proposed as described above to address potential indirect effects to adjacent features. A summary of these potential negative effects to significant natural features, mitigation strategies, performance objectives, monitoring plan principles (including general methods, location, frequency, rationale and reporting), and contingency measures are outlined in **Table B.8 (Appendix B)**. These measures have been included in the Construction Environmental Effects Monitoring Plan (CEEMP). The primary objective of the CEEMP is to assess the impacts of construction activities on environmental features and to check that mitigation measures and contingency planning are effectively implemented. The general contractor will be the primary party responsible for the implementation of the CEEMP and should be undertaken in compliance with applicable municipal, provincial, and federal standards and guidelines. Trained personnel should be on-site

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to monitor construction and should be responsible for verifying that the mitigation measures and monitoring requirements within the CEEMP are executed.

5.4 SUMMARY OF IMPACTS AND MITIGATION

Through a comprehensive review of background material in conjunction with site-specific investigations and an evaluation of significance, significant, or presumed significant, natural features have been identified adjacent to the Project Location (e.g., within the ZOI). This included significant woodlands, wetlands, Generalized Candidate SWH and a candidate amphibian movement corridor.

As part of this EIS, construction monitoring commitments and mitigation measures have been recommended to be implemented as part of the development of the Project. These recommendations have been developed in consideration of the significant natural features and wildlife habitats that were identified in Section 4.0.

The application of these mitigation measures are expected to address any negative environmental effects of construction, operation and decommissioning of the Project on the natural heritage features located in the ZOI and their associated ecological functions.

**BARLOW SOLAR ENERGY CENTRE
NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

References
June 15, 2017

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**BARLOW SOLAR ENERGY CENTRE
NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

References
June 15, 2017

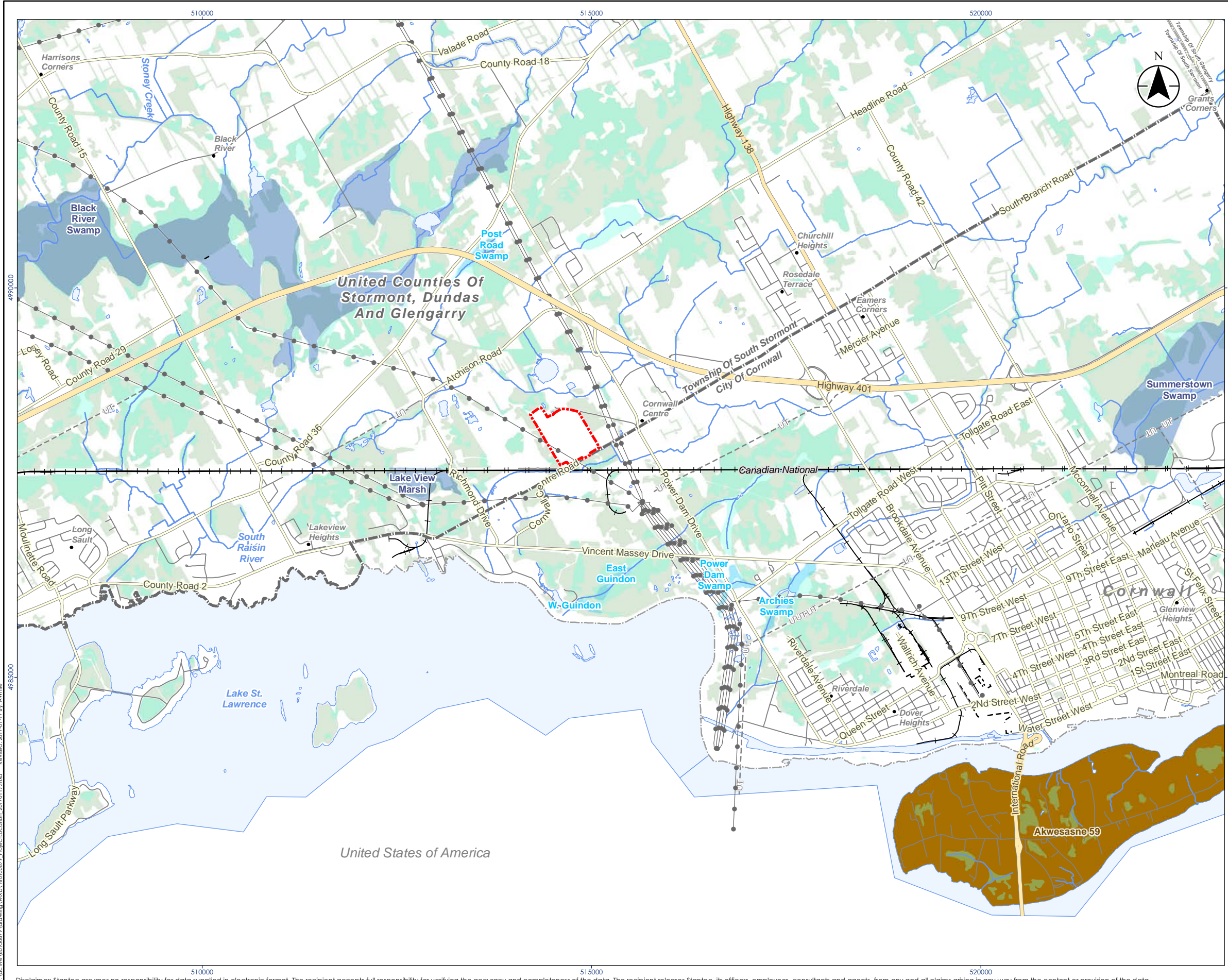
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**BARLOW SOLAR ENERGY CENTRE
NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

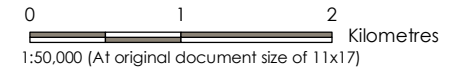
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APPENDIX A: FIGURES



- Legend**
- Project Location
 - Highway
 - Major Road
 - Minor Road
 - Railway
 - Hydro One Transmission Line
 - Unknown Pipeline
 - Unknown Transmission Line
 - Watercourse (Intermittent)
 - Watercourse (Permanent)
 - Municipal Boundary, Upper
 - Municipal Boundary, Lower
 - Waterbody
 - Wetland, Provincially Significant
 - Wetland, Other Evaluated
 - Wetland, Not evaluated per OWES
 - Wooded Area
 - First Nation Reserve



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 18N
 2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2016.
 3. Waterbody and watercourse mapping within 120 m of the Project Location has been updated based on field studies completed as part of the REA process under O. Reg. 359/09. See the Water Assessment and Water Body Report for details.

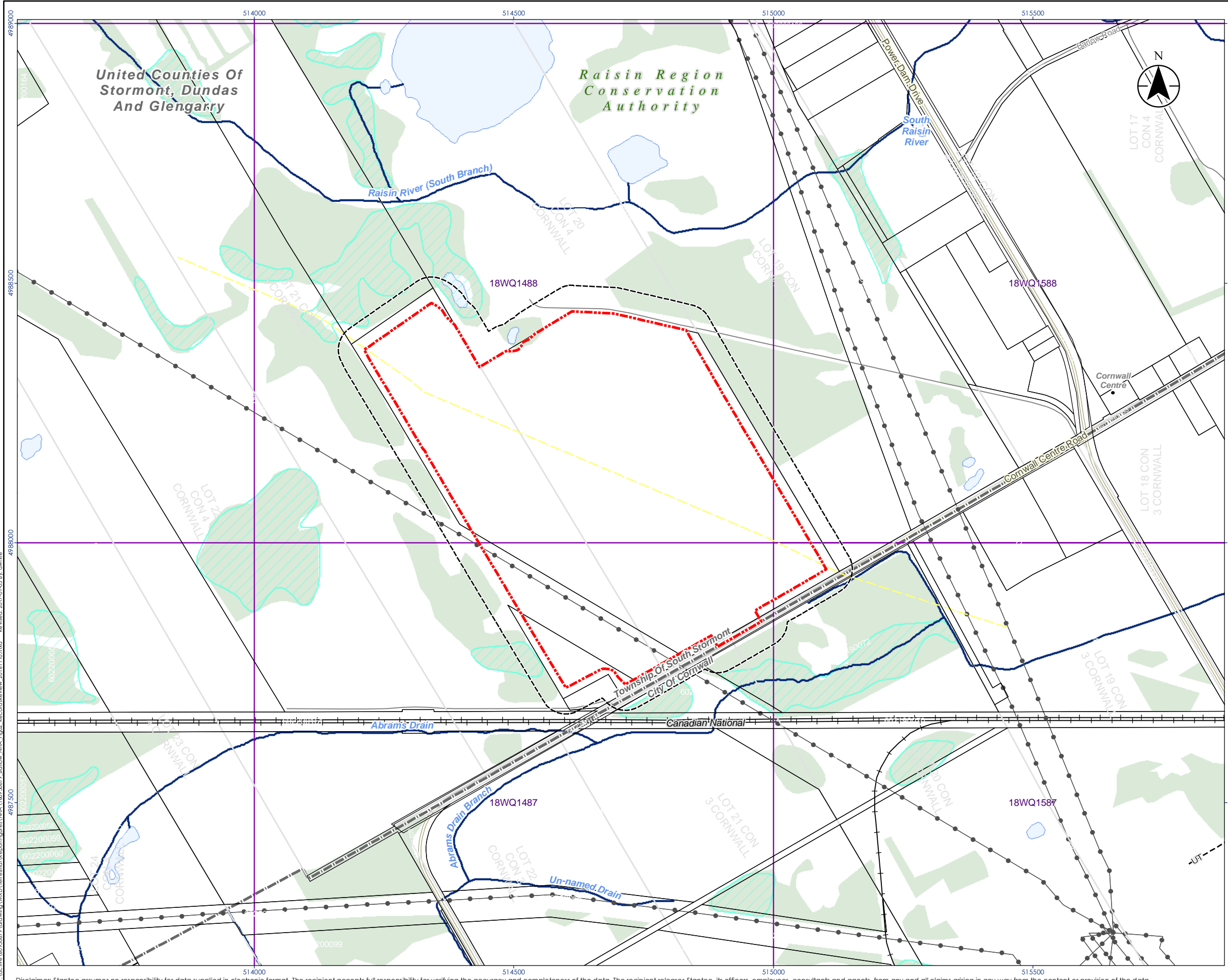


Project Location
 Municipality of United Counties Of Stormont, Dundas And Glengarry
 Client/Project
 BARLOW ENERGY CENTRE LP
 BARLOW SOLAR ENERGY CENTRE

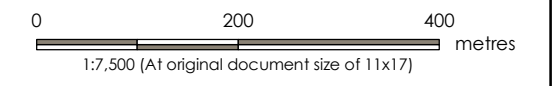
160950879 REV C
 Prepared by AW on 2017-01-17

Figure No.
1
 Title
Site Location

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 Revised: 2017-01-17 By: AVWhite
 4985000



- Legend**
- Project Location
 - Zone of Investigation (50 m from Project Location)
 - Pipeline
 - Constructed Drain
 - Hydro Line
 - Unknown Transmission Line
 - Major Road
 - Minor Road
 - Railway
 - Watercourse (Permanent, as per MNR mapping)
 - 1 km UTM Grid
 - Municipal Boundary, Upper
 - Municipal Boundary, Lower
 - Property Boundary
 - Water Body (as per MNR mapping)
 - Wetland, Not evaluated per OWES
 - Wooded Area



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 18N
 2. Base features and aerial imagery produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2016. Base data modified by Stantec.



Project Location: United Counties of Stormont, Dundas and Glengarry
 Prepared by AMW on 2017-01-05
 Technical Review by RN on 2017-01-02
 Independent Review by RN on 2017-01-02

Client/Project: BARLOW ENERGY CENTRE LIMITED PARTNERSHIP
 BARLOW SOLAR ENERGY CENTRE

Figure No. **2**

Title: **Records Review**

Legend

- | | |
|--|-------------------------------|
| Zone of Investigation (50 m from Project Location) | Project Location |
| Ecological Land Classification | Solar Panel Area |
| Point of Common Coupling | Substation |
| Culvert | Tree Planting Area |
| Connection Line | Existing Features |
| Inverter Step-up Transformer and Inverter | Major Road |
| Permanent Access | Minor Road |
| Temporary Access During Construction | Culvert (existing) |
| Temporary Construction Laydown and Parking Area | Distribution Line (Hydro One) |
| Operations & Maintenance Storage Area | Hydro One Transmission Line |
| | Pipeline |
| | Railway |
| | Watercourse |
| | Property Boundary |
| | Waterbody |

0 100 200 metres
1:5,000 (At original document size of 11x17)

- Notes**
1. Coordinate System: NAD 1983 UTM Zone 18N
 2. Base features and aerial imagery produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2016.
 3. Imagery Source: DRAPE 2014
 4. Waterbody and watercourse mapping within 120 m of the Project Location has been updated based on field studies completed as part of the REA process under O. Reg. 359/09. See the Water Assessment and Water Body Report for details.



Project Location: Cornwall, Ontario
 United Counties of Stormont, Dundas and Glengary
 Prepared by AMW on 2017-05-23
 Technical Review by NK on 2016-11-17
 Independent Review by NK on 2016-11-17

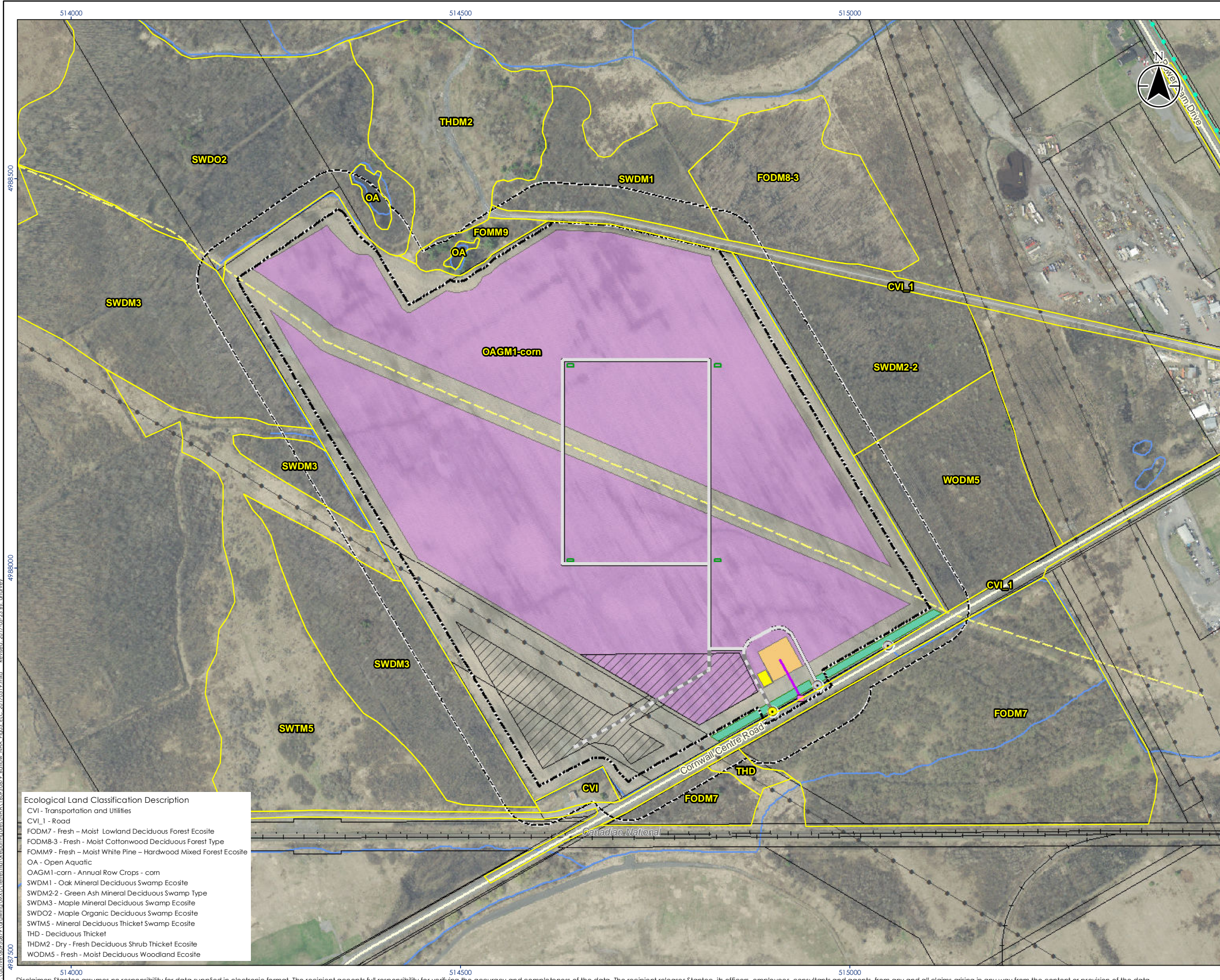
Client/Project: BARLOW ENERGY CENTRE LIMITED PARTNERSHIP
 BARLOW SOLAR ENERGY CENTRE

Figure No.

3

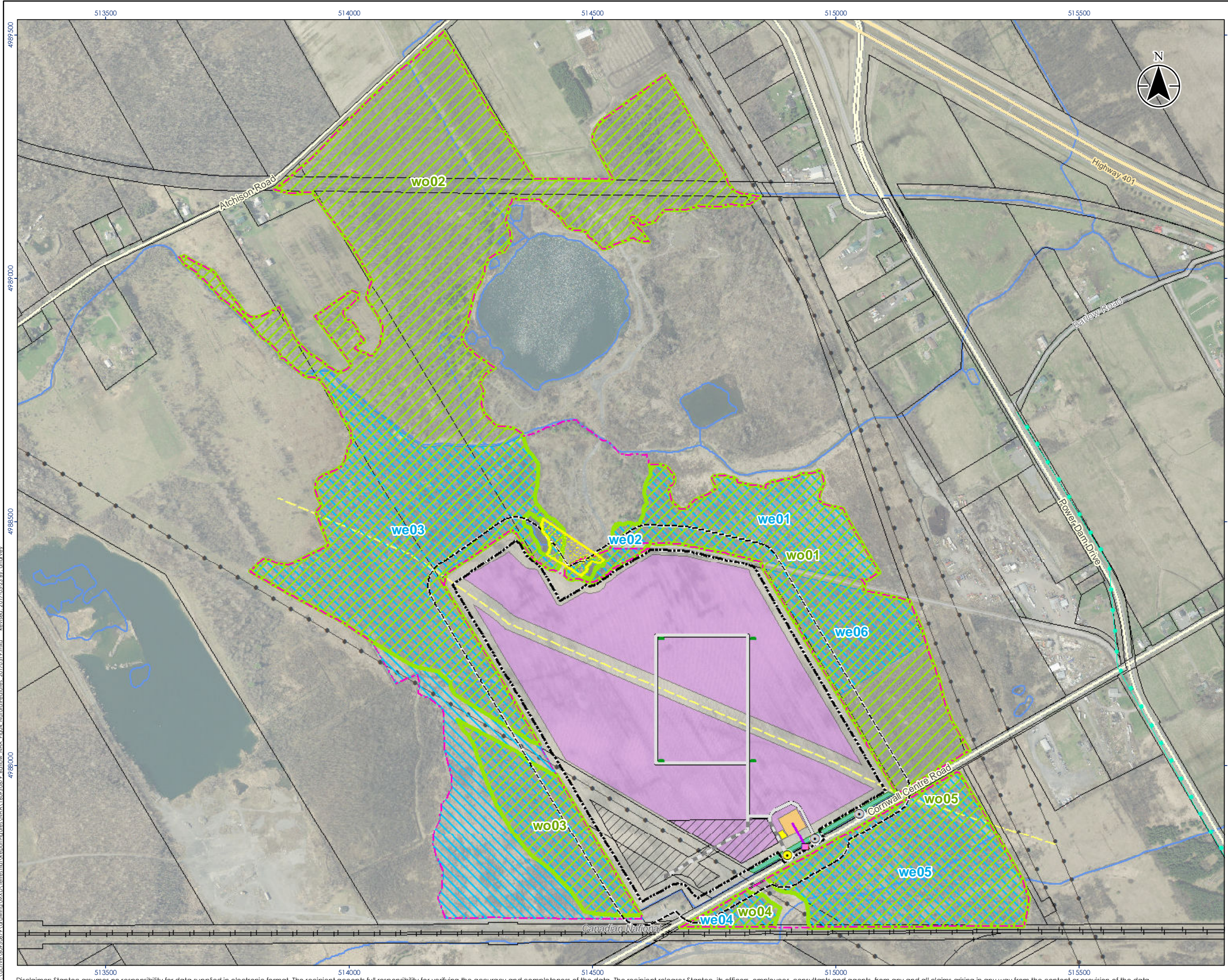
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Ecological Land Classification

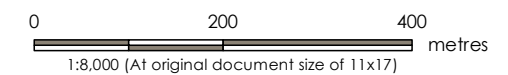


Ecological Land Classification Description

CVI - Transportation and Utilities
CVL1 - Road
FODM7 - Fresh - Moist Lowland Deciduous Forest Ecosite
FODM8-3 - Fresh - Moist Cottonwood Deciduous Forest Type
FODM9 - Fresh - Moist White Pine - Hardwood Mixed Forest Ecosite
OA - Open Aquatic
OAGM1-corn - Annual Row Crops - corn
SWDM1 - Oak Mineral Deciduous Swamp Ecosite
SWDM2-2 - Green Ash Mineral Deciduous Swamp Type
SWDM3 - Maple Mineral Deciduous Swamp Ecosite
SWDO2 - Maple Organic Deciduous Swamp Ecosite
SWTM5 - Mineral Deciduous Thicket Swamp Ecosite
THD - Deciduous Thicket
THDM2 - Dry - Fresh Deciduous Shrub Thicket Ecosite
WODM5 - Fresh - Moist Deciduous Woodland Ecosite



- Legend**
- Zone of Investigation (50 m from Project Location)
 - Point of Common Coupling
 - Culvert
 - Connection Line
 - Inverter Step-up
 - Transformer and Inverter
 - Permanent Access
 - Temporary Access During Construction
 - Temporary Construction Laydown and Parking Area
 - Operations & Maintenance Storage Area
 - Project Location
 - Substation
 - Tree Planting Area
 - Solar Panel Area
- Natural Features**
- Candidate Amphibian Movement Corridor
 - Generalized Candidate Significant Wildlife Habitat
 - Wetland
 - Woodland
- Existing Features**
- Expressway / Highway
 - Major Road
 - Minor Road
 - Culvert (existing)
 - Distribution Line (Hydro One)
 - Hydro One Transmission Line
 - Pipeline
 - Railway
 - Watercourse
 - Property Boundary
 - Waterbody



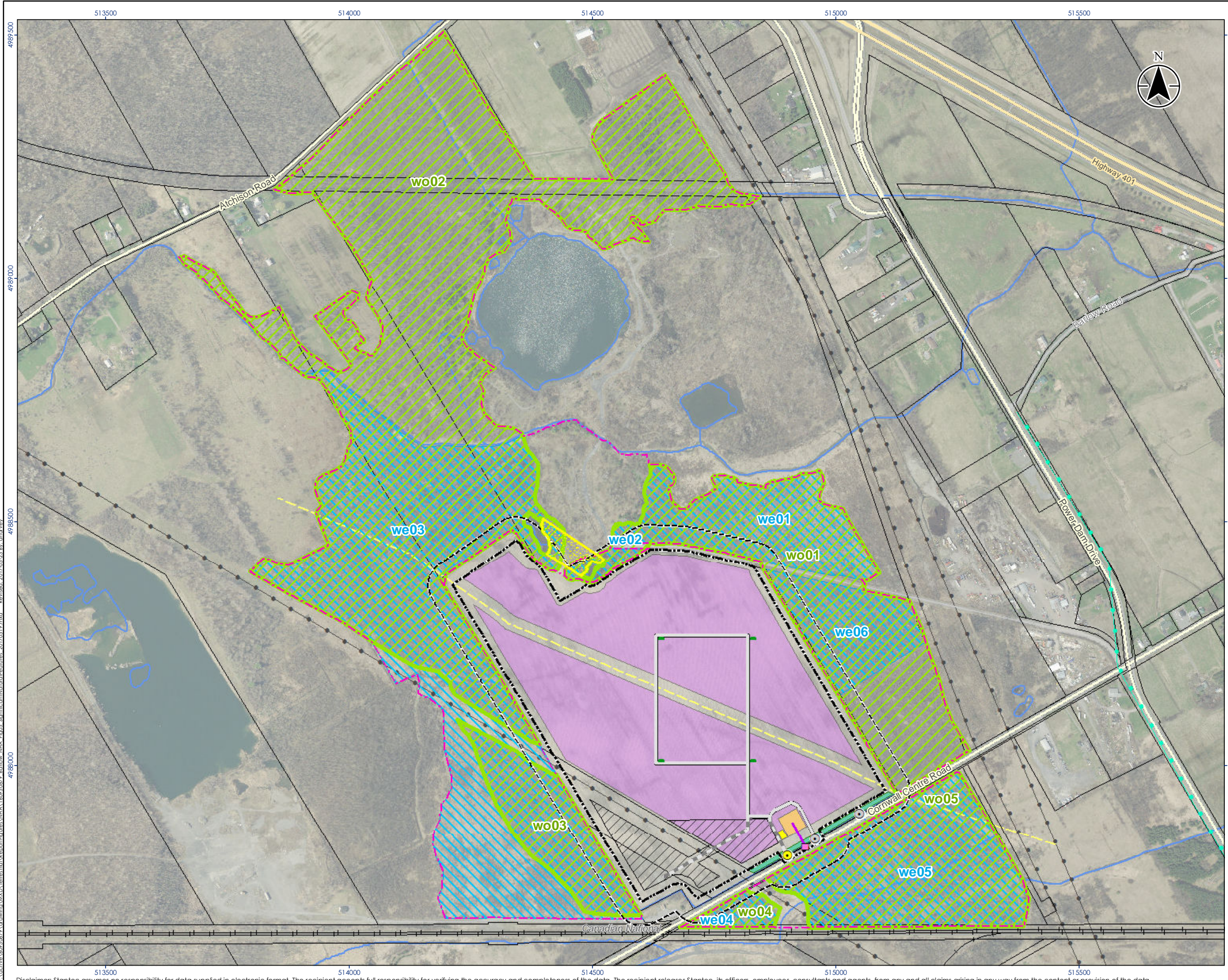
- Notes**
1. Coordinate System: NAD 1983 UTM Zone 18N
 2. Base features and aerial imagery produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2016.
 3. Imagery Source: DRAPE 2014
 4. Waterbody and watercourse mapping within 120 m of the Project Location has been updated based on field studies completed as part of the REA process under O. Reg. 359/09. See the Water Assessment and Water Body Report for details.



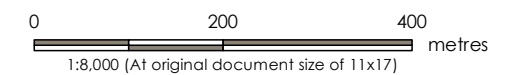
Project Location: 160950879 REV D
 United Counties of Stormont, Dundas and Glengarry
 Prepared by AMW on 2017-05-23
 Technical Review by NK on 2016-11-17
 Independent Review by NK on 2016-11-17

Client/Project: BARLOW ENERGY CENTRE LIMITED PARTNERSHIP
 BARLOW SOLAR ENERGY CENTRE

Figure No. **4**
 Title **Natural Features**



- Legend**
- | | |
|--|--|
| Zone of Investigation (50 m from Project Location) | Natural Features |
| Point of Common Coupling | Candidate Amphibian Movement Corridor |
| Culvert | Generalized Candidate Significant Wildlife Habitat |
| Connection Line | Wetland |
| Inverter Step-up Transformer and Inverter | Woodland |
| Permanent Access | Existing Features |
| Temporary Access During Construction | Expressway / Highway |
| Temporary Construction Laydown and Parking Area | Major Road |
| Operations & Maintenance Storage Area | Minor Road |
| Project Location | Culvert (existing) |
| Substation | Distribution Line (Hydro One) |
| Tree Planting Area | Hydro One Transmission Line |
| Solar Panel Area | Pipeline |
| | Railway |
| | Watercourse |
| | Property Boundary |
| | Waterbody |



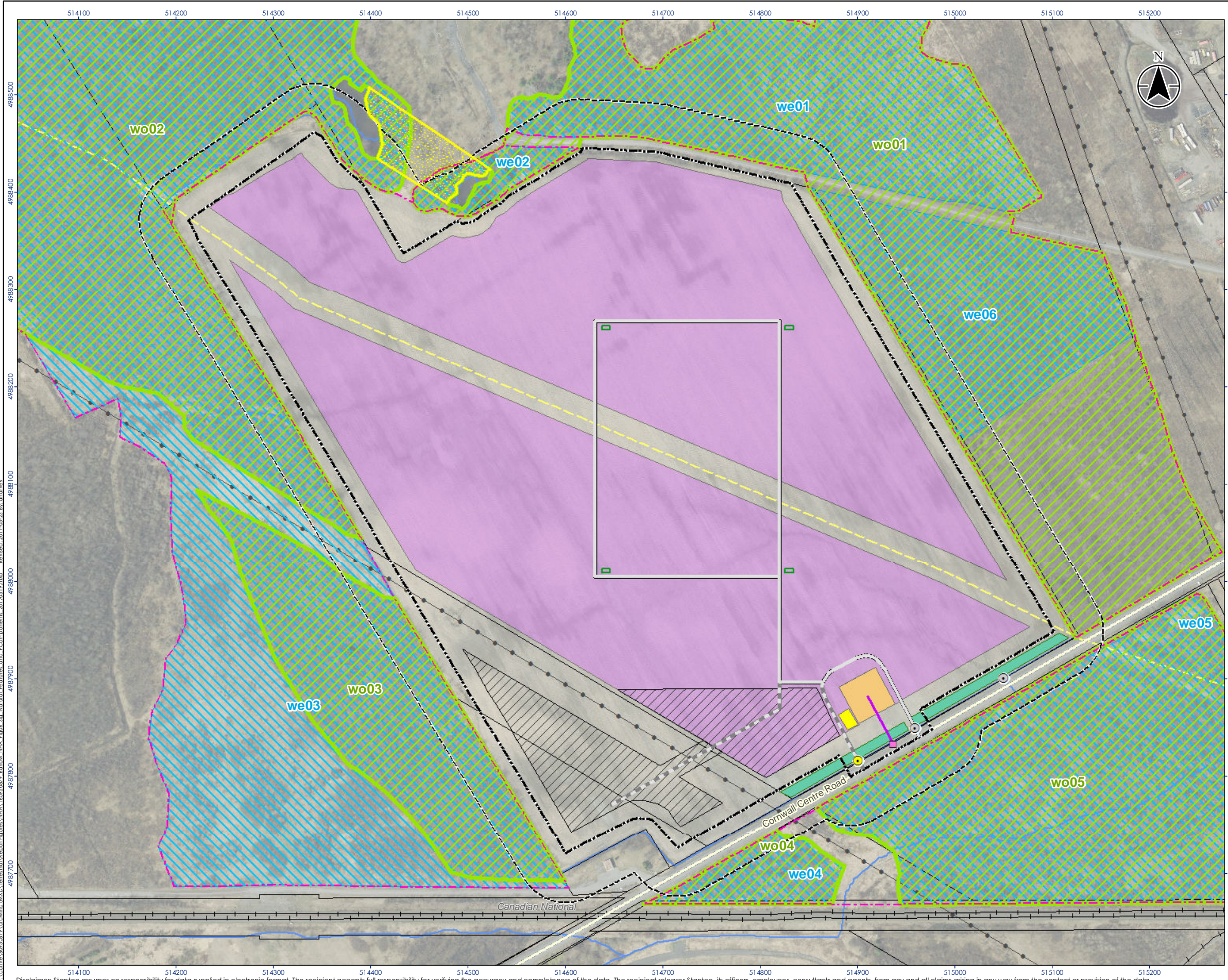
- Notes**
1. Coordinate System: NAD 1983 UTM Zone 18N
 2. Base features and aerial imagery produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2016.
 3. Imagery Source: DRAPE 2014
 4. Waterbody and watercourse mapping within 120 m of the Project Location has been updated based on field studies completed as part of the REA process under O. Reg. 359/09. See the Water Assessment and Water Body Report for details.



Project Location: 160950879 REV D
 United Counties of Stormont, Dundas and Glengarry
 Prepared by MDK on 2017-05-23
 Technical Review by NK on 2016-11-17
 Independent Review by NK on 2016-11-17

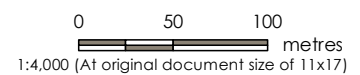
Client/Project: BARLOW ENERGY CENTRE LIMITED PARTNERSHIP
 BARLOW SOLAR ENERGY CENTRE

Figure No. **5**
 Title **Significant Natural Features**



Legend

Zone of Investigation (50 m from Project Location)	Natural Features
Point of Common Coupling	Candidate Amphibian Movement Corridor
Culvert	Generalized Candidate Significant Wildlife Habitat
Connection Line	Wetland
Inverter Step-up Transformer and Inverter	Woodland
Permanent Access	Existing Features
Temporary Access During Construction	Major Road
Temporary Construction Laydown and Parking Area	Minor Road
Operations & Maintenance Storage Area	Culvert (existing)
Project Location	Hydro One Transmission Line
Substation	Pipeline
Tree Planting Area	Railway
Solar Panel Area	Watercourse
	Property Boundary
	Waterbody



Notes

1. Coordinate System: NAD 1983 UTM Zone 18N
2. Base features and aerial imagery produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2016.
3. Imagery Source: DRAPE 2014
4. Waterbody and watercourse mapping within 120 m of the Project Location has been updated based on field studies completed as part of the REA process under O. Reg. 359/09. See the Water Assessment and Water Body Report for details.



Project Location: 160950879 REV D
 United Counties of Stormont, Dundas and Glengarry
 Prepared by MDK on 2017-05-23
 Technical Review by NK on 2016-11-17
 Independent Review by NK on 2016-11-17

Client/Project: BARLOW ENERGY CENTRE LIMITED PARTNERSHIP
 BARLOW SOLAR ENERGY CENTRE

Figure No. **6**
 Title: **Significant Natural Features and Project Components**

APPENDIX B: TABLES

Table B1: Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria for determining Candidate Significant Wildlife Habitat 1	Records Review Results	Site Investigation Methods	Site Investigation Results	Evaluation of Significance
SEASONAL CONCENTRATION AREAS					
Waterfowl Stopover and Staging Area (Terrestrial)	<ul style="list-style-type: none"> Fields with sheet water during spring (mid-March to May) or annual spring melt water flooding found in any of the following Community Types: Meadow (CUM1), Thicket (CUT1). Agricultural fields with waste grains are commonly used by waterfowl, and these are not considered SWH unless they have spring sheet water available. 	<ul style="list-style-type: none"> The records review completed for the Project Location and Zone of investigation (ZOI) did not identify known occurrences of waterfowl stopover and staging habitat. 	<ul style="list-style-type: none"> ELC (Ecological Land Classification) was used to of the presence of vegetation communities that would support waterfowl stopover and staging areas (terrestrial). 	<ul style="list-style-type: none"> No CUM1 or CUT1 were identified at Project Location or ZOI during field investigations. Agricultural fields (corn) occurred at the Project Location however these fields are tile drained and do not flood in spring. No candidate habitat for waterfowl stopover and staging (terrestrial) occurred at the Project Location or ZOI. 	<ul style="list-style-type: none"> N/A
Waterfowl Stopover and Staging Area (Aquatic)	<ul style="list-style-type: none"> Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migration. These habitats have an abundant food supply (mostly aquatic invertebrates and vegetation in shallow water) 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. The following Community Types: Shallow Marsh (MAS), Shallow Aquatic (SA), Deciduous Swamp (SWD). 	<ul style="list-style-type: none"> The records review completed for the Project Location and ZOI did not identify known occurrences of waterfowl concentrations in aquatic habitat. 	<ul style="list-style-type: none"> ELC surveys were used to identify the presence of vegetation communities that would support waterfowl stopover and staging areas (aquatic). Only those communities that contain open standing water (i.e. open aquatic areas) and were associated with marshes, shallow aquatic areas, or swamp communities were considered candidate SWH. 	<ul style="list-style-type: none"> No Shallow Marsh (MAS), Shallow Aquatic (SA), Deciduous Swamp (SWD) occurred at the Project Location. One deciduous swamp community with an open aquatic inclusion was identified at the ZOI. In accordance with Appendix D of the NHAG (MNRF, 2012) given the landscape and geography (specifically the ELC assessment) this wildlife habitat type is considered to have the potential to occur. It is treated as existing and described as "Generalized Candidate Significant Wildlife Habitat (SWH)". 	<ul style="list-style-type: none"> "Generalized Candidate SWH" in the ZOI is treated as significant.
Shorebird Migratory Stopover Area	<ul style="list-style-type: none"> Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats. Vegetation community types: Meadow Marsh (MAM), Beach/Bar (BB), or Sand Dune (SD). Sewage treatment ponds and storm water ponds do not qualify as a significant wildlife habitat. 	<ul style="list-style-type: none"> The Barlow Solar Energy Centre is not located along the shoreline of a lake or river. No known shorebird migratory stopover areas were identified through the records review. 	<ul style="list-style-type: none"> ELC surveys were used to identify the presence of vegetation communities Meadow Marsh (MAM), Beach/Bar (BB), or Sand Dune (SD) that would support a Shorebird Migratory Stopover Area 	<ul style="list-style-type: none"> The Project is not located on the shoreline of a lake or river and did not contain wetlands that included beach areas, bars and seasonally flooded, muddy or un-vegetated shoreline habitats. No Meadow Marsh (MAM), Beach/Bar (BB), or Sand Dune (SD) occurred at the Project Location or ZOI. No candidate wildlife habitat for shorebird migratory stopover area occurred at the Project Location or ZOI. 	<ul style="list-style-type: none"> N/A
Raptor Wintering Area	<ul style="list-style-type: none"> Presence of fields and woodlands. i.e. at least one of the following Community Types: Deciduous Forest (FOD), Mixed Forest (FOM) or Coniferous Forest (FOC), in addition to one of the following Upland Community Types: Meadow (CUM), Thicket (CUT), Savannah 	<ul style="list-style-type: none"> The records review did not identify any known raptor wintering areas at the Project Location or ZOI. 	<ul style="list-style-type: none"> ELC surveys were used to identify the presence of vegetation communities, including Deciduous Forest (FOD), Mixed Forest (FOM) or Coniferous Forest (FOC), in addition to Meadow (CUM), 	<ul style="list-style-type: none"> The Project Location is in an actively managed agricultural field. Forest and meadow/thicket or savannah habitats do not occur at the Project Location. Thicket communities with forest 	<ul style="list-style-type: none"> "Generalized Candidate SWH" in the ZOI is treated as significant.

