Confirmation from the Ministry of Natural Resources and Forestry

Ministry of
Natural Resources
Regional Resources Section
Southern Region
300 Water Street
4th Floor, South Tower
Peterborough, ON K9J 8M5

Ministère des
Richesses naturelles

Ontario

June 26, 2017

Pendleton Energy Centre Limited Partnership
53 Jarvis Street, Suite 300
Toronto, ON
M5C 2H2

RE: NHA Confirmation for Pendleton Solar Energy Centre

Dear Kevin 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 natural heritage assessment and environmental impact study for the Pendleton Solar Energy Centre located in the Township of Alfred and Plantagenet in the United Counties of Prescott and Russell, the final version of which was submitted by Pendleton Energy Centre Limited Partnership on June 23, 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 assessment report has been prepared in accordance with procedures established by the MNRF.

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 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' *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, A/Renewable Energy Coordinator at Mike.Poskin@ontario.ca or 705-755-1362.

Sincerely,

Erin Cotnam
Land Use Planning Supervisor, Southern Region
Regional Operations Division
Ministry of Natural Resources and Forestry

cc. Dan Thompson, District Manager, MNRF Kemptville District
cc. Mike Poskin, A/Renewable Energy Coordinator, MNRF
cc. Amy Cameron, Regional Planning Ecologist, MNRF
cc. Kelly Belshaw, Regional Planner, MNRF
cc. Narren Santos, MOECC
cc. Mohsen Keyvani, MOECC

Natural Heritage Assessment and Environmental Impact Study

Pendleton Solar Energy Centre Natural Heritage Assessment and Environmental Impact Study

FINAL REPORT

Prepared for:
Pendleton Energy Centre Limited Partnership
53 Jarvis Street, Suite 300
Toronto, Ontario M5C 2H2

Prepared by:
Stantec Consulting Ltd.
Suite 1-70 Southgate Drive
Guelph, ON N1G 4P5

File No. 160960878
June 23, 2017

Sign-off Sheet

This document entitled Pendleton Solar Energy Centre Natural Heritage Assessment and Environmental Impact Study was prepared by Stantec Consulting Ltd. ("Stantec") for the account of Pendleton 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.

Prepared by Melissa Straus
(signature)

Melissa Straus, M.Sc.
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Reviewed by
(signature)

Nicole Kopysh, BES
Project Manager/ Ecologist

Stantec

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Abbreviations

ANSI	Areas of Natural and Scientific Interest
COSSARO	Committee on the Status of Species at Risk in Ontario
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	Hectares
km	Kilometre
LIO	Land Information Ontario
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
OWES	Ontario Wetland Evaluation System
PV	Photovoltaic

PCC	Point of Common Coupling
PSW	Provincially Significant Wetland
PUT	Pollutant Uptake Factor
REA	Renewable Energy Approval
SARA	Species at Risk Act
SNCA	South Nation Conservation Authority
SWH	Significant Wildlife Habitat
SWHTG	Significant Wildlife Habitat Technical Guide
SWHMiST	Significant Wildlife Habitat Mitigation Support Tool
WCEFA	Wetland Characteristics and Ecological Functions Assessment
WIF	Watershed Improvement Factor
W	Watt
ZOI	Zone of investigation

1.0 INTRODUCTION

1.1 BACKGROUND

Pendleton Energy Centre Limited Partnership (the Proponent), is proposing the development of a 12 megawatt (MW) alternating current solar energy generating facility, known as the Pendleton Solar Energy Centre (the Project) in the Township of Alfred and Plantagenet, United Counties of Prescott and Russell, Ontario. A map showing the location of the Project is provided in Figure 1 and Figure 2, Appendix A. 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 of the *Environmental Protection Act* (MOECC 2009, amended 2016).

The Proponent is proposing to develop, construct and operate the Project on approximately 53 hectares (ha; 130 acres) of land in response to the Government of Ontario's Large Renewable Procurement 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 Project 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 is located in the Township of Alfred and Plantagenet within the United Counties of Prescott and Russell. It is situated on one parcel of privately-owned land, totaling approximately 140 acres at the south-east corner of County Road 19 and County Road 2. It is approximately 5 km east of Curran, Ontario and the proposed connection point to the distribution grid will be located immediately adjacent to the property, on the west side of County Road 19.