¹ Definitions taken from SWH Criteria Schedules for Ecoregion 6E (MNRF, 2015).

Table B1: Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria for determining Candidate Significant Wildlife Habitat 1	Records Review Results	Site Investigation Methods	Site Investigation Results	Evaluation of Significance
	(CUS), Woodland (CUW) that are >20 ha combined and provide roosting, foraging and resting habitats for wintering raptors.		Thicket (CUT), Savannah (CUS), Woodland (CUW) that would support Raptor Wintering Areas.	community types were identified at the ZOI. <ul style="list-style-type: none"> • GIS analysis confirmed that forested areas adjacent to upland thicket habitat that are greater than 20 ha occur in the ZOI. • In accordance with Appendix D of the NHAG (MNRF, 2012) given the landscape and geography (specifically the ELC assessment) this wildlife habitat type is considered to have the potential to occur. It is treated as existing and described as "Generalized Candidate SWH". 	
Bat Hibernacula	<ul style="list-style-type: none"> • Hibernacula may be found in caves, mine shafts, underground foundations and karsts. • May be found in these Community Types: Crevice (CCR), Cave (CCA). 	<ul style="list-style-type: none"> • No known bat hibernacula were identified through the Records Review within the Project Location and ZOI. 	<ul style="list-style-type: none"> • ELC surveys and associated wildlife habitat assessments were used to identify the presence of crevices and caves. 	<ul style="list-style-type: none"> • No crevices or caves were found at of the Project Area or ZOI. • No candidate habitat for bat hibernacula occurred at the Project Location or ZOI. 	<ul style="list-style-type: none"> • N/A
Bat Maternity Colonies	<ul style="list-style-type: none"> • Community Types: Deciduous Forest (FOD) or Mixed Forest (FOM), Deciduous Swamp (SWD) and Mixed Swamp (SWM) are ecosites in which maternity colonies can be found. 	<ul style="list-style-type: none"> • The records review completed for the Project Location and ZOI did not identify any known maternity roosts. 	<ul style="list-style-type: none"> • ELC surveys were used to identify the presence of Deciduous Forest (FOD) or Mixed Forest (FOM), Deciduous Swamp (SWD) and Mixed Swamp (SWM) at the Project Location and ZOI. 	<ul style="list-style-type: none"> • No deciduous or mixed forests were found at the Project Location. • No candidate habitat for bat maternity roosts occurred at the Project Location. • Deciduous and mixed forest and swamp that potentially support maternity colonies for bats occurred in the ZOI. • In accordance with Appendix D of the NHAG (MNRF, 2012) given the landscape and geography (specifically the ELC assessment) this wildlife habitat type is considered to have the potential to occur. It is treated as existing and described as "Generalized Candidate SWH". 	<ul style="list-style-type: none"> • "Generalized Candidate SWH" in the ZOI is treated as significant.
Turtle Wintering Areas	<ul style="list-style-type: none"> • Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate dissolved oxygen. • Snapping and Midland Painted turtles utilize ELC community classes: Swamp (SW), Marsh (MA), Open Water (OA) and Shallow Aquatic (SA), and ELC community series: Open Fen (FEO) and Open Bog (BOO). • Man-made ponds such as sewage lagoons or storm water ponds are not be considered SWH. 	<ul style="list-style-type: none"> • The records review completed for the Project Location and ZOI did not identify known occurrences of turtle wintering habitat. 	<ul style="list-style-type: none"> • ELC surveys were used to identify the presence of Swamp (SW), Marsh (MA), Open Water (OA) and Shallow Aquatic (SA), Open Fen (FEO) or Open Bog (BOO).at the Project Location and ZOI . 	<ul style="list-style-type: none"> • The Project Location is sited in actively managed agricultural fields (corn); no Swamp (SW), Marsh (MA), Open Water (OA) and Shallow Aquatic (SA), Open Fen (FEO) or Open Bog (BOO) occurred at the Project Location. • No candidate habitat for turtle wintering areas occurred at the Project Location. • A deciduous swamp community and a mixed forest community within the ZOI each had an open aquatic inclusion. • In accordance with Appendix D of the NHAG (MNRF, 2012) given the 	<ul style="list-style-type: none"> • "Generalized Candidate SWH" in the ZOI is treated as significant.

Table B1: Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria for determining Candidate Significant Wildlife Habitat 1	Records Review Results	Site Investigation Methods	Site Investigation Results	Evaluation of Significance
				landscape and geography (specifically the ELC assessment) this wildlife habitat type is considered to have the potential to occur. It is treated as existing and described as "Generalized Candidate SWH."	
Reptile Hibernacula	<ul style="list-style-type: none"> Hibernation occurs in sites located below frost lines in burrows, rock crevices, broken and fissured rock and other natural features. The existence of features that go below the frost line, including rock piles or slopes, old stone fences and abandoned crumbling foundations assist in identifying candidate SWH. The following Community Types may be directly related to snake hibernacula: Talus (TA), Rock Barren (RB), Crevice (CCR), Cave (CCA), and Alvar (RBOA1, RBSA1, RBTA1). Five-lined Skink inhabit mixed forests with rock outcrop openings in the case where the cover rock overlays granite bedrock that contains fissures. 	<ul style="list-style-type: none"> The records review completed for the Project Location and ZOI did not identify known occurrences of reptile hibernaculum. The Southern Shield population of five-lined skink occurs along the southern edge of the Canadian Shield, from Georgian Bay in the west, with the eastern extent of the range in Leeds and Grenville County (Seburn, 2010). The Barlow Project Location occurs outside of the range for the southern shield population and no known records of Five-lined Skink occur in the Project Location and ZOI. 	<ul style="list-style-type: none"> ELC surveys were used to identify community types that may the support reptile hibernacula. In addition, habitat features that would provide an underground route, act as a potential hibernacula including exposed rock crevices or inactive animal borrows were searched for during ELC surveys. 	<ul style="list-style-type: none"> No Talus, Rock Barrens, Crevices, Caves or Alvar were identified at the Project Location. In addition, no features (i.e. inactive burrows, fissures etc.) that would provide access below the frost line were recorded during the site investigation. No Talus, Rock Barrens, Crevices, Caves or Alvar were identified within the ZOI. Two sites containing burrows were discovered during wildlife habitat assessments within the ZOI. One burrow was documented within the SWDO2. The entrance to the burrow was approximately groundhog-sized, was free of dirt or leaves and was comprised of smooth, hard packed soil. The ground disturbance and lack of vegetation around the burrow indicates that the burrow was actively in use by mammals and therefore not suitable for a reptile hibernaculum. The second site occurred along the side of an embankment at the edge of a road. No burrows in the embankment were visible when this area was visited in 2017, likely resulting from sliding substrate. No candidate habitat for reptile hibernacula occurred at the Project Location or ZOI. 	<ul style="list-style-type: none"> N/A
Colonial-Nesting Bird Breeding Habitat (Bank and Cliff)	<ul style="list-style-type: none"> Eroding banks, sandy hills, borrow pits, steep slopes, sand piles, cliff faces, bridge abutments, silos, or barns found in any of the following Community Types: Meadow (CUM), Thicket (CUT), Savanna (CUS), Bluff (BL), Cliff (CL). Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, soil, or aggregate stockpiles. 	<ul style="list-style-type: none"> The records review completed for the Project Location and ZOI did not identify any known colonial bird nesting sites. 	<ul style="list-style-type: none"> ELC surveys were utilized to assess the presence of Meadow (CUM), Thicket (CUT), Savanna (CUS), Bluff (BL), Cliff (CL) at the Project Location and ZOI that could support colonial bird breeding habitat (bank and cliff). During the ELC survey any areas of exposed vertical surfaces, such as hills, valley slopes and banks were searched for and recorded. 	<ul style="list-style-type: none"> No eroding banks, sandy hills, borrow pits, steep slopes and sand piles were present at the Project Location or ZOI. No candidate habitat for bank or cliff colonial nesting birds occurred at the Project Location or ZOI. 	<ul style="list-style-type: none"> N/A
Colonial-Nesting Bird Breeding Habitat	<ul style="list-style-type: none"> Identification of stick nests in any of the following Community Types: Mixed Swamp 	<ul style="list-style-type: none"> The records review completed for the Project Location and ZOI did not 	<ul style="list-style-type: none"> ELC Surveys were utilized to assess vegetation communities within the 	<ul style="list-style-type: none"> No large stick nests or colonies were recorded at the Project Location or 	<ul style="list-style-type: none"> N/A

Table B1: Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria for determining Candidate Significant Wildlife Habitat 1	Records Review Results	Site Investigation Methods	Site Investigation Results	Evaluation of Significance
(Tree/Shrubs)	(SWM), Deciduous Swamp (SWD), and Treed Fen (FET). <ul style="list-style-type: none"> Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used. 	identify any known colonial bird nesting sites.	Project Location and ZOI that could support colonial bird breeding habitat (Mixed Swamp, Deciduous Swamp, and Treed Fen) and the presence of large stick nests was recorded during wildlife habitat assessment surveys.	ZOI. <ul style="list-style-type: none"> No candidate habitat for tree/shrub colonial nesting birds occurred at the Project Location or ZOI. 	
Colonial-Nesting Bird Breeding Habitat (Ground)	<ul style="list-style-type: none"> Any rocky island or peninsula within a lake or large river. Nesting colonies of gulls and terns are on islands or peninsulas associated with open water or in marshy areas. For Brewer's Blackbird, close proximity to watercourses in open fields or pastures with scattered trees or shrubs found in any of the following Community Types: Meadow Marsh (MAM1-6), Shallow Marsh (MAS1-3), Meadow (CUM), Thicket (CUT), Savannah (CUS). 	<ul style="list-style-type: none"> The records review completed for the Project Location and ZOI did not identify any known colonial bird nesting sites. The Project Location and ZOI are not located on a rocky island or peninsula within a lake or large river. The Project is not located within the known range of Brewer's Blackbird (Cadman et al., 2007). 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A
Migratory Butterfly Stopover Areas	<ul style="list-style-type: none"> Located within 5 km of Lake Ontario. A combination of ELC communities, one from each land class is required: Field (CUM, CUT, CUS) and Forest (FOC, FOM, FOD, CUP). Minimum of 10 ha in size with a combination of field and forest habitat present. 	<ul style="list-style-type: none"> The Project Location and ZOI are not located within 5 km of a Great Lakes shoreline. 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A
Landbird Migratory Stopover Areas	<ul style="list-style-type: none"> The following community types: Forest (FOD, FOM, FOC) or Swamp (SWC, SWM, SWD). Woodlots must be >10 ha in size and within 5 km of Lake Ontario – woodlands within 2 km of Lake Ontario are more significant. 	<ul style="list-style-type: none"> The Project Location and ZOI are not located within 5 km of a Great Lakes shoreline. 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A
Deer Yarding Areas	<ul style="list-style-type: none"> Deer yarding areas are areas where deer move to in response to the onset of winter snow and cold. Usually mixed or deciduous forest with plenty of browse available for food. 	<ul style="list-style-type: none"> The identification and delineation of deer yards is the responsibility of the MNRF (MNRF, 2015). Review of the NHIC and LIO databases, and consultation with the MNRF Kemptville District did not identify any deer yarding areas within the ZOI and Project Location (MNRF, 2016; LIO, 2016; NHIC, 2015). The Project Location and ZOI are not located in an area that would constitute candidate significant wildlife habitat for deer yarding areas. 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A
Deer Winter Congregation Areas	<ul style="list-style-type: none"> Woodlots typically > 100 ha in size unless determined by the MNR as significant. All forested ecosites within Community Series: FOC, FOM, FOD, SWC, SWM, SWD. Conifer plantations much smaller than 50 ha may also be used 	<ul style="list-style-type: none"> MNRF undertakes the identification and delineation of significant deer winter congregation areas (MNRF, 2015). Review of the NHIC and LIO databases, and consultation with the MNRF Kemptville District did not identify any deer wintering areas within the ZOI and Project Location (MNRF, 2016; LIO, 2016; NHIC, 2015). The Project Location and ZOI are not 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A

Table B1: Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria for determining Candidate Significant Wildlife Habitat 1	Records Review Results	Site Investigation Methods	Site Investigation Results	Evaluation of Significance
		located in an area that would constitute candidate significant wildlife habitat for deer winter congregation areas.			
RARE VEGETATION COMMUNITIES					
Cliffs and Talus Slopes	<ul style="list-style-type: none"> Any ELC Ecosite within Community Series: TAO, TAS, TAT, CLO, CLS, CLT. Most cliff and talus slopes occur along the Niagara Escarpment. 	<ul style="list-style-type: none"> A search of the NHIC database and other background information did not identify any records of known cliffs and talus slope communities in the ZOI and Project Location (LIO, 2016; NHIC, 2015). 	<ul style="list-style-type: none"> ELC surveys were utilized to assess vegetation communities within the Project Location and ZOI that would be considered cliffs or talus slope communities. 	<ul style="list-style-type: none"> No cliffs or talus slope communities were identified at the Project Location or ZOI. No candidate wildlife habitat for cliffs or talus slope communities occurred at the Project Location or ZOI. 	<ul style="list-style-type: none"> N/A
Sand Barrens	<ul style="list-style-type: none"> Any of the following Community Types: SBO1 (Open Sand Barren Ecosite), SBS1 (Shrub Sand Barren Ecosite), SBT1 (Treed Sand Barren Ecosite). A sand barren >0.5 ha in size. 	<ul style="list-style-type: none"> A search of the NHIC database and other background information did not identify any records of known sand barren communities in the ZOI and Project Location (LIO, 2016; NHIC, 2015). 	<ul style="list-style-type: none"> ELC surveys were utilized to assess vegetation communities within the Project Location and ZOI that would be considered for sand barren communities. 	<ul style="list-style-type: none"> No sand barren communities were identified at the Project Location or ZOI. No candidate wildlife habitat for sand barren communities occurred at the Project Location or ZOI. 	<ul style="list-style-type: none"> N/A
Alvars	<ul style="list-style-type: none"> Any of the following Community Types: ALO1 (Open Alvar Rock Barren Ecosite), ALS1 (Alvar Shrub Rock Barren Ecosite), ALT1 (Treed Alvar Rock Barren Ecosite), FOC1 (Dry-Fresh Pine Coniferous Forest), FOC2 (Dry-Fresh Cedar Coniferous Forest), CUM2 (Bedrock Cultural Meadow), CUS2 (Bedrock Cultural Savannah), CUT2-1 (Common Juniper Cultural Alvar Thicket), or CUW2 (Bedrock Cultural Woodland) An alvar site > 0.5 ha in size 	<ul style="list-style-type: none"> A search of the NHIC database and other background information did not identify any records of known alvar communities in the ZOI and Project Location (LIO, 2016; NHIC, 2015). 	<ul style="list-style-type: none"> ELC surveys were utilized to assess vegetation communities within the Project Location and ZOI that would be considered alvar communities. 	<ul style="list-style-type: none"> No vegetation communities indicating alvar communities and no supporting characteristics of alvar habitats such as exposed bedrock, alvar indicator species, patchy to barren vegetation were identified at the Project Location or ZOI. No candidate wildlife habitat for alvar communities occurred at the Project Location or ZOI. 	<ul style="list-style-type: none"> N/A
Old-growth Forest	<ul style="list-style-type: none"> Old-growth forests tend to be relatively undisturbed, structurally complex, and contain a wide variety of trees and shrubs in various age classes. These habitats usually support a high diversity of wildlife species. Any of the following Community Types: FOD (Deciduous Forest), FOM (Mixed Forest), FOC (Coniferous Forest) or Swamp (SWC, SWM, SWD). Woodlands >30 ha with >10 ha interior habitat (interior habitat considered with a 100 m buffer). 	<ul style="list-style-type: none"> A search of the NHIC database and other background information did not identify any records of known old-growth forest in the ZOI and Project Location (LIO, 2016; NHIC, 2015). 	<ul style="list-style-type: none"> ELC conducted in 2016 was used to assess vegetation communities and the potential presence of old-growth forests. Interior habitat was calculated by placing a 100 m buffer from the edge within each contiguous forested community. 	<ul style="list-style-type: none"> No old growth forests were identified at the Project Location. No candidate wildlife habitat for old growth forests occurred at the Project Location. One woodland greater than 30 ha occurred in the ZOI (wo2), however it did not have >10 ha of interior habitat (wo02 was 50.6 ha with 8.5 ha of interior habitat) The remaining woodlands are less than 30 ha (see Table B7) and do not contain more than 10 ha of interior habitat. No candidate wildlife habitat for old growth forests occurred at the Project Location or ZOI. 	<ul style="list-style-type: none"> N/A
Savannahs	<ul style="list-style-type: none"> A Savannah is a tallgrass prairie habitat that has tree cover between 25 – 60% with no minimum size. Remnant sites such a railway right of ways are not SWH. 	<ul style="list-style-type: none"> A search of the NHIC database and other background information did not identify any records of known savannah communities in the ZOI and Project Location (LIO, 2016; NHIC, 2015). 	<ul style="list-style-type: none"> ELC surveys were utilized to assess vegetation communities within the Project Location and ZOI that would be considered savannah communities. 	<ul style="list-style-type: none"> No savannah communities were identified at the Project Location or ZOI. No candidate wildlife habitat for savannah communities occurred at 	<ul style="list-style-type: none"> N/A

Table B1: Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria for determining Candidate Significant Wildlife Habitat 1	Records Review Results	Site Investigation Methods	Site Investigation Results	Evaluation of Significance
	<ul style="list-style-type: none"> Any of the following Community Types: TPS1 (Dry-Fresh Tallgrass Mixed Savannah Ecosite), TPS2 (Fresh-Moist Tallgrass Deciduous Savannah Ecosite), TPW1 (Dry-Fresh Black Oak Tallgrass Deciduous Woodland Ecosite), TPW2 (Fresh-Moist Tallgrass Deciduous Woodland Ecosite), CUS2 (Bedrock Cultural Savannah Ecosite). 			the Project Location or ZOI.	
Tall-grass Prairies	<ul style="list-style-type: none"> A Tallgrass Prairie has ground cover dominated by prairie grasses with no minimum size. An open Tallgrass Prairie habitat has < 25% tree cover. Remnant sites such a railway right of ways are not SWH. Any of the following Community Types: TPO1 (Dry Tallgrass Prairie Ecosite), TPO2 (Fresh-Moist Tallgrass Prairie Ecosite). 	<ul style="list-style-type: none"> A search of the NHIC database and other background information did not identify any records of known tall grass prairie communities in the ZOI and Project Locations (LIO, 2016; NHIC, 2015). 	<ul style="list-style-type: none"> ELC surveys were utilized to assess vegetation communities within the Project Location and ZOI that would be considered for tall grass prairie communities. 	<ul style="list-style-type: none"> No tall grass prairie communities were identified at the Project Location or ZOI. No candidate wildlife habitat for tall grass prairie communities occurred at the Project Location or ZOI. 	<ul style="list-style-type: none"> N/A
Other Rare Vegetation Communities	<ul style="list-style-type: none"> Rare vegetation communities may include beaches, fens, marsh, barrens, dunes and swamps. Provincially Rare S1, S2 and S3 vegetation communities are listed in Appendix M of the SWHTG. 	<ul style="list-style-type: none"> A search of the NHIC database and other background information did not identify any records of known rare vegetation communities in the ZOI and Project Locations (LIO, 2016; NHIC, 2015). 	<ul style="list-style-type: none"> ELC surveys were utilized to assess vegetation communities within the Project Location and ZOI that would be considered additional rare vegetation communities. Rare vegetation communities were identified based on the provincial status of vegetation communities identified in NHIC, 2015. 	<ul style="list-style-type: none"> No rare vegetation communities were identified at the Project Location or ZOI. No candidate wildlife habitat for rare vegetation communities occurred at the Project Location or ZOI. 	<ul style="list-style-type: none"> N/A
SPECIALIZED HABITAT FOR WILDLIFE					
Waterfowl Nesting Area	<ul style="list-style-type: none"> Any upland areas extending >120m away from a wetland (>0.5ha), or a wetland (>0.5ha) and any small wetlands (0.5 ha) within 120 m, or a cluster of 3 or more small (<0.5) wetlands within 120 m of each individual wetland where waterfowl nesting is known to occur. 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, SWT1, SWT2, SWD1, SWD2, SWD3, SWD4. Any upland areas extending >120m away from a wetland (>0.5ha), or a wetland (>0.5ha) and any small wetlands (0.5 ha) within 120 m, or a cluster of 3 or more small (<0.5) wetlands within 120 m of each individual wetland where waterfowl nesting is known to occur. Note: includes adjacency to Provincially Significant Wetlands 	<ul style="list-style-type: none"> The records review completed for the Project Location and ZOI did not identify known occurrences of waterfowl nesting areas. 	<ul style="list-style-type: none"> The results of ELC surveys and GIS analysis of the landscape were used to identify upland areas of open habitat > 120 m wide that occurred adjacent to a large marsh, pond, swamp or swamp thicket communities or clusters of these vegetation communities within the Project Location and ZOI. Habitats adjacent to wetlands without standing water were not considered candidate SWH. 	<ul style="list-style-type: none"> No MAS, SAS, SAM, SAF or MAM communities are found at the Project Location or ZOI. No upland habitats were identified at the Project Location. No candidate wildlife habitat for waterfowl nesting areas occurred at the Project Location. SWD and SWT habitat are located within the ZOI. These features are associated with >120m upland habitat such as forest features (FO) and woodlands features (WO). In accordance with Appendix D of the NHAG (MNR, 2012) given the landscape and geography (specifically the ELC assessment) this wildlife habitat type is considered to have the potential to occur. It is treated as existing and described as "Generalized Candidate SWH". 	<ul style="list-style-type: none"> "Generalized Candidate SWH" in the ZOI is treated as significant.
Bald Eagle and Osprey nesting, Foraging, and Perching Habitat	<ul style="list-style-type: none"> Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water. Nests located on man-made objects are not to be included as SWH (e.g. telephone poles and 	<ul style="list-style-type: none"> The records review completed for the Project Location and ZOI did not identify known occurrences of Osprey or Bald Eagle nests within the Barlow Energy Solar Centre. 	<ul style="list-style-type: none"> Searches for stick nests (active or not) as well as a general habitat assessment were conducted during wildlife habitat assessment surveys and ELC surveys at the Project 	<ul style="list-style-type: none"> No stick nests were identified at the Project Location or in the ZOI. Forest communities directly adjacent to riparian areas did not occur at the Project Location or the ZOI. 	<ul style="list-style-type: none"> N/A

Table B1: Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria for determining Candidate Significant Wildlife Habitat 1	Records Review Results	Site Investigation Methods	Site Investigation Results	Evaluation of Significance
	<ul style="list-style-type: none"> constructed nesting platforms). • ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas – rivers, lakes, ponds and wetlands 		Location and ZOI.	<ul style="list-style-type: none"> • No candidate wildlife habitat for Osprey or Bald Eagle habitat occurred at the Project Location or ZOI. 	
Woodland Raptor Nesting Habitat	<ul style="list-style-type: none"> • All natural or conifer plantation woodland/forest stands combined >30 ha and with >10 ha of interior habitat. Interior habitat determined with a 200 m buffer. • Stick nests found in a variety of 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. • May be found in all forested ELC Ecosites. • May also be found in SWC, SWM, SWD and CUP3. 	<ul style="list-style-type: none"> • The records review did not identify any known woodland raptor nesting habitat at the Project Location and ZOI. 	<ul style="list-style-type: none"> • Searches for stick nests (active or not) as well as a general habitat assessment were conducted during wildlife habitat assessment surveys and ELC surveys at the Project Location and ZOI. 	<ul style="list-style-type: none"> • No stick nests were identified at the Project Location or ZOI. • The project location is sited in actively managed agricultural fields. • No candidate wildlife habitat for woodland raptor nesting habitat occurred at the Project Location • One woodland greater than 30 ha occurred in the ZOI (wo2), however it did not have >10 ha of interior habitat (wo2 was 50.6 ha with 8.5 ha of interior habitat) • The remaining woodlands are less than 30 ha (see Table B7) and do not contain more than 10 ha of interior habitat. 	<ul style="list-style-type: none"> • N/A
Turtle Nesting Areas	<ul style="list-style-type: none"> • Exposed mineral soil (sand or gravel) areas adjacent (<100 m) or within the following ELC Ecosites: MAS1, MAS2, MAS3, SAS1, SAM1, SAF1, BOO1, FEO1. • For an area to function as a turtle-nesting area, it must 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. 	<ul style="list-style-type: none"> • The records review did not identify any known turtle nesting habitat in the ZOI and Project Locations. 	<ul style="list-style-type: none"> • ELC surveys were utilized to assess ELC Ecosites at the Project Location and ZOI that may support turtle nesting areas. 	<ul style="list-style-type: none"> • No MAM, SAS, SAF, BOO or FEO communities with exposed mineral soil areas were identified at the Project Location or ZOI. • No candidate wildlife habitat for turtle nesting occurred at the Project Location. • While the ELC ecosites for turtle nesting did not occur within the ZOI, suitable open habitat and/or evidence of scavenged turtle nest (unknown species) was located within THDM2 and SWDO2. In accordance with Appendix D of the NHAG (MNRF, 2012), these woodland features have been identified as "Generalized Candidate SWH". 	<ul style="list-style-type: none"> • "Generalized Candidate SWH" in the ZOI is treated as significant.
Seeps and Springs	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • The records review did not identify any known seeps and springs in the ZOI and Project Locations. 	<ul style="list-style-type: none"> • Searches for seeps and springs were conducted during ELC investigations. As the Project Study Area consists of cultivated agricultural cropland, the search for seeps and springs focused on the natural features (forested ecosites) within the ZOI of the Project Location. 	<ul style="list-style-type: none"> • No seeps or springs were identified at the Project Location or ZOI. • The Project Location is actively managed agricultural fields; No candidate wildlife habitat for seeps/springs occurred at the Project Location. • While no seeps/springs were observed, forested ELC ecosites occurred within the ZOI. In accordance with Appendix D of the NHAG (MNRF, 2012), these woodland features have been 	<ul style="list-style-type: none"> • "Generalized Candidate SWH" in the ZOI is treated as significant.

Table B1: Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria for determining Candidate Significant Wildlife Habitat 1	Records Review Results	Site Investigation Methods	Site Investigation Results	Evaluation of Significance
Amphibian Breeding Habitat (Woodland)	<ul style="list-style-type: none"> All Ecosites associated with these ELC Community Series; FOC, FOM, FOD, SWC, SWM, SWD. Presence of a wetland, lake, or pond (>500 m²) 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. 	<ul style="list-style-type: none"> The records review did not identify any known woodland amphibian breeding habitat at the Project Location and ZOI. 	<ul style="list-style-type: none"> Natural vegetation communities with the potential to support amphibian breeding habitat (woodland) within the Project Location and ZOI were assessed during ELC surveys. Areas of standing water or areas which showed evidence of holding water through the spring (based on topography and vegetation) were identified. 	<p>identified as "Generalized Candidate SWH".</p> <ul style="list-style-type: none"> No wetlands, lakes or ponds were identified at the Project Location. No candidate wildlife habitat for amphibian breeding habitat (woodland) occurred at the Project Location. Swamp and wetland communities containing open aquatic areas occurred at the ZOI. In accordance with Appendix D of the NHAG (MNRF, 2012) given the landscape and geography (specifically the ELC assessment) this wildlife habitat type is considered to have the potential to occur. It is treated as existing and described as "Generalized Candidate SWH". 	<ul style="list-style-type: none"> "Generalized Candidate SWH" in the ZOI is treated as significant.
Amphibian Breeding Habitat (Wetland)	<ul style="list-style-type: none"> ELC Community Classes SW, MA, FE, BO, OA and SA that are isolated (>120 m) from woodland habitats however larger wetland containing predominately aquatic species (e.g. Bullfrogs) may be adjacent to woodlands 	<ul style="list-style-type: none"> The records review did not identify any known wetland amphibian breeding habitat at the Project Location and ZOI. No known bullfrog concentration areas were identified during the records review at the Project Location and ZOI. 	<ul style="list-style-type: none"> ELC surveys were utilized to assess features within the Project Location and ZOI that may support wetland amphibian breeding habitat. ELC surveys were used to identify wetland habitat features at the Project Location and ZOI including those that may support bullfrogs (i.e., natural open aquatic and marsh habitats greater than 500m² (about 25 m diameter). 	<ul style="list-style-type: none"> No SW, MA, FE, BO, OA and SA ecosites occurred at the Project Location. SW and OA ecosites occurred in the ZOI None of the SW communities contained wetlands >500m²/ >25m diameter in the ZOI that were isolated from woodland ecosites <ul style="list-style-type: none"> The SWDM1 did not contain vernal pooling, the SWDM2-2 community contained vernal pools however they were less than 500m²/>25m, the SWDM3 communities contained vernal pooling (seasonal) however pools were very small (maximum 10m diameter) and were dry or drying during the June 7, 2016 site visit, the SWTM5 contained ground cover of grasses and goldenrod. Wet areas were noted however the community did not contain any vernal pools The SWD02 community contained an open aquatic area (further discussed below) Ecosites SWDM1, SWD02, SWDM2-2, SWTM5 and SWDM3 (southern ecosite) occur within 	<ul style="list-style-type: none"> "Generalized Candidate SWH" in the ZOI is treated as significant.

Table B1: Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria for determining Candidate Significant Wildlife Habitat 1	Records Review Results	Site Investigation Methods	Site Investigation Results	Evaluation of Significance
				<p>120 of an upland woodland ecosite.</p> <ul style="list-style-type: none"> Two OA communities occurred in the ZOI, neither are isolated from woodland ecosites; one occurred within a white-pine-hardwood mixed forest ecosite and the other within 120 m of the mixed forest ecosite. However, these are both permanent waterbodies and are greater than 500m² with >25m diameter. As a result, the OA ecosites provide candidate amphibian breeding habitat (wetland) for bullfrogs. In accordance with Appendix D of the NHAG (MNR, 2012) given the landscape and geography (specifically the ELC assessment) amphibian breeding habitat (wetland) for bullfrog is considered to have the potential to occur in the two open aquatic ecosites. It is treated as existing and described as "Generalized Candidate SWH". 	
Woodland Area-Sensitive Bird Breeding Habitat	<ul style="list-style-type: none"> Where interior forest birds typically breed; large mature forest (>60 years old) that have >30 ha of interior habitat. Interior habitat determined with a 200 m buffer. All Ecosites associated with these ELC Community Series; FOC, FOM, FOD, SWC, SWM, SWD. 	<ul style="list-style-type: none"> The records review did not identify any known woodland area-sensitive bird breeding habitat at the Project Location and ZOI. 	<ul style="list-style-type: none"> ELC field surveys and GIS analysis were used to determine woodlots that occurred at the Project Location and ZOI that were >30 ha and contained interior habitat (>200 m from edge). Nest searched for Red-breasted Nuthatch, Veery, Blue-headed Vireo, Black-throated Green Warbler, Blackburnian Warbler, Black-throated Blue Warbler, Ovenbird and Scarlet Tanager. 	<ul style="list-style-type: none"> No FOC, FOM, FOD, SWC, SWM, SWD occur at the Project Location. No candidate wildlife habitat for woodland area-sensitive breeding bird habitat occurred at the Project Location. One woodland in the ZOI (wo2) was greater than 30 ha however it did not contain any interior habitat (200 m from edge). The remaining woodlands were less than 30 ha and did not contain any interior habitat. 	<ul style="list-style-type: none"> N/A
SPECIES OF CONSERVATION CONCERN					
Marsh Bird Breeding Habitat	<ul style="list-style-type: none"> All wetland habitats with shallow water and emergent aquatic vegetation are SWH. May include any of the following Community Types: Meadow Marsh (MAM), Shallow Aquatic (SA), Open Bog (BOO), Open Fen (FEO), or for Green Heron: Swamp (SW), Marsh (MA) and Meadow (CUM1) Community Types. Green Heron's habitat is present at the edge of water such as sluggish streams, ponds and marshes sheltered by shrubs and trees. 	<ul style="list-style-type: none"> The records review did not identify any known marsh bird breeding habitat at the Project Location and ZOI. 	<ul style="list-style-type: none"> Vegetation community classification surveys were used to identify marshes with shallow water and emergent vegetation that occurred at the Project Location and ZOI. 	<ul style="list-style-type: none"> Swamp and shallow aquatic communities within the ZOI lack habitat to support marsh breeding birds. No marsh, swamp or shallow aquatic communities were identified at the Project Location. Swamp and shallow aquatic communities containing open aquatic areas occurred at the ZOI. In accordance with Appendix D of 	<ul style="list-style-type: none"> "Generalized Candidate SWH" in the ZOI is treated as significant.

Table B1: Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria for determining Candidate Significant Wildlife Habitat 1	Records Review Results	Site Investigation Methods	Site Investigation Results	Evaluation of Significance
				the NHAG (MNRF, 2012) given the landscape and geography (specifically the ELC assessment) this wildlife habitat type is considered to have the potential to occur. It is treated as existing and described as "Generalized Candidate SWH".	
Open Country Bird Breeding Habitat	<ul style="list-style-type: none"> Grassland (which includes natural and cultural fields and meadow) areas > 30 ha, not Class 1 or Class 2 agricultural lands, with no row-cropping or hay or livestock pasturing in the last 5 years, in the following Community Type: Meadow (CUM). 	<ul style="list-style-type: none"> The records review did not identify any open country bird breeding habitat at the Project Location and ZOI. 	<ul style="list-style-type: none"> ELC surveys were conducted to assess the presence of grassland communities at the Project Location and ZOI to support area-sensitive bird species. 	<ul style="list-style-type: none"> No grassland communities were identified at the Project Location or ZOI. No candidate wildlife habitat for open country breeding bird habitat occurred at the Project Location or ZOI. 	<ul style="list-style-type: none"> N/A
Shrub/Early Successional Bird Breeding Habitat	<ul style="list-style-type: none"> Large field areas succeeding to shrub and thicket habitats >10 ha, not Class 1 or Class 2 agricultural lands, with no row-cropping or intensive hay or livestock pasturing in the last 5 years, in the following Community Types: Thickets (CUT), Savannahs (CUS), or Woodlands (CUW). Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or pasturelands. 	<ul style="list-style-type: none"> The records review did not identify any shrub/early successional bird breeding habitat at the Project Location and ZOI. 	<ul style="list-style-type: none"> ELC surveys were conducted to assess the presence of thicket and savannah type communities at the Project Location and ZOI. 	<ul style="list-style-type: none"> No field areas succeeding to shrub and thicket habitats >10 ha were identified at the Project Location. No candidate wildlife habitat for shrub/early successional breeding bird habitat occurred at the Project Location. Thicket communities occurred at the ZOI. In accordance with Appendix D of the NHAG (MNRF, 2012) given the landscape and geography (specifically the ELC assessment) this wildlife habitat type is considered to have the potential to occur. It is treated as existing and described as "Generalized Candidate SWH". 	<ul style="list-style-type: none"> "Generalized Candidate SWH" in the ZOI is treated as significant.
Terrestrial Crayfish	<ul style="list-style-type: none"> Wet meadows and edges of shallow marshes (no minimum size) and in the following Community Types: Meadow Marsh (MAM1, MAM2, MAM3, MAM4, MAM5, MAM6), Shallow Marsh (MAS1, MAS2, MAS3) Deciduous Swamp (SWD), Thicket Swamp (SWT) and Mixed Swamp (SWM). Construct burrows in marshes, mudflats, meadows. Can be found far from water. 	<ul style="list-style-type: none"> The Project Location and ZOI are not located within the Canadian range of terrestrial crayfish, which is restricted to southwestern Ontario (MNRF, 2015). 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A
SPECIAL CONCERN AND RARE WILDLIFE SPECIES (I.E. ALL SPECIAL CONCERN AND S1-S3 SPECIES)					
Brainerd's Hawthorn	<ul style="list-style-type: none"> This shrub is drought tolerant. It is typically found within woodland habitats, with partial sun exposure. Optimal growing conditions include dry-fresh soils of loamy texture (Reznicek et al. 2011). 	<ul style="list-style-type: none"> The records review identified brainerd's hawthorn as being recorded historically within the regional area of the Project Location and ZOI. 	<ul style="list-style-type: none"> ELC-based habitat assessments for both plant and wildlife species of conservation concern as described in the SWH Ecoregion 6E Criterion Schedule were used to determine the presence of candidate wildlife habitat for these species at the Project Location and ZOI. 	<ul style="list-style-type: none"> No woodland habitats at the Project Location. No candidate wildlife habitat for brainerd's hawthorn occurred at the Project Location. Woodland habitats occurred at the ZOI. In accordance with Appendix D of the NHAG (MNRF, 2012) given the landscape and geography (specifically the ELC assessment) the brainerd's hawthorn is considered to have the potential to occur. Its 	<ul style="list-style-type: none"> "Generalized Candidate SWH" in the ZOI is treated as significant.

Table B1: Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria for determining Candidate Significant Wildlife Habitat 1	Records Review Results	Site Investigation Methods	Site Investigation Results	Evaluation of Significance
				habitat is treated as existing and described as "Generalized Candidate SWH".	
Caughuawaga Hawthorn	<ul style="list-style-type: none"> Occurs on abandoned farmland, along streams, and in forest openings, especially on soils high in calcium. Moderately shade-tolerant. Often forming thickets of several different species (Farrar, 1995). 	<ul style="list-style-type: none"> The records review identified caughuawaga hawthorn as being recorded historically within the regional area of the Project Location and ZOI. 		<ul style="list-style-type: none"> No abandoned farmland, streams or forest habitats at the Project Location. No candidate wildlife habitat for caughuawaga hawthorn occurred at the Project Location. Forest habitats with soils high in calcium and in forest openings occurred at the ZOI. In accordance with Appendix D of the NHAG (MNRF, 2012) given the landscape and geography (specifically the ELC assessment) the caughuawaga hawthorn is considered to have the potential to occur. Its habitat is treated as existing and described as "Generalized Candidate SWH". 	<ul style="list-style-type: none"> "Generalized Candidate SWH" in the ZOI is treated as significant.
Snapping Turtle	<ul style="list-style-type: none"> Occurs in a variety of wetlands with standing permanent water. Characteristics of optimal habitat for Snapping Turtle include slow-moving water with mud bottoms and dense aquatic vegetation. The Snapping Turtle usually occurs in large wetland or bodies of water, but can sometimes be encountered in small ponds or creeks. Nesting occurs in loose soils in close proximity to overwintering wetland habitat (COSEWIC, 2008). 	<ul style="list-style-type: none"> The records review identified Snapping Turtle as being recorded historically within the regional area of the Project Location and ZOI. 		<ul style="list-style-type: none"> No wetland habitats at the Project Location. No candidate wildlife habitat for Snapping Turtle occurred at the Project Location. Wetland habitats with standing, permanent water occurred at the ZOI. In accordance with Appendix D of the NHAG (MNRF, 2012) given the landscape and geography (specifically the ELC assessment) the Snapping Turtle is considered to have the potential to occur. Its habitat is treated as existing and described as "Generalized Candidate SWH". 	<ul style="list-style-type: none"> "Generalized Candidate SWH" in the ZOI is treated as significant.
Northern Map Turtle	<ul style="list-style-type: none"> The Northern Map Turtle is highly aquatic and inhabits slow moving, large rivers and lakes with soft bottoms and abundant aquatic vegetation. Basking sites include rocks and deadheads adjacent to deep water (COSEWIC 2002). Nesting occurs in soft sand or soil and at a distance from the water; hibernation is communal and occurs at the bottoms of lakes (MacCulloch, 2002). 	<ul style="list-style-type: none"> The records review identified Northern Map Turtle as being recorded historically within the regional area of the Project Location and ZOI. 		<ul style="list-style-type: none"> No large rivers or lakes communities were identified at the Project Location or ZOI. No candidate wildlife habitat for Northern Map Turtle occurred at the Project Location or ZOI. 	<ul style="list-style-type: none"> N/A
Black-crowned Night Heron	<ul style="list-style-type: none"> Black-crowned Night Heron inhabits around both freshwater and saltwater habitats, including marshes, rivers, ponds, mangrove swamps, tidal flats and canals. It will nest in groves of trees, in thickets, or on ground, usually on islands (National Audubon Society, 2016). 	<ul style="list-style-type: none"> The records review identified Black-crowned Night Heron as being recorded historically within the regional area of the Project Location and ZOI. 		<ul style="list-style-type: none"> No wetland, open aquatic or thicket habitats at the Project Location. No candidate wildlife habitat for Black-crowned Night Heron occurred at the Project Location. Ponds and thicket habitats occurred at the ZOI. In accordance with Appendix D of the NHAG (MNRF, 2012) given the landscape and 	<ul style="list-style-type: none"> "Generalized Candidate SWH" in the ZOI is treated as significant.

Table B1: Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria for determining Candidate Significant Wildlife Habitat 1	Records Review Results	Site Investigation Methods	Site Investigation Results	Evaluation of Significance
				geography (specifically the ELC assessment) the Black-crowned Night Heron is considered to have the potential to occur. Its habitat is treated as existing and described as "Generalized Candidate SWH".	
Common Nighthawk	<ul style="list-style-type: none"> Common Nighthawks nest on the ground in open habitats preferably with rocky or graveled substrate. This could include sand dunes, beaches, logged areas, forest clearings and pastures (COSEWIC, 2007). Common Nighthawks are crepuscular aerial insectivores that are considered opportunistic feeders that may forage in a variety of open habitats (Sandilands 2010), however they particularly favour open water and artificial light (Environment Canada 2015). 	<ul style="list-style-type: none"> The records review identified Common Nighthawk as being recorded historically within the regional area of the Project Location and ZOI. 		<ul style="list-style-type: none"> No habitats with graveled substrates such as sand dunes, beaches, logged areas, forest clearings and pastures were identified at the Project Location or ZOI. Open water habitat occurred in the ZOI. In accordance with Appendix D of the NHAG (MNRF, 2012) given the landscape and geography (specifically the ELC assessment) foraging habitat for Common Nighthawk is considered to have the potential to occur. Its habitat is treated as existing and described as "Generalized Candidate SWH". 	<ul style="list-style-type: none"> "Generalized Candidate SWH" in the ZOI is treated as significant.
Eastern Wood Pewee	<ul style="list-style-type: none"> The Eastern Wood-Pewee inhabits deciduous and mixed woods. Nest-site selection favors open space near the nest, typically provided by clearings, roadways, water, and forest edges (Cadman et al, 2007). 	<ul style="list-style-type: none"> The records review identified Eastern Wood Pewee as being recorded historically within the regional area of the Project Location and ZOI. 		<ul style="list-style-type: none"> No forests occurred at the Project Location. No candidate wildlife habitat for Eastern Wood Pewee occurred at the Project Location. Deciduous and mixed forest habitats occurred at the ZOI. In accordance with Appendix D of the NHAG (MNRF, 2012) given the landscape and geography (specifically the ELC assessment) the Eastern Wood Pewee is considered to have the potential to occur. Its habitat is treated as existing and described as "Generalized Candidate SWH". 	<ul style="list-style-type: none"> "Generalized Candidate SWH" in the ZOI is treated as significant.
Great Black-backed Gull	<ul style="list-style-type: none"> The Great Black-backed Gull breeds in the Great Lakes and along the Atlantic coast of North America from northern Québec to North Carolina. Nesting sites are usually within large open territories (Cadman, 2007). 	<ul style="list-style-type: none"> The records review identified Great Black-backed Gull as being recorded historically within the regional area of the Project Location and ZOI. 		<ul style="list-style-type: none"> The Project Location and ZOI are not located along the Great Lakes or Atlantic Coast. 	<ul style="list-style-type: none"> N/A
Great Egret	<ul style="list-style-type: none"> The Great Egret will inhabit both freshwater and saltwater habitats. They nest high in trees, often on islands that are isolated (Cornell University, 2015). Great Egrets feed by wading in open water with fish that is in proximity to nesting colonies. Great Egret will forage at increasing distances from colonies in cases where there is a lack of availability of suitable foraging habitat near the nesting colony (Sandilands 2005). 	<ul style="list-style-type: none"> The records review identified Great Egrets as being recorded historically within the regional area of the Project Location and ZOI. Great Egrets nest in the St. Lawrence River, approximately 4.5 km from the Project Location and ZOI (Cadman et al. 2007). 		<ul style="list-style-type: none"> The Project Location is an actively managed agricultural field and does not provide suitable nesting (isolated islands) or foraging habitat (open water with fish) for Great Egret. The nearest documented nesting colony is approximately 4.5 km from the Project Location and ZOI and is found in the St. Lawrence River which contains a high availability of foraging habitat for Great Egret. 	<ul style="list-style-type: none"> N/A

Table B1: Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria for determining Candidate Significant Wildlife Habitat 1	Records Review Results	Site Investigation Methods	Site Investigation Results	Evaluation of Significance
				<ul style="list-style-type: none"> The ZOI contains two small ponds. These are not considered to provide foraging habitat for Great Egret due to their small size, that they are off-line ponds (i.e. not connected to fisheries tributaries) and are located 4.5 km away from the St. Lawrence River which provides abundant foraging habitat in proximity to known nesting habitat. 	
Wood Thrush	<ul style="list-style-type: none"> The Wood Thrush inhabits deciduous woodlots of various sizes. Preferred habitat includes tall trees for singing perches and a thick understorey for nesting (Cadman et al, 2007). 	<ul style="list-style-type: none"> The records review identified Wood Thrush as being recorded historically within the regional area of the Project Location and ZOI. 		<ul style="list-style-type: none"> No forests occurred at the Project Location. No candidate wildlife habitat for Wood Thrush occurred at the Project Location. Deciduous forest habitats occurred at the ZOI. In accordance with Appendix D of the NHAG (MNRF, 2012) given the landscape and geography (specifically the ELC assessment) the Wood Thrush is considered to have the potential to occur. Its habitat is treated as existing and described as "Generalized Candidate SWH". 	<ul style="list-style-type: none"> "Generalized Candidate SWH" in the ZOI is treated as significant.
ANIMAL MOVEMENT CORRIDORS					
Amphibian Movement Corridor	<ul style="list-style-type: none"> Corridors may be found in all ecosites associated with water. Determined based on identifying significant amphibian breeding habitat (wetland). 	<ul style="list-style-type: none"> The records review did not identify any known amphibian movement corridors at the Project Location and ZOI. 	<ul style="list-style-type: none"> Identified after Amphibian Breeding Habitat - Wetland is confirmed. This criterion was applied to the candidate amphibian breeding habitat – wetland features using a combination of ELC mapping and GIS investigations as well as species specific information to determine if candidate amphibian movement corridors are present. 	<ul style="list-style-type: none"> Two open aquatic communities that are considered to provide candidate amphibian breeding habitat (wetland) for bullfrog occur in the ZOI. Bullfrog are highly aquatic species, breeding, feeding and hibernating in areas of permanent water, however, some dispersal between open aquatic areas may occur. The two open aquatic areas are each surrounded by woodland habitat (maple organic deciduous swamp and white pine-hardwood mixed forest) with a deciduous shrub thicket separating the two woodlands. Given amphibian movement corridors should consist of native vegetation (MNRF, 2015), that bullfrogs are assumed to move in a straight line (Willis et al 1956) and that areas such as agricultural fields tend to be avoided by migrating frogs (MNRF, 2014) the woodland and thicket habitat that occurs between the two open aquatic areas is considered to provide 	<ul style="list-style-type: none"> Surveys to confirm habitat use by bullfrog will be conducted prior to development as detailed in Section 5.2.4 of the NHA/EIS.

Table B1: Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria for determining Candidate Significant Wildlife Habitat 1	Records Review Results	Site Investigation Methods	Site Investigation Results	Evaluation of Significance
				candidate wildlife habitat for an amphibian movement corridor for bullfrog. Candidate wildlife habitat for an amphibian movement corridor for bullfrog is shown on Figure 4, Appendix A.	
Deer Movement Corridors	<ul style="list-style-type: none"> Corridors may be found in all forested ecosites. Determined based on identifying significant deer wintering habitat. 	<ul style="list-style-type: none"> The records review did not identify any known deer movement corridors at the Project Location and ZOI. The Project Location and ZOI are not located in an area that would constitute candidate significant wildlife habitat for deer movement Corridors. 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A. 	<ul style="list-style-type: none"> N/A

Table B2: Barlow Solar Energy Centre Site Investigation Record

Survey Date	Completed By	Survey Times (24Hr)	Weather Conditions*
June 7, 2016	C. Staples	9:00 - 16:30	19-22°C, 25-45 km/h wind, 50-100% cloud, light precipitation during survey, moderate precipitation in the last 24hrs
April 10, 2017	J. Mansell	08:00 – 12:00	15°C, 0-2 km/h wind, no cloud, no rain during survey, 80 mm of rain in previous 48 hrs

Table B3: Ecological Land Classification (ELC) Community Series Types, Barlow Solar Energy Centre

ELC TYPE	Community Description
Terrestrial System	
Thicket (TH)	
Deciduous Thicket (THD)	
THD Deciduous Thicket	Thicket dominated by deciduous species.
THDM2 Dry - Fresh Deciduous Shrub Thicket Ecosite	Thicket dominated by trembling aspen with white elm, Manitoba maple, as associates. Green ash was abundant in the understory, while species observed in the ground layer included alfalfa, oxeye daisy, strawberry, and various grasses.
Woodland (WO)	
Deciduous Woodland (WOD)	
WODM5 Fresh - Moist Deciduous Woodland Ecosite	Young community dominated by green ash and white elm in the canopy with green ash in the subcanopy. The understory is dominated by common buckthorn with sweet bedstraw and various sedges documented in the ground layer.
Forest (FO)	
Mixed Forest (FOM)	
FOMM9 Fresh – Moist White Pine – Hardwood Mixed Forest Ecosite	White pine dominates this community, with green ash in the sub-canopy and swamp white oak in the understory. The ground layer consisted of goldenrod and mosses.
Deciduous Forest (FOD)	
FODM7* Fresh – Moist Lowland Deciduous Forest Type	Mid-age community dominated by silver maple with Manitoba maple, white elm, and willow species. Ground cover was comprised of dame's rocket and goldenrod with associates of Virginia creeper and riverbank grape.
FODM8-3 Fresh - Moist	Mid-age community dominated by eastern cottonwood with an understory of green ash with red maple, white elm and white oak as associates. Jewelweed and

* Visually assessed from edge of feature due to lack of access.

Table B3: Ecological Land Classification (ELC) Community Series Types, Barlow Solar Energy Centre

ELC TYPE	Community Description
Cottonwood Deciduous Forest Type	sensitive fern dominate the ground layer.
Swamp (SW)	
Deciduous Swamp (SWD)	
SWDM1 Oak Mineral Deciduous Swamp Ecosite	Bur and white oak dominated swamp with green ash and largetooth aspen associates in the sub-canopy. Green ash, oaks and Manitoba maple comprised the sparse understorey with jewelweed in the ground layer.
SWDM3 Maple Mineral Deciduous Swamp Ecosite	Mature silver maple and green ash swamp with black cherry as an associate, an understorey comprised of Hawthorn, and ground layer dominated by sensitive fern.
SWDO2 ² Maple Organic Deciduous Swamp Ecosite	Mature silver maple swamp with green ash and basswood as associates in the canopy. Dominated by green ash in the sub-canopy with basswood and white oak as associates, and a ground layer dominated by sensitive fern.
SWDM2-2 Green Ash Mineral Deciduous Swamp Type	Young green ash dominated swamp with white elm in the canopy and associates of silver maple and bur oak in the sub-canopy. Sedge and fern species (including cinnamon fern) were documented in the ground layer.
Thicket Swamp (SWT)	
SWTM5* Mineral Deciduous Thicket Swamp Ecosite	Thicket community with green ash and trembling aspen, narrow-leaved meadowsweet, goldenrod, and various grass species.
Aquatic System	
Open Water (OA)	<p>One open water ecosite was located within SWDO2 community, measuring approximately 70 m by 30 m with an approximate area of 2072 m². Water depths appeared to range from 10 cm to 1 m with soft muck and/or clay bottom visible. This waterbody is expected to be permanent, based on depth of water during the site visit as well as historical air photos. Sparse cattails are present along the shore of a small section of the pond, but is otherwise void of vegetation.</p> <p>A second open water ecosite was located within FOMM9, measuring approximately 30 m long by 10 m with and an approximate area of 721 m². Water depths appeared to range from 1-2 m within the western, deepest, portion. Shoreline vegetation is restricted to shrubs associated with the adjacent community (FOMM9), with sparse cattails within a small section of the pond.</p>

² Organic ELC code designation based on LIO Records Review (Figure 1), attached to this report

* Visually assessed due to lack of access.

Table B4: Site Investigation Results: Wetlands

Feature No.	Total Feature Size (ha)	Project Component(s) located within 50 m (approximate closest point in parenthesis)	Distance to Project Location	ELC Community	Description
we1	6.9	Solar Panel Area – adjacent (21 m)	Solar Panel Area – 12 Solar Panel Area – 0 (adjacent)	FODM8-3 Fresh - Moist Cottonwood Deciduous Forest	Mid-age community dominated by eastern cottonwood with green ash and trembling aspen. Sensitive fern and jewelweed comprised the ground layer. No surface water was observed in this community, although evidence of seasonal pooling was apparent.
				SWDM1 Oak Mineral Deciduous Swamp	This community was dominated by green ash with sensitive fern and jewelweed in the understorey. Wetter areas within the polygon contain dense mats of moneywort and red-osier dogwood was present in low amounts.
we2	0.5	Solar Panel Area – adjacent (10 m)	Solar Panel Area – 0 (adjacent)	FOMM9 Fresh-Moist White Pine Hardwood Mixed Forest	Mature community was dominated with white pine and green ash in the subcanopy and swamp white oak in the understorey along the edges. A permanent pond with is located in this community.
				OA Open Water	An open water ecosite was located within the FOMM9, measuring approximately 30 m long by 10 m with and an approximate area of 721 m ² . Water depths appeared to range from 1-2 m within the western, deepest, portion. Shoreline vegetation is restricted to shrubs associated with the adjacent community (FOMM9), with sparse cattails within a small section of the pond.

Table B4: Site Investigation Results: Wetlands

Feature No.	Total Feature Size (ha)	Project Component(s) located within 50 m (approximate closest point in parenthesis)	Distance to Project Location	ELC Community	Description
we3	31.5	Solar Panel Area – adjacent (13 m)	Solar Panel Area – 12	SWDO2 Maple Organic Deciduous Swamp	This community was dominated by silver maple with green ash and basswood associates. Understory species include green ash, basswood, and bur oak, with sensitive fern and jewelweed in the shrub/herb layer. Evidence of seasonal pooling was apparent. A permanent pond is located in this community.
				SWDM3 Maple Mineral Deciduous Swamp	Silver maple and green ash dominated with occasional black cherry in the canopy. Hawthorn and hazelnut shrubs are present in the understory with a ground layer dominated by sensitive fern with sedges, jack-in-the-pulpit and Virginia creeper as associates. No surface water was observed in this community, although evidence of seasonal pooling was evident.
				SWTM5 Mineral Deciduous Thicket Swamp Ecosite	This community was dominated by narrow-leaved meadowsweet that also contains abundant green ash, goldenrod, occasional trees (hawthorn, trembling aspen). Ground cover was dominated by goldenrods and grasses without evidence of surface pooling or seasonal pooling.
				OA Open Aquatic	One open water ecosite was located within SWDO2 community, measuring approximately 70 m by 30 m with an approximate area of 2072 m ² . Water depths appeared to range from 10 cm to 1 m with soft muck and/or clay bottom visible. This waterbody is expected to be permanent, based on depth of water during the site visit as well as historical air photos. Sparse cattails are present along the shore of a small section of the pond, but is otherwise void of vegetation.

Table B4: Site Investigation Results: Wetlands

Feature No.	Total Feature Size (ha)	Project Component(s) located within 50 m (approximate closest point in parenthesis)	Distance to Project Location	ELC Community	Description
we4	0.9	Parking/ Laydown Area – adjacent (52 m)	Parking/Laydown Area – 35	FODM7 Fresh – Moist Lowland Deciduous Forest	This mature community was dominated by silver maple, white elm and Manitoba maple. Dame's rocket, riverbank grape, and goldenrod species were abundant along the forest edge, although visible portions of interior habitat showed a moderate shrub and herb layer, with occasional coarse woody debris. European common reed is present along the roadside ditch-line bordering.
we5	10.5	Point of Connection/ Connection on Line– adjacent (17 m)	Point of Connection/ Connection on Line – 11	FODM7 Fresh – Moist Lowland Deciduous Forest	Located within the same ELC community type as we4, as described above. Divided by an upland thicket (transmission corridor).
We6	4.4	Solar Panel Area – adjacent (28 m)	Solar Panel Area - 13	SWDM2-2 Green Ash Mineral Deciduous Swamp Type	Young green ash dominated swamp with white elm in the canopy and associates of silver maple and bur oak in the sub-canopy. Vernal pooling was evident during surveys conducted in spring 2017 but not during surveys conducted in June 2016. Evidence of downed logs and debris was restricted to pieces <25 cm, consistent with the most abundant tree size documented within the community (10-25 cm in diameter). Sedge and fern species were abundant in the ground layer.

Table B5: Site Investigation Results: Woodlands

Feature No.	Feature Size (ha)	Project Component(s) located within 50 m (approximate closest point in parenthesis)	Distance to Project Location (approximate closest point in parenthesis)	ELC Community Type(s)	Description	Attributes, Characteristics and Functions	Habitat Features
wo1	16.7	Solar Panel Area – adjacent (7 m)	Solar Panel Area – 0 (adjacent) Solar Panel Area – 0 (adjacent) Parking/Laydown Area – 15	WODM5 Fresh – Moist Tallgrass Deciduous Woodland	Young community dominated by green ash, with white elm in the canopy layer and dense understory shrubs; canopy openings were occupied by a variety of understory species, but Virginia creeper, common buckthorn, bedstraw and sedges were predominant. Prickly ash was also present in small amounts. Younger trees and advanced understorey growth in the southern half of this polygon is most likely due to historical clearing activities.	This woodland feature is located north, northeast and east of the Project Location. It is bordered by thicket, with Cornwall Centre Road to the south. An old quarry road, a pond and vernal pooling was located within this woodland.	Does not provide woodland interior habitat (100 m from the edge) or breeding bird interior habitat (200 m from edge).
				SWDM2-2 Green Ash Mineral Deciduous Swamp Type	Directly adjacent to and north of WODM5, with vegetation species similar between the two communities. Young green ash dominated this swamp with white elm, silver maple and bur oak as associates. Sedge and fern species were abundant in the ground layer.		
				SWDM1 Oak Mineral Deciduous Swamp	This community was mixed with young and mature stands, and was dominated by green ash in the canopy layer, with occasional bur and white oak present. Sensitive fern and jewelweed are the dominant understory species, although wetter areas within the polygon contain dense mats of moneywort and red-osier dogwood was present in low amounts.		
				FODM8-3 Fresh - Moist Cottonwood Deciduous Forest	Mid-age community dominated by eastern cottonwood with understory species that included dominated by green ash and trembling aspen. Understorey layer density is variable and dominated by sensitive fern and jewelweed.		
wo2	50.6	Solar Panel Area – adjacent (16 m)	Solar Panel Area – 0 (adjacent) Solar Panel Area – 0 (adjacent)	SWDO2 Maple Organic Deciduous Swamp	Mature community dominated by silver maple with green ash and basswood associates. Understorey species are represented by multiple dominant species, including green ash, basswood, bur oak, and sensitive fern and jewelweed dominate the ground layer.	This woodland feature is located northwest of the Project Location, and is bordered by thicket. A pond and vernal pooling was located within this woodland.	Does not provide breeding bird interior habitat (200 m from edge).
				SWDM3 Maple Mineral Deciduous Swamp	Mid-age/mature community dominated by silver maple and green ash with occasional black cherry tree in the canopy. Hawthorn and hazelnut shrubs are present in the understory, and the ground layer was dominated by sensitive fern with tall sedges, jack-in-the-pulpit and Virginia creeper associates.		

Table B5: Site Investigation Results: Woodlands

Feature No.	Feature Size (ha)	Project Component(s) located within 50 m (approximate closest point in parenthesis)	Distance to Project Location (approximate closest point in parenthesis)	ELC Community Type(s)	Description	Attributes, Characteristics and Functions	Habitat Features
wo3	4.9	Parking/Laydown Area – adjacent (32 m)	Parking/Laydown Area – 15	SWDM3 Maple Mineral Deciduous Swamp	Mid-age/mature community dominated by silver maple and green ash with occasional black cherry tree in the canopy. Hawthorn and hazelnut shrubs are present in the understory, and the ground layer was dominated by sensitive fern with tall sedges, jack-in-the-pulpit and Virginia creeper associates. An organic deciduous swamp inclusion was located within the feature.	This woodland feature is located southwest of the Project Location. It is bordered by thicket, with Cornwall Centre Road to the south.	Does not provide woodland interior habitat (100 m from the edge) or breeding bird interior habitat (200 m from edge).
wo4	0.9	Parking/Laydown Area – adjacent (52 m)	Point of Connection/Connection on Line – 11	FODM7 Fresh – Moist Lowland Deciduous Forest	Mid-age community with a canopy abundant with silver maple, white elm, Manitoba maple, and willow species. In the understory layer, dame's rocket and goldenrod species appeared abundant with associates of Virginia creeper and riverbank grape.	This woodland feature is located south of the Project Location. It is a small, isolate woodland bordered by railroad and thicket, with Cornwall Centre Road to the north.	Does not provide woodland interior habitat (100 m from the edge) or breeding bird interior habitat (200 m from edge).
wo5	10.5	Point of Connection/Connection on Line– adjacent (17 m)		FODM7 Fresh – Moist Lowland Deciduous Forest	Mid-age community with a canopy abundant with silver maple, white elm, Manitoba maple, and willow species. In the understory layer, dame's rocket and goldenrod species appeared abundant with associates of Virginia creeper and riverbank grape.	This woodland feature is located southeast of the Project Location. It is border by railroad and thicket, with Cornwall Centre Road to the north.	Does not provide woodland interior habitat (100 m from the edge) or breeding bird interior habitat (200 m from edge).

Table B6: Wetland Characteristics and Ecological Functions Assessment for Wetlands found within the ZOI of the Project Location

Wetland #	Size (ha)	Wetland Type	Site Type	Vegetation Forms (dominant, sub-dominant)	Proximity to other wetlands	Interspersion	Flood Attenuation	Open Water Types	Water Quality Improvement (short term)	Water Quality Improvement (long term nutrient trap)	Water Quality Improvement (groundwater discharge)	Shoreline Erosion	Groundwater Recharge	Summary of Hydrology	Rare Species	Significant Features	Fish Habitat
we 1	6.9	Swamp	Palustrine	h*, ts, gc, ne	11m from we02	45	Mid-reach; 9 hectare catchment	No open water	No inflow and intermittent outflow; Over 50% forested or other natural vegetation; wetland with live trees and herbs.	Swamp with <50% coverage of organic soil	No evidence of discharge observed	Not applicable	Palustrine feature with predominantly clay loam soil	Palustrine swamp on clay loam soil with no inflow and intermittent outflow. Upstream land use in the catchment with over 50% forested or other natural vegetation. Data based on site surveys, air photo interpretation, and soil mapping*	None known to be present	Generalized Candidate SWH	Not present
we 2	0.5	Swamp with open aquatic ecosite	Palustrine	c*, h*, ts, m	11m from we01	42	Mid-reach; 1 hectare catchment	Type 1	No inflow and intermittent outflow; Over 50% forested or other natural vegetation; wetland with live trees and moss.	Swamp with <50% coverage of organic soil	No evidence of discharge observed	Not applicable	Palustrine feature with predominantly clay loam soil	Palustrine swamp on clay loam soil with no inflow and intermittent outflow. Upstream land use in the catchment with over 50% forested or other natural vegetation. Data based on site surveys, air photo interpretation, and soil mapping*	None known to be present, contains suitable habitat to support Snapping Turtle	Generalized Candidate SWH Candidate significant wildlife habitat, amphibian movement corridor (bullfrog)	Present
we 3	31.5	Swamp with open aquatic ecosite	Palustrine	h*, ts, ls, gc, ne	13m from we02	62	Mid-reach; 138 hectare catchment	No open water	No inflow and intermittent/permanent outflow; Over 50% forested or other natural vegetation; wetland with live trees, shrubs and herbs.	Swamp with <50% coverage of organic soil	No evidence of discharge observed	Not applicable	Palustrine feature with predominantly clay loam soil	Palustrine swamp on clay loam soil with no inflow and intermittent outflow. Upstream land use in the catchment with over 50% forested or other natural vegetation. Data based on site surveys, air photo interpretation, and soil mapping*	Eastern Wood Pewee, contains suitable habitat to support Snapping Turtle	Generalized Candidate SWH Candidate significant wildlife habitat, amphibian movement corridor (bullfrog)	Present
we 4	0.9	Swamp	Palustrine	h*, ts, ls, gc	28m from we05	34	Mid-reach; 2 hectare catchment	No open water	No inflow and intermittent outflow; Over 50% forested or other natural vegetation; wetland with live trees, shrubs and herbs.	Swamp with <50% coverage of organic soil	No evidence of discharge observed	Not applicable	Palustrine feature with predominantly clay loam soil	Palustrine swamp on clay loam soil with no inflow and intermittent outflow. Upstream land use in the catchment with over 50% forested or other natural vegetation. Data based on site surveys, air photo interpretation, and soil mapping*	None known to be present	Generalized Candidate SWH	Not present
we 5	10.5	Swamp	Riverine	h*, ts, ls, gc	28m from we04	42	Mid-reach; 360 hectare catchment	No open water	Permanent inflow and outflow; Over 50% forested or other natural vegetation; wetland with live trees, shrubs and herbs.	Swamp with <50% coverage of organic soil	No evidence of discharge observed	Not applicable	Riverine feature with predominantly clay loam soil	Riverine swamp on clay loam soil with permanent inflow and outflow. Upstream land use in the catchment with over 50% forested or other natural vegetation. Data based on site surveys, air photo interpretation, and soil mapping*	None known to be present	Generalized Candidate SWH	Present
We 6	4.4	Swamp	Palustrine	h*, ts, ls,	16m from we01	22	Mid-reach; 8 hectare catchment	Type 1	No inflow and intermittent outflow; Over 50% forested or other natural	Swamp with <50% coverage of organic soil	No evidence of discharge observed	Not applicable	Palustrine feature with predominantly clay loam soil	Palustrine swamp on clay loam soil with no inflow and intermittent outflow. Upstream land use in the catchment with over 50% forested or other natural	None known to be present	Generalized Candidate SWH	Not present

Table B6: Wetland Characteristics and Ecological Functions Assessment for Wetlands found within the ZOI of the Project Location

Wetland #	Size (ha)	Wetland Type	Site Type	Vegetation Forms (dominant, sub-dominant)	Proximity to other wetlands	Interspersion	Flood Attenuation	Open Water Types	Water Quality Improvement (short term)	Water Quality Improvement (long term nutrient trap)	Water Quality Improvement (groundwater discharge)	Shoreline Erosion	Groundwater Recharge	Summary of Hydrology	Rare Species	Significant Features	Fish Habitat
				gc, ne					vegetation; wetland with live trees, shrubs and herbs.					vegetation. Data based on site surveys, air photo interpretation, and soil mapping*			

c = coniferous trees (>6m tall); h = deciduous trees (>6m tall); ts = tall shrubs (1-6m tall); ls = low shrubs (<1m tall); gc = herbaceous ground cover; ne = narrow-leaved emergent (e.g. sedges, grasses); m = moss

Table B7: Evaluation of Significance – Woodlands

Feature #	Size (ha) ¹	Interior Habitat ²	Proximity to other significant woodlands/habitats ³	Linkages ⁴	Water Protection ⁵	Diversity ⁶	Uncommon Characteristics ⁷	Significant (Y/N)
wo01	16.7 - N	N	Y	Y	Y	Y	N	Y
wo02	50.6 - Y	Y	Y	Y	Y	Y	N	Y
wo03	4.9 - N	N	Y	Y	Y	Y	N	Y
wo04	0.9 - N	N	N	N	N	N	N	N
wo05	10.5 - N	N	Y	Y	Y	Y	N	Y

¹ Considered significant if ≥ 20 ha based on the woodland size criteria standards within the Natural Heritage Assessment Guide for Renewable Energy Projects (MNR, 2012).

² Considered significant if interior habitat is present (i.e., woodland has ≥ 2 ha interior forest measured 100 m from the edge) (MNR, 2012).

³ Considered significant if located within 30 m from another natural feature or fish habitat, and ≥ 4 ha (MNR, 2012).

⁴ Considered significant if located within 120 m of two other significant features, and ≥ 4 ha (MNR, 2012).

⁵ Considered significant if located within 50 m of groundwater discharge, recharge, headwater area, watercourse or fish habitat, and ≥ 2 ha (MNR, 2012).

⁶ Considered significant if contains native, naturally occurring vegetation types, and ≥ 4 ha (MNR, 2012).

⁷ Considered significant if contains a rare (S1-S3) vegetation community, rare plant habitat, and ≥ 2 ha (MNR, 2012).