The Project is located within Ecoregion 6E, as defined by the Ministry of Natural Resources and Forestry (MNRF, 2015).

O. Reg. 359/09 defines the Project Location 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 in engaging in or proposes to engage in the Project."

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

to this designated area. Installation activities related to the collection line at the point of common coupling on the east side of County Road 19 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, measured 50 m from the outer limits of the Project Location, but does not include the Project Location. The Project Location and ZOI are shown on Figure 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 10x10km squares for wildlife atlases).

1.3 REPORT REQUIREMENTS

This Natural Heritage Assessment (NHA) and Environmental Impact Study (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 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 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. 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)

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 (50 m surrounding the Project Location). 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. Background information from the MNRF Kemptville District Information Request Services (Information request submitted May 31, 2016. Response received June 27, 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)

Conservation Authority

- South Nation Conservation Authority (SNCA). Requested mapping showing regulated areas within the Project location and ZOI on November 7, 2016. Mapping provided November 9, 2016.

Local and Upper-Tier Municipalities / Municipal Planning Authority

- United Counties of Prescott and Russell. 2016. 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 Herpetofauna 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 is 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.

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), and the United Counties of Prescott and Russell Official Plan (2009). This review identified eight unevaluated wetlands within the ZOI. Four of the eight wetlands that were identified were present within the Project Location.

2.2.1.1 Provincially Significant Wetlands

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

2.2.1.2 Other/ Locally Significant Wetlands

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

2.2.1.3 Unevaluated Wetlands

Eight unevaluated wetlands were identified within the Project Location and/or ZOI during the Records Review, as shown on Figure 2, Appendix A (LIO, 2016). Four of these unevaluated wetlands were entirely or partially located within the Project Location, and an additional four were located exclusively within the ZOI.

A land use change by the landowner occurred in 2010 which involved vegetation clearing and the installation of tile drains across most of the current Project Location in 2014, completed for the purposes of agricultural production. The first crops occurred in 2015. These changes have not yet been reflected in the sources described above (e.g., LIO, official plans).

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 United Counties of Prescott and Russell Official Plan (2016) indicate that the Project area is located in a rural area that is predominantly agricultural, with portions of wooded areas. The United Counties of Prescott and Russell Official Plan (2016) states that 26% of the land base contained within their Official Plan consists of forest cover.

LIO mapping identifies a total of three woodlands in the Project Location and ZOI, (LIO, 2016). Within LIO's significant ecological layer, these woodlands are considered significant.

A portion of one of the woodlands is located within the Project Location. Schedule B of the United Counties of Prescott and Russell Official Plan (2016) identifies this woodland, and the two remaining woodlands located exclusively within the ZOI, and has evaluated them as significant based on the requirements set out by the NHAG.

As described above, vegetation clearing within the Project Location by the landowner for the purposes of agricultural production was completed in 2012. These changes have not yet been reflected in the sources described above (e.g., LIO, official plans).

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 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 occurrences 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, one species of bufferfly,102 species of birds, 20 species of mammals, six 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 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 been 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 within the Project Location and ZOI are provided in Table 2.1 below.

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 Project Location and ZOI	Known Recorded Information within the Project Location
Wetlands	Y	8 unevaluated wetlands	4 unevaluated wetlands
Woodlands	Y	3 wooded areas	1 wooded area
Wildlife Habitat	Y	Animal movement corridor	Animal movement corridor

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 Project Location and ZOI	Known Recorded Information within the Project Location
Areas of Natural and Scientific Interest (ANSIs): • Life Science ANSI • Earth Science ANSI	N	Not present	Not present
Specified Provincial Plan Areas	N	Not present	Not present
Provincial Parks and Conservation Reserves	N	Not present	Not present

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:

- whether the results of the record review are correct or require correction, and identifying any required corrections
- whether any additional natural features exist, other than those that were identified in the records review
- 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. Site investigations were conducted for the Project Location on July 7, 2015 and April 10, 2017.

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.

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.

During the July 7 2015 site investigation:

- land access was available for all land parcels where Project components are proposed and this area was traversed
- all areas within the ZOI were on adjacent landowner property in which the field staff could not access and Alternative Site Investigation methods were used.