Table B.8: Monitoring Plan

Potential Negative Effect	Mitigation Strategy	Performance Objective	Monitoring Plan					Contingency Measures
			Methods	Location	Frequency	Rationale	Reporting	
Dust generation, sedimentation and erosion during construction to wetland, woodland and generalized candidate significant wildlife habitats	Where wetlands, woodlands or generalized candidate significant wildlife habitat occur within 30 m of construction work, silt barriers to be erected along the edge of the construction area.	Silt barriers to remain in good repair No deposition or erosion > 1cm outside silt barriers	Visual inspection of silt barriers	All silt barriers	Weekly	n/a	Monthly	Repair any gaps or holes in silt barriers Remove any silt accumulations or backfill eroded areas, and replant or reseed (if existing vegetation has been affected)
Indirect effects (i.e. dust, sediment, contaminants) to amphibian movement corridors (bullfrog) during construction occurring in July and August ¹	Silt barriers to be erected within 30 m of the FOMM9 and SWD02 communities that contain the open aquatic features.	Silt barriers to remain in good repair No deposition or erosion > 1cm outside silt barriers Prevent access to construction site by bullfrogs	Visual inspection of silt barriers	Silt barriers within 30 m of the FOMM9 and SWD02 communities that contain the open aquatic features.	Daily during July and August	n/a	Monthly	Repair any gaps or holes in silt barriers Remove any silt accumulations or backfill eroded areas, and replant or reseed (if existing vegetation has been affected)
Disturbance and encroachment into natural features during construction	Limits of construction to be staked in the field to avoid disturbance and encroachment into natural features	No construction activities beyond staked limits	Visual inspections to ensure stakes are present and works stay within demarcated areas	Limits of the construction envelope	Weekly	n/a	Monthly	Replace any missing stakes Immediately stop work in off-limit areas and replant or reseed as needed
Contamination of	Proper storage	Minimize likelihood	Visual	Storage areas	Weekly	n/a	Monthly	Follow-up

Table B.8: Monitoring Plan

Potential Negative Effect	Mitigation Strategy	Performance Objective	Monitoring Plan					Contingency Measures
			Methods	Location	Frequency	Rationale	Reporting	
natural heritage features through accidental spills during construction	<p>of materials in storage containers more than 30 m from significant wetlands, woodlands and generalized candidate significant wildlife habitat</p> <p>Adherence to Emergency Response Plan</p> <p>Contact MOE Spills Action Centre</p>	<p>of spill</p> <p>Contain spill material</p>	inspections to ensure proper storage					<p>monitoring /inspections in the event of an accidental spill/leak</p> <p>Remedial actions may be required in the event monitoring indicates a negative effect to natural features</p>

1- If habitat use studies conducted prior to development reveal that the candidate wildlife habitat is not being used, this mitigation measure and monitoring will not be required.

APPENDIX C: BACKGROUND WILDLIFE LIST

COMMON NAME	SCIENTIFIC NAME	ONTARIO STATUS	GLOBAL STATUS	COSSARO	COSEWIC	Source
AMPHIBIANS						
Mudpuppy	<i>Necturus maculosus</i>	S4	G5	NAR	NAR	OHA
Red-spotted Newt	<i>Notophthalmus viridescens</i>	S5	G5T5			OHA
American Toad	<i>Anaxyrus americanus</i>	S5	G5			OHA
Tetraploid Gray Treefrog	<i>Hyla versicolor</i>	S5	G5			OHA
Western Chorus Frog (carolinian)	<i>Pseudacris triseriata</i>	S4	G5	NAR	NAR	OHA
Spring Peeper	<i>Pseudacris crucifer</i>	S5	G5			OHA
Bullfrog	<i>Lithobates catesbeiana</i>	S4	G5			OHA
Northern Green Frog	<i>Lithobates clamitans</i>	S5	G5			OHA
Wood Frog	<i>Lithobates sylvatica</i>	S5	G5			OHA
Northern Leopard Frog	<i>Lithobates pipiens</i>	S5	G5	NAR	NAR	OHA
REPTILES						
Snapping Turtle	<i>Chelydra serpentina</i>	S3	G5	SC	SC	OHA/MNRF
Midland Painted Turtle	<i>Chrysemys picta marginata</i>	S5	G5T5			OHA
Northern Map Turtle	<i>Graptemys geographica</i>	S3	G5	SC	SC	OHA
Blanding's Turtle	<i>Emydoidea blandingi</i>	S3	G4	THR	THR	MNRF
Eastern Gartersnake	<i>Thamnophis sirtalis</i>	S5	G5			OHA
Redbelly Snake	<i>Storeria occipitomaculata</i>	S5	G5			OHA
BIRDS						
Canada Goose	<i>Branta canadensis</i>	S5	G5			OBBA
American Black Duck	<i>Anas rubripes</i>	S4	G5			OBBA
Mallard	<i>Anas platyrhynchos</i>	S5	G5			OBBA
Ruffed Grouse	<i>Bonasa umbellus</i>	S5	G5			OBBA
Common Loon	<i>Gavia immer</i>	S5B,S5N	G5	NAR	NAR	OBBA
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	S5B	G5	NAR	NAR	OBBA

COMMON NAME	SCIENTIFIC NAME	ONTARIO STATUS	GLOBAL STATUS	COSSARO	COSEWIC	Source
Least Bittern	<i>Ixobrychus exilis</i>	S4B	G5	THR	THR	OBBA/MNRF
Great Blue Heron	<i>Ardea herodias</i>	S5	G5			OBBA
Great Egret	<i>Ardea alba</i>	S2B	G5			OBBA
Green Heron	<i>Butorides virescens</i>	S4B	G5			OBBA
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	S3B,S3N	G5			OBBA
Turkey Vulture	<i>Cathartes aura</i>	S5B	G5			OBBA
Northern Harrier	<i>Circus cyaneus</i>	S4B	G5	NAR	NAR	OBBA
Cooper's Hawk	<i>Accipiter cooperii</i>	S4	G5	NAR	NAR	OBBA
Broad-winged Hawk	<i>Buteo platypterus</i>	S5B	G5			OBBA
Red-tailed Hawk	<i>Buteo jamaicensis</i>	S5	G5	NAR	NAR	OBBA
American Kestrel	<i>Falco sparverius</i>	S4	G5			OBBA
Killdeer	<i>Charadrius vociferus</i>	S5B, S5N	G5			OBBA
Spotted Sandpiper	<i>Actitis macularia</i>	S5	G5			OBBA
Wilson's Snipe	<i>Gallinago delicata</i>	S5B	G5			OBBA
Ring-billed Gull	<i>Larus delawarensis</i>	S5B,S4N	G5			OBBA
Herring Gull	<i>Larus argentatus</i>	S5B,S5N	G5			OBBA
Great Black-backed Gull	<i>Larus marinus</i>	S2B	G5			OBBA
Common Tern	<i>Sterna hirundo</i>	S4B	G5	NAR	NAR	OBBA
Rock Pigeon	<i>Columba livia</i>	SNA	G5			OBBA
Mourning Dove	<i>Zenaida macroura</i>	S5	G5			OBBA
Common Nighthawk	<i>Chordeiles minor</i>	S4B	G5	SC	THR	OBBA
Eastern Whip-poor-will	<i>Antrostomus vociferus</i>	S4B	G5	THR	THR	MNRF
Chimney Swift	<i>Chaetura pelagica</i>	S4B, S4N	G5	THR	THR	OBBA
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	S5B	G5			OBBA
Belted Kingfisher	<i>Ceryle alcyon</i>	S4B	G5			OBBA

COMMON NAME	SCIENTIFIC NAME	ONTARIO STATUS	GLOBAL STATUS	COSSARO	COSEWIC	Source
Downy Woodpecker	Picoides pubescens	S5	G5			OBBA
Hairy Woodpecker	Picoides villosus	S5	G5			OBBA
Northern Flicker	Colaptes auratus	S4B	G5			OBBA
Eastern Wood-Pewee	Contopus virens	S4B	G5	SC	SC-NS	OBBA
Alder Flycatcher	Empidonax alnorum	S5B	G5			OBBA
Willow Flycatcher	Empidonax traillii	S5B	G5			OBBA
Least Flycatcher	Empidonax minimus	S4B	G5			OBBA
Eastern Phoebe	Sayornis phoebe	S5B	G5			OBBA
Great Crested Flycatcher	Myiarchus crinitus	S4B	G5			OBBA
Eastern Kingbird	Tyrannus tyrannus	S4B	G5			OBBA
Blue-headed Vireo	Vireo solitarius	S5B	G5			OBBA
Warbling Vireo	Vireo gilvus	S5B	G5			OBBA
Red-eyed Vireo	Vireo olivaceus	S5B	G5			OBBA
Blue Jay	Cyanocitta cristata	S5	G5			OBBA
American Crow	Corvus brachyrhynchos	S5B	G5			OBBA
Horned Lark	Eremophila alpestris	S5B	G5			OBBA
Purple Martin	Progne subis	S4B	G5			OBBA
Tree Swallow	Tachycineta bicolor	S4B	G5			OBBA
Northern Rough-winged Swallow	Stelgidopteryx serripennis	S4B	G5			OBBA
Bank Swallow	Riparia riparia	S4B	G5	THR	THR-NS	OBBA
Cliff Swallow	Petrochelidon pyrrhonota	S4B	G5			OBBA
Barn Swallow	Hirundo rustica	S4B	G5	THR	THR-NS	OBBA/MNRF
Black-capped Chickadee	Poecile atricapillus	S5	G5			OBBA
Red-breasted Nuthatch	Sitta canadensis	S5	G5			OBBA
White-breasted Nuthatch	Sitta carolinensis	S5	G5			OBBA

COMMON NAME	SCIENTIFIC NAME	ONTARIO STATUS	GLOBAL STATUS	COSSARO	COSEWIC	Source
House Wren	Troglodytes aedon	S5B	G5			OBBA
Marsh Wren	Cistothorus palustris	S4B	G5			OBBA
Veery	Catharus fuscescens	S4B	G5			OBBA
Wood Thrush	Hylocichla mustelina	S4B	G5	SC	THR-NS	OBBA
American Robin	Turdus migratorius	S5B	G5			OBBA
Gray Catbird	Dumetella carolinensis	S4B	G5			OBBA
Brown Thrasher	Toxostoma rufum	S4B	G5			OBBA
European Starling	Sturnus vulgaris	SNA	G5			OBBA
Cedar Waxwing	Bombycilla cedrorum	S5B	G5			OBBA
Ovenbird	Seiurus aurocapilla	S4B	G5			OBBA
Northern Waterthrush	Parkesia noveboracensis	S5B	G5			OBBA
Black-and-white Warbler	Mniotilta varia	S5B	G5			OBBA
Nashville Warbler	Oreothlypis ruficapilla	S5B	G5			OBBA
Mourning Warbler	Geothlypis philadelphia	S4B	G5			OBBA
Common Yellowthroat	Geothlypis trichas	S5B	G5			OBBA
American Redstart	Setophaga ruticilla	S5B	G5			OBBA
Cerulean Warbler	Dendroica cerulea	S3B	G4	THR	END	MNRF
Magnolia Warbler	Setophaga magnolia	S5B	G5			OBBA
Yellow Warbler	Setophaga petechia	S5B	G5			OBBA
Chestnut-sided Warbler	Setophaga pensylvanica	S5B	G5			OBBA
Black-throated Blue Warbler	Setophaga caerulescens	S5B	G5			OBBA
Pine Warbler	Setophaga pinus	S5B	G5			OBBA
Black-throated Green Warbler	Setophaga virens	S5B	G5			OBBA
Chipping Sparrow	Spizella passerina	S5B	G5			OBBA
Clay-colored Sparrow	Spizella pallida	S4B	G5			OBBA

COMMON NAME	SCIENTIFIC NAME	ONTARIO STATUS	GLOBAL STATUS	COSSARO	COSEWIC	Source
Savannah Sparrow	<i>Passerculus sandwichensis</i>	S4B	G5			OBBA
Song Sparrow	<i>Melospiza melodia</i>	S5B	G5			OBBA
Swamp Sparrow	<i>Melospiza georgiana</i>	S5B	G5			OBBA
White-throated Sparrow	<i>Zonotrichia albicollis</i>	S5B	G5			OBBA
Scarlet Tanager	<i>Piranga olivacea</i>	S4B	G5			OBBA
Northern Cardinal	<i>Cardinalis cardinalis</i>	S5	G5			OBBA
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	S4B	G5			OBBA
Indigo Bunting	<i>Passerina cyanea</i>	S4B	G5			OBBA
Bobolink	<i>Dolichonyx oryzivorus</i>	S4B	G5	THR	THR-NS	NHIC/MNRF
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	S4	G5			OBBA
Eastern Meadowlark	<i>Sturnella magna</i>	S4B	G5	THR	THR-NS	OBBA/MNRF
Common Grackle	<i>Quiscalus quiscula</i>	S5B	G5			OBBA
Brown-headed Cowbird	<i>Molothrus ater</i>	S4B	G5			OBBA
Baltimore Oriole	<i>Icterus galbula</i>	S4B	G5			OBBA
Purple Finch	<i>Haemorhous purpureus</i>	S4B	G5			OBBA
House Finch	<i>Haemorhous mexicanus</i>	SNA	G5			OBBA
American Goldfinch	<i>Carduelis tristis</i>	S5B	G5			OBBA
House Sparrow	<i>Passer domesticus</i>	SNA	G5			OBBA
MAMMALS						
Little Brown Myotis	<i>Myotis lucifugus</i>	S4	G5	END	END	OMA/MNRF
Northern Myotis	<i>Myotis septentrionalis</i>	S3?	G4	END	END	OMA/MNRF
Big Brown Bat	<i>Eptesicus fuscus</i>	S5	G5			OMA
Woodchuck	<i>Marmota monax</i>	S5	G5			OMA
Grey Squirrel	<i>Sciurus carolinensis</i>	S5	G5			OMA
Red Squirrel	<i>Tamiasciurus hudsonicus</i>	S5	G5			OMA

COMMON NAME	SCIENTIFIC NAME	ONTARIO STATUS	GLOBAL STATUS	COSSARO	COSEWIC	Source
Beaver	Castor canadensis	S5	G5			OMA
White-footed Mouse	Peromyscus leucopus	S5	G5			OMA
Muskrat	Ondatra zibethicus	S5	G5			OMA
Norway Rat	Rattus norvegicus	SNA	G5			OMA
Meadow Jumping Mouse	Zapus hudsonicus	S5	G5			OMA
Porcupine	Erethizon dorsatum	S5	G5			OMA
Coyote	Canis latrans	S5	G5			OMA
Red Fox	Vulpes vulpes	S5	G5			OMA
Raccoon	Procyon lotor	S5	G5			OMA
Fisher	Martes pennanti	S5	G5			OMA
Mink	Mustela vison	S4	G5			OMA
Striped Skunk	Mephitis mephitis	S5	G5			OMA
White-tailed Deer	Odocoileus virginianus	S5	G5			OMA
Moose	Alces alces	S5	G5			OMA

SUMMARY

Total Amphibians: 10

Total Reptiles: 6

Total Birds: 99

Total Mammals: 20

SIGNIFICANT SPECIES

Global (G1-G3): 0
National: (SC, THR, END): 16
Provincial (SC, THR, END): 16

Explanation of Status and Acronyms

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

COSEWIC: Committee on the Status of Endangered Wildlife in Canada

REGION: Rare in a Site Region

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

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

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

S4: Apparently Secure—Uncommon but not rare

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

SX: Presumed extirpated

SH: Possibly Extirpated (Historical)

SNR: Unranked

SU: Unrankable—Currently unrankable due to lack of information

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

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

S#B- Breeding status rank

S#N- Non Breeding status rank

?: Indicates uncertainty in the assigned rank

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

G1G2: Extremely rare to very rare globally

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

G2G3: Very rare to uncommon globally

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

G3G4: Rare to common globally

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

G4G5: Common to very common globally

G5: Very common globally; demonstrably secure

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

GNR: Unranked—Global rank not yet assessed.

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



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

END: Endangered

THR: Threatened

SC: Special Concern

2, 3 or NS after a COSEWIC ranking indicates the species is either on Schedule 2, Schedule 3 or No Schedule of the Species At Risk Act (SARA)

NAR: Not At Risk

LATEST STATUS UPDATE

Amphibians: July 2014

Reptiles: April 2015

Birds: January 2016

Mammals: January 2016

S and G ranks and explanations: December 2011

NOTE

All rankings for birds refer to breeding birds unless the ranking is followed by N

REFERENCES

COSSARO Status

Endangered Species Act, 2007 (Bill 184). Species at Risk in Ontario List.

COSEWIC Status

COSEWIC. 2007. Canadian Species at Risk. Committee on the Status of Endangered Wildlife in Canada. \MNRF: Ministry of natural Resources and Forestry

Ontario Ministry Natural Resources. pers. comm. 2016. Communication with Information Request Services. MNRF Kemptville District.

OBBA: Ontario Breeding Bird Atlas



Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage and A.R. Couturier (eds). 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. 706pp.

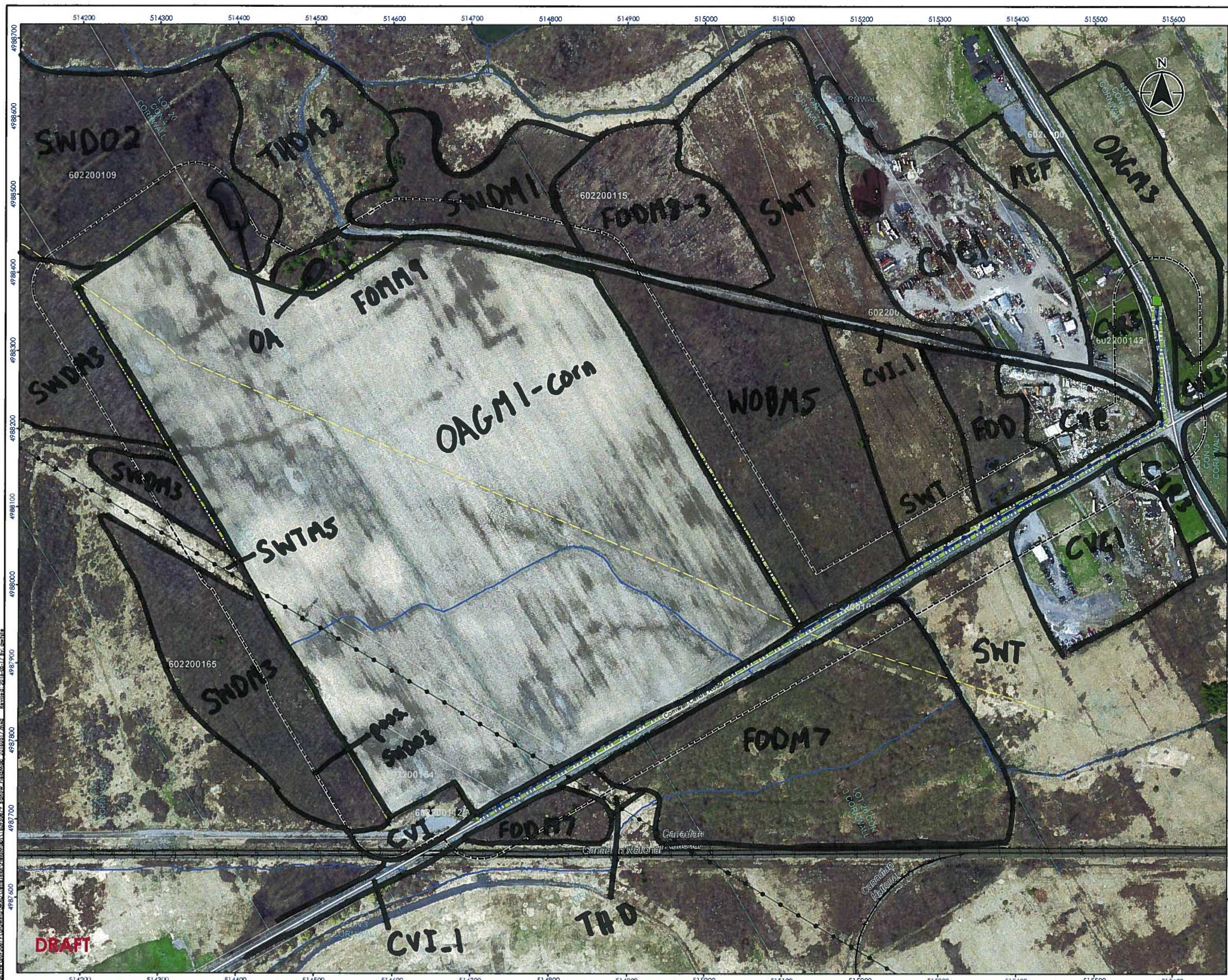
OHA: Ontario Herpetofauna Atlas

Ontario Nature. 2016. Ontario Herpetofauna Atlas. Available online: <https://www.ontarionature.org/dynamic-maps/dynamic-maps/>

OMA: Ontario Mammal Atlas

Dobbyn, J. 1994. Atlas of the Mammals of Ontario. Federation of Ontario Naturalists

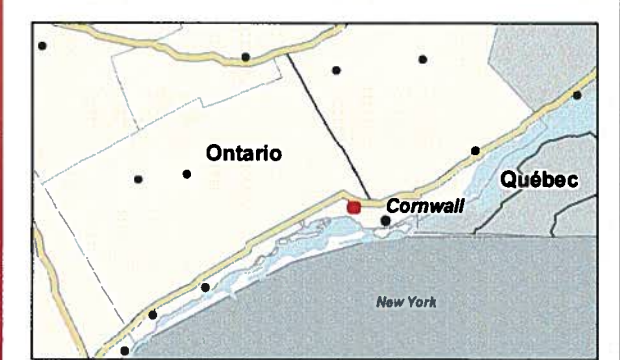
APPENDIX D: FIELD FORMS



- Legend**
- Connection Point
 - Connection Line
 - Project Location
 - Zone of Investigation
 - Major Road
 - Minor Road
 - + Railway - Operational
 - Transmission Line
 - Pipeline
 - Water Body (as per MNR mapping)
 - Parcel Fabric
 - Lot



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 18N
 2. Base features and aerial imagery produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2016.
 3. Imagery Source: DRAPE 2014



Project Location: United Counties of Prescott and Russell
 Prepared by AMW on 2016-05-17
 Technical Review by DLH on 2016-05-05
 Independent Review by RN on 2016-05-05

Client/Project: EDF EN CANADA DEVELOPMENT INC.
 BARLOW SOLAR ENERGY CENTRE

Figure No. **1**
 Title **Field Map**
DRAFT



Stanlec Consulting Ltd.
1 - 70 Southgate Drive
Guelph, ON
Canada N1G 4P5
Tel: (519) 836-6050
Fax: (519) 836-2493

Wildlife Habitat Assessment Form

Project Number: 160950879

Polygon No. 1

Assessment Type: Visual: no access / Entire: walk through feature / Partial access (indicate on map)

Weather Conditions:	TEMP (°C):	WIND:	CLOUD:	PPT:	PPT (last 24 hrs):
	19-22	25-30 mph gust	60%	0	~5mm

NOTES & SPECIES OBSERVATIONS (list species and type of observation, indicate on map):

Amphibians
Leopard Frog (OB - adult, tadpole)
photo 2070) tadpole

BIRDS
AMER (OB)
AMRO (VO)
Gull - Herring (OB)
RWBL (VO)
COLE (VO)

CA=carcass, DP=distinctive parts, FE=feeding evidence, FY=eggs/nest, HO=house/den,
OB=observed, SC=scar, SI=other sign, TK=track, VO=vocalization

Wildlife Habitat Type & Description	Site Assessment	Photo ID	Map ID	UTM Coordinates		
				Zone	Easting	Northing
ALL SITES						
Bat Hibernacula: Caves, abandoned mines, underground foundations, karst features	Size of opening(s) Bedrock Type Depth of feature (if possible)					
Snake Hibernacula: Burrows, rock crevices, fissures that extend below the frost line (i.e. at least 1 m)	Number of access points Size of opening(s) Substrate	occasional (1-2) rodent burrows observed in feature, poss increase along road fill	none	-	18T SH882	4988399
Bank / Cliff Colonial Bird Nesting Habitat: Exposed soil banks, undisturbed, naturally eroding, steep slopes, cliff faces with evidence of nests or burrows	Size of burrow Number of burrows	none				
Stick Nests: Stick nests found in any forest/ woodland/swamp; includes heron colonies and bald eagle/ osprey/ other raptor nests	Tree species Nest size	none observed				
WOODLANDS						
Vernal Pools: Permanent or semi-permanent pool or pond. Evidence of holding water in most years through late spring (i.e. late May) or into summer	Number of features Feature size (diameter) Water depth	none observed				
Seeps and Springs: Locations where groundwater comes to the surface in forests (see document for indicator species)	Sub/emergent veg present Shrubs/logs at edge present Water permanency					
WETLANDS						
Turtle Wintering Areas: Permanent water bodies, large wetlands, bogs, or fens with soft substrates and deep enough not to freeze solid	Feature size (diameter) Water depth Substrate of water body Water permanency	none w/in feature				
Turtle Nesting Habitat: Exposed mineral soil (sand or gravel) areas adjacent (<100 m) to MAM/SA/BOO/ FEO (note if man-made)	Type of substrate Distance to wetland Size of feature	↓				
Terrestrial Crayfish Habitat: Edges of shallow marshes and meadows (no minimum size) with crayfish chimneys	Number of chimneys	N/A				

Page 2 of 2

Print Name: Ceryne Staples
(Field Notes Author)

Quality Control: This form is complete & legible

Signature: _____
(Field No. / A/QC personnel)

REV: 2016-06-06

ELC (project no./name): Barkow Solar Farm POLYGON: 2
 SURVEYOR(S): C. Staples DATE: June 7, 2016 PHOTO No.:
 START: END: ZONE & UTM: VAD 93 1BT

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
<input checked="" type="checkbox"/> TERRESTRIAL	<input type="checkbox"/> ORGANIC	<input type="checkbox"/> LACUSTRINE	<input checked="" type="checkbox"/> NATURAL	<input type="checkbox"/> PLANKTON	<input type="checkbox"/> LAKE
<input type="checkbox"/> WETLAND	<input checked="" type="checkbox"/> MINERAL SOIL	<input type="checkbox"/> RIVERINE	<input type="checkbox"/> CULTURAL	<input type="checkbox"/> SUBMERGED	<input type="checkbox"/> POND
<input type="checkbox"/> AQUATIC	<input type="checkbox"/> PARENT MIN.	<input checked="" type="checkbox"/> BOTTOMLAND		<input type="checkbox"/> FLOATING-LVD.	<input type="checkbox"/> RIVER
	<input type="checkbox"/> ACIDIC BEDRK.	<input type="checkbox"/> TERRACE		<input type="checkbox"/> GRAMINOID	<input type="checkbox"/> STREAM
	<input type="checkbox"/> BASIC BEDRK.	<input type="checkbox"/> VALLEY SLOPE		<input type="checkbox"/> FORB	<input type="checkbox"/> MARSH
		<input type="checkbox"/> TABLELAND		<input type="checkbox"/> LICHEN	<input type="checkbox"/> SWAMP
		<input type="checkbox"/> ROLL, UPLAND		<input type="checkbox"/> BRYOPHYTE	<input type="checkbox"/> FEN
		<input type="checkbox"/> CLIFF		<input checked="" type="checkbox"/> DECIDUOUS	<input type="checkbox"/> BOG
		<input type="checkbox"/> TALUS		<input type="checkbox"/> CONIFEROUS	<input type="checkbox"/> BARREN
		<input type="checkbox"/> CREVICE / CAVE		<input type="checkbox"/> MIXED	<input type="checkbox"/> MEADOW
SITE	<input type="checkbox"/> CARB. BEDRK.	<input type="checkbox"/> ALVAR	COVER		<input type="checkbox"/> PRAIRIE
<input type="checkbox"/> OPEN WATER		<input type="checkbox"/> ROCKLAND	<input type="checkbox"/> OPEN		<input type="checkbox"/> THICKET
<input type="checkbox"/> SHALLOW WATER		<input type="checkbox"/> BEACH / BAR	<input type="checkbox"/> SHRUB		<input type="checkbox"/> SAVANNAH
<input checked="" type="checkbox"/> SURFICIAL DEP.		<input type="checkbox"/> SAND DUNE	<input checked="" type="checkbox"/> TREED		<input type="checkbox"/> WOODLAND
<input type="checkbox"/> BEDROCK		<input type="checkbox"/> BLUFF			<input checked="" type="checkbox"/> FOREST
					<input type="checkbox"/> PLANTATION

STAND DESCRIPTION:

LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (>>MUCH GREATER THAN; >GREATER THAN; = ABOUT EQUAL TO)
1 CANOPY	1	4	Eastern cottonwood
2 SUB-CANOPY			
3 UNDERSTOREY	3-4	4	green ash >> red maple > white elm > white oak
4 GRD. LAYER			Jewelweed > sensitive fern

HT CODES: 1=>25m 2=10<HT<25m 3=2<HT<10m 4=1<HT<2m 5=0.5<HT<1m 6=0.2<HT<0.5m 7=HT<0.2m
 CVR CODES: 0=NONE 1=0%<CVR<10% 2=10<CVR<25% 3=25<CVR<60% 4=CVR>60%

STAND COMPOSITION: BA:

SIZE CLASS ANALYSIS:	<input type="checkbox"/> <10	<input checked="" type="checkbox"/> 10-24	<input type="checkbox"/> 25-50	<input type="checkbox"/> >50
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STANDING SNAGS:	<input type="checkbox"/> <10	<input type="checkbox"/> 10-24	<input type="checkbox"/> 25-50	<input type="checkbox"/> >50
-----------------	------------------------------	--------------------------------	--------------------------------	------------------------------

DEADFALL/LOGS:	<input type="checkbox"/> <10	<input type="checkbox"/> 10-24	<input type="checkbox"/> 25-50	<input type="checkbox"/> >50
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ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT

COMM. AGE: PIONEER YOUNG MID-AGE MATURE OLD GROWTH

SOIL ANALYSIS:

TEXTURE: DEPTH TO MOTTLES/GLEY g= G=
 MOISTURE: DEPTH OF ORGANICS: (cm)
 HOMOGENEOUS / VARIABLE DEPTH TO BEDROCK: (cm)

COMMUNITY CLASSIFICATION:

COMMUNITY CLASS: CODE:
 COMMUNITY SERIES: CODE:
 ECOSITE: Fresh-moist cottonwood deciduous CODE: FODM8-3
 VEGETATION TYPE: CODE:
 INCLUSION CODE:
 COMPLEX CODE:

Notes: (e.g. disturbance, surface water depths, etc.)

- some drying waterpools present (photo 1999)
- Cottonwoods are mature, decay present persistently in stand; potential bat roosting colony

LAYERS: 1=CANOPY>10m 2=SUB-CANOPY 3=UNDERSTOREY 4=GROUND (GRD.) LAYER
 ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT D=DOMINANT

SPECIES CODE	LAYER				COLL.	SPECIES CODE	LAYER				COLL.
	1	2	3	4			1	2	3	4	
Eastern cottonwood	D					Jewelweed					A
Red maple			O			Sensitive fern					A
White elm			O			Canada goose					A
White oak			O			purple loosestrife					O
Green ash			D			reed canary grass					O
Franklin, aspen		O	O			wood nettle					O
Manitoba maple			O			Sedges					O
						mayweed/lusi num					O
						Saraca alba					

Print Name: Cynthia Staples-Lo
 (Field Notes Author)

Quality Control: This form is complete & legible

Signature: _____
 (Field Notes QA/QC personnel)



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Guelph, ON
Canada N1G 4P5
Tel: (519) 836-6050
Fax: (519) 836-2493

Wildlife Habitat Assessment Form

Project Number: 160950879 Polygon No.: 2
Assessment Type: Visual: no access / Entire: walk through feature / Partial access (indicate on map)

Weather Conditions:

TEMP (°C): <u>19</u>	WIND: <u>30km/h W</u>	CLOUD: <u>100%</u>	PPT: <u>1mm</u>	PPT (last 24 hrs): <u>~5mm</u>
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NOTES & SPECIES OBSERVATIONS (list species and type of observation, indicate on map):

BIRDS

REVI (vo)
VEER (vo)
YBCU (vo)
unknown bird 1 - chir, chir, chir (vo)

CA=carcass; DP=distinctive parts; FE=feeding evidence; FY=eggs/nest; HO=house/den;
OB=observed; SC=scat, SI=other sign; TK=track; VO=vocalization

Wildlife Habitat Type & Description	Site Assessment	Photo ID	Map ID	UTM Coordinates		
				Zone	Easting	Northing
ALL SITES						
Bat Hibernacula: Caves, abandoned mines, underground foundations, karst features	Size of opening(s) Bedrock Type Depth of feature (if possible)	<u>None</u>				
Snake Hibernacula: Burrows, rock crevices, fissures that extend below the frost line (i.e. at least 1 m)	Number of access points Size of opening(s) Substrate	<u>None observed in feature</u>				
Bank / Cliff Colonial Bird Nesting Habitat: Exposed soil banks, undisturbed, naturally eroding, steep slopes, cliff faces with evidence of nests or burrows	Size of burrow Number of burrows	<u>N/A</u>				
Stick Nests: Stick nests found in any forest/ woodland/swamp; includes heron colonies and bald eagle/ osprey/other raptor nests	Tree species Nest size	<u>none observed.</u>				
WOODLANDS						
Vernal Pools: Permanent or semi-permanent pool or pond. Evidence of holding water in most years through late spring (i.e. late May) or into summer	Number of features Feature size (diameter) Water depth	<u>~5</u> <u>small (~2 x 3 m)</u>	<u>1999</u>	<u>18T</u>	<u>514896</u>	<u>4988470</u>
Seeps and Springs: Locations where groundwater comes to the surface in forests (see document for indicator species)	Sub/emergent veg present Shrubs/logs at edge present Water permanency	<u>yes (logs) - 10-20cm dia, partial to well-decomposed semi-permanent (bat soil @ site used)</u>	<u>no</u>			
WETLANDS						
Turtle Wintering Areas: Permanent water bodies, large wetlands, bogs, or fens with soft substrates and deep enough not to freeze solid	Feature size (diameter) Water depth Substrate of water body Water permanency	<u>none observed</u>				
Turtle Nesting Habitat: Exposed mineral soil (sand or gravel) areas adjacent (<100 m) to MAM/SA/BOO/ FEO (note if man-made)	Type of substrate Distance to wetland Size of feature	<u>none observed</u>				
Terrestrial Crayfish Habitat: Edges of shallow marshes and meadows (no minimum size) with crayfish chimneys	Number of chimneys	<u>n/a</u>				

Page 2 of 2

Print Name: Ceryne Staples
(Field Notes Author)

Quality Control: This form is complete & legible

Signature: _____
(Field Notes Author / QC personnel)

REV: 2016-06-06

ELC
COMMUNITY DESCRIPTION & CLASSIFICATION

Site (project no./name): Banlow Solar POLYGON: 3

SURVEYOR(S): C. Staples DATE: June 7, 2016 PHOTO No.: _____

START: _____ END: _____ ZONE & UTM: NAD83 18T

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
<input checked="" type="checkbox"/> TERRESTRIAL	<input type="checkbox"/> ORGANIC	<input type="checkbox"/> LACUSTRINE	<input checked="" type="checkbox"/> NATURAL	<input type="checkbox"/> PLANKTON	<input type="checkbox"/> LAKE
<input type="checkbox"/> WETLAND	<input checked="" type="checkbox"/> MINERAL SOIL	<input type="checkbox"/> RIVERINE	<input type="checkbox"/> CULTURAL	<input type="checkbox"/> SUBMERGED	<input type="checkbox"/> POND
<input type="checkbox"/> AQUATIC	<input type="checkbox"/> PARENT MIN.	<input checked="" type="checkbox"/> BOTTOMLAND		<input type="checkbox"/> FLOATING-LVD.	<input type="checkbox"/> RIVER
	<input type="checkbox"/> ACIDIC BEDRK.	<input type="checkbox"/> TERRACE		<input type="checkbox"/> GRAMINOID	<input type="checkbox"/> STREAM
	<input type="checkbox"/> BASIC BEDRK.	<input type="checkbox"/> VALLEY SLOPE		<input type="checkbox"/> FORB	<input type="checkbox"/> MARSH
		<input type="checkbox"/> TABLELAND		<input type="checkbox"/> LICHEN	<input type="checkbox"/> SWAMP
		<input type="checkbox"/> ROLL UPLAND		<input type="checkbox"/> BRYOPHYTE	<input type="checkbox"/> FEN
		<input type="checkbox"/> CLIFF		<input checked="" type="checkbox"/> DECIDUOUS	<input type="checkbox"/> BOG
		<input type="checkbox"/> TALUS		<input type="checkbox"/> CONIFEROUS	<input type="checkbox"/> BARREN
		<input type="checkbox"/> CREVICE / CAVE		<input type="checkbox"/> MIXED	<input type="checkbox"/> MEADOW
SITE	<input type="checkbox"/> CARB. BEDRK.	<input type="checkbox"/> ALVAR	COVER		<input type="checkbox"/> PRAIRIE
<input type="checkbox"/> OPEN WATER		<input type="checkbox"/> ROCKLAND	<input type="checkbox"/> OPEN		<input type="checkbox"/> THICKET
<input type="checkbox"/> SHALLOW WATER		<input type="checkbox"/> BEACH / BAR	<input type="checkbox"/> SHRUB		<input type="checkbox"/> SAVANNAH
<input checked="" type="checkbox"/> SURFICIAL DEP.		<input type="checkbox"/> SAND DUNE	<input type="checkbox"/> TREED		<input type="checkbox"/> WOODLAND
<input type="checkbox"/> BEDROCK		<input type="checkbox"/> BLUFF			<input checked="" type="checkbox"/> FOREST
					<input type="checkbox"/> PLANTATION

STAND DESCRIPTION:

LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (>>MUCH GREATER THAN; >GREATER THAN; = ABOUT EQUAL TO)
1 CANOPY	1-2	3	Bur oak > white oak
2 SUB-CANOPY	2-3	3	Green ash > bigtooth aspen
3 UNDERSTOREY	4	2	Green ash > oaks > man maple
4 GRD. LAYER	-	-	Jewelweed

HT CODES: 1=>25m 2=10<HT<25m 3=2<HT<10m 4=1<HT<2m 5=0.5<HT<1m 6=0.2<HT<0.5m 7=HT<0.2m
CVR CODES: 0=NONE 1=0%<CVR<10% 2=10<CVR<25% 3=25<CVR<60% 4=CVR>60%

STAND COMPOSITION: _____ BA: _____

SIZE CLASS ANALYSIS:	A <10	A 10-24	O 25-50	R >50
----------------------	-------	---------	---------	-------

STANDING SNAGS:	R <10	R 10-24	R 25-50	R >50
-----------------	-------	---------	---------	-------

DEADFALL/LOGS:	- <10	R 10-24	R 25-50	N >50
----------------	-------	---------	---------	-------

ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT

COMM. AGE: PIONEER YOUNG MID-AGE MATURE OLD GROWTH

SOIL ANALYSIS:

TEXTURE: DEPTH TO MOTTLES/GLEY g= _____ G= _____

MOISTURE: DEPTH OF ORGANICS: _____ (cm)

HOMOGENEOUS / VARIABLE DEPTH TO BEDROCK: _____ (cm)

COMMUNITY CLASSIFICATION:

COMMUNITY CLASS: _____ CODE: _____

COMMUNITY SERIES: _____ CODE: _____

ECOSITE: Oak mineral decid. swamp CODE: SWDM1

VEGETATION TYPE: _____ CODE: _____

INCLUSION _____ CODE: _____

COMPLEX _____ CODE: _____

Notes: (e.g. disturbance, surface water depths, etc.)

5 to 7 = 2 common

LAYERS: 1=CANOPY>10m 2=SUB-CANOPY 3=UNDERSTOREY 4=GROUNDS (GRD.) LAYER
ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT D=DOMINANT

SPECIES CODE	LAYER				COLL.
	1	2	3	4	
Green ash		A			
big tooth aspen		O			
white oak	O	O	R		
Staghorn sumac			O		(edge)
bur oak	O	O	O		
Manitoba maple			O		
white elm			O		
red woodpecker			R		

SPECIES CODE	LAYER				COLL.
	1	2	3	4	
Jewelweed				A	
wild plant 1)				A	photo 1947
Strawberries					
phil. fleabane				O	
Lysimachia/molewort				A	
grasses				O	
Canada anemone				O	
sensitive fern			A		

Print Name: Caryne Staples
(Field Notes Author)

Quality Control: This form is complete & legible

Signature: _____
(Field Notes QA/QC personnel)



Stanlec Consulting Ltd.
1 - 70 Southgate Drive
Guelph, ON
Canada N1G 4P5
Tel: (519) 836-6050
Fax: (519) 836-2493

Wildlife Habitat Assessment Form

Project Number: 160950879 Polygon No.: 3
 Assessment Type: Visual: no access / Entire: walk through feature / Partial access (indicate on map)
 Weather Conditions:

TEMP (°C):	WIND:	CLOUD:	PPT:	PPT (last 24 hrs):
21	20 km/h SW	100%	0	~ 5 mm

NOTES & SPECIES OBSERVATIONS (list species and type of observation, indicate on map):

BIRDS
 AMRO (VO)
 VEER (VO)
 WISN (VO)

mammals
 w-t deer (OB, SC)
 FE, SI

insects
 tent caterpillar (1 m x 1702) (FY)

CA=carcass; DP=distinctive parts; FE=feeding evidence; FY=eggs/nest; HO=house/den;
 OB=observed; SC=scat; SI=other sign; TK=track; VO=vocalization

Wildlife Habitat Type & Description	Site Assessment	Photo ID	Map ID	UTM Coordinates		
				Zone	Easting	Northing
ALL SITES						
Bat Hibernacula: Caves, abandoned mines, underground foundations, karst features	Size of opening(s) none - potential roosting sites in oaks (see photos) Bedrock Type Depth of feature (if possible)	1965	1161965	18T	514787	4988505
Snake Hibernacula: Burrows, rock crevices, fissures that extend below the frost line (i.e. at least 1 m)	Number of access points 2 visible Size of opening(s) 10cm Substrate silt/sandy silt	1894	1161894	18T	514419	4988492
Bank / Cliff Colonial Bird Nesting Habitat: Exposed soil banks, undisturbed, naturally eroding, steep slopes, cliff faces with evidence of nests or burrows	Size of burrow none Number of burrows					
Stick Nests: Stick nests found in any forest/ woodland/swamp; includes heron colonies and bald eagle/ osprey/other raptor nests	Tree species none observed Nest size					
WOODLANDS						
Vernal Pools: Permanent or semi-permanent pool or pond. Evidence of holding water in most years through late spring (i.e. late May) or into summer	Number of features Feature size (diameter) Water depth none observed					
Seeps and Springs: Locations where groundwater comes to the surface in forests (see document for indicator species)	Sub/emergent veg present Shrubs/logs at edge present Water permanency					
WETLANDS						
Turtle Wintering Areas: Permanent water bodies, large wetlands, bogs, or fens with soft substrates and deep enough not to freeze solid	Feature size (diameter) Water depth Substrate of water body Water permanency none obs. w/in feature					
Turtle Nesting Habitat: Exposed mineral soil (sand or gravel) areas adjacent (<100 m) to MAM/SA/BOO/ FEO (note if man-made)	Type of substrate Distance to wetland Size of feature none obs. w/in feature					
Terrestrial Crayfish Habitat: Edges of shallow marshes and meadows (no minimum size) with crayfish chimneys	Number of chimneys none					

Page 2 of 2

Print Name: Caryne Staples

(Field Notes Author)

Quality Control: This form is complete & legible

Signature: _____

(Field No. / A/QC personnel)

REV: 2016-06-06



Stantec Consulting Ltd.
1 - 70 Southgate Drive
Guelph, ON
Canada N1G 4P5
Tel: (519) 836-6050
Fax: (519) 836-2493

Wildlife Habitat Assessment Form

Project Number: 160950879 Polygon No.: 4
Assessment Type: Visual; no access / Entire: walk through feature / Partial access (indicate on map)

Weather Conditions:	TEMP (°C):	WIND:	CLOUD:	PPT:	PPT (last 24 hrs):
---------------------	------------	-------	--------	------	--------------------

NOTES & SPECIES OBSERVATIONS (list species and type of observation, indicate on map):

Birds Mammals Amphib Reptiles
VEER (VO) DEERMOOSE Graying (VO) garter snake (OB) - see reptile OBS form.
AMRD (VO)
SOSP (VO)
GULL X - OB (flyover)
RWBL (VO)

CA=carcass; DP=distinctive parts; FE=feeding evidence; FY=eggs/nest; HO=house/den;
OB=observed; SC=scat; SI=other sign; TK=track; VO=vocalization

Wildlife Habitat Type & Description	Site Assessment	Photo ID	Map ID	UTM Coordinates		
				Zone	Easting	Northing
ALL SITES						
Bat Hibernacula: Caves, abandoned mines, underground foundations, karst features	Size of opening(s) Bedrock Type Depth of feature (if possible)					
Snake Hibernacula: Burrows, rock crevices, fissures that extend below the frost line (i.e. at least 1 m)	Number of access points Size of opening(s) Substrate	1856		18T	514513	4988067
Bank / Cliff Colonial Bird Nesting Habitat: Exposed soil banks, undisturbed, naturally eroding, steep slopes, cliff faces with evidence of nests or burrows	Size of burrow Number of burrows					
Slick Nests: Stick nests found in any forest/ woodland/swamp; includes heron colonies and bald eagle/ osprey/other raptor nests	Tree species Nest size					
WOODLANDS						
Vernal Pools: Permanent or semi-permanent pool or pond. Evidence of holding water in most years through late spring (i.e. late May) or into summer	Number of features Feature size (diameter) Water depth					
Seeps and Springs: Locations where groundwater comes to the surface in forests (see document for indicator species)	Sub/emergent veg present Shrubs/logs at edge present Water permanency					
WETLANDS						
Turtle Wintering Areas: Permanent water bodies, large wetlands, bogs, or fens with soft substrates and deep enough not to freeze solid	Feature size (diameter) Water depth Substrate of water body Water permanency					
Turtle Nesting Habitat: Exposed mineral soil (sand or gravel) areas adjacent (<100 m) to MAM/SA/BOO/ FEO (note if man-made)	Type of substrate Distance to wetland Size of feature					
Terrestrial Crayfish Habitat: Edges of shallow marshes and meadows (no minimum size) with crayfish chimneys	Number of chimneys					

Page ___ of ___

Quality Control: This form is complete & legible

Print Name: _____

(Field Notes Author)

Signature: _____

(Field Notes Author / QC personnel)

REV: 2016-06-06



Stantec Consulting Ltd.
1 - 70 Southgate Drive
Guelph, ON
Canada N1G 4P5
Tel: (519) 836-6050
Fax: (519) 836-2493

Wildlife Habitat Assessment Form

Project Number: 160950879 Polygon No.: 5
Assessment Type: Visual: no access / Entire: walk through feature / Partial access (indicate on map)
Weather Conditions: TEMP (°C): 20 WIND: 2 (heavy) CLOUD: 50% PPT: 0 PPT (last 24 hrs): ~5mm

OBSERVATIONS (list species and type of observation, indicate on map):
GKTR=VO
MPT OB (S. Retus) 5 (2 adult) ba none OCC. br. d. amete
EAWP=VO Silver maple, bigtooth aspen
BISA=VO
Rapid jaw bones (5 seen a found)
woodeid s
CA=carcass; DP=distinctive parts; FE=feeding evidence; FY=eggs/nest; HO=house/den,
OB=observed; SC=scat; SL=other sign; TK=track; VO=vocalization

Wildlife Habitat Type & Description	Site Assessment	Photo ID	Map ID	UTM Coordinates		
				Zone	Easting	Northing
ALL SITES						
Bat Hibernacula: Caves, abandoned mines, underground foundations, karst features	Size of opening(s) Bedrock Type Depth of feature (if possible)					
Snake Hibernacula: Burrows, rock crevices, fissures that extend below the frost line (i.e. at least 1 m)	Number of access points Size of opening(s) Substrate	1723	mbr 123	18T	(514323) linear	(4988500)
Bank / Cliff Colonial Bird Nesting Habitat: Exposed soil banks, undisturbed, naturally eroding, steep slopes, cliff faces with evidence of nests or burrows	Size of burrow Number of burrows					
Stick Nests: Stick nests found in any forest/ woodland/swamp; includes heron colonies and bald eagle/ osprey/ other raptor nests	Tree species Nest size					
WOODLANDS						
Vernal Pools: Permanent or semi-permanent pool or pond. Evidence of holding water in most years through late spring (i.e. late May) or into summer	Number of features Feature size (diameter) Water depth Sub/emergent veg present Shrubs/logs at edge present Water permanency	1736 1737 1740 1741	mbr 123	18T	514289 514253 512225	4988480 invalid pos 4988476 4988470
Seeps and Springs: Locations where groundwater comes to the surface in forests (see document for indicator species)						
WETLANDS						
Turtle Wintering Areas: Permanent water bodies, large wetlands, bogs, or fens with soft substrates and deep enough not to freeze solid	Feature size (diameter) Water depth Substrate of water body Water permanency	1719 1720 1721 1722	mbr 119 mbr 120 mbr 121 mbr 122	18T ↓	514390 514389 11 11	4988487 4988478 11 11
Turtle Nesting Habitat: Exposed mineral soil (sand or gravel) areas adjacent (<100 m) to MAM/SA/BOO/ FEO (note if man-made)	Type of substrate Distance to wetland Size of feature	1952 1953 1964 1965				
Terrestrial Crayfish Habitat: Edges of shallow marshes and meadows (no minimum size) with crayfish chimneys	Number of chimneys	1871 1938	mbr 124 mbr 125	18T ↓	514401 514405	4988585 4988588

Page 3 of 2

Print Name: Cengre Staples
(Field Notes Author)

Quality Control: This form is complete & legible

Signature: _____
(Field No. A/QC personnel)

REV: 2016-06-06



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**Roadside ELC,
Woodland & Wildlife Habitat
Assessment Form**

Project Number: 160950879 Project Name: Barlow Solar Farm
Date: 2016/06/09 Field Personnel: C. Staples

Weather Conditions: TEMP (°C): 19 WIND: 15-20 CLOUD: 50% PPT: 0 PPT (in last 24 hrs): 0-5

Polygon 6

POLYGON DESCRIPTION

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	POLYGON:	TOPOGRAPHIC FEATURE	HISTORY
	START TIME: <u>—</u>	<input type="checkbox"/> LACUSTRINE <input type="checkbox"/> TALUS <input type="checkbox"/> RIVERINE <input type="checkbox"/> CREVICE / CAVE <input checked="" type="checkbox"/> BOTTOMLAND <input type="checkbox"/> ALVAR <input type="checkbox"/> CULTURAL <input type="checkbox"/> TERRACE <input type="checkbox"/> ROCKLAND <input type="checkbox"/> VALLEY SLOPE <input type="checkbox"/> BEACH / BAR <input type="checkbox"/> TABLELAND <input type="checkbox"/> SAND DUNE <input type="checkbox"/> ROLL UPLAND <input type="checkbox"/> BLUFF <input type="checkbox"/> CLIFF	<input checked="" type="checkbox"/> NATURAL <input type="checkbox"/> CULTURAL
	END TIME: <u>—</u>		

STAND DESCRIPTION:

LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (>>MUCH GREATER THAN; >GREATER THAN; = ABOUT EQUAL TO)
1 CANOPY	1-2	4	Silver maple green ash black cherry
2 SUB-CANOPY	3	2	hawthorn
3 UNDERSTOREY			
4 GRD. LAYER	6	1	

HT CODES: 1=>25m 2=10<HT<25m 3=2<HT<10m 4=1<HT<2m 5=0.5<HT<1m 6=0.2<HT<0.5m 7=HT<0.2m

CVR CODES: 0=NONE 1=0%<CVR<10% 2=10<CVR<25% 3=25<CVR<50% 4=CVR>50% N/O=not observed

STANDING SNAGS: 0 <10 10-24 R 25-50 >50

ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT N/O=Not observed

STAND MATURITY: PIONEER YOUNG MID-AGE MATURE OLD GROWTH

VEGETATION TYPE: Maple mineral deciduous CODE: SWM3

COMPLEX: Organic decid. woods CODE: SWD03
Mineral decid thicket CODE: SWM3

Evidence of Disturbance / Notes:

- Mature Silver maple green ash swamp.
- Vernal pooling - dry, + location. in dried pools.
- Deer blinds @ edge/transmission corridors
- tributary to Henderson Drain flows eastward to Oasmi field, follows ditch to Cornwall centre Rd.
Photos 1749-1772 = swd feature
1757-1762 = tributary watercourse

LAYERS: 1=CANOPY >10m 2=SUB-CANOPY 3=UNDERSTOREY 4=GROUND (GRD.) LAYER
ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT D=DOMINANT N/O=Not observed

SPECIES CODE	LAYER				DISTANCE FROM RD.		COLL.
	1	2	3	4	<5 m	>5 m	
TREES:							
A					✓	✓	
red m	0	0			✓	✓	
black cherry		0				✓	
SHRUBS:							
hazelnut		A	0			✓	
blackberry		0				✓	
riverbank grape			0			✓	
Hazelnut			0				
oak				0		✓	
GROUND:							
larkspur						✓	
purple loosestrife			0		✓	✓	
purple loosestrife				0	✓	✓	
oak				0	✓	✓	
oak				0	✓	✓	
oak				0	✓	✓	
trailing raspberry				0	✓	✓	
cranberry sp.				0	✓	✓	
horseweed				0	✓	✓	
Sensitive Fern				0	✓	✓	
White Birch				0		✓	
Smooth horsetail				0		✓	

Page 1 of 2

Quality Control: This form is complete & legible

Print Name: Cyrine Staples
(Field Notes Author)

Signature: _____
(Field Notes QA/QC personnel)

ELC Polygon: # 6 Assessment Type: -Visual; no access / -Walk through feature

Extent of Physical Investigation of Feature: -Entire / -Partial, walk through polygon (indicate on map)

NOTES & SPECIES OBSERVATIONS (list species and type of observation, indicate on map):

Migration corridor for turtles = rerouted watercourse/ditch along east side of feature/west side of sol. solar farm

REV1 (VO)
EAWP (VO/OB)

CA=carcass; DP=distinctive parts; FE=feeding evidence; FY=eggs/nest; HO=house/den; OB=observed; SC=scat; SI=other sign; TK=track; VO=vocalization

Wildlife Habitat Type & Description	Site Assessment	Photo ID	Map ID	UTM Coordinates		
				Zone	Easting	Northing
ALL SITES						
Bat Hibernacula: Caves, abandoned mines, underground foundations, karst features	Size of opening(s) Bedrock Type Depth of feature (if possible)	none; mature trees may provide roosting habitat in foliage				
Snake Hibernacula: Burrows, rock crevices, fissures that extend below the frost line (i.e. at least 1 m)	Number of access points Size of opening(s) Substrate	occasional rodent burrows (~ 5cm dia), interspersed on ground (Forest floor)				
Bank / Cliff Colonial Bird Nesting Habitat: Exposed soil banks, undisturbed, naturally eroding, steep slopes, cliff faces with evidence of nests or burrows	Size of burrow Number of burrows	None				
Stick Nests: Stick nests found in any forest/ woodland/swamp; includes heron colonies and bald eagle/ osprey/other raptor nests	Tree species Nest size	none observed				
WOODLANDS						
Vernal Pools: Permanent or semi-permanent pool or pond. Evidence of holding water in most years through late spring (i.e. late May) or into summer	Number of features Feature size (diameter) Water depth	multiple through ELC feature 5 x 10m and smaller dry				
Seeps and Springs: Locations where groundwater comes to the surface in forests (see document for indicator species)	Sub/emergent veg present Shrubs/logs at edge present Water permanency	tall sedges occasional logs - most scrub fern semi				
WETLANDS						
Turtle Wintering Areas: Permanent water bodies, large wetlands, bogs, or fens with soft substrates and deep enough not to freeze solid	Feature size (diameter) Water depth Substrate of water body Water permanency	none observed.				
Turtle Nesting Habitat: Exposed mineral soil (sand or gravel) areas adjacent (<100 m) to MAM/SA/BOO/ FEO (note if man-made)	Type of substrate Distance to wetland Size of feature	none observed within feat.				
Terrestrial Crayfish Habitat: Edges of shallow marshes and meadows (no minimum size) with crayfish chimneys	Number of chimneys	n/a				

Landowner lists 7,8

Stantec Consulting Ltd.
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Tel: (519) 836-6050
Fax: (519) 836-2493

**Roadside ELC,
Woodland & Wildlife Habitat
Assessment Form**

Project Number: 160950879 Project Name: Barlow Solar Farm
Date: 2016/06/07 Field Personnel: C. Staples

Weather Conditions: TEMP (°C): 19-22 WIND: 25-45 km/h CLOUD: 50% PPT: Ø PPT (In last 24 hrs): 5mm

Polygon 7 SE

POLYGON DESCRIPTION

TOPOGRAPHIC FEATURE	HISTORY
<input type="checkbox"/> LACUSTRINE	<input type="checkbox"/> TALUS
<input type="checkbox"/> RIVERINE	<input type="checkbox"/> CREVICE / CAVE
<input type="checkbox"/> BOTTOMLAND	<input type="checkbox"/> ALVAR
<input type="checkbox"/> TERRACE	<input type="checkbox"/> ROCKLAND
<input type="checkbox"/> VALLEY SLOPE	<input type="checkbox"/> BEACH / BAR
<input type="checkbox"/> TABLELAND	<input type="checkbox"/> SAND DUNE
<input type="checkbox"/> ROLL UPLAND	<input type="checkbox"/> BLUFF
<input type="checkbox"/> CLIFF	
	<input type="checkbox"/> NATURAL
	<input type="checkbox"/> CULTURAL

ELC
COMMUNITY DESCRIPTION & CLASSIFICATION

POLYGON: _____
START TIME: _____
END TIME: _____

STAND DESCRIPTION:

LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (>>MUCH GREATER THAN; >GREATER THAN; = ABOUT EQUAL TO)
1 CANOPY	1-2	4	Silver maple > Manitoba maple > White elm
2 SUB-CANOPY			green ash > willow
3 UNDERSTOREY			Dame's - rocket
4 GRD. LAYER			-

HT CODES: 1=>25m 2=10<HT<25m 3=2<HT<10m 4=1<HT<2m 5=0.5<HT<1m 6=0.2<HT<0.5m 7=HT<0.2m

CVR CODES: 0=NONE 1=0%<CVR<10% 2=10<CVR<25% 3=25<CVR<60% 4=CVR>60% N/O=not observed

STANDING SNAGS: <10 10-24 25-50 >50

ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT N/O=Not observed

STAND MATURITY: PIONEER YOUNG MID-AGE MATURE OLD GROWTH

VEGETATION TYPE: fresh-moist lowland decid. CODE: FQDM7

COMPLEX CODE: THD along transmission line

Evidence of Disturbance / Notes:

- No SAR observed
- occasional coarse woody debris visible
 - Phragmites along ditchline / edge of polygon
 - Ditched watercourse along north side of feature ~15-20cm depth, approx 2m wide, slow moving w/ light colored (silt) bottom; algae growth 20-30%.

LAYERS: 1=CANOPY >10m 2=SUB-CANOPY 3=UNDERSTOREY 4=GROUND (GRD.) LAYER
ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT D=DOMINANT N/O=Not of

SPECIES CODE	LAYER				DISTANCE FROM RD.	
	1	2	3	4	≤5 m	>5 m
TREES:						
Silver maple	A				✓	
White elm	A				✓	
Manitoba maple	A				✓	
willow	A				✓	✓
apple		O				
green ash	O	O	O		✓	
SHRUBS:						
Raspberry			O		✓	
riverbank grape			O		✓	
GROUND:						
Dame's-rocket			A		✓	✓
goldenrod			A		✓	✓
narrow-leaved meadowweet			O			✓
Virginia creeper			O		✓	

dense

none (snags) visible

Page 1 of 2

Quality Control: This form is complete & l.e.

Print Name: Cyrus Staples
Field Notes Author

Signature: _____
(Field Notes QA/QC person)

photos
1803, 1801
1791-1793 - watercourse edge of polygon
1781, 1789 = FOD

ELC Polygon: # 7 Assessment Type: -Visual; no access / -Walk through feature Extent of Physical Investigation of Feature: -Entire / -Partial, walk through polygon (indicate on map)

NOTES & SPECIES OBSERVATIONS (list species and type of observation, indicate on map):

YENA-VO
RWBL-VO

CA=carcass; DP=distinctive parts; FE=feeding evidence; FY=eggs/nest; HO=house/den; OB=observed; SC=scat; SI=other sign; TK=track; VO=vocalization

Wildlife Habitat Type & Description	Site Assessment	Photo ID	Map ID	UTM Coordinates		
				Zone	Easting	Northing
ALL SITES						
Bat Hibernacula: Caves, abandoned mines, underground foundations, karst features	Size of opening(s) Bedrock Type Depth of feature (if possible)					
Snake Hibernacula: Burrows, rock crevices, fissures that extend below the frost line (i.e. at least 1 m)	Number of access points Size of opening(s) Substrate					
Bank / Cliff Colonial Bird Nesting Habitat: Exposed soil banks, undisturbed, naturally eroding, steep slopes, cliff faces with evidence of nests or burrows	Size of burrow Number of burrows					
Stick Nests: Stick nests found in any forest/ woodland/swamp; includes heron colonies and bald eagle/ osprey/other raptor nests	Tree species Nest size					
WOODLANDS						
Vernal Pools: Permanent or semi-permanent pool or pond. Evidence of holding water in most years through late spring (i.e. late May) or into summer	Number of features Feature size (diameter) Water depth					
Seeps and Springs: Locations where groundwater comes to the surface in forests (see document for indicator species)	Sub/emergent veg present Shrubs/logs at edge present Water permanency					
WETLANDS						
Turtle Wintering Areas: Permanent water bodies, large wetlands, bogs, or fens with soft substrates and deep enough not to freeze solid	Feature size (diameter) Water depth Substrate of water body Water permanency					
Turtle Nesting Habitat: Exposed mineral soil (sand or gravel) areas adjacent (<100 m) to MAM/SA/BOO/ FEO (note if man-made)	Type of substrate Distance to wetland Size of feature					
Terrestrial Crayfish Habitat: Edges of shallow marshes and meadows (no minimum size) with crayfish chimneys	Number of chimneys					

Landowner lot 5



Stantec Consulting Ltd.
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Canada N1G 4P5
Tel: (519) 836-6050
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**Roadside ELC,
Woodland & Wildlife Habitat
Assessment Form**

Project Number: 160950879 Project Name: Barlow Solar Farm

Date: June 7, 2016 Field Personnel: C. Staples

Weather Conditions: TEMP (°C): 19 WIND: 25-35 km/h SE CLOUD: 50% PPT: Ø PPT (in last 24 hrs): ~5mm

Polygon 9

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	POLYGON:	<input type="checkbox"/> LACUSTRINE <input type="checkbox"/> TALUS <input type="checkbox"/> NATURAL <input type="checkbox"/> RIVERINE <input type="checkbox"/> CREVICE / CAVE <input type="checkbox"/> CULTURAL <input checked="" type="checkbox"/> BOTTOMLAND <input type="checkbox"/> ALVAR <input type="checkbox"/> CULTURAL <input type="checkbox"/> TERRACE <input type="checkbox"/> ROCKLAND <input type="checkbox"/> VALLEY SLOPE <input type="checkbox"/> BEACH / BAR <input type="checkbox"/> TABLELAND <input type="checkbox"/> SAND DUNE <input type="checkbox"/> ROLL UPLAND <input type="checkbox"/> BLUFF <input type="checkbox"/> CLIFF	
	START TIME:		
	END TIME:		

STAND DESCRIPTION:

LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (>>MUCH GREATER THAN; >GREATER THAN; = ABOUT EQUAL TO)
1 CANOPY	1	3	White pine
2 SUB-CANOPY	2	3	green ash
3 UNDERSTOREY	-	4	swamp white oak (edges)
4 GRD. LAYER			

HT CODES: 1=>25m 2=10<HT<25m 3=2<HT<10m 4=1<HT<2m 5=0.5<HT<1m 6=0.2<HT<0.5m 7=HT<0.2m

CVR CODES: 0=NONE 1=0%<CVR<10% 2=10<CVR<25% 3=25<CVR<60% 4=CVR>60% N/O=not observed

STANDING SNAGS: NO <10 10-24 25-50 >50

ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT D=DOMINANT N/O=Not observed

STAND MATURITY: PIONEER YOUNG MID-AGE MATURE OLD GROWTH

VEGETATION TYPE: Fresh moist pw/hardwood CODE: Fommg
 COMPLEX: Shallow aquatic CODE: SA

Evidence of Disturbance / Notes:

- Photos 1708, 1709 - waterbody 1 - see turtle hab assess form
- 1714, 1715
- 1712, 1713 - vegetation
- Disturbance = 1m² concrete blocks along ^{south} shoreline
- No SAR observed
- Snake habitat (basking) present - old car tires on south bank (photos 1714, 1715)

LAYERS: 1=CANOPY >10m 2=SUB-CANOPY 3=UNDERSTOREY 4=GROUND (GRD.) LAYER
 ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT D=DOMINANT N/O=Not observed

SPECIES CODE	LAYER				DISTANCE FROM RD.		COLL.
	1	2	3	4	≤5 m	>5 m	
TREES:							
White pine	1		0	0			
green ash		0	0				
swamp white oak		0					
Silver maple			0				
SHRUBS:							
virginia creeper			0				
common buckthorn			0				
riverbank grape							
GROUND:							
common birdock				0			
goldenrod				0			
Mosses						0	

Page 1 of 2

Print Name: Cynthia Staples
 (Field Notes Author)

Quality Control: This form is complete & legible

Signature: _____
 (Field Notes QA/QC personnel)

CONTINUED

SITE: Barlow Solar

DATE: June 7, 2016

Roadside ELC, Woodland &
Wildlife Habitat Assessment Form

ELC Polygon: # 9 Assessment Type: Visual; no access / Walk through feature Extent of Physical Investigation of Feature: Entire / Partial, walk through polygon (indicate on map)

NOTES & SPECIES OBSERVATIONS (list species and type of observation, indicate on map):

Leop. Aug x 1.03
VEER = VO
YEW A = VO

at s P lin li upart FE f g vid ne P g net HO=house/der. C=observed SC=scat. S=sharpen H=track VO=vocalization

Wildlife Habitat Type & Description	Site Assessment	Photo ID	Map ID	UTM Coordinates		
				Zone	Easting	Northing
ALL SITES						
Bat Hibernacula: Caves, abandoned mines, underground foundations, karst features	Size of opening(s) Bedrock Type Depth of feature (if possible)					
	none observed					
Snake Hibernacula: Burrows, rock crevices, fissures that extend below the frost line (i.e. at least 1 m)	Number of access points Size of opening(s) Substrate					
	none observed sandy clay silt					
Bank / Cliff Colonial Bird Nesting Habitat: Exposed soil banks, undisturbed, naturally eroding, steep slopes, cliff faces with evidence of nests or burrows	Size of burrow Number of burrows					
	none					
Stick Nests: Stick nests found in any forest/ woodland/swamp; includes heron colonies and bald eagle/ osprey/other raptor nests	Tree species Nest size					
	none observed					
WOODLANDS						
Vernal Pools: Permanent or semi-permanent pool or pond. Evidence of holding water in most years through late spring (i.e. late May) or into summer	Number of features Feature size (diameter) Water depth					
	none observed					
Seeps and Springs: Locations where groundwater comes to the surface in forests (see document for indicator species)	Sub/emergent veg present Shrubs/logs at edge present Water permanency					
WETLANDS						
Turtle Wintering Areas: Permanent water bodies, large wetlands, bogs, or fens with soft substrates and deep enough not to freeze solid	Feature size (diameter) Water depth Substrate of water body Water permanency	1708 1709 1714 1715	Pond 1	18T	514488	4988407
	25m 1-2m - west side soft muck (detritus) permanent					
Turtle Nesting Habitat: Exposed mineral soil (sand or gravel) areas adjacent (<100 m) to MAM/SA/BOO/ FEQ (note if man-made)	Type of substrate Distance to wetland Size of feature	19411	road	18T	514501	4988520
	gravel 30m linear, ~9m (old quarry road).					
Terrestrial Crayfish Habitat: Edges of shallow marshes and meadows (no minimum size) with crayfish chimneys	Number of chimneys					
	n/a					

Page 2 of 2

Print Name: Ceryne Staples
Field Notes AuthorQuality Control: This form is complete & legible Signature: _____
(Field Notes QA/QC personnel)

REV: 2014-04-14



Stantec Consulting Ltd.
1 - 70 Southgate Drive
Guelph, ON
Canada N1G 4P5
Tel: (519) 836-6050
Fax: (519) 836-2493

Roadside ELC, Woodland & Wildlife Habitat Assessment Form

Project Number: 160950879 Project Name: Barlow Solar Farm
Date: 2016/06/07 Field Personnel: C. Staples

Weather Conditions: TEMP (°C): 17 WIND: 15 20 km/h CLOUD: 50% PPT: Ø PPT (in last 24 hrs): 0.5 mm

POLYGON DESCRIPTION

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	POLYGON:	<input type="checkbox"/> LACUSTRINE	<input type="checkbox"/> TALUS	<input type="checkbox"/> NATURAL
	START TIME: _____	<input type="checkbox"/> RIVERINE	<input type="checkbox"/> CREVICE / CAVE	<input type="checkbox"/> CULTURAL
	END TIME: _____	<input type="checkbox"/> BOTTOMLAND	<input type="checkbox"/> ALVAR	
		<input type="checkbox"/> TERRACE	<input type="checkbox"/> ROCKLAND	
		<input type="checkbox"/> VALLEY SLOPE	<input type="checkbox"/> BEACH / BAR	
		<input checked="" type="checkbox"/> TABLELAND	<input type="checkbox"/> SAND DUNE	
		<input type="checkbox"/> ROLL UPLAND	<input type="checkbox"/> BLUFF	
		<input type="checkbox"/> CLIFF		

STAND DESCRIPTION:

LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (>>MUCH GREATER THAN; >GREATER THAN; = ABOUT EQUAL TO)
1 CANOPY	_____	_____	_____
2 SUB-CANOPY	_____	_____	_____
3 UNDERSTOREY	_____	_____	_____
4 GRD. LAYER	_____	_____	_____

HT CODES: 1=>25m 2=10<HT≤25m 3=2<HT≤10m 4=1<HT≤2m 5=0.5<HT≤1m 6=0.2<HT≤0.5m 7=HT<0.2m

CVR CODES: 0=NONE 1=0%<CVR≤10% 2=10<CVR≤25% 3=25<CVR≤60% 4=CVR>60% N/O=not observed

STANDING SNAGS: <10 10 - 24 25 - 50 >50

ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT N/O=Not observed

STAND MATURITY: PIONEER YOUNG MID-AGE MATURE OLD GROWTH

VEGETATION TYPE: Mineral deciduous thicket swamp CODE: SWTMS

COMPLEX _____ CODE: _____

Evidence of Disturbance / Notes:

- polygon is a hydro corridor. Vegetation within polygon is approx. 1.5-2m in height (hasnt been recently brushed)
- NO SAR species observed w/in feature.
- feature is wet. Terrain is level + adjacent features are forested swamps.

LAYERS: 1=CANOPY >10m 2=SUB-CANOPY 3=UNDERSTOREY 4=GROUND (GRD) LAYER
ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT D=DOMINANT N/O=Not observed

SPECIES CODE	LAYER				DISTANCE FROM RD.		COLL.
	1	2	3	4	≤5 m	>5 m	
TREES:							
<u>green ash</u>		O					✓
<u>trumping aspen</u>		O					✓
SHRUBS:							
<u>narrow-leaved noddarsweet</u>							✓
<u>hawthorn</u>							✓
<u>willows</u>							✓
GROUND:							
<u>goldenrod spp</u>							✓
<u>grass spp</u>							✓

Page 1 of _____

Quality Control: This form is complete & legible

Print Name: Ceyne Staples
(Field Notes Author)

Signature: _____
(Field Notes QA/QC personnel)

ELC Polygon: # Assessment Type: Visual; no access / Extent of Physical Investigation of Feature: Entire /
 Walk through feature Partial, walk through polygon (indicate on map)

NOTES & SPECIES OBSERVATIONS (list species and type of observation, indicate on map):

No species observed.