During the April 10, 2017 site investigation

- land access was available for all land parcels where Project components are proposed as well as for property parcels in the ZOI to the east and south of the Project Location (except on parcel as described below) and these areas were traversed on foot
- areas of the ZOI that are found north of Country Road 2, west of Country Road 19 and on one property parcel located south of the property (in the eastern corner) were on adjacent

landowner property in which the field staff could not access and Alternative Site Investigation methods were used.

3.1.1 Alternative Site Investigation Methods

Stantec and the Proponent worked collaboratively to identify land access requirements and contact landowners 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.

During the Alternative Site Investigation, areas where access was not available were assessed from the edge of the Project's property where access was available or from locations that were publicly accessible (e.g. the municipal road allowance for those north of County Road 2 and west of County Road 19). Vegetation communities in these natural areas were identified to the lowest nested ELC community using the Ecological Land Classification(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 2015.

Vegetation communities were delineated on aerial photographs and confirmed in the field on July 7, 2015. Vascular plant species lists were recorded separately for each community. Community characterizations were based on the ELC system (Lee et al., updated in 2008). English colloquial names and scientific binominals 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 the 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 outer boundaries of wetlands were verified and delineated in the field using OWES-methods (MNRF, 2014a, version 3.3) on April 10, 2017. by a certified OWES evaluator (Appendix E). The boundary of the wetland was delineated using the 50/50 rule, where 50% of the plants are upland species and 50% of the plants are wetland species.

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 Project Location or 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 July 7, 2015 in conjunction with the ELC survey. Presence or absence of wildlife habitat features as identified within the MNRF's SWH Criteria Schedules (2015) was recorded along with a description of the attributes and location of each feature identified, as seen 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

If applicable, all candidate wildlife habitats occurring within the Project Location require an individual identification, delineation and Evaluation of Significance.

3.2 RESULTS

The Project Location is located primarily within active agriculture, with one small area of woodland and thicket within the northwestern edge. 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, treed agriculture, thicket, and swamp, as described in Sections 3.2.1-3.2.2. The ZOI, Project Location, and ELC boundaries are shown on Figure 3, Appendix A.

Field notes for site investigations are provided in Appendix D.

A list of candidate significant wildlife habitats identified during the site investigation within the Project Location and ZOI is provided in Table B1, Appendix B, and natural features and their boundaries are shown on Figure 4a and Figure 4b, 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. None of the vegetation communities identified are considered rare in the province.

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

3.2.1 Wetlands

The site investigation confirmed that the four unevaluated wetlands within the Project Location identified during the records review were no longer present as the Project Location was comprised of agricultural land use. No wetlands were located within the Project Location.

The site investigation confirmed the presence of four wetlands (we01-we04) in the ZOI that were identified during the Records Review, while the remaining four unevaluated wetlands identified in the Records Review within the ZOI were identified as upland communities and not as wetlands. These corrections are further described in Table 3.1

Wetland features were mixed swamp communities and are shown on Figure 4a and 4b, Appendix A. Descriptions of we01- we04 are provided in Table B4, Appendix B.

The presence of the wetland and associated boundaries present during the site investigation are shown on Figure 4a and 4b, Appendix A.

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

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

3.2.2 Woodlands

Based on the results of the site investigation, four woodland features were identified within the ZOI (wo1, wo2, wo3 and wo4). One woodland occurs in the Project Location (wo4extends within the Project Location), as shown on Figure 4a and 4b (Appendix A). These site investigation results corrected woodland boundaries identified in the records review. Corrections are further detailed in Table 3.1.

Table B5, Appendix B includes a description of the attributes and composition for each of the woodlands identified as occurring at the Project Location and/or ZOI during the site investigation.

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

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.

Within the ZOI no candidate SWH features that must be individually identified and delineated were identified. All candidate wildlife habitat that were identified within the ZOI (see Table B1, Appendix B) can be considered Generalized Candidate SWH in accordance with Appendix D of the NHAG (MNR, 2012).

These wildlife habitats are not required to be identified or delineated individually but are considered to be existing,. These habitats are grouped and are referred to as "Generalized Candidate SWH." The location and boundaries of Generalized Candidate SWH is shown on Figure 4a and 4b, Appendix A. The Generalized Candidate SWH features were adjacent or farther from the Project Location.