CA=carcass; DP=distinctive parts; FE=feeding evidence; FY=eggs/nest; HO=house/den; OB=observed; SC=scat; SI=other sign; TK=track; VO=vocalization

Wildlife Habitat Type & Description	Site Assessment	Photo ID	Map ID	UTM Coordinates		
				Zone	Easting	Northing
ALL SITES						
Bat Hibernacula: Caves, abandoned mines, underground foundations, karst features	Size of opening(s) Bedrock Type Depth of feature (if possible)					
Snake Hibernacula: Burrows, rock crevices, fissures that extend below the frost line (i.e. at least 1 m)	Number of access points Size of opening(s) Substrate					
Bank / Cliff Colonial Bird Nesting Habitat: Exposed soil banks, undisturbed, naturally eroding, steep slopes, cliff faces with evidence of nests or burrows	Size of burrow Number of burrows					
Stick Nests: Stick nests found in any forest/ woodland/swamp; includes heron colonies and bald eagle/ osprey/other raptor nests	Tree species Nest size					
WOODLANDS						
Vernal Pools: Permanent or semi-permanent pool or pond. Evidence of holding water in most years through late spring (i.e. late May) or into summer	Number of features Feature size (diameter) Water depth					
Seeps and Springs: Locations where groundwater comes to the surface in forests (see document for indicator species)	Sub/emergent veg present Shrubs/logs at edge present Water permanency					
WETLANDS						
Turtle Wintering Areas: Permanent water bodies, large wetlands, bogs, or fens with soft substrates and deep enough not to freeze solid	Feature size (diameter) Water depth Substrate of water body Water permanency					
Turtle Nesting Habitat: Exposed mineral soil (sand or gravel) areas adjacent (<100 m) to MAM/SA/BOO/ FEO (note if man-made)	Type of substrate Distance to wetland Size of feature					
Terrestrial Crayfish Habitat: Edges of shallow marshes and meadows (no minimum size) with crayfish chimneys	Number of chimneys					

Page 2 of 2

Quality Control: This form is complete & legible

Print Name:

Ceryne Staples
(Field Notes Author)

Signature:

(Field Notes QA/OC personnel)



Stanlec Consulting Ltd.
1 - 70 Southgate Drive
Guelph, ON
Canada N1G 4P5
Tel: (519) 836-6050
Fax: (519) 836-2493

Wildlife Habitat Assessment Form

Project Number: V01A 50879 Polygon No.: n/a
Assessment Type: Visual; no access / Entire; walk through feature / Partial access (indicate on map)

Weather Conditions: TEMP (°C): 13 WIND: 0-1 CLOUD: 0-10 PPT: 0 PPT (last 24 hrs): -1-2mm

NOTES & SPECIES OBSERVATIONS (list species and type of observation, indicate on map):

See incidental observations from
Apr. 10/2017.

CA=carcass; DP=distinctive parts; FE=feeding evidence; FY=eggs/nest; HO=house/den;
OB=observed; SC=scat; SI=other sign; TK=track; VO=vocalization

Wildlife Habitat Type & Description	Site Assessment	Photo ID	Map ID	UTM Coordinates		
				Zone	Easting	Northing
ALL SITES						
Bat Hibernacula: Caves, abandoned mines, underground foundations, karst features	Size of opening(s) Bedrock Type Depth of feature (if possible)					
Snake Hibernacula: Burrows, rock crevices, fissures that extend below the frost line (i.e. at least 1 m)	Number of access points Size of opening(s) Substrate					
Bank / Cliff Colonial Bird Nesting Habitat: Exposed soil banks, undisturbed, naturally eroding, steep slopes, cliff faces with evidence of nests or burrows	Size of burrow Number of burrows					
Stick Nests: Stick nests found in any forest/ woodland/swamp; includes heron colonies and bald eagle/ osprey/other raptor nests	Tree species Nest size					
WOODLANDS						
Vernal Pools: Permanent or semi-permanent pool or pond. Evidence of holding water in most years through late spring (i.e. late May) or into summer	Number of features Feature size (diameter) Water depth					
Seeps and Springs: Locations where groundwater comes to the surface in forests (see document for indicator species)	Sub/emergent veg present Shrubs/logs at edge present Water permanency					
WETLANDS						
Turtle Wintering Areas: Permanent water bodies, large wetlands, bogs, or fens with soft substrates and deep enough not to freeze solid	Feature size (diameter) Water depth Substrate of water body Water permanency					
Turtle Nesting Habitat: Exposed mineral soil (sand or gravel) areas adjacent (<100 m) to MAM/SA/BOO/ FEO (note if man-made)	Type of substrate Distance to wetland Size of feature					
Terrestrial Crayfish Habitat: Edges of shallow marshes and meadows (no minimum size) with crayfish chimneys	Number of chimneys					

Page 2 of 2

Print Name: John Marshall

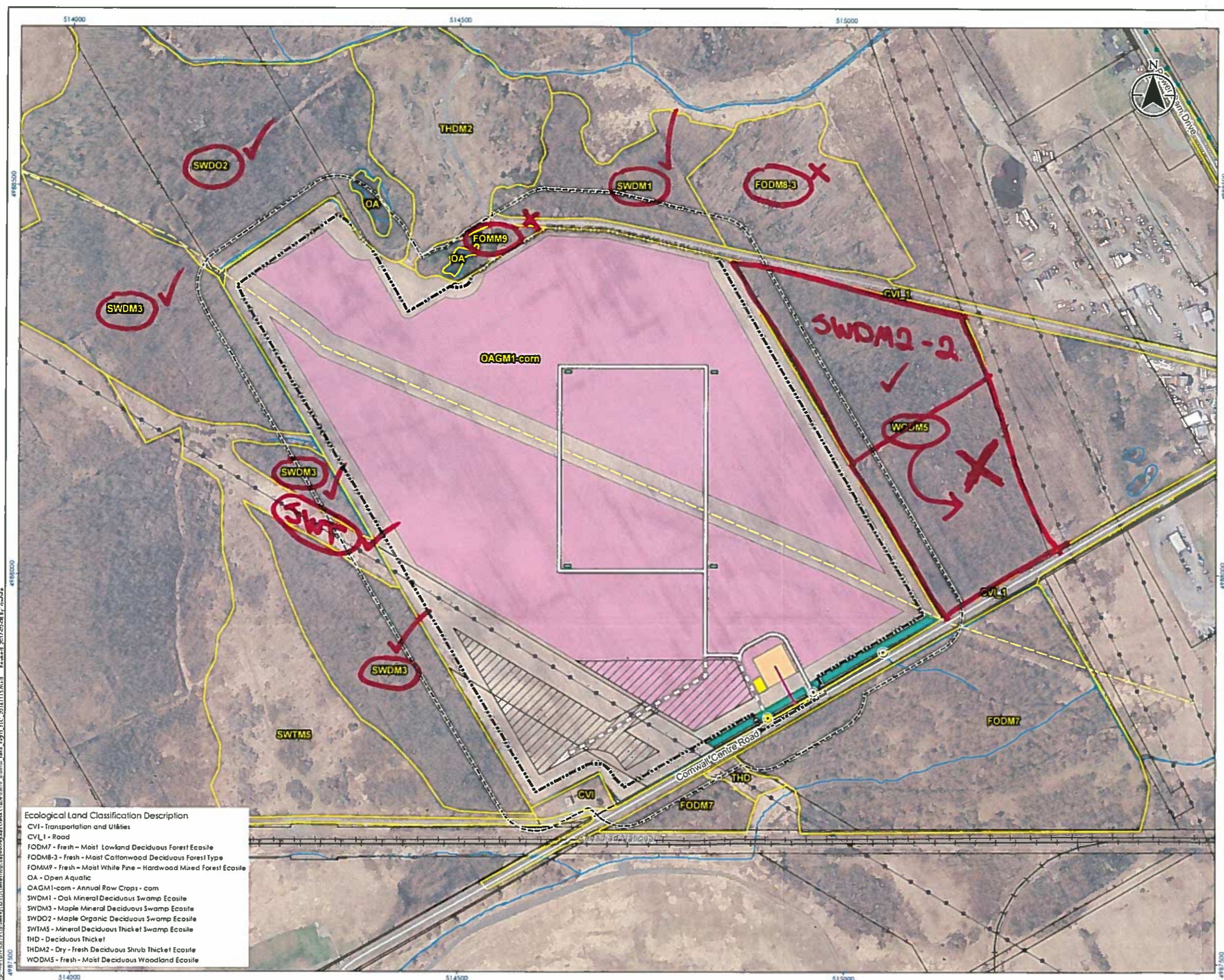
(Field Notes Author)

Quality Control: This form is complete & legible

Signature: _____

(Field Notes QA/QC personnel)

REV: 2016-09-07



Legend

Zone of Investigation (50 m from Project Location)	Project Location
Ecological Land Classification	Solar Panel Area
Proposed Project Components	Substation
Point of Common Coupling	Tree Planting Area
Culvert	Existing Features
Connection Line	Major Road
Inverter Step-up Transformer and Inverter	Minor Road
Permanent Access	Culvert (existing)
Temporary Access During Construction	Distribution Line (Hydro One)
Temporary Construction Laydown and Parking Area	Hydro One Transmission Line
Operations & Maintenance Storage Area	Pipeline
	Railway
	Watercourse
	Property Boundary
	Waterbody

0 100 200 metres
1:5,000 (A1 original document size of 11x17)

Notes

- Coordinate System: NAD 1983 UTM Zone 18N
- Base features and aerial imagery produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2016.
- Imagery Source: DRAPE 2014
- Waterbody and watercourse mapping within 120 m of the Project Location has been updated based on field studies completed as part of the REA process under O Reg. 359/09. See the Water Assessment and Water Body Report for details.



Ecological Land Classification Description

- CVI - Transportation and Utilities
- CVL1 - Road
- FODM7 - Fresh - Moist Lowland Deciduous Forest Ecosite
- FODM8-3 - Fresh - Moist Cottonwood Deciduous Forest Type
- FOMM9 - Fresh - Moist White Pine - Hardwood Mixed Forest Ecosite
- OA - Open Aquatic
- OAGM1-com - Annual Row Crops - com
- SWDM1 - Oak Mineral Deciduous Swamp Ecosite
- SWDM3 - Maple Mineral Deciduous Swamp Ecosite
- SWDO2 - Maple Organic Deciduous Swamp Ecosite
- SWTMS - Mineral Deciduous Thicket Swamp Ecosite
- THD - Deciduous Thicket
- THDM2 - Dry - Fresh Deciduous Shrub Thicket Ecosite
- WODM5 - Fresh - Moist Deciduous Woodland Ecosite

Project Location: 160950879 REVC
 United Counties of Stormont, Dundas and Glengarry
 Prepared by AMW on 2017-02-08
 Technical Review by NK on 2016-11-17
 Independent Review by NK on 2016-11-17

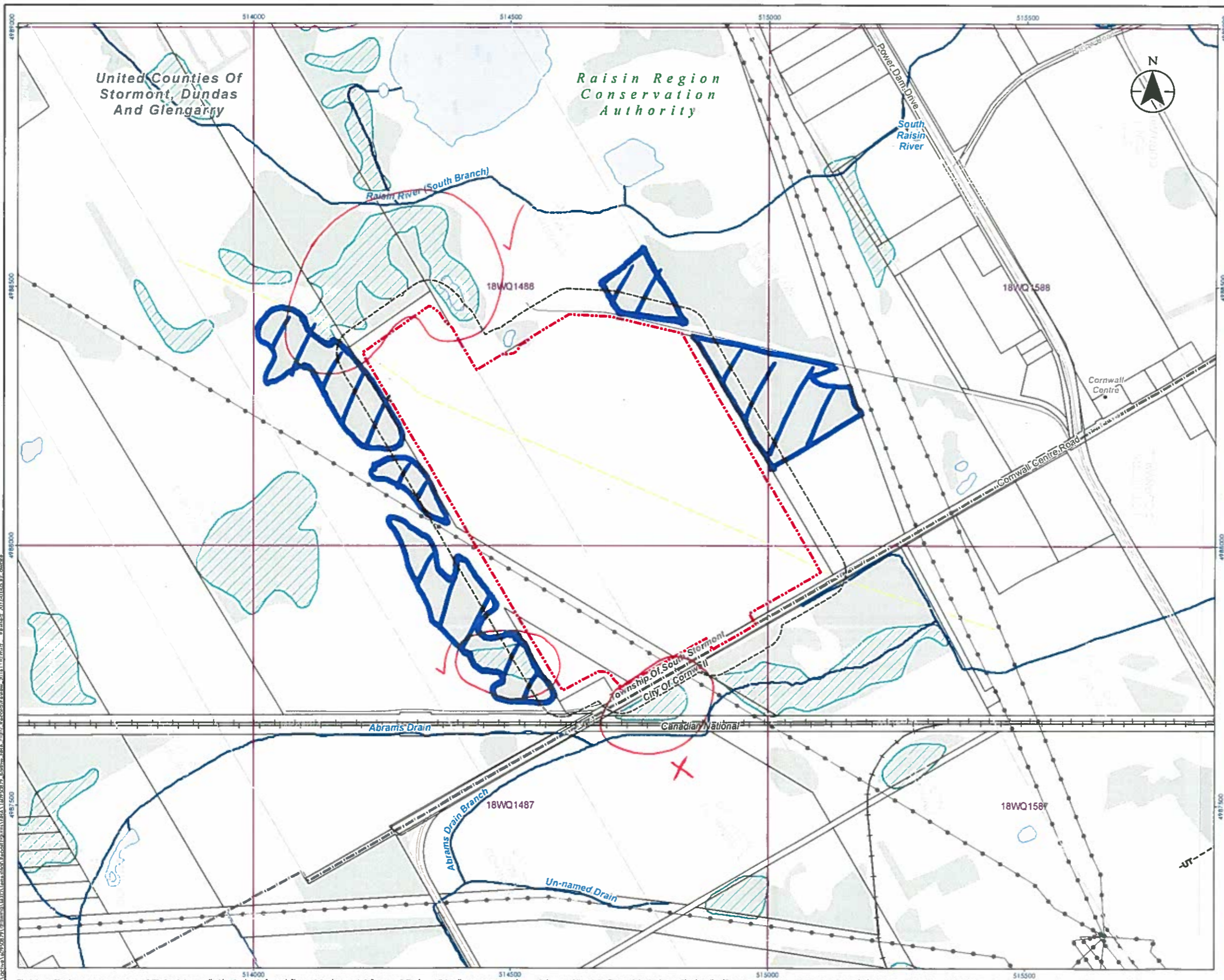
Client/Project:
BARLOW ENERGY CENTRE LIMITED PARTNERSHIP
BARLOW SOLAR ENERGY CENTRE

Figure No. **3**
 Title **Ecological Land Classification**

OWES Evaluation - Field Map.

✓ - denotes wetland present as per OWES
 X - denotes wetland not present as per OWES

April 10/2017 @ 0800 - 1200 hrs
 Josh Mansell.



- Legend**
- Project Location
 - Zone of Investigation (50 m from Project Location)
 - Pipeline
 - Constructed Drain
 - Hydro Line
 - Unknown Transmission Line
 - Major Road
 - Minor Road
 - Railway
 - Watercourse (Permanent, as per MNR mapping)
 - 1 km UTM Grid
 - Municipal Boundary, Upper
 - Municipal Boundary, Lower
 - Property Boundary
 - Water Body (as per MNR mapping)
 - Wetland, Not evaluated per OWES
 - Wooded Area



Notes

1. Coordinate System: NAD 1983 UTM Zone 18N
2. Base features and aerial imagery produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2016. Base data modified by Stantec.



Project Location: United Counties of Stormont, Dundas and Glengarry
 Prepared by AMW on 2017-01-05
 Technical Review by RN on 2017-01-02
 Independent Review by RN on 2017-01-02

Client/Project: BARLOW ENERGY CENTRE LIMITED PARTNERSHIP
 BARLOW SOLAR ENERGY CENTRE

Figure No. **2**
 Title **Records Review**

*OWES Evaluation - Field Map
 April 10/2017 @ 0800-1200 hrs.
 Josh Mansell.*

 - confirmed wetland observed. - observed wetland communities.

APPENDIX E: CURRICULUM VITAE

Nicole Kopysh is a Terrestrial Ecologist and Project Manager who has been involved in projects of varying sizes from multiple sectors including aggregates, renewable energy and other development types. Nicole has successfully managed or directed the natural terrestrial field programs and reporting requirements for Environmental Impact Assessments, constraints analyses, natural environment technical reports, Environmental Implementation Reports, Natural Heritage Assessments for the Renewable Energy Assessment program and natural heritage monitoring programs. These have included extensive agency and public consultation, where Nicole demonstrates effective communication skills.

Nicole's experience includes the implementation of the natural heritage policy of the Ontario Provincial Policy Statement, Greenbelt Plan, *Oak Ridges Moraine Act*, *Migratory Birds Convention Act*, *Green Energy Act* and municipal policy documents for municipal draft plan applications throughout southern Ontario. Nicole is also experienced in the interpretation and application of the *Endangered Species Act* (ESA), including the development and completion of permit applications under the ESA. Nicole is a skilled birder and has field experience conducting bird surveys, Species at Risk surveys, general terrestrial monitoring and assessments, wildlife inventories and habitat assessments.

EDUCATION

BES, University of Waterloo / Bachelor of Environmental Studies, Honours Environment and Resource Studies, Co-op Program, Waterloo, Ontario, 1998

Certificate, Ontario Ministry of Natural Resources / Ecological Land Classification (ELC) for Southern Ontario, Turkey Point, Ontario, 2014

MEMBERSHIPS

Committee Member, Bobolink and Eastern Meadowlark Round Table, Ontario Ministry of Natural Resources

Steering Committee Member, Joint Bird and Bat Monitoring Database - Environment Canada, Ministry of Natural Resources, Canadian Wind Association, Bird Studies Canada

Member, Society of Canadian Ornithologists

Member, Ontario Field Ornithologists

PROJECT EXPERIENCE

Renewable Energy

Grand Renewable Energy Project, 250 MW (includes 100 MW solar farm), Niagara Region, Haldimand County, Ontario (Species at Risk Advisor)

Almonte Solar Project, 10 MW, Ontario (Species at Risk Advisor / Senior Reviewer)

David Brown Solar Park, 10 MW, Ontario (Species at Risk Advisor)

Niagara Region Wind Farm, 230 MW, Niagara Region, Haldimand County, Ontario (Terrestrial Ecologist)

Kingsbridge I & II Wind Projects, 200 MW, Goderich, Ontario (Terrestrial Ecologist)

Melancthon I & II Wind Farms, 200 MW (Terrestrial Ecologist)

Nicole Kopysh BES

Ecologist / Project Manager

Wolfe Island Wind Power Project, 198 MW, Wolfe Island, Ontario (Terrestrial Ecologist)

Study design, coordination and conducting of monitoring for spring migratory birds, fall migrating raptors, staging waterfowl, winter raptors and grassland bird populations. Design and conducting of specific studies to target avian Species at Risk. Assessment of amphibian populations, mammal populations, and wildlife corridors. Preparation of technical report appendix to the Environmental Screening Report

Port Dover & Nanticoke Wind Project, 105 MW, Ontario (Project Manager / Terrestrial Ecologist)

Amherst Island Wind Project, 75 MW, Ontario (Terrestrial Ecologist)

Sydenham Wind Project, 67 MW, Ontario (Project Manager / Terrestrial Ecologist)

Bow Lake Wind Project, 60 MW, Ontario (Terrestrial Ecologist)

White Pines Wind Project, 60 MW, Ontario (Project Manager / Terrestrial Ecologist)

St. Columban Wind Project, 33 MW, Ontario (Project Manager / Senior Reviewer)

Plateau Wind Project, 27 MW, Ontario (Project Manager / Terrestrial Ecologist)

Goulais Wind Project, 25 MW, Ontario (Terrestrial Ecologist)

Ostrander Point Wind Energy Park, 22.5 MW, Ontario (Project Manager / Terrestrial Ecologist)

Grand Valley Wind Farm 1 & 2 Wind Project, 19 MW, Ontario (Terrestrial Ecologist)

Fairview Wind Project, 18.4 MW, Ontario (Terrestrial Ecologist)

Brooke Alvinston Wind Project, 10 MW, Ontario (Project Manager / Terrestrial Ecologist)

Springwood Wind Project, 9 MW, Ontario (Project Manager / Terrestrial Ecologist)

Whittington Wind Project, 6.15 MW, Ontario (Project Manager / Terrestrial Ecologist)

Napier Wind Project, 4.8 MW, Ontario (Project Manager / Terrestrial Ecologist)

Port Ryerse Wind Project, Ontario (Species at Risk Advisor)

Chinodin Melancthon and Grey Highlands Wind Projects, Ontario (Terrestrial Ecologist)

Coordinating and conducting monitoring of bats and migratory and breeding birds for wind turbine development

Proton Wind Program, Southgate Township, Ontario (Terrestrial Ecologist)

Coordinating and conducting monitoring of migratory and breeding birds for wind turbine development, preparation of comprehensive technical appendix to the Environmental Screening Report

Pre-construction: Renewable Energy Projects, Various Sites, Ontario (Team Lead - Field Program and Technical Reporting)

Study design, direction of field programs, agency and public consultation, evaluation and assessment of natural features, significant wildlife habitat, presence of Species at Risk, assessment of project impacts and preparation of final reports for the following projects:

- White Pines Wind Project Natural Heritage Assessment, Environmental Impact Study and Endangered Species Act Assessment and Permitting

- Ostrander Point Wind Energy Park Natural Heritage Assessment, Environmental Impact Study and Endangered Species Act Assessment and Permitting

- Springwood Wind Project Natural Heritage Assessment

- Whittington Wind Project Natural Heritage Assessment, Environmental Impact Studies and Endangered Species Act Assessment and Permitting

* denotes projects completed with other firms

Nicole Kopysh BES

Ecologist / Project Manager

- Port Dover and Nanticoke Wind Project Natural Heritage Assessment, Environmental Impact Study and Endangered Species Act Assessment and Permitting
- Brooke-Alvinston Wind Project Natural Heritage Assessment

Post-construction: Renewable Energy Projects, Various Sites, Ontario (Team Lead - Field Program and Technical Reporting)

Post-construction monitoring and reporting for various wind energy projects in Ontario, including:

- Melancthon I Wind Plant
- Wolfe Island Wind Power Project

Endangered Species/Species at Risk Assessments

Species at Risk Assessments, Various Sites, Ontario (Team Lead, Field Program and Technical Reporting)

Study design, direction of field programs, agency and public consultation, evaluation and assessment of presence of Species at Risk and their habitats, development of mitigation measures and monitoring programs, assessment of project impacts and preparation of final reports for the following projects:

- White Pines Wind Project Natural Heritage Assessment; Environmental Impact Study and Endangered Species Act Assessment and Permitting, involving Barn Swallow, Eastern Meadowlark, Bobolink, Butternut, Blanding's Turtle, Whip-poor-will, Henslow's Sparrow
- Ostrander Point Wind Energy Park Natural Heritage Assessment; Environmental Impact Study and Endangered Species Act Assessment and Permitting, involving Barn Swallow, Eastern Meadowlark, Bobolink, Butternut, Blanding's Turtle, Whip-poor-will, Henslow's Sparrow
- Whittington Wind Project Natural Heritage Assessment, Environmental Impact Studies and Endangered Species Act Assessment and Permitting, involving Barn Swallow, Eastern Meadowlark and Bobolink
- Port Dover and Nanticoke Wind Project Natural Heritage Assessment, Environmental Impact Study and Endangered Species Act Assessment and Permitting, involving American Badger, Eastern Hog-nosed Snake, Barn Swallow, Bobolink and Eastern Meadowlark

Aggregate Services

Neubauer Pit, Township of Puslinch, Ontario (Project Assistant, Ecologist)

Natural environment field inventories and Level II Natural Environment Technical Report

Hillsburgh Huxley Pit, Hillsburgh, Ontario (Project Assistant, Ecologist)

Natural environment field inventories, Woodlot Assessment of Significance and Level II Natural Environment Technical Report

Proposed Bromberg Pit, Ayr, Ontario (Project Assistant, Ecologist)

Natural environment field inventories and Level I Natural Environment Technical Report

Commercial / Retail Development

First Capital Holdings Trust, Guelph, Ontario (Project Manager)

Environmental Implementation Report. Vegetation buffers, wildlife corridor, tree conservation plan, planning and design of invasive species removal, design of compliance and performance monitoring program

Natural Sciences & Heritage Resources

Forest Bird Research - Canadian Wildlife Service* (Field Assistant)

Located Wood Thrush nests, monitored nesting success, banded adult and nestling birds, and conducted vegetation surveys

Forest Bird Research - Smithsonian Institution* (Field Assistant)

Located and monitored Hooded Warbler nests and conducted insect sweep net sampling. Located Blue-headed Vireo nests and conducted playback experiments

Ontario Breeding Bird Atlas - Ontario Nature-Federation of Ontario Naturalists* (Assistant Coordinator)

Coordinated and managed various aspects of a province-wide conservation/research project. This involved coordinating coverage to ensure project goals were met; hiring, training and managing contract staff; development of funding proposals; coordination of field work; management of volunteers and working committees; assistance in preparation of Atlas book for publication

* denotes projects completed with other firms

Nicole Kopysh BES

Ecologist / Project Manager

Colonial Marshbird Census - Bird Studies Canada* (Project Coordinator)

Developed the project outline, scope, organization and staffing. Scheduled the project timelines and tasks. Performed key field work in marshes throughout southern Ontario

Ontario Eastern Screech-owl Survey - Ontario Breeding Bird Atlas* (Project Manager)

Developed project proposal, project timeline, schedule and budget. Responsible for communications, data management and handling. Launched survey and coordinated volunteer involvement

Residential Development

Almas Property, Hamilton, Ontario (Project Manager)

*Environmental Impact Statement and Natural Heritage
Assessment*

Golhar Residence, Hockley Valley, Ontario (Project Manager)

*Development of environmental review for a proposed pond
located within the Niagara Escarpment Protection Area*

GasPELL Homeowner's Guide, Whitby, Ontario (Project Manager)

Fourteen Mile Creek Long-term Natural Heritage Monitoring Program, Oakville, Ontario (Natural Heritage Monitoring Project Director)

*A watershed-based inventory and monitoring program for a
study area in the Fourteen Mile Creek watershed was
developed in association with the Conservation Authority to
assess human induced stress on the greater ecosystem. The
program included one year of inventory work and four
subsequent years of monitoring and incorporated the
following components: streamflow and rainfall monitoring,
erosion and creek morphology, groundwater, vegetation and
Ecological Land Classification, breeding birds, fish, water
quality and benthos*

Sports, Recreation & Leisure

Clublink Wyndance Golf Courses, Uxbridge, Ontario (Project Manager)

*Natural heritage assessment and development of
environmental report addendum and significant species plan*

* denotes projects completed with other firms

PUBLICATIONS

Eastern Screech-Owl pp. 290-291. *Atlas of the Breeding Birds of Ontario*, 2007.

Kopysh, N. Other Owls!. *Ontario Breeding Bird Atlas Newsletter*. Vol 5, Issue 1., 2005.

Kopysh, N. On the Prowl for Owls. *OFO News* 22(1): 12-13., 2004.

Kopysh, N. Owling for EASO. *Ontario Breeding Bird Atlas Newsletter*. Vol 3, Issue 2., 2003.

Kopysh, N. and C. Weseloh. Reporting Colonial Species. *Ontario Breeding Bird Atlas Newsletter*. Vol 3, Issue 2., 2003.

Morton, E., J. Howlett, N.C. Kopysh and I. Chiver. Overcoming the cost of male incubation: blue-headed vireos memorize the locations where intruders sing. *In submission to Proc Royal Soc of London, biology letters.*, 2002.

Buehler, D.M., D.R. Norris, B.J.M. Stuchbury and N.C. Kopysh. Food Supply and Parental Feeding Rates of Hooded Warblers in Forest Fragments. *Wilson Bulletin* 114(1), 122-127., 2002.

Timmermans, S. and N. Kopysh. What's Happening With Colonial Marshbirds?. *Ontario Breeding Bird Atlas Newsletter*. Vol 1, Issue 2., 2001.

Melissa Straus completed her undergraduate degree with honours in Environmental Sciences at the University of Guelph and her Masters degree in Biology at Trent University. Her M.Sc. focused on the effects of silvicultural practices on reproductive success of cavity-nesting birds in southwestern Ontario.

Melissa is a Terrestrial Ecologist with experience in various sectors, including aggregate services, electrical power distribution, oil and gas, renewable energy, residential development and transportation planning. Her experience involves implementation of the *Migratory Birds Convention Act*, the *Species at Risk Act*, and *Endangered Species Act*. Melissa is a skilled birder and has extensive field experience conducting avian, reptile, amphibian, Ecological Land Classification (ELC), and botany surveys, including rare and protected species. She performs construction monitoring, wetland delineations according to the Ontario Wetland Evaluation System (OWES) and post-construction monitoring for wind power projects. Melissa has conducted habitat assessments and species-specific studies for various species at risk including Jefferson's Salamander, Blanding's Turtle, Butler's Gartersnake, Eastern Foxsnake, Massasauga, Bobolink, Eastern Meadowlark, Barn Swallow, Chimney Swift, Eastern Whip-poor-will, Loggerhead Shrike, Cerulean Warbler and bat species at risk. She has extensive experience conducting species at risk occurrence surveys and mitigation measure effectiveness monitoring during construction. Melissa's project management experience includes various green energy, oil and gas pipelines, and residential development projects.

EDUCATION

M.Sc. in Biology, Trent University, Peterborough, Ontario, 2009

B.Sc. in Environmental Sciences, Co-op Program, University of Guelph, Guelph, Ontario, 2003

CERTIFICATIONS & TRAINING

Certificate, Ontario Ministry of Natural Resources / Ontario Wetland Evaluation System, North Bay, Ontario, 2012

Certificate, Ontario Ministry of Natural Resources / Ecological Land Classification System for Southern Ontario, Kemptville, Ontario, 2010

Certificate, St. John Ambulance / Standard First Aid with CPR C + AED, Guelph, Ontario, 2015

PROJECT EXPERIENCE

Renewable Energy

K2 Wind Power Project, Goderich, Ontario
(Terrestrial Ecologist / Coordinator)

Performed environmental monitoring tasks both pre- and post-construction related to breeding amphibians, bat species at risk, and a heronry. Coordinator for daily monitoring, data management, reporting as well as identification and notification of bat and bird species at risk during the mortality monitoring program in 2016.

Adelaide Wind Power Project, Strathroy, Ontario

Conducted ELC and wildlife habitat assessments pre-construction surveys. Coordinator for 2015 and 2016 mortality monitoring program, including oversight of daily monitoring, data management, reporting, species identification, and agency notification for species at risk.

Grand Renewable Energy Project, Cayuga, Ontario
(Terrestrial Ecologist / Technical Reporting)

Conducted ELC and wildlife habitat assessment, salamander trapping including sampling for Jefferson's Salamander, coordinated and conducted winter raptor and Short-eared Owl surveys, assisted with NHA, EIS, and species at risk reporting for proposed wind and solar project

Melissa A. Straus M.Sc.

Terrestrial Ecologist

Niagara Region Wind Project, Niagara Region and Haldimand County, Ontario (Terrestrial Ecologist)

Conducted inspection and compliance monitoring during construction to verify that exclusion fencing was functioning to exclude Blanding's Turtles and Snapping Turtles

White Pines Wind Project, Picton, Ontario (Terrestrial Ecologist)

Conducted ELC, amphibian, crepuscular bird auditory surveys for Eastern Whip-poor-will, and incidental wildlife surveys for species at risk including Blanding's Turtle. Implemented onsite contractor training pertaining to Blanding's Turtle, Eastern Meadowlark, Bobolink and Eastern Whip-poor-will

Port Dover and Nanticoke Wind Project, Port Dover, Ontario (Terrestrial Ecologist / Coordinator)

Performed environmental monitoring tasks related to migrating Tundra Swans and identification and notification of bat and bird species at risk during post-construction monitoring programs. Melissa was responsible for coordinating daily monitoring, data management and reporting of post-construction monitoring

Proposed Solar Farm, Thunder Bay, Ontario (Terrestrial Ecologist)

Conducted a preliminary natural heritage assessment and constraints analysis for a proposed solar project. Coordinated and conducted field surveys, including ELC, reptile basking surveys, an inventory of rare plants, and wildlife habitat assessments

Melancthon Ecopower Centre, Melancthon Township, Ontario (Terrestrial Ecologist)

Conducted environmental monitoring of post-construction wind turbine impacts on bird and bat mortalities

Wolfe Island Wind Plant, Wolfe Island, Ontario (Terrestrial Ecologist)

Conducted winter raptor and raptor disturbance surveys in addition to assisting with permitting reports and post-construction mortality monitoring trials

Kruger Energy Port Alma, Port Alma, Ontario (Terrestrial Ecologist / Coordinator)

Coordinated on site subcontractors conducting mortality monitoring and scavenger trials, some permit reporting

Endangered Species/Species at Risk Assessments

Species at Risk Assessments and Construction Inspections, Various Sites, Ontario (Terrestrial Ecologist / Project Coordinator)

Melissa engaged in agencies consultation and coordinated, implemented, and conducted field programs, including determination of potential presence of species at risk and associated habitats, assessment of project impacts, permitting, as well as development of mitigation plans and monitoring programs for the following projects:

- Enbridge Gas Distribution Inc. A1 Monitoring Well
- Enbridge Gas Distribution Inc. Integrity Digs
- Enbridge Gas Distribution Inc. Wilkesport Project
- Enbridge Project Nexus Interconnect Pipeline
- Grand Renewable Energy Project
- Niagara Region Wind Project
- NOVA Chemicals 2020 Expansion Project
- NOVA Chemicals Genesis Pipeline Extension Project
- NOVA Chemicals Kimball Road Pipeline Extension Project
- Port Dover and Nanticoke Wind Project
- Private Development in Schomberg
- St. Clair Pipelines Bluewater River Crossing Replacement
- TransCanada Pipelines Inc. Energy East Pipeline Project
- Union Gas Brantford to Kirkwall Pipeline
- Union Gas Dawn Compressor Station Expansion
- Union Gas Hamilton to Milton Pipeline
- Union Gas Parkway West Natural Gas Pipeline and Compressor Station
- Union Gas Sarnia Expansion
- White Pines Wind Project

Oil and Gas Pipelines

Enbridge Gas Distribution Inc. GTA Project, Greater Toronto Area, Ontario (Wildlife Lead)

Worked as part of a multidisciplinary team to coordinate the 2015 bird nest sweep program for compliance with the Migratory Bird Convention Act across three spreads during installation of a new gas pipeline within the Greater Toronto Area. This entailed tracking positive locates, establishing construction buffers based on bird species, and coordinating deployment of technical staff for follow-up checks to determine status of active vs. completed nests

* denotes projects completed with other firms

Melissa A. Straus M.Sc.

Terrestrial Ecologist

Enbridge Gas Distribution Inc. Integrity Digs at Multiple Sites, Various Sites, Ontario (Reviewer / Terrestrial Ecologist)

Species at risk reviewer of environmental compliance documents for hundreds of integrity digs across Ontario, including a suite of avian (e.g. Cerulean Warbler, Bobolink, Eastern Meadowlark, Loggerhead Shrike) and reptile species at risk (e.g. Blanding's Turtle, Butler's Gartersnake). Conducted nest searches at various sites in southern Ontario to ensure compliance under the Migratory Birds Convention Act, and participated in vegetation removal inventories

Enbridge Gas Distribution Inc. Wilkesport Project, Wilkesport, Ontario (Lead Terrestrial Ecologist)

Developed construction mitigation measures and consulted with the Ministry of Natural Resources and Forestry regarding species at risk potentially impacted during construction of the Project. Developed species at risk factsheets and delivered an onsite contractor training session pertaining to Eastern Foxsnake, Butler's Gartersnake, Blanding's Turtle, and Barn Swallow

Enbridge Project Nexus Interconnect Pipeline, Mooretown, Ontario (Terrestrial Ecologist)

Conducted species at risk surveys for various vegetation species and coverboard surveys for Butler's Gartersnake

NOVA Chemicals 2020 Expansion Project, Corunna, Ontario (Terrestrial Ecologist)

ELC, amphibian and bird surveys, botanical inventory including searching for species at risk, and coverboard surveys for Butler's Gartersnake

NOVA Chemicals Genesis Pipeline Extension Project, Corunna, Ontario (Terrestrial Ecologist / Environmental Inspector)

Conducted suite of pre-construction and environmental surveys including ELC, amphibian and bird surveys, as well as species at risk surveys for various vegetation species, grassland birds, Snapping Turtles, and coverboard surveys for Butler's Gartersnake. Served as on site environmental inspector during construction, responsible for snake exclusion fencing maintenance and encountered wildlife, including Butler's Gartersnake

NOVA Chemicals Kimball Road Pipeline Extension Project, Corunna, Ontario (Lead Terrestrial Ecologist)

Coordinated and conducted environmental surveys including vegetation, amphibian and bird surveys, including during construction inspection and compliance monitoring for Butler's Gartersnake and Snapping Turtle

St. Clair Pipelines Bluewater River Crossing Replacement, Corunna, Ontario (Terrestrial Ecologist / Environmental Inspector)

Conducted pre-construction environmental surveys including coverboard surveys for Butler's Gartersnake. Served as on site environmental inspector during construction, responsible for snake exclusion fencing and encountered wildlife, including Butler's Gartersnake and Snapping Turtle

TransCanada Pipelines Inc. Energy East Pipeline Project, Cornwall, Ontario (Terrestrial Ecologist)

Assisted with various ecological surveys, including marsh bird monitoring, species at risk crepuscular Whip-poor-will auditory surveys, amphibian surveys, ELC, and botanical inventories

Union Gas Dawn to Dover Pipeline, Chatham-Kent, Ontario (Terrestrial Ecologist)

Conducted Eastern Foxsnake habitat assessments and amphibian surveys throughout the proposed pipeline route.