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 or provincially wetlands occur Four unevaluated wetlands identified	Confirmed the Project Location is not within any wetlands
Wetlands in the ZOI	No locally significant or provincially significant wetlands occur Eight unevaluated wetlands identified, four of which also overlap within the Project Location	Presence of four unevaluated wetland confirmed (we01, we02, we03, we04) Boundaries delineated based on site investigation
Woodlands in Project Location	One woodland	One woodland in the Project Location (wo04)
Woodlands in ZOI	Three woodlands	No additional woodlands located during the site investigation Three woodlands surrounding the Project location were confirmed (wo01, wo02, wo03) Boundaries delineated based on site investigation by Stantec
Wildlife Habitat in Project Location	Animal movement corridor identified	No candidate wildlife habitat occurred in the Project Location for amphibian movement corridors or deer movement corridors (see Table B1)
Wildlife Habitat in ZOI	Animal movement corridor identified	No candidate wildlife habitat occurred in the ZOI for amphibian movement corridors or deer movement corridors (see Table B1)

The following feature was identified within the Project Location and is carried forward to the EOS:

- Woodland (wo04)

The following features were identified within the ZOI and are carried forward to the EOS:

- Wetlands (we01, we02, we03, we04)
- Woodlands (wo01, wo02, wo03, wo04)
- Generalized Candidate SWH

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 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, 2015).

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 MNRF 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).

The four wetlands that occurred within the ZOI were assessed using the WCEFA to determine the potential impacts created by the installation of solar panels, 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). 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:

Evaluation of significance
June 23, 2017

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).

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 3.2.1.3]), described as:
  - 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).

4.1.2 Woodlands

An assessment of woodland significance was applied to each of the four woodlands identified within the Project Location and ZOI, using the guidance and criteria outlined in the NHAG (MNR, 2012). Criteria that was 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 Alfred and Plantagenet, United Counties of Prescott and Russell, Ontario, with a reported percent forest cover value of 26% (United Counties of Prescott and Russell 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 in the NHAG to assess significance of all woodlands identified within the ZOI and 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.

Woodlands that meet the minimum standard for any one of these criteria and is a minimum of 60 m wide 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.

4.2 RESULTS

4.2.1 Wetlands

The WCEFA assessment results for the four wetlands identified within the ZOI is presented in Table B6, Appendix B. These wetlands are treated as significant, as per Appendix C of the Natural Heritage Assessment Guide,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. Three of the four woodlands met the criteria for significance based on criteria standards within the NHAG (MNR, 2012), including Features: wo01, wo02, and wo03. These features are shown on Figure 5, Appendix A, summarized in Table 4.1, and included in the EIS. Feature wo04 was not significant.

4.2.3 Wildlife and Wildlife Habitat

Generalized Candidate SWH is treated as significant and an EIS is required. All Generalized Candidate SWH 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 evaluate their significance. Significant features as per results of the EOS and their closest distances to project components and Project Location are summarized in Table 4.1. No significant features occurred in the Project Location.

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

Feature ID	Feature Type	Distance to Project Component (m)	Distance to Project Location (m)	Project Component in Feature
we1	Wetland	Solar Panel Area – 15	5	None
we2	Wetland	Solar Panel Area – 17.5	5	None
we3	Wetland	Solar Panel Area – 41.7	31	None
we4	Wetland	Solar Panel Area – 36	28	None
wo1	Woodland	Solar Panel Area – 40	31	None
wo2	Woodland	Solar Panel Area – 15	5	None
wo3	Woodland	Point of Common Coupling/ Connection Line – 19	11	None
GH	Generalized Candidate Significant Wildlife Habitat	Solar Panel Area - 15	5	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.

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 the majority of project components (e.g., solar panels, substation, operation and maintenance storage, temporary laydown area, and permanent access roads) outside of natural features and within actively cultivated agricultural land. Vegetation removal is required to facilitate the installation of the temporary access, point of common coupling and associated connection line, as shown on Figure 3, Appendix A.

Despite siting the Project mostly within agricultural lands and in part of a small woodland and thicket feature, significant natural heritage features occur on the adjacent lands and within the ZOI, summarized in Table 4.1, and include:

- Significant Wetland (we01, we02, we03, we04)
- Significant Woodlands (wo01-03)
- Generalized Candidate SWH (GH)

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

The Project consists of a single parcel of land comprised of 35,000 to 60,000 solar panels and associated racking, an existing access road and proposed secondary access point for internal access roads, inverters, inverter step-up transformers, substation, operation and maintenance storage area, collector system, perimeter fencing, and temporary staging areas as described below. All project components are located within an existing agricultural field. The project components in relation to significant natural features are shown on Figure 6, Appendix A.

Construction is proposed to begin early in the spring of 2018 with tree removal followed by the bulk of construction occurring in the spring/summer/fall of 2018 (e.g., construction material delivery, as well as installation of solar panels, collector cables, inverters and inverter step-up

transformers. Temporary work space reclamation and final grading are scheduled for late 2018, with commercial operation anticipated in December 2018. Tree planting to reclaim the area used for the temporary access during construction and within the Project Location (wo4) is scheduled for spring 2019.

5.1.1 Solar Panels

The Project will include the installation of approximately 35,000 to 60,000 solar panels. The exact make and model of the solar panels will be determined at a later date, but are anticipated to be monocrystalline/polycrystalline silicon technology with 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). 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 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.

The foundations (if screwed or augered and poured) will be installed into the ground to a depth of approximately 2 m below the frost line. Alternatively, the pre-cast pads would be positioned on-grade.

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 County Road 19 to the west of the Project is anticipated to be used for permanent access to the site and may be modified as required. A temporary secondary gravel access road from County Road 19, north of the existing primary access road may be required for construction. At the end of construction, the temporary access road will be reclaimed and trees will be planted along the Project Location boundary. Gravel access roads will be constructed on-site to provide access to the facility for the duration of the Project.

5.1.3 Inverters and Inverter Step-Up Transformers

Six stations, located throughout the Project Location, each with one or more inverters will convert the DC electricity generated by the solar panels to AC electricity. One or more inverter step-up transformers co-located with each inverter will increase the voltage to 27.6 kV before delivering the power to the local distribution grid through the substation.

The specifications of the inverters and inverter step-up transformers will be determined by the Proponent during the preliminary design phase. In accordance with the specifications, the manufacturer of the inverters and inverter step-up transformers will be selected by the Proponent or the general contractor during the detailed design phase.

The station components (inverters and inverter step-up transformers) will be delivered to the Project Location by truck.

To prepare the areas hosting the stations, topsoil will be stripped, stockpiled and reused to the extent possible during site landscaping. Concrete pads approximately 600 mm in depth will support the station components. The construction would typically consist of 400 mm of engineered fill/on-site crushed materials, topped with 200 mm of crushed gravel (Granular A) and 50 mm of Styrofoam insulation.

5.1.4 Substation

A main power transformer is not being considered for this Project. The project will require a 27.6 kV substation comprised of circuit breakers, disconnect switches, grounding transformer, surge arresters, auxiliary services transformer and, revenue metering equipment. A chain link security fence will be installed around the perimeter of the substation site. All of this equipment will be built in a fenced in area except the control building that 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 of this equipment is likely to be prefabricated and transported to site. The equipment will be supported by either cast-in place slab-on-grade concrete pads or structural steel piers and the entire substation area will be graded and overlaid with a clear stone granular material. The specific make of the associated electrical equipment will be selected by the Proponent or general contractor during the detailed design phase and based on the Proponent specifications. 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

An operations and maintenance building is not currently planned for the site. Small permanent structures, such as storage containers will likely be located in an operations and maintenance storage area. The area would be comprised of compacted gravel and the container set upon a

concrete pad. The storage containers will be used to store equipment and spare parts used for maintenance activities, and spill response and containment materials.

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. Construction of the operations and maintenance storage area would utilize excavators, dump trucks and compaction equipment.

The operations and maintenance storage containers will be located within the site perimeter fencing.

5.1.6 Perimeter Fencing

The facility will be surrounded with a chain link fence topped with barbed wire to prevent unauthorized access. A gate will be installed at the main access from County Road 19 to provide access for maintenance personnel and emergency vehicle access. A secondary access will be located north of the primary access for access during construction only. Perimeter fencing would be located within the Project Location boundary.

Signage will be placed on access gates and on the fence, where appropriate, to advise the public that the facility is a solar energy centre and to provide warning of the hazards associated with unauthorized entry to the facility. The fence may affect animal movement patterns, however small mammals, amphibians and reptiles will be able to pass through the fence and cross the Project Location. A second chain link fence, located within the perimeter fence, will be constructed around the substation.

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.