Union Gas Brantford to Kirkwall Pipeline, Region of Waterloo and City of Hamilton, Ontario (Terrestrial Ecologist)

Participated in a turtle rescue program, including Snapping Turtle, during infilling of ponds during construction.

Union Gas Dawn Compressor Station Expansion, Dresden, Ontario (Lead Terrestrial Ecologist)

Coordinated and conducted portions of the extensive 2015 field program for the proposed Dawn Compressor Station Expansion Environmental Impact Study. Tasks included coordination with First Nations groups, meeting with the local conservation authority to discuss permitting, as well as consultation with the Ministry of Natural Resources and Forestry regarding wetland evaluation, and species at risk permitting for Eastern Foxsnake, a listed plant species, and bats

* denotes projects completed with other firms

Melissa A. Straus M.Sc.

Terrestrial Ecologist

Union Gas Hamilton to Milton Pipeline Project,
Regional Municipality of Hamilton Wentworth and
Halton Region, Ontario (Terrestrial Ecologist)
*Conducted bat exit surveys at selected potential maternity
roost trees*

Union Gas Parkway West Natural Gas Pipeline and
Compressor Station Project, Milton, Ontario
(Terrestrial Ecologist)
*Registration and development of a Habitat Management Plan
for Barn Swallows under the Endangered Species Act,
including executing the ongoing monitoring program*

Union Gas Sarnia Expansion, Corunna, Ontario
(Terrestrial Ecologist / Environmental Inspector)
*Conducted pre-construction environmental surveys including
bird surveys, botanical inventories including searches for
plant species at risk, as well as coverboard surveys for Butler's
Gartersnake. Served as on site environmental inspector
during construction, responsible for species at risk mitigation*

Electrical Power Distribution

Hydro One Bruce X Milton Transmission
Reinforcement, Bruce County, Ontario (Terrestrial
Ecologist)
*Located and protected active bird nests during land clearing
to ensure client compliance with the Migratory Birds
Convention Act*

Multi-Unit / Family Residential

Daniels High Park Condominiums, High Park Village
and Minto High Park, Toronto, Ontario
(Coordinator)
*Development and coordinator of a bird-building collision
monitoring program for three condominium developments
near High Park in Toronto.*

Private Development, Schomberg, Ontario
(Terrestrial Ecologist)
*Conducted surveys for Bobolink, Eastern Meadowlark, Barn
Swallow, and bat species at risk in compliance with Ministry
of Natural Resources and Forestry protocols. Registration and
creation of a Habitat Management Plan for Bobolink and
Eastern Meadowlark in compliance with the Endangered
Species Act*

5 Arthur Street Brownfield Development, Guelph,
Ontario (Project Manager)
*Project manager and lead writer of the Environmental Impact
Study and Environmental Implementation Report for the
multi-phase Metalworks brownfield development*

Kortright East Phase 4, Guelph, Ontario (Project
Manager)
*Project manager and lead writer of the Environmental
Implementation Report Addendum for Phase 4 of a previously
approved phased subdivision in the City of Guelph*

Natural Heritage Evaluations for Various Residential
Development Projects, Various Sites, Southern
Ontario (Terrestrial Ecologist)
*Terrestrial surveys included breeding bird, species at risk,
habitat assessment, ELC and wetland delineations for several
residential development projects in Kitchener-Waterloo,
Guelph, the Greater Toronto Area and London, Ontario*

148-152 MacDonnell and 150 Wellington
Condominium Developments, Guelph, Ontario
(Terrestrial Ecologist / Task Manager)
*Vegetation removal surveys and lead writer of the
Environmental Impact Study for both properties, including
attendance at Environmental Advisory Committee meetings
with the City*

Huron Village, Kitchener-Waterloo, Ontario
(Terrestrial Ecologist)
*Conducted turtle rescues during the draining of a stormwater
management pond for dredging.*

Municipal

City of Hamilton Professional and Consultant
Services Roster 2011-2012 (C12-06-10);
Garner/Rymal Road and Garth Street
Environmental Assessment, Hamilton, Ontario
(Terrestrial Ecologist)
*Served as study lead and conducted tree inventory to
document existing trees and shrubs within 10 m of the existing
municipal right-of-way; identified constraints with respect to
species at risk within the right-of-way for the proposed
expansion of Garner/Rymal Road*

* denotes projects completed with other firms

Melissa A. Straus M.Sc.

Terrestrial Ecologist

Natural Sciences & Heritage Resources

Conservation Planning*, Mississauga, Ontario
(Conservation Planning Assistant)

Created conservation plans for private landowners in the Credit Valley Watershed and inventoried vegetation using Ecological Land Classification for Southern Ontario protocol

Forestry Impacts on Regeneration Rates and Bird Communities Research*, East Lansing, Michigan
(Field Assistant)

Performed avian point counts in the upper peninsula of Michigan, estimated White-tailed Deer densities, and completed specialized vegetation surveys to assess forest regeneration rates

Forest Bird Research*, London, Ontario (Project Biologist)

Prepared a manuscript on the nesting success of cavity-nesting birds in woodlots subjected to silviculture, conducted a meta-analysis of edge effects on nesting success of songbirds, and created fact sheets for a landowner stewardship guide. Conducted salamander mark and recapture surveys, nest searching and monitoring, completed numerous vegetation surveys, located and reported avian and plant species at risk, collected and identified invertebrates to Order

Roadways

MTO Bridge Rehabilitation, Guelph, Ontario
(Terrestrial Ecologist)

Conducted ELC and habitat assessments for bird species at risk

MTO Highway 40, Chatham, Ontario (Terrestrial Ecologist)

Conducted reptile and species at risk surveys and habitat assessment

MTO Highway 24, Cambridge, Ontario (Terrestrial Ecologist)

Conducted reptile and avian species at risk surveys and habitat assessment

Aggregates & Rock

Hillsburgh Quarry, Hillsburgh, Ontario (Terrestrial Ecologist)

Conducted species at risk surveys for bats and Barn Swallows.

Proposed Acton Quarry Extension, Dufferin Aggregates, Acton, Ontario (Terrestrial Ecologist)
Conducted evening amphibian surveys in accord with Ministry of Natural Resources protocols

Proposed Melancthon Quarry, The Highland Companies, Melancthon Township, Ontario
(Terrestrial Ecologist)

Conducted habitat assessment and species at risk surveys

* denotes projects completed with other firms

Melissa A. Straus M.Sc.

Terrestrial Ecologist

PUBLICATIONS

Straus, M., N. Kopysh, and A. Taylor. *Bat Species at Risk and Implication to Infrastructure Projects in Ontario*. Canadian Society for Civil Engineering Conference Paper, 2016.

Straus, M. *Multiple paths after grad school: transition to for-profit companies*. Western University Panelist, 2016.

Straus, M.A., K. Bavrlic, E. Nol, D.M. Burke, K.A. Elliott. Reproductive success of cavity-nesting birds in partially harvested woodlots. *Canadian Journal of Forest Research*, 41: 1004-1017, 2011.

Burke, D., K. Elliott, K. Falk, and T. Pirano. (M. Straus, contributing author). *A land manager's guide to conserving habitat for forest birds in southern Ontario*. Ministry of Natural Resources and Trent University, 2011.

Straus, M. Reproductive success of cavity-nesting birds in partially harvested woodlots in southwestern Ontario. *M.Sc. Thesis, Department of Biology, Trent University, Ontario, Canada*, 2009.

Straus, M. The effects of partial harvesting on cavity-nesting bird communities in southwestern Ontario. *Society of Canadian Ornithologists (SCO-SOC) Conference Poster*, 2007.

Straus, M. Carolinian forests of southern Ontario: Species at risk and cavity-nesters. *Guelph Field Naturalists Guided Hike*, 2006.

Peterborough Field Naturalists Guest Speaker. *Impacts of partial harvesting on cavity-nesting birds in southwestern Ontario*, 2006.

Brian Miller is a Botanist and Terrestrial Ecologist whose academic background encompasses various aspects of natural resource management, with a focus on vascular plant identification and vegetation community assessment. Brian has extensive field experience conducting detailed botanical inventories of plant communities throughout southern and northern Ontario, which has provided him with an advanced knowledge of Ontario's vascular flora. Brian has gained botanical experience outside of Ontario by participating in field programs in southern Manitoba and in the prairies of Saskatchewan. For over nine years Brian has participated in numerous surveys of species at risk and other significant plant species, as well as wetland boundary delineations.

Brian is experienced in wildlife (faunal) identification and has conducted a variety of wildlife surveys including breeding bird, amphibian call and visual reptile surveys (e.g. turtle basking surveys, snake coverboard surveys). Identification of wildlife species and their associated habitats complements Brian's botanical expertise.

EDUCATION

Tech. Dipl., Sault College / Fish and Wildlife Technician (Honours), Sault Ste. Marie, Ontario, 2006

CERTIFICATIONS & TRAINING

Ontario Ministry of Natural Resources / Forest Gene Conservation Association / Butternut Health Assessor Refresher Workshop, Napanee, Ontario, 2014

Certificate, Ontario Ministry of Natural Resources / Ontario Wetland Evaluation System (OWES), North Bay, Ontario, 2013

Certified Arborist, International Society of Arboriculture, Guelph, Ontario, 2012

Toronto and Region Conservation Authority / Carex Sedge Identification Workshop, Toronto, Ontario, 2011

Field Botanists of Ontario / Spring Hawthorn Identification Workshop, Middlesex County, Ontario, 2010

Royal Botanical Gardens / Woodland Sedge Identification Workshop, Burlington, Ontario, 2009

Certificate, Ontario Ministry of Natural Resources / Butternut Health Assessor, Hamilton, Ontario, 2009

Certificate, Ontario Ministry of Natural Resources / Ecological Land Classification (ELC) System for Southern Ontario, Lindsay, Ontario, 2008

Certificate, University of Guelph / Classification and Morphology of Seed Plants, Guelph, Ontario, 2007

PROJECT EXPERIENCE

Natural Sciences & Heritage Resources

Gesner Wind Farm, Chatham-Kent, Ontario (Botanist)

Performed botanical surveys and ELC mapping of natural features within the study area

Niagara Region Wind Centre, Niagara Peninsula, Ontario (Botanist)

Performed roadside ELC assessment along transmission line route

Grand Renewable Energy Park, Haldimand County, Ontario (Botanist)

Performed numerous wetland boundary delineations and mapping

Henvey Inlet Wind Project, Parry Sound District, Ontario (Botanist)

Performed detailed botanical inventory, ELC vegetation community mapping, and assisted with breeding bird and avian migration surveys for wind farm and transmission line. Conducted incidental wildlife surveys, including species at risk surveys for Blanding's Turtle, Five-lined Skink, and Eastern Massasauga Rattlesnake

Brian M. Miller Tech. Dipl.

Botanist / Terrestrial Ecologist

Grand Valley 3 Wind Project, Dufferin County, Ontario (Botanist)

Performed roadside ELC assessment and wetland boundary delineations

Suncor Energy, Cedar Point Wind Project, Lambton County, Ontario (Botanist)

Performed detailed botanical inventory and ELC mapping

West London Dyke, London, Ontario (Botanist and Ecologist)

Performed multi-season botanical surveys and turtle basking surveys along the Thames River in downtown London, Ontario

Sifton Bog Vegetation Monitoring and Inventory: 2015, London, Ontario (Botanist)

Performed multi-season botanical inventory and vegetation plot monitoring in the Sifton Bog Natural Area

Union Gas Dawn Parkway System Expansion, Dawn H Compressor Station, Bentpath Line, Lambton County, Ontario (Botanist and Ecologist)

*Performed botanical surveys, surveys of the rare sedge *Carex lupuliformis*, as well as snake cover board surveys*

Pasqua to Swift Current Transmission Project, Saskatchewan (Botanist)

Assisted with Late Rare Plant Surveys in Saskatchewan prairies

Union Gas Hamilton to Milton Pipeline Project, Ontario (Botanist)

Performed botanical inventories in forest and swamp communities adjacent to the pipeline

Bradley Farms, Dover Township (Chatham-Kent), Ontario (Botanist and Ecologist)

Conducted botanical surveys and amphibian call surveys adjacent to the mouth of the Thames River and Lake St. Clair

TransCanada Pipelines Energy East Pipeline Project, Northern and Eastern Ontario (Botanist)

Performed numerous botanical inventories and ELC assessments along TransCanada pipeline at proposed pump stations from northwestern Ontario to eastern Ontario. Performed spring and summer botanical inventories at new build section in eastern Ontario

Union Gas Lobo Compressor Station, Ivan, Ontario (Botanist)

Performed detailed botanical inventory and ELC assessment of natural features surrounding compressor station. Performed snake cover board and breeding bird surveys in same study area

Huron Pits, Clinton, Ontario (Botanist)

Performed detailed botanical inventories of natural features within subject lands. Performed breeding bird surveys in same study area

Parkway West Union Gas Facilities Expansion, Milton, Ontario (Botanist)

Performed detailed botanical inventories of study areas

Brantford to Kirkwall Union Gas Pipeline, Ontario (Botanist)

Performed detailed botanical inventory of natural features along the pipeline

Union Gas Panhandle Replacement, Ojibway Prairie Complex, Windsor, Ontario (Botanist)

Performed detailed botanical inventory and SAR mapping along pipeline corridor

Wesdome Eagle River Gold Mine, Wawa, Ontario (Botanist)

Conducted vegetation community characterization and assessment along proposed road and pipeline

Canadian Pacific Site-specific Ecological Risk Assessment, Pointe au Baril Derailment Site, Parry Sound District, Ontario (Botanist)

Performed detailed botanical inventory and herpetofaunal SAR survey

Brian M. Miller Tech. Dipl.

Botanist / Terrestrial Ecologist

Design-Build New Interchange, Highway 401 at Wonderland Road, London, Ontario (Arborist)
Conducted detailed tree inventory of trees within the proposed works area

Detailed Design Services for Leslie Street Realignment, York Region, Ontario (Botanist)
Performed detailed botanical inventory and ELC mapping

Hydro One Inc., Proposed Clarington Transformer Station, Durham Region, Ontario (Botanist)
Performed detailed botanical inventory and ELC mapping

Cambridge Hydro North Dumfries at Speed River, North Dumfries, Ontario (Botanist)
Performed detailed botanical inventory and ELC mapping

Walker Industries Holdings, Uppers Lane Quarry, Niagara Falls, Ontario (Botanist)
*Performed fall hawthorn (*Crataegus sp.*) survey and botanical inventory*

Sharp Road Lands EIS, County of Brant, Ontario (Botanist)
Performed detailed botanical inventories of natural features within the study area

9820 Lakeshore Road EIS, Lambton Shores, Ontario (Botanist)
Performed detailed botanical inventory of natural features within the study area

Kilworth-Black Property, Komoka, Ontario (Botanist)
Performed detailed botanical inventory of study area and adjacent natural features

Courtney Subdivision, London, Ontario (Botanist)
Performed detailed botanical inventory of natural features within and adjacent to the study area

Fairway/Lackner Lands, Kitchener, Ontario (Botanist)
Performed detailed botanical inventory, ELC mapping, and wetland boundary delineation

Marigold Homes North Dorchester Servicing Study and EIS, Middlesex County, Ontario (Botanist)
Performed detailed botanical inventory and ELC mapping

Sunningdale Golf and Country Club, Hole Relocation EIS, London, Ontario (Botanist)
Performed detailed botanical inventory, ELC mapping, and SAR surveys

Endangered Species/Species at Risk Assessments
Enbridge Pipelines Inc. Lines 10 and 11, Thorold, Ontario (Botanist)
Performed Butternut Health Assessments (species at risk) within pipeline easements

Manitoba-Minnesota Transmission Project (MMTP), Southeastern Manitoba (Botanist)
Performed rare plant surveys and detailed botanical inventories along transects throughout Manitoba section of proposed transmission line

Union Gas Easements, Windsor, Ontario (Botanist)
Conducted detailed botanical inventories and mapped numerous SAR and provincially rare species in gas line easements

Shell Canada Proposed Heavy Oil Refinery Expansion Project*, Lambton County, Ontario (Botanist)
Conducted ELC surveys and GPS mapping of provincially and regionally significant species and vegetation communities

Ferromin Iron Magnetite Quarry, Ompah, Ontario (Ecologist)
Conducted a survey for the presence of Pale-bellied Frost Lichen, a provincially endangered lichen species

CBM Olszowka Property Pit Application, Township of Burford, Ontario (Botanist/Ecologist)
Performed detailed botanical inventories of natural features within the study area. Conducted snake cover board, basking Blanding's Turtle, and breeding bird surveys

* denotes projects completed with other firms

Brian M. Miller Tech. Dipl.

Botanist / Terrestrial Ecologist

Windsor Essex Parkway*, Windsor, Ontario (Botanist)
Conducted detailed botanical inventories of SAR-rich remnant prairie sites. Numerous SAR were flagged and mapped using handheld GPS

Highway 407 Extension*, Durham Region (Botanist)
Conducted regionally rare /significant plant species surveys and GPS mapping along new Highway route

CPA Subwatershed Study*, Township of Centre Wellington, Ontario (Botanist)
Conducted comprehensive biological inventories of vascular flora, vegetation communities, breeding birds, snakes and calling anurans as part of Phase 1 (Existing Conditions) of the subwatershed study. All species of regional and provincial significance were mapped

Mill Pond Park Biological Inventory*, Town of Richmond Hill, Ontario (Botanist)
Conducted detailed biological inventory of vascular flora, vegetation communities and breeding birds for proposed trail improvements. Prepared 64 page 'Ecological Land Classification (ELC) Assessment and Breeding Bird Survey of Mill Pond Park' technical report with appendices and ELC map (Aboud & Associates Inc., 2010)

Block 11 Wetland Vegetation Monitoring*, Vaughan, Ontario (Botanist)
Set-up and conducted wetland vegetation monitoring in two wetlands adjacent to a proposed subdivision

* denotes projects completed with other firms

Brian M. Miller Tech. Dipl.

Botanist / Terrestrial Ecologist

PUBLICATIONS

Miller, Brian M. A Day of Botanizing at the rare Charitable Research Reserve, Cambridge, Ontario. *Field Botanists of Ontario (FBO) Newsletter* 25 (2/3), 2013.

Miller, Brian M. Sparrow Lake Aquatics Trip Report, Muskoka. *Field Botanists of Ontario (FBO) Newsletter* 24(1), 2012.

Miller, Brian M. Five Points Forest Trip Report, Ingersoll (June 6th, 2010). *Field Botanists of Ontario (FBO) Newsletter* 23(1), 2011.

Miller, Brian M., Robert J. Aitken, Michael J. Oldham, and Anton A. Reznicek. Slender False Brome (*Brachypodium sylvaticum*, Poacea), an invasive grass new to Ontario, Canada. *Canadian Field Naturalist* 125(3): 235-240, 2011.

Anna Corrigan is a member of Stantec's terrestrial ecology team, with experience conducting field work and providing data management and analyses services for a variety of development projects. She has been involved primarily with post-construction mortality monitoring projects for renewable energy wind projects during the past three years, and has developed proficiency at running these specialized field programs. Anna is certified in Ecological Land Classification (ELC).

Anna recently completed her undergraduate degree at McMaster University with combined honours in Biology and Environmental Science. During her studies, Anna acquired field work experience working along the Amazon River and in various parts of Southern Ontario. These experiences have enhanced her abilities in species identification and the completion of wildlife surveys.

EDUCATION

B.Sc. Honours Biology and Environmental Sciences,
McMaster University, Hamilton, Ontario, 2014

CERTIFICATIONS & TRAINING

Certificate, Ontario Ministry of Natural Resources
and Forestry / Ecological Land Classification,
Kemptville, Ontario, 2015

Certificate, Canadian Red Cross / Standard First
Aid Level C, Pickering, Ontario, 2013

AWARDS

2014 McMaster University Dean's Honour List

PROJECT EXPERIENCE

Renewable Energy, Wind

K2 Wind Farm, Goderich, Ontario (Assistant Project
Coordinator/ Ecologist)

Assisted with post-construction monitoring and field work to determine mortality rates of birds and bats. Lead the Amphibian monitoring portion of the project. Managed field staff schedules, conducted data management and analyses, and reporting.

Grand Valley Wind Farm Phase I and Phase II,
Grand Valley, Ontario (Ecologist)

Conducted post-construction monitoring field work to determine mortality rates of birds and bats. Responsible for scheduling, data entry and analyses, and reporting

Gosfield Wind Energy Project, Cottam, Ontario
(Ecologist)

Conducted post-construction monitoring field work to determine mortality rates of birds and bats. Responsible for scheduling, data entry and analyses, and reporting

Comber Wind Power Project, Comber, Ontario
(Ecologist)

Responsible for scheduling, conducted post-construction monitoring field work, performed data collection, management and analyses, and reporting

Cruickshank Wind Farm, Kincardine, Ontario
(Ecologist)

Managed field staff schedules, conducted data management and analyses, and reporting

Ontario Wind Power Project LP, Kincardine, Ontario
(Ecologist)

Managed field staff schedules, conducted data management and analyses, and reporting

Port Dover and Nanticoke Wind Project, Nanticoke,
Ontario (Ecologist)

Assisting with field schedules coordination, conducted data management and analyses, and reporting.

Adelaide Wind Power Facility, Strathroy, Ontario
(Ecologist)

Assisted with post-construction monitoring and field work to determine mortality rates of birds and bats. Managed field staff schedules, conducted data management and analyses, and reporting

Anna L. Corrigan B.Sc. (Hons)

Ecologist

Renewable Energy, Solar

Pendleton Solar Energy Centre, Township of Alfred and Plantagenet, ON (Ecologist)

Author of the Natural Heritage Assessment Report.

Barlow Solar Energy Centre Project, South Stormont, Ontario (Ecologist)

Author of the Natural Heritage Assessment Report.

Oil & Gas

Dawn to Dover Pipeline, Project expanded from Dawn to Dover, Ontario (Ecologist)

Conducted Eastern Foxsnake habitat assessment surveys and bat maternity roost assessment surveys for reptile and bat species at risk, and other wildlife surveys that assessed habitat of species at risk.

Dawn Parkway System Expansion, Dawn H Compressor Station, Dresden, Ontario (Ecologist)

Conducted snake coverboard surveys and bat maternity roost assessment surveys for reptile and bat species at risk, assisted with delineation surveys, and other wildlife surveys. Wrote several technical field memos regarding amphibian, breeding bird, snake coverboard and bat surveys

Hamilton-Milton Pipeline, Hamilton and Milton, Ontario (Ecologist)

Provided in-field support for snake coverboard surveys for species at risk, amphibian call surveys, and conducted vegetation surveys

Burlington-Oakville Pipeline, Burlington and Oakville, Ontario (Ecologist)

Provided in-field support for snake coverboard surveys for species at risk and amphibian call surveys

TransCanada Energy East Pipeline Project, Ontario and Quebec (Ecologist)

Performed tracking of health and safety training for Quebec and Ontario First Nation team members, and attended weekly team meetings pertaining to Project progress. Served as standby support to conduct Traditional Ecological Knowledge studies

Enbridge Gas Distribution Inc. GTA Project, Greater Toronto Area Pipeline, Ontario (Ecologist)

Participated in 2015 and 2016 field season bird nest sweeps and delineation of setbacks during construction of the pipeline, which included work in areas of construction activity and Project-specific health and safety requirements. Supported terrestrial ecology staff resource scheduling and data management

Community Development

Ballentrae, Whitchurch-Stouffville, Ontario (Ecologist)

Lead the amphibian call surveys for the field work portion of this project.

Anna L. Corrigan B.Sc. (Hons)

Ecologist

PUBLICATIONS

Birko, N., A. Corrigan, K. Daoust, B. Kemp and E. Krutzmann. From the Ground Up - Sustainable Farming. *McMaster University. Advanced Topics in Ecology Seminar. Hamilton, Ontario, 2014.*

Ceryne is a biologist with Stantec Consulting Ltd. in Ottawa, Ontario. She provides technical experience with ecological and environmental site assessments, having worked on numerous projects at federal, provincial and municipal levels. She is a registered butternut health assessor and has experience conducting butternut health assessments, species at risk, ecological land classification and terrestrial wildlife surveys. She also has strong technical experience conducting hydrogeological assessments, and has participated in numerous Phase I, Phase II and Phase III ESAs and remediation programs. She has worked on projects in British Columbia, Alberta, Ontario, Quebec, and Nunavut.

She is familiar with both British Columbia's Biogeoclimatic Ecosystem Classification (BEC) and Ontario's Ecological Land Classification (ELC) systems, and has conducted ELC surveys, species at risk (SAR) and habitat surveys, wetland assessments, amphibian and reptile surveys, bird surveys and nest sweeps. She also has experience identifying significant wildlife habitat and applying Ontario's Significant Wildlife Habitat Technical Guide. Ceryne is well versed in other Canadian federal and provincial technical guidance and legislation such as the Species at Risk Act, Endangered Species Act and Migratory Birds Convention Act. Ceryne is also experienced with many aspects of forest management, including identifying vegetation and soils, timber volume, quality, and composition, and watercourse assessments for industry and government clients in British Columbia.

EDUCATION

Natural Resource Science Bachelor's Degree,
Thompson Rivers University, Kamloops, BC, 2011

Renewable Resource Management Diploma,
Lethbridge College, Lethbridge, AB, 2005

Environmental Assessment and Restoration
Diploma, Lethbridge College, Lethbridge, Alberta,
2005

CERTIFICATIONS & TRAINING

Petroleum Oriented Safety Training (POST) 2015
Behavior Based Safety Orientation, Ontario
Petroleum Contractors Association, Ottawa,
Ontario, 2015

Ground Disturbance for Supervisors, eCompliance
Online Training, Ottawa, Ontario, 2014

Safety and Environmental Orientation, Enbridge LP
Operations Canada, Ottawa, Ontario, 2015

Health, Safety and Environment Orientation Training
and Excavation Orientation, TransCanada Pipelines
Ltd., Ottawa, Ontario, 2014

Health and Safety Orientation Training, Suncor
Energy, Ottawa, Ontario, 2015

Hazardous Waste Operations and Emergency
Response (HAZWOPER) Operations Level Training
OSHA 1910.120, Magellan Critical Incident
Specialists, Ottawa, Ontario, 2014

Green Defensive Driving Training, Canada Safety
Council, Ottawa, Ontario, 2014

Site Assessment Training Seminar - 2010
Reclamation Criteria for Wellsites and Associated
Facilities for Cultivated Lands, Forested Lands, and
Native Grasslands, Cenovus Energy Inc., and
Alberta Environment and Sustainable Resource
Development, Medicine Hat, Alberta, 2011

Health and Safety Orientation Training, Trans-
Northern Pipelines Inc., Ottawa, Ontario, 2015

Ecological Land Classification (ELC) Training
Course, Ontario Ministry of Natural Resources and
Forestry, Kemptonville, Ontario, 2014

Ceryne Staples B.Sc.

Biologist

Butternut Health Assessment (BHA) Workshop, Ontario Ministry of Natural Resources and Forestry - and Forest Gene Conservation Association, Kemptville, Ontario, 2014

Ground Disturbance Level II Training, ABCGA 201 Standard Ground Disturbance Certified, Global Training Centre, Ottawa, Ontario, 2013

Standard First Aid CPR/AED Level C re-certification, Canadian Red Cross, Ottawa, Ontario, 2014

Reptile and Amphibian Training Workshop, Nature Conservancy Canada, with Ontario Nature, Ontario Ministry of Natural Resources and Forestry, and Queens University, Elbow Lake Environmental Education Centre - Leland, Ontario, 2013

Bird and Bat Mortality Monitoring Workshop, Ontario Ministry of Natural Resources and Forestry, Simcoe, Ontario, 2014

Ottawa Bird Count - Chirps, Tweets, and Trills: learn your local birdsongs bird identification course, Ottawa, Ontario, 2014

Transportation of Dangerous Goods, PHH ARC Environmental, Calgary, AB, 2011

WHMIS Training, PHH ARC Environmental, Calgary, AB, 2011

H2S Alive, Enform, Ottawa, ON, 2013

MEMBERSHIPS

Member, Ontario Invasive Plant Council

Member, Biologist-In Training (BIT), Alberta Society of Professional Biologists

PROJECT EXPERIENCE

Wildlife Biology

Ashcroft-Eastboro Community – Phase 2A, Phase 2B and Stormwater Ponds Environmental Impact Statement. Species at Risk Survey Navan Road, Ottawa, Ontario (Environmental Technologist)

Ceryne designed and coordinated a bat maternity colony candidate tree and exit survey program, conducting evening bat surveys and training field assistants to monitor for bat presence with bat echolocation equipment.

Wetland Determination and Delineation

City of Ottawa – Tree Inventory and Wetland Assessment, Proposed Orleans Watermain East Link, Ottawa, Ontario (Field Technologist)

Ceryne conducted an evaluation of a small marsh to be removed during site development. Her evaluation was based on Ontario Wetland Evaluation System (OWES) guidelines.

Carey Investissements Inc. Wetland Evaluation, Brigham, Quebec (Environmental Technologist)

A wetland evaluation and vegetation characterization required by the Ministère du Développement Durable, de L'Environnement et des Parcs (MDDEP) of Quebec was required prior to development of the site. Ceryne was the report author and completed a wetland delineation as per MDDEP guidelines, and characterized vegetation and soils, conducted amphibian and reptile surveys and breeding bird surveys.

Wetland Determination and Delineation, Montreal, Quebec (Environmental Technologist)

A wetland evaluation and vegetation characterization required by the Ministère du Développement Durable, de L'Environnement et des Parcs (MDDEP) of Quebec was required prior to development of the site. Ceryne was the report author and completed a wetland delineation as per MDDEP guidelines, characterized vegetation, and completed amphibian and reptile surveys and breeding bird surveys. Ceryne also completed the Ecological Constraints Analysis report for the project.

* denotes projects completed with other firms

Ceryne Staples B.Sc.

Biologist

Vegetation Assessments

Cenovus - Limited Phase II Pipeline Assessment*,
Sundrie, Alberta

Performed a Detailed Site Assessment on agricultural soils in response to landowner concerns about potential pipeline impacts on his grazing land, according to Alberta Environment and Sustainable Resource Development 2010 Reclamation Criteria for Wellsites and Associated Facilities for Cultivated Lands.

Endangered Species/Species at Risk Assessments

Riverside South Community Master Drainage Plan
Update – Natural Heritage Features, Ottawa,
Ontario (Biologist)

Conducted species at risk and wildlife habitat surveys, assessed site features for significant wildlife habitat potential, report author

Dendroïca Environnement et Faune - Habitat
Stewardship SAR Survey, Quebec (Volunteer)

Ceryne participated in Cerulean warbler and Canada warbler call/response surveys, as well as an American Ginseng seed collection and habitat protection program in the Gatineau region for Environment Canada and the Fondation de la faune du Québec. Responsibilities involved identifying species at risk and their habitat on private landowner lots.

Enbridge - Information Gathering Form and Nest
Sweeps at 10970 Highway 70, Carleton Place,
Ontario (Environmental Technologist)

Ceryne conducted a nesting survey and identified potential species at risk habitat within a proposed pipeline location prior to construction.

Public Works and Government Services Canada
Phase II Species at Risk Survey at the Carling
Campus, 3500 Carling Avenue, Ottawa, Ontario
(Environmental Technologist)

Ceryne conducted targeted species at risk surveys for short-eared owl, black tern, milksnake, and turtles.

City of Ottawa - Glencairn Stormwater
Management Pond – Natural Environment,
Ottawa, Ontario (Environmental Technologist)

Site investigations were conducted to determine potential mitigation components required during construction and operation phases of the project. Ceryne conducted targeted species at risk surveys for least bittern, bobolink, turtles, and their habitats. Ceryne conducted call-response surveys for least bitterns, and completed bobolink habitat assessments.

Ashcroft-Eastboro Community – Phase 2A, Phase 2B
and Stormwater Ponds Environmental Impact
Statement. Species at Risk Survey Navan Road,
Ottawa, Ontario (Environmental Technologist)

Ceryne completed several components of the field program including the identification of SAR and SAR habitat within the study area, targeted species at risk surveys for whip-poor-will, butternut, barn swallows, and bat maternity roosting colonies, as well as various reporting obligations.

City of Ottawa - Combined Sewage Storage
Tunnel, Ottawa, Ontario (Environmental
Technologist)

Ceryne conducted a site survey of natural heritage features and potential constraints in multiple locations across Ottawa's downtown core. Her responsibilities included inventorying existing natural environment conditions and identifying species at risk and their habitats.

City of Ottawa – Proposed Snow Dump Facility
(SDF), Carp, Ontario (Environmental Technologist)

Ceryne conducted a Blanding's turtle presence/absence survey of ponds, identified potential nesting locations nearby, and prepared a summary report of her findings.

City of Ottawa Lynda Lane Natural Environment
Inventory, Ottawa, Ontario (Environmental
Technologist)

The City of Ottawa required an assessment of natural features on Lynda Lane prior to roadway and sidewalk improvements. Ceryne conducted a field investigation for potential species at risk within the project corridor and prepared a natural environment inventory report. Ceryne also participated in a subsequent site visit to assess a butternut tree with a certified Butternut Health Assessor.

* denotes projects completed with other firms

Ceryne Staples B.Sc.

Biologist

R.W. Tomlinson Ltd. Breeding Bird Nest Survey and Turtle Nest Sweeps - Hurdman Bridge, Ottawa, Ontario (Biologist)

Ceryne conducted targeted pre-construction nest surveys for breeding birds and a species at risk survey along a section of Highway 417 right of way, as well as in-channel and stream bank sweeps for turtles and nest along the Rideau River at Hurdman Bridge.

Northern Graphite – Bissett Creek Mine – Alternate Tailings Management Facility Location, Bissett Creek, Ontario (Environmental Technologist)

Ceryne conducted reptile basking surveys and Blanding's turtle habitat assessments, incorporating the Ontario MNR's General Habitat Description for the Blanding's Turtle guidelines and ELC descriptions to identify or confirm turtle habitat within the proposed project area.

Ecological Land Classification

Ecological Land Classification and Significant Wildlife Habitat Natural Environment Site Investigation, Napanee, Ontario (Environmental Technologist)

Ceryne conducted a preliminary site survey of natural heritage features and potential constraints, particularly species at risk and Significant Wildlife Habitat (SWH). She completed a preliminary ELC assessment, identifying species at risk and their habitat, and potential significant wildlife habitat within the survey area.

Right-of-Way Surveys

Pipeline Right of Way Species at Risk Survey, Eastern Ontario (Environmental Technologist)

Ceryne identified butternut trees within a gas pipeline right of way in the Cardinal - Cornwall region of Eastern Ontario.

Wind Power

EDP Renewables South Branch Wind Farm – Post-construction Bird and Bat Monitoring, Brinston, Ontario (Field Technologist)

An Environmental Effects Monitoring Plan has been developed and a three-year post-construction monitoring program of a 30 MW wind power facility is required. Ceryne conducted bird and bat mortality monitoring, searcher efficiency and scavenger trials, throughout the field season, as well as raptor monitoring in November.

Fish and Fish Habitat Services

Surveys on Adult Sockeye Salmon*, Adams River, BC (Volunteer)

Volunteered with the Department of Fisheries and Oceans (Pacific Region) during the fall 2010 sockeye salmon run in the Adams River BC, performing mark-recapture surveys on adult sockeye salmon

Ricky Place Fish Rescue, Ottawa, Ontario (Environmental Technologist)

Fish were removed from a section of the Carp River for construction activities using electrofishing techniques. Responsibility involved identifying potential SAR and other fish species within the removal area.

Forestry Services

City of Ottawa – Tree Inventory, Francois Dupuis Recreation Centre Expansion EIS, Ottawa, Ontario (Biologist)

Part of the team to conduct field studies to support the Environmental Impact Statement (Municipal). Conducted a tree inventory survey.