5.1.7 Construction Staging & Temporary Storage Areas

The construction staging area will be an approximately 2.3 ha (5.6 acre) area (Figure 3, Appendix A) of compacted gravels, as shown and will support the following construction operations:

- 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
- 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 the 2.3 ha area will be stripped, stockpiled and reused to the extent possible for site landscaping. Gravel will be laid and compacted. Construction of the temporary staging area would utilize excavators, dump trucks and compaction equipment. Once construction is complete, the temporary staging area will be removed and restored.

5.1.8 Site Landscaping

To prevent soil erosion, provide dust control and maintain visual appeal during facility operation, the Proponent will implement a vegetation management plan related to the ground cover beneath the panels. While the species of vegetation to be established under the panels has not yet been selected, it is expected to be a native grassland species, such as clover. The Proponent intends to consult with SNCA to determine the appropriate species.

In consultation with the SNCA, more than 1,200 trees (mostly white spruce, eastern white pine, and eastern white cedar) were planted along County Road 19, south of the primary access road, and along County Road 2 in the fall of 2016, outside the Project Location (within the ZOI). Approval was received from the MOECC prior to tree planting. Additional trees will be planted in the spring of 2017 for a total of more than 1,300 trees altogether. In time, the trees will gradually lessen the visual impact of the solar panels. In addition, tree planting within the Tree Preservation Area disturbed by construction will occur at the end of construction.

5.1.9 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.

Phase Details Sequence	Estimated Schedule
1. Surveying	2016
2. Tree removal	Q1/Q2 2018
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
9. Commercial Operation	Q4 2018
10. Tree planting within Project Location boundary	Q2 2019

5.2 POTENTIAL IMPACTS OF THE PROJECT

The Project Location is located primarily within active agriculture, with one small area of woodland and thicket within the northwestern edge. 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, treed agriculture, thicket, and swamp. Significant natural features in the ZOI include wetlands, woodlands and generalized candidate significant wildlife habitat.

During the construction of the Project, there will be no infringement on significant natural features. However, there will be some limited vegetation clearing required within the southern portion of the small woodland and thicket feature that occurs at the Project Location (wo04). Feature wo04 is not a significant woodland.

Best management practices intended to minimize or mitigate potential adverse impacts on adjacent natural features not described above are detailed below. These measures will be implemented, where required and reasonable, during the construction and decommissioning of the Project.

To the extent practical, tree and/or vegetation removal will be completed prior to, or after, the core nesting season for migratory birds (April 21 to August 14; nesting zone C4, *see* Environment and Climate Change Canada, 2016a). Should clearing be required during the breeding bird season, best management practices will be implemented to reduce risks to migratory birds and their habitats. Prior to construction, surveys will be undertaken by a qualified biologist to identify

the presence/absence of nesting birds or breeding habitat. If a nest is located, a designated buffer will be marked off within which no construction activity will be allowed while the nest is active. The radius of the buffer will range depending on the species of bird:1-5 m up to 10-50 m or more for most nests of songbirds and other small birds, 10-25 m up to 50 m or more for swallow colonies, and 10-30 m up to 50 m or more for most waterfowl nests. It will also depend on the species' sensitivity and consideration of their level of tolerance to disturbance, and will be developed by a qualified biologist based on Environment and Climate Change Canada's guidance (Environment and Climate Change Canada, 2016b).

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

5.2.1 Significant Wetlands

No significant wetlands occur within the Project Location, with four (Figure 5, Appendix A) occurring within the ZOI. The wetlands ranged from 0.6- 30.5 ha in size and were comprised of mixed swamp, surrounded by mixed forest and agriculture. The solar panel areas are between 15 – 41.7 m away from the closest point of the wetland boundary. At its closest point, the Project Location is 5 m from we01 and occurs 5 m from we02, 31 m from we03 and 28 m from we04. We 03 is separated from the Project Location by County Road 2. 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.

There will be no clearing of trees in the wetland features that could result in wetland desiccation or drying. 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).

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). Installation of the solar panel racks, placement of solar panels, installation of cables and the perimeter fence may occur within 30 m of wetlands with installation of the fence being the closest construction activity in proximity to the wetlands we1, we02 and we04. The perimeter fence is to be installed within the Project Location and expected to be placed approximately 5 m from the edge of the solar panels. (i.e. approximately 10- 36m from wetlands). Installation of the fence is completed using a skid steer and auger to excavate holes for the fence posts. 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.

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. The risk of accidental intrusion and vegetation removal will be minimized through demarcation of work areas. Ongoing inspection will occur to ensure all construction works stay within the demarcated area.

Construction activites are considered short term in duration. The entire construction phase is 8-10 months and construction activities are staged (see Section 5.1.9). The exact location of construction activities 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.

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, there will be no direct loss of habitat and indirect effects will be mitigated through the measures indicated below.

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.

5.2.1.1 Mitigation measures

Avoidance is the main strategy used to minimize impacts to the wetland features within 50 m of the Project Location. All components of the Project and all construction activites are outside wetland 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 work zone where wetlands 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.
- Should there be any accidental damage to trees, or unexpected vegetation removal within wetlands, re-planting of similar, native species may be required. 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 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.

5.2.2 Significant Woodlands

No significant woodlands occur within the Project Location, with three (wo01, wo02, and wo03, Figure 5, Appendix A) occurring within the ZOI. Significant woodland features ranged in size from 88.4 ha (218.4 acres) to 1042.7 ha (2576.6 acres) and were comprised of upland deciduous and mixed forests, a plantation and swamp divided by roadways, agriculture, and residences. The description, characteristics and ecological functions of each woodland are provided in Tables B5 and B7, Appendix B.

Woodlands wo01 and wo03 are separated from the Project by Country Roads and are 31 m and 11 m (respectively) from the closest point of the Project Location. Wo01 is 40 m from solar panels and wo03 is 19 m to the Point of Common Coupling/ Connection Line. wo 2 occurs along the eastern and southern boundary of the Project; at its closest point along the eastern boundary the woodland is 28 m from the Project Location and along the southern boundary occurs 5 m from the Project Location.

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.

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. During operation there is the potential for spills and contamination to the woodland. Storage of fuel and activities with the potential to cause contamination will occur in properly protected and sealed areas outside the woodland boundaries.

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.

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.

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

5.2.2.1 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 work zone where significant 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-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 significant 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.
- In the case of dewatering, mitigation as detailed in Section 5.3.1 will be followed.
- Improper disposal of wastes (fluids, containers, cleaning materials) that could have a negative impact on the feature will be avoided. Wastes would be stored on-site for recycling, where it would be collected on a regular basis. Other waste materials such as fuels and other lubricants would be stored on site for reuse, recycling and/or disposal at an appropriate MOECC-approved off-site facility.

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 is 5 m from the Project Location at its closest point (Figure 5, Appendix A). Generalized candidate SWH with the potential to occur and treated as existing are detailed in Table B1, Appendix B.

Generalized candidate SWH occurs on the north, south, east and west sides of the project. To the north and west it is separated from the Project by County Roads and is 31 m (to the north) and 11 m (to the west) from the closest point of the Project Location. Along the eastern boundary it is 28 m at its closest point to the Project Location and along the southern boundary occurs 5 m from the Project Location. Solar panels will be 15 m- 40 m at their closest point from generalized candidate SWH. The perimeter fence will be placed within the Project Location and and expected to be placed approximately 5 m from the edge of the solar panels. (i.e. approximately 10- 35 m from generalized candidate SWH). 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.

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. 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).

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

Disturbance impacts from operation of a solar facility on resident wildlife are considered negligible.

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.

5.2.3.1 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.

5.3 BEST MANAGEMENT PRACTICES AND OTHER GENERAL CONSTRUCTION MITIGATION

5.3.1 Dewatering

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

Prior to Dewatering:

- During site preparation, silt fencing 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.
- 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.

5.4 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 significant natural features, potential impacts are restricted to indirect effects during construction and decommissioning of the Project.

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

5.5 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, and Generalized Candidate SWH.

As part of this EIS, 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 (Evaluation of Significance).

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 within the Project Location and ZOI and their associated ecological functions.