City of Ottawa – Tree Inventory and Wetland Assessment, Proposed Orleans Watermain East Link, Ottawa, Ontario (Field Technologist)

Ceryne conducted an inventory of trees to be removed prior to site development. Tree condition and the presence/absence of nesting animals were evaluated.

Forest Technician*, Thompson-Okanagan Region, BC

Performed pre-harvest ecological site assessments under British Columbia's Biogeoclimatic Ecosystem Classification (BEC) system, and performed timber cruising assessments of volume, quality, species composition and value of timber resources, as well as riparian assessments, GPS data collection for industry and government clients in British Columbia.

Spill Response

Suspect Soils Screening Support for Construction Activities - Ottawa Gate Station, Ottawa, Ontario (Environmental Technologist)

Ceryne conducted field screening and soil sampling for suspect soils encountered during expansion construction activities at the Enbridge Ottawa Gate Station in Ottawa, Ontario.

* denotes projects completed with other firms

Ceryne Staples B.Sc.

Biologist

Site Characterization*, Brooks, Alberta (Environmental Technologist)

Responsible for performing an initial site evaluation of surface impacts from a ruptured pipeline. Activities included documenting the surficial extent of the spill, and logging field observations.

National Research Council of Canada Automotive and Surface Transportation Research Institute Climatic and Dynamic Test Facility Due Diligence Study - Species at Risk and Fish Habitat Study, Ottawa, Ontario (Environmental Technologist)

A due diligence study was required by the National Research Council of Canada to address potential impacts of a new test facility at the NRC's Lester Road Campus. A species at risk and fish habitat study of the project area was conducted. Ceryne's role included conducting field surveys for species at risk and potential habitat, and preparing a report identifying potential constraints and mitigation.

Initial Site Assessment*, High Level, Alberta (Environmental Technologist)

Ceryne performed an initial assessment of surface and subsurface impacts of cold weather diesel. Field activities included test pitting, small scale excavations, and soil sampling.

Phase II ESAs of several residential fuel oil spill sites for insurance companies, Ottawa and Eastern Ontario (Environmental Technologist)

Ceryne as responsible for the safety orientation and implementation of site supervisor duties, subsurface sampling, borehole drilling, groundwater monitoring well installation, groundwater sampling, reporting activities, logging field activities, and data compilation.

Enbridge Suspect Soils Screening Support for Construction Activities – 960 Saint Joseph Boulevard, Gatineau, Quebec (Environmental Technologist)

Ceryne was responsible for field screening and soil sampling for suspect soils encountered during expansion construction activities at 960 Saint Joseph Boulevard in Gatineau, Quebec.

Enbridge Line 9, Smiths Road, Glen Becker, Ontario (Environmental Technologist)

Ceryne provided an initial site evaluation of surface impacts from a ruptured pipeline. She documented the surficial extent of the spill, potential nearby pathways, and vegetation impacts, and delineated the spill extent and collected soil and water samples for laboratory analysis.

Enbridge Line 9, St. Andrews, Ontario (Environmental Technologist)

Ceryne provided an initial site evaluation of surface impacts from a ruptured pipeline. She documented the surficial extent of the spill, potential nearby pathways, and vegetation impacts, delineated the spill extent and collected soil samples for laboratory analysis.

Environmental Monitoring

Enbridge Line 9 - Integrity Digs, Multiple Sites, Ontario (Environmental Technologist)

Ceryne conducted rigorous environmental monitoring at various Enbridge construction and specialty dig sites across Eastern Ontario. Attention was paid to specific details to ensure that Enbridge was in compliance with the regulatory agencies during their remediation efforts.

Enbridge Line 9 - Pre-screening, Multiple Sites, Ontario (Environmental Technologist)

Ceryne participated in completing environmental pre-screening activities at over 400 sites within a six week time period. Ceryne's duties included performing reconnaissance visits for site-specific permitting requirements, data management, and reporting activities.

Groundwater Monitoring and Reporting

Groundwater Monitoring Programs at Numerous Petroleum Sites across Ontario for Shell, Multiple Sites, Ontario (Field Technologist)

Ceryne was responsible for the safety orientation and implementation of site supervisor duties, well monitoring using proper protocols, water sampling programs, data compilation and interpretation, and the logging field observations.

* denotes projects completed with other firms

Ceryne Staples B.Sc.

Biologist

Water Quality Sampling and Noise Monitoring*, Kamloops, BC (Environmental Technologist)

Carried out surface and ground water quality sampling, and noise monitoring for the Afton - Ajax gold and copper project in Kamloops, BC as part of a job experience mentorship.

Environmental Site Assessments Phase I, II, III
Phase II ESA Field Activities, Ottawa, Ontario
(Environmental Technologist)

Field activities included; soil and groundwater sampling, groundwater monitoring (water level monitoring, free product testing and removal), field measurements (pH, dissolved oxygen, turbidity, conductivity), soil vapour analysis, and air sampling.

Phase I and II ESA Field Activities*, Calgary, Alberta
(Environmental Technologist)

Performed upstream oil and gas Phase I and II environmental site assessments; groundwater monitoring and sampling, soil sampling, vegetation and soils assessments, report writing, surveys, and hydraulic conductivity testing.

Phase I Site Visit Field Activities*, Alberta
(Environmental Technologist)

Performed multiple remote site upstream oil and gas Phase I Site Visits across West-central Alberta; Ceryne surveyed for evidence of potential historical impacts on vegetation and soils.

Public Works and Government Services Canada
Chilkoot Trail National Historic Site, Bennett Lake
Supplementary Investigation, Parks Canada,
Bennett Lake, British Columbia (Environmental
Technologist)

An intrusive investigation of potential point-source contamination was conducted in Bennett Lake, BC. Ceryne assisted with the completion of a sampling program that included the installation of groundwater monitoring piezometers, collection of surface and groundwater samples, benthic sediment and surface soil samples, as well as background soil, water and sediment samples.

Limited Phase II Pipeline Assessment*, Sundrie,
Alberta

Performed a Detailed Site Assessment on agricultural soils in response to landowner concerns about potential pipeline impacts on his grazing land.

National Research Council (NRC) - Supplemental
Phase II Environmental Site Assessment (ESA) – NRC
National Fire Laboratory, Carleton Place, Ontario
(Environmental Technologist)

Ceryne was the field team lead for a Phase II ESA at the NRC Fire Research Laboratory. She coordinated drilling activities, and sampled soil, groundwater and surface water from adjacent surface water sources. This project assessed the presence of chemicals of potential concern in soils, groundwater, surface water and sediment at the site.

National Research Council (NRC) – Limited
Supplemental Phase II ESA to Support the HHERA
Montreal Road Campus - NRC Montreal Road,
Ottawa, Ontario (Environmental Technologist)

Ceryne was the lead field technologist for a sampling program to delineate impacts to soil, groundwater and sub-slab vapour.

Shell - Phase II Environmental Site Assessment (ESA)
for Former Shell Bulk Storage Plant, Hawkesbury,
Ontario (Field Technician)

Participated in a Phase II ESA of a former Shell Bulk Storage Plant. This project assessed the presence of chemicals of potential concern in soils, groundwater, and soil vapours beneath the site.

Public Works and Government Services Canada
Bathurst Island Phase III ESA, Bent Horn, Ile Vanier,
Stokes Range, Young Inlet and Humphries Hill,
Nunavut (2013)

An intrusive investigation of potential point-source contamination was conducted in multiple locations within the Bathurst Island area, NU. Ceryne was part of a small team conducting a sampling program that included the collection of surface and groundwater samples, surface soil samples, and background soil and water samples.

Landfill Management Groundwater Monitoring of
Former Alta Vista Landfill, Ottawa, Ontario (Field
Technician)

Coordinated drilling activities, and sampled soil and groundwater at the former Alta Vista Landfill in Ottawa, ON. The water sampling program is ongoing at the site to monitor levels of chemicals of potential concern in the groundwater.

* denotes projects completed with other firms

Ceryne Staples B.Sc.

Biologist

Lake Sediment Sampling

Public Works and Government Services Canada
Chilkoot Trail National Historic Site, Bennett Lake
Supplementary Investigation, Parks Canada.,
Bennett Lake, British Columbia (Environmental
Technologist)

Ceryne assisted with the completion of a sampling program that included the installation of groundwater monitoring piezometers, collection of surface and groundwater samples, benthic sediment and surface soil samples, as well as background soil, water and sediment samples.

Indoor Air Quality Assessment

Phase II Environmental Site Assessment (ESA) for
Former Shell Bulk Storage Plant, Hawkesbury,
Ontario (Field Technician)

Ceryne was the lead field technician for this program; coordinating sampling efforts to assess whether subsurface vapour concentrations associate with chemicals of potential concern in soil and groundwater were sufficiently high to pose a potential vapour intrusion concern.

Shell Soil Vapour Assessment of Residential Property
adjacent to Former Shell Retail Outlet, Ottawa,
Ontario (Environmental Technologist)

Ceryne participated in a Soil Vapour Assessment of a residential property adjacent to a former Shell Retail Outlet. This project assessed whether subsurface vapour concentrations associate with chemicals of potential concern in soil and groundwater were sufficiently high to pose a potential vapour intrusion concern for the buildings on-site.

National Capital Commission (NCC) 60 Mann
Avenue Sub-Slab Vapour Assessment, Ottawa,
Ontario (Environmental Technologist)

Ceryne was the lead field technician for this program; coordinating sampling efforts to assess whether subsurface vapour concentrations associate with chemicals of potential concern in soil and groundwater were sufficiently high to pose a potential vapour intrusion concern for the buildings on-site.

Defence Construction Canada (DCC)
Supplemental Phase II Environmental Site
Assessment (ESA) – DCC Trenton ATESS RF, Trenton,
Ontario (Environmental Technologist)

Ceryne was the lead field technician for this program; coordinating sampling efforts for multiple 8-hour sampling events, and a 24-hour residential sampling event. This project assessed the presence of chemicals of potential concern in soil, groundwater, surface water, and sub-slab vapour at the site. The data collected as part goal of the ESA will be used to complete a detailed quantitative risk assessment (DQRA).

Hydrogeologic Assessments

National Research Council of Canada Automotive
and Surface Transportation Research Institute
Climatic and Dynamic Test Facility Due Diligence
Study – Hydrogeologic Testing. Lester Road,
Ottawa, Ontario (Environmental Technologist)

A due diligence study was required by the National Research Council of Canada to address potential impacts of a new test facility at the NRC's Lester Road Campus. Ceryne completed pumping tests and slug tests on groundwater wells on the site.

Hydrogeological Study near Val D'Or, Quebec
(Field Technician)

Ceryne participated in a hydrogeological study to identify soil types and groundwater flow near Val D'Or, QC. Hydrogeological work included GPS mapping of the area of study, as well as soil and groundwater sampling.

City of Ottawa – Hydrogeological Assessment,
Kanata West Forcemain and Pumping Station,
Ottawa, Ontario (Field Technician)

Ceryne conducted groundwater sampling and hydrogeological recovery tests on groundwater wells along Maple Grove Road and Katimavik Road in Ottawa, ON.

Landfill Management Groundwater Monitoring of
Former Alta Vista Landfill, Ottawa, Ontario (Field
Technician)

Ceryne conducted hydrogeological recovery tests on groundwater wells at the former Alta Vista Landfill in Ottawa, ON.

* denotes projects completed with other firms

Ceryne Staples B.Sc.

Biologist

CIMA+ - Projet de mise à niveau des ouvrages d'alimentation en eau potable, Municipalité de Papineauville, Papineauville, Quebec (Field Technician)

Ceryne conducted constant rate (72 hours) direct pumping tests on an existing well that supplies the municipality in Papineauville, QC.

Municipal Class Environmental Assessment Studies

March Road Pump Station Environmental Assessment and Functional Design, Ottawa, Ontario (Biologist)

Part of the team to conduct field studies to support the Municipal Class EA (Provincial). Conducted wildlife and species at risk surveys.

Environmental Assessments

Francois Dupuis Recreation Centre Expansion EIS (Biologist)

Part of the team to conduct field studies to support the Environmental Impact Statement (Municipal). Conducted wildlife and species at risk surveys.

Josh Mansell is a Biologist, in the Environmental Services Group for Stantec Consulting Ltd. His academic background and professional experience encompasses many aspects of environmental sciences and natural resource management with a strong focus towards aquatic and terrestrial biology. Mr. Mansell is certified in Ontario's Southern Ontario Wetland Evaluation System and is knowledgeable in its field and reporting applications. He also has field experience in avian, amphibian and mammal identification through sight, sound and their associated habitats, as well as conducting extensive terrestrial and aquatic flora identification. Josh's expertise encompasses a healthy knowledge of Ontario's freshwater fish species, familiarity with the Natural Heritage Information Centre, Natural Heritage Reference Manual, Significant Wildlife Habitat Technical Guide, the Species at Risk Act, Endangered Species Act, 2007, Fisheries Act and Migratory Birds Convention Act, which aids in the analysis of natural heritage features to identify significance through Natural Heritage Assessments. Aside from completing natural heritage assessments, Josh is well versed in the roles of assessment, permitting and compliance. He is a Canadian Certified Inspector of Sediment and Erosion Control and along with his knowledge of permitting requirements and language is routinely a field-lead for many large-scale development projects (e.g. pipeline construction, urban development). Also, he has a vast experience in reporting findings for biological surveys, conducting the associated statistical analysis, preparing budgets and constructing proposals.

EDUCATION

Fish and Wildlife Management Technologist, Sir Sandford Fleming College, Lindsay, Ontario, 2007

Ecosystems Management Technician, Sir Sandford Fleming College, Lindsay, Ontario, 2006

Fish and Wildlife Management Technician, Sir Sandford Fleming College, Lindsay, Ontario, 2005

CERTIFICATIONS & TRAINING

Canadian Certified Inspector of Sediment and Erosion Control (CISEC), Ottawa, Ontario, 2016

OSAP Training Course/Electrofishing Certificate - update (Class 2), Guelph, Ontario, 2013

Rideau Valley Conservation Authority Headwaters Drainage Features Assessment Workshop, Ottawa, Ontario, 2016

DFO Ontario Freshwater Mussel Identification Workshop, Finch, Ontario, 2010

Winter GPS Mammal Tracking, Lindsay, Ontario, 2006

MNRF Bat Maternity Colony Training, Peterborough, Ontario, 2012

AED and CPR (C) Certificate of Completion, Ottawa, Ontario, 2014

MNRF Butternut Health Assessment Workshop, Certified Butternut Health Assessor, Kemptville, Ontario, 2014

Ecological Land Classification (ELC) Training Course Certificate of Completion, Kemptville, Ontario, 2014

ROM Species at Risk Fish Identification Certificate of Completion, Guelph, Ontario, 2013

Level II Certified, Ontario Freshwater Fish Identification Course, Kemptville, Ontario, 2011

Ontario Driver's License (D Glass)/Defensive Driving/Traffic Control, Toronto, Ontario, 2007

PAL and Ontario Hunter Safety Certificate, Lindsay, Ontario, 2006

ROM Fish Identification Certificate of Completion, Toronto, Ontario, 2010

* denotes projects completed with other firms

Josh Mansell Can-CISEC

Biologist

MNR NHIC Training for SAR Management, Smiths Falls, Ontario, 2011

Ontario Fur Harvesters Certificate, Lindsay, Ontario, 2005

Ice Safety/Rescue WOI Certificate (OMNR), Lindsay, Ontario, 2006

Fish Hatchery Operations Certificate, Lindsay, Ontario, 2007

Ontario Wetland Evaluation System Certificate (Southern Region), Lindsay, Ontario, 2007

MEMBERSHIPS

Voluntary Member, Bird Studies Canada

Voluntary Member, Ducks Unlimited

PROJECT EXPERIENCE

Aquatic Ecology

Stream Monitoring and Assessment Research Team Eastern Region (SMARTER)* (Fisheries Technician)

The purpose of the SMARTER group was to collaborate with Eastern Ontario stream researchers that talked about study designs, funding opportunities, evolving legislation and techniques. As a member of the Ontario Stream Assessment Protocol (OSAP) Steering Committee new information regarding the protocol was presented to the team biannually; who most of which implemented the protocol at their respective agencies.

Headwaters Drainage Feature Assessments within Rideau Valley Conservation Authorities Jurisdiction (Biologist)

Combined with Josh's knowledge of the Ontario Stream Assessment Protocol and headwaters drainage feature (HDF) assessment training, Josh completes many HDF's assessments throughout the year for our developer clients. The HDF assessments combine several aspects of aquatic ecology to deliver management recommendations to our clients.

Environmental Monitoring

Enbridge Pipelines Inc. - Integrity Digs, Multiple Sites, Ontario and Quebec (Biologist)

Josh was trained to conduct rigorous environmental monitoring at various Enbridge dig sites across Ontario and Quebec. Specific attention was paid to details that ensured Enbridge was in compliance with the regulatory agencies, such as the MOE, MNRF and conservation authorities, during their construction and remediation efforts. Aside from the duties outlined above Josh provided expertise to the construction management team and Enbridge Environment on both aquatic and terrestrial ecosystems in eastern Ontario and their potential constraints as they pertain to their integrity program.

Fisheries Management

Tundra Mine Remediation, Human Health and Ecological Risk Assessment, Tundra Mine, Northwest Territories (Biologist)

Josh was named the field lead for all the components of 2-week long program to obtain data for a Human Health and Ecological Risk Assessment. Josh was responsible for the development and subsequent species collection of the fisheries field sampling program. Experience with the biology of Arctic fish species was required as well as extensive knowledge of helicopter safety and ground operations was necessary for this project to access sampling locations.

Premier Gold Mines Ltd. - Hardrock Environmental Baseline Study, Geraldton, Ontario (Biologist)

Josh was appointed as a crew leader to conduct an intense fisheries field program to obtain baseline data to support an environmental assessment. Field activities included captaining a boat to set/fish experimental gill nets as prescribed by the MNRF, electrofishing watercourses, characterizing fisheries habitat with an emphasis on spawning and nursery habitats and obtaining water chemistry data. Bushcraft knowledge and orienteering were essential in completing this field program efficiently and safely due to the remoteness of the project area.

* denotes projects completed with other firms

National Research Council of Canada - Climatic Chamber Relocation, Ottawa, Ontario (Biologist)

A review of existing fisheries information, a fisheries habitat assessment and a fisheries community inventory was completed within the project area. The community inventory was completed with the use of minnow traps. An emphasis on the identification of federal species at risk as outlined in Species at Risk Act was required.

Fitzroy Harbour Community Centre - Slope Stabilization, Fitzroy Harbour, Ontario (Biologist)

Josh was retained by the City of Ottawa to conduct a complete fish rescue from the lower reaches of the Carp River in order to facilitate the relocation of the main channel of the Carp River. Josh coordinated with the contractor to discuss the best areas to erect barriers and conduct the fish rescue. All fish were identified, counted and relocated downstream.

Alderon Iron Ore Company - Fisheries Investigation, Sept-Iles, Quebec (Biologist)

Josh completed a fisheries investigation within freshwater watercourses on a proposed mine site to determine the extent of fish habitat as defined by DFO. Electrofishing and orienteering in remote locations were key components to the completion of his efforts.

CN Rail - Post-Construction Fisheries Monitoring, Brockville, Ontario (Biologist)

Post construction fisheries monitoring was completed on multiple watercourses from Brockville to Gananoque with an emphasis on SAR. Capture techniques and knowledge of aquatic SAR in the region was essential for the completion of this project. Safety training specific to CN Rail was completed in order to conduct field work.

Fleet Street Pump Station (FSPS) Fish Rescue, Ottawa, Ontario (Biologist)

Josh was retained by the City of Ottawa to construct and implement a strategy to complete a high profile fish rescue within the aqueducts and tailrace sections of the FSPS. American Eel were observed during dewatering efforts and Josh was responsible for coordinating with all the required agencies to address further efforts in order to not contravene the Endangered Species Act, 2007. He also assisted in the biological sampling and tagging procedures of the eel with the MNR. A thorough report was delivered to all proponents and agencies outlining all aspects of the fish rescues including recommendations as a fish rescue on this scale has not been completed before within the FSPS.

Ontario Graphite Ltd. - Fisheries Investigation, Kearney, Ontario (Terrestrial Biologist)

A simple fisheries investigation in remote locations was conducted to determine the current fisheries community within various waterbodies and watercourses in the study area. Orienteering and backpacking were large components of this project.

Slope Stabilization Project, Carp, Ontario (Terrestrial Biologist)

Josh provided a detailed description of the existing fisheries communities and habitat to the city for this project.

Windsor Park Village Environmental Inventory, Finch, Ontario (Terrestrial Biologist)

A simple fisheries investigation was conducted to determine the current fisheries community and habitat within the watercourse.

Liffey Creek, Arnprior, Ontario (Terrestrial Biologist)

Josh completed a fish rescue for the Township of Braeside-McNab in order for them to install a new culvert. Identification skills were a necessity because of identified SAR in the area.

Kemptville Commercial EIS, Kemptville, Ontario (Terrestrial Biologist)

Josh was involved with several fish and fish habitat components for this project. Identifying and describing the fisheries communities within several watercourses were a major component.

MTO Highway 7 & 35, Lindsay, Ontario (Terrestrial Biologist)

A detailed fisheries community and habitat assessment was conducted along several watercourse crossings for this project using specific MTO guidelines.

City of Ottawa Campeau Drive, Kanata, Ontario (Terrestrial Biologist)

Josh was involved with several fish and fish habitat components for this project. Identifying and describing the fisheries communities within the Carp River were a major component.

Lake Ontario Atlantic Salmon Reintroduction Program* (Hatchery Technician)

Volunteered my services to the Lake Ontario Atlantic Salmon Reintroduction Program at Fleming College's Frost Campus fish hatchery. Enough hours were accumulated to obtain a Fish Hatchery Operations Certificate. Experience with Muskellunge at the hatchery was also obtained in previous years.

South Nation Conservation* (Fisheries Technician)

As a technician I had the responsibility of initiating, coordinating and implementing a stream fisheries monitoring project watershed wide. The Ontario Stream Assessment Protocol (OSAP) was conducted on various streams in outlined subwatersheds to obtain baseline data that is used to perform multiple restoration projects, fulfill data requests and update the municipal drain database. Morphological, chemistry and biological data was gathered during each sampling event. The Near Shore Community Index Netting (NSCIN) protocol was also conducted on the larger rivers of the watershed where important fisheries data was collected that was used to create a fisheries management plan for the watershed. Various other projects that were conducted involved species at risk management; including a rare turtle study, butternut and ginseng surveys and cutlip minnow sampling.

Forestry Services

Ontario Ministry of Natural Resources*, Aylmer, Ontario (Internship)

Collaborated with Elgin/Oxford/Middlesex Counties Stewardship Councils to assist with the Ministry of Resources' Forests for Life program, where it was required to secure native seed stocks for plantings on private land. An important role was to engage landowners and interact with them daily on the Stewardship Councils roles and projects.

Stream Rehabilitation

Catfish Creek Conservation Authority*, Aylmer, Ontario (Internship)

Involved with various stewardship projects in the watershed Responsible for students of the Environmental Leadership Program

Aided with stream remediation projects to improve habitat

Tree Preservation & Assessment

Kanata North Park & Ride - Innovation Drive, Ottawa, Ontario (Biologist)

To assist the City of Ottawa with their functional design of a park and ride a natural environment inventory was completed. A component of the inventory was the completion of a tree inventory and butternut search within the project area. The tree inventory consisted of species identification, size (DBH) and height and overall health.

Lebreton Flats Diversion Chamber & Sewer, Ottawa, Ontario (Biologist)

As part of the ongoing redevelopment of the Lebreton Flats area trees are going to be removed along Old Wellington St. to facilitate the construction of a new diversion chamber and sewer. Josh was retained to complete a tree inventory within the Study Area to fulfill the requirements of a Tree Conservation Report. Along with identification of various tree species, size and health were recorded.

Rideau River Pedestrian Bridge, Ottawa, Ontario (Biologist)

The City of Ottawa has proposed to erect a pedestrian crossing bridge over the Rideau River. Josh was retained to complete a tree inventory within the Study Area to fulfill the requirements of a Tree Conservation Report. Along with identification of various tree species, size and health were recorded.

Davey Tree Expert* (Arborist/Crew Leader)

Many aspects of this position involved the identification of tree species, tree health and tree maintenance at an advanced level to comply with clients requests. Understanding the ecology of various tree species was integral to the successful completion of many of the projects.

* denotes projects completed with other firms

Wetland Restoration and Mitigation

Port of Prescott Fish Habitat - Compensation Plan*, Morrisburg, Ontario (Fisheries Technician)

Involved with the initiation, coordination and design of a coastal wetland along the St. Lawrence River for the purpose of creating fish habitat. Required to construct an extensive monitoring plan that involved aspects of terrestrial and aquatic biology for pre and post-construction monitoring. Led the process of actively searching and selecting an engineering firm to construct professional CAD drawings of the proposed wetland.

Freestone International Inc. - LNG Terminal, Saguenay, Quebec (Biologist)

Josh collaborated with Stantec's Montreal office to complete wetland evaluations throughout the project area along the Saguenay River. Using an abbreviated methodology combining several protocols wetlands were delineated and characterized through the identification of plant species and hydrological connectivity. Bushcraft knowledge and orienteering were essential in completing this field program efficiently and safely due to the remoteness of the project area.

Ontario Graphite - Bissett Creek Site, Bissett Creek, Ontario (Biologist)

Part of the environmental baseline study included the identification and classification of wetland communities within the project area. A majority of these features were identified and classified through air photo interpretation and were later confirmed through ground truthing. Through the use of OWES and ELC these features were either confirmed or adjusted to reflect the baseline conditions.

Yarmouth Natural Heritage Area Wetland Restoration*, Aylmer, Ontario (Co-op Student)

The Yarmouth Natural Heritage Area was historically a wetland that was drained for agricultural purposes and was designated to be restored to its natural function after the it was retired. Duties included the initial consultation and field visits to the site. Surveying, species identification and basin delineation were involved with the initial visits. GIS services were also provided, creating a map of the area with different polygons that outlined the distinct vegetation communities, habitat features and project area.

Wildlife Biology

Tundra Mine Remediation, Human Health and Ecological Risk Assessment, Tundra Mine, Northwest Territories (Biologist)

Josh was named the field lead for all the components of 2-week long program to obtain data for a Human Health and Ecological Risk Assessment. Josh was responsible for the identification of fauna using the assessment area. This included observations of large mammals and breeding birds. Extensive knowledge of helicopter safety and ground operations was necessary for this project to access sampling locations.

City of Ottawa, Kanata South Link, Ottawa, Ontario (Biologist)

This field sampling program encompassed multiple season surveys for the flora and fauna of Stony Swamp in the City of Ottawa. Stony Swamp is a large, naturalized complex of forests and wetlands that are home to a variety of well-established Species at Risk. As the field lead for this project, Josh completed many surveys including, but not limited to, winter mammal tracking and identification, breeding bird surveys, SAR herptile surveys and fisheries assessments.

TransCanada Pipelines Ltd. - Energy East Project - Eastern Ontario New Build Section, Ontario (Biologist)

As an identified crew leader, Josh was responsible for all activities pertaining to terrestrial wildlife surveys within a 100km section of eastern Ontario. Several of the surveys included breeding bird surveys, basking turtle and snake surveys and species at risk habitat identification. This extensive field program spanned several field seasons.

Enbridge Pipelines Inc. - Integrity Digs - Multiple Sites, Ontario and Quebec (Biologist)

Josh provided wildlife biology expertise to the integrity program in eastern Ontario with respect to the identification of SAR species and habitat. He also conducted wildlife nest sweeps for construction management and provided recommendations and guidance on the issues surrounding active nests and SAR species.

* denotes projects completed with other firms

Shell - Refinery Decommissioning, Montreal, Quebec (Biologist)

Involved with several rounds of amphibian monitoring and BBS within the Shell Refinery site and adjacent lands. Josh also conducted a vegetation community survey using a protocol outlined by the Développement durable, Environment et Parcs agency in Quebec.

Greenwood Aggregate Pit Expansion, Petawawa, Ontario (Biologist)

Josh used his avian identification skills to conduct several surveys to update an existing environmental assessment report with newly listed provincial SAR. Daytime surveys looked at grassland species and habitat, while evening surveys targeted Whip-poor-will and Common Nighthawk.

City of Ottawa - Proposed Snow Dump Facility (SDF), Carp, Ottawa, Ontario (Biologist)

An environmental impact study was required by the City of Ottawa to address the impact of a proposed SDF on the surround natural heritage features. All field work identifying these features, SAR and SAR habitat was conducted by Josh. Various species specific surveys were conducted using protocols outlined by the MNR.

Public Works and Government Services Canada - Wetland Assessment, Tremblay Road, Ottawa, Ontario (Biologist)

PWGSC contracted Josh to identify and assess wetland features on PWGSC owned property using the Federal Wetland Evaluation guide (Bond et al. 1992)

Public Works and Government Services Canada SAR - Surveys, Ottawa, Ontario (Biologist)

A variety of aquatic and terrestrial SAR species were identified as potentially occurring on several parcels of land in the Ottawa region. Josh's responsibility involved identifying and outlining SAR and SAR habitat within the parcels. Daytime and evening surveys were conducted for the purpose of this project.

City of Ottawa East Pool SAR Study, Orleans, Ontario (Terrestrial Biologist)

A Bobolink habitat survey was completed in conjunction with a dedicated Bobolink transect survey.

Windsor Park Village Environmental Inventory, Ottawa, Ontario (Terrestrial Biologist)

A complete environmental inventory of a National Capital Commission (NCC) property was conducted using the BBS protocol, MMP's amphibian monitoring protocol, Butternut transect survey and also a complete vegetation inventory was collected. Knowledge of provincially significant natural features and federally significant species was essential.

Ottawa 300 Development, Lindsay, Ontario (Terrestrial Biologist)

Josh implemented three rounds of the MMP's amphibian survey and two rounds of the BBS.

MTO Highway 7 & 35, Lindsay, Ontario (Terrestrial Biologist)

The ELC protocol was implemented using MTO's specific terrestrial assessment guidelines outlined. An emphasis was also placed on the identification of bird nests within culverts and bridges of the watercourse crossings.

Kemptville Commercial EIS, Kemptville, Ontario (Terrestrial Biologist)

Familiarity with the local municipal official plan and provincial guidelines, with respect to significant natural features, was necessary for this project. Josh was involved with the ELC and habitat characterization components for this project.

Highway 7 Service Road EA Update, Stittsville, Ontario (Terrestrial Biologist)

Several SAR surveys and protocols were implemented in this project. They include active searching for Blanding's and Spotted Turtles, Environment Canada's Least Bittern survey protocol and Butternut and Ginseng transect surveys. Reporting on the findings and describing SAR habitat was important.

David Brown Solar Project, Ingleside, Ontario (Terrestrial Biologist)

Identifying and describing watercourses, waterbodies and wetlands with respect to the Renewable Energy Act (REA) were the main focus of this project. Wetlands were identified and delineated using the OWES protocol and vegetation communities were described using the ELC protocol.

Campeau Drive, Kanata, Ontario (Terrestrial Biologist)

Two rounds of the BBS were carried out within the project area, as well as, the ELC protocol.

Ashcroft Homes East Urban Community, Orleans, Ontario (Terrestrial Biologist)

Prior to development a series of surveys were conducted to determine the presence or absence of Species at Risk (SAR). A thorough Butternut survey was conducted by walking transects through potential habitat within the project area. Recommendations were given to the client concerning Butternut and associated municipal and provincial regulations. A dedicated Bobolink transect and point count survey was also implemented using the MNR's draft Bobolink survey methodology.

Amherst Island Proposed Wind Farm, Stella, Ontario (Terrestrial Biologist)

Various avian surveys were conducted throughout the year, including: fall passerine transects, fall and winter raptor and waterfowl surveys and Short-eared Owl Surveys. ELC was also conducted in certain locations on the island.

Wolfe Island Wind Farm, Marysville, Ontario (Terrestrial Biologist)

Various avian surveys were conducted throughout the year, including: marsh monitoring protocol, winter raptor surveys, Short-eared Owl surveys and bi-weekly aerial waterfowl surveys.

Almonte Solar Project, Almonte, Ontario (Terrestrial Biologist)

Josh conducted several rounds of the Breeding Bird Survey (BBS) while implementing a protocol specifically targeting Bobolink, Eastern Meadowlark and Barn Swallow. Also, he was involved with wetland delineation and characterizing vegetation communities using the Ontario Wetland Evaluation System (OWES) and the Ecological Land Classification (ELC) protocol.

Bird Studies Canada/Toronto Region Conservation Authority* (Avian Specialist)

This project was conducted on behalf of Bird Studies Canada (BSC) and the Toronto Region Conservation Authority (TRCA) to perform BSC's Marsh Monitoring Protocol that targets specific sensitive marsh birds along Lake Ontario's large coastal wetlands. Though these sensitive species were the primary target it was equally as important to have knowledge of all avian marsh species to record incidental occurrences. Breeding bird surveys were also a component of this position.

Algonquin Park Eastern Wolf Study* (Researcher)

Provided assistance to the lead researcher and research team when conducting various duties to determine the prey preference of Algonquin Park's wolves. GPS telemetry was a major component of this study to determine where wolves captured their prey and the species of prey. Deer, Moose and Wolf ecology knowledge was important to understand in order to accomplish the scope of the study. Winter identification of forest trees and shrubs was also a necessity to complete the required vegetation survey plots to determine the amount of deer and moose browse around the specific sites.

Herptile Marsh Monitoring Tommy Thompson Park*, Toronto (Researcher)

Involved with the ongoing monitoring of Tommy Thompson Parks' Herptile population by performing the Marsh Monitoring Protocols' amphibian survey at various locations throughout the park. Extensive knowledge of Ontario's amphibian vocalizations were required to accurately complete the surveys throughout the summer.

Tommy Thompson Bird Research Station*, Toronto (Researcher)

Volunteered in a citizen science program that identified and banded migrating land birds at a provincial bird banding research station in Toronto. Avian identification and ecology knowledge was provided to perform various seasonal components including census point counts, handling of birds and banding of birds.

* denotes projects completed with other firms

Approvals, Permitting and Feasibility Studies

Carp Snow Disposal Facility, Kanata, Ontario
(Biologist)

After Josh completed all the required field studies for the Carp SDF, it was determined that an Overall Benefit Permit would be required from the MNRF under the provincial Endangered Species Act, 2007. Josh took the lead in developing all of the necessary permitting documentation, agency consultation and is currently developing the permit conditions with the MNRF.

Greenwood Aggregate Pit Expansion, Petawawa, Ontario (Biologist)

After completion of the fieldwork it was determined that the client will be required to apply for an Overall Benefit Permit due to the presence of whip-poor-will. After submission of the Information Gathering Forms, Avoidance Alternatives Form and the Overall Benefit Permit, conditions under the ESA, 2007, the MNRF has replied with further comments which are still in deliberation.

Canadian Nuclear Laboratories – Enbridge Gas
Distribution Pipeline Installation, Chalk River, Ontario
(Biologist)

Enbridge Gas Distribution was constructing a pipeline to service a newly constructed building within the CNL compound which involved a Species at Risk permit under the federal Species at Risk Act. The activity locations were known to go through SAR turtle nesting and overwintering habitat and with that came strict permit conditions. Josh was instrumental in developing a construction schedule plan with Enbridge to eliminate any potential interactions with nesting and overwintering turtles. Josh also provided SAR training to all members of the Enbridge construction team along with completing weekly compliance site visits.

CBRE Ltd. - Rideau Correctional Facility Barn
Swallow Nesting Structures, Burritts Rapids, Ontario
(Biologist)

Josh initially completed the fieldwork component of this project when he found and recorded 20 barn swallow nests on buildings designated for decommissioning. In order to move forward with the removal of the buildings and nests Josh completed Information Gathering Forms and Avoidance Alternatives as well as providing the client with specifications and locations of artificial nesting structures to comply with a letter of advice from the MNRF.

Kanata North Park & Ride, Innovation Drive,
Ottawa, Ontario (Biologist)

Butternut trees were found throughout the project area and are required to be removed to facilitate this project. Josh completed the butternut health assessment, provided the client with the conditions to move forward to submit a Notice to Impact Butternut; all of which are requirements under O.Reg 242/08 of the ESA, 2007.