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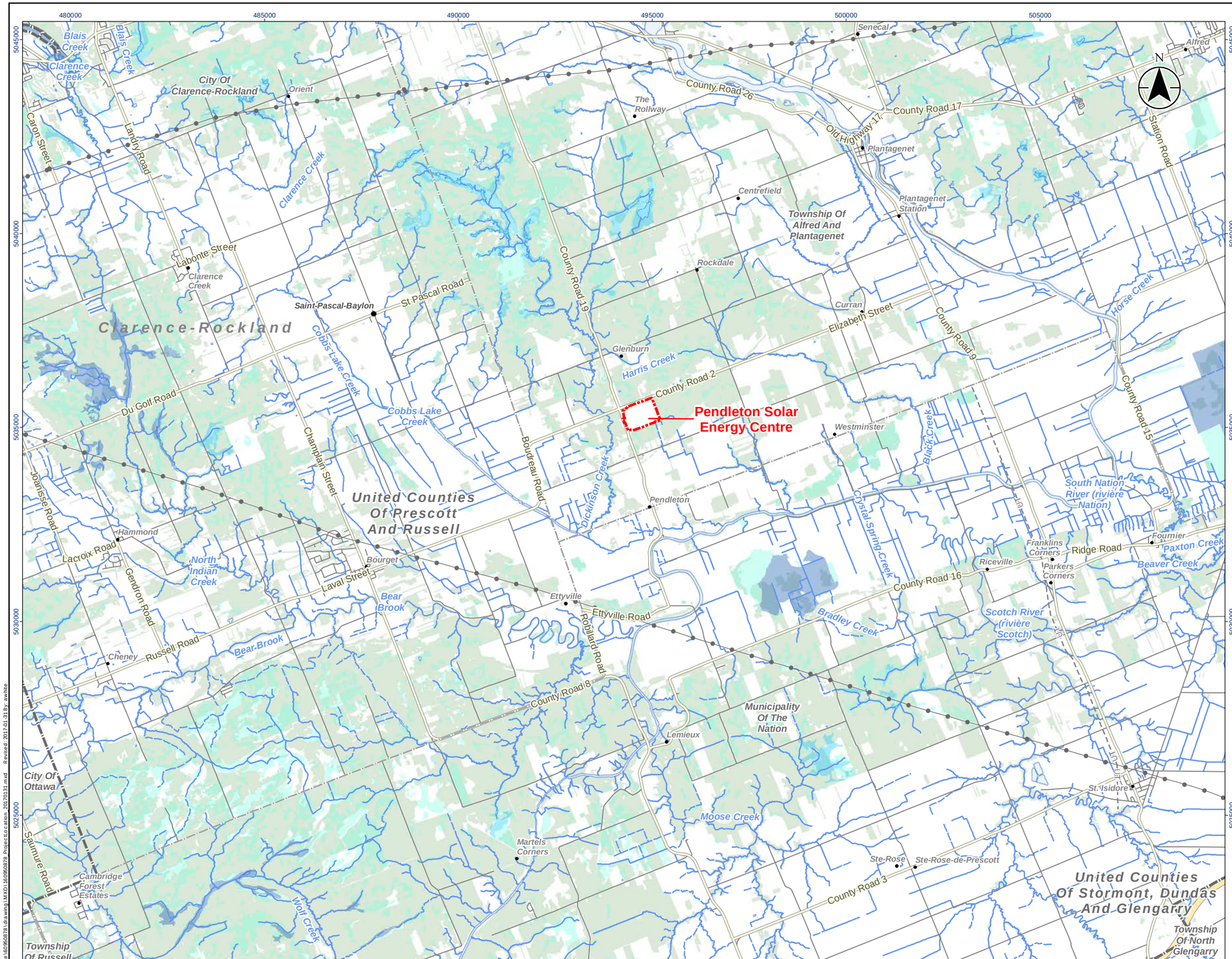
APPENDIX A: FIGURES



Stantec

PENDLETON solar energy centre

Legend

- Project Location
- Highway
- Major Road
- Hydro Line
- Unknown Transmission Line
- Watercourse (Intermittent)
- Watercourse (Permanent)
- Municipal Boundary, Upper
- Municipal Boundary, Lower
- Waterbody

0 2.5 5 Kilometres

1:100,000 (At original document size of 11x17)

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, wooded area, and wetlands 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 Natural Heritage Assessment Report and Water Assessment and Water Body Report for details.

Project Location
United Counties Of Prescott And Russell

160950878 REVC
Prepared by AW on 2017-01-31

Client/Project
PENDLETON ENERGY CENTRE LP
PENDLETON SOLAR ENERGY CENTRE

Figure No.
1

Title
Site Location

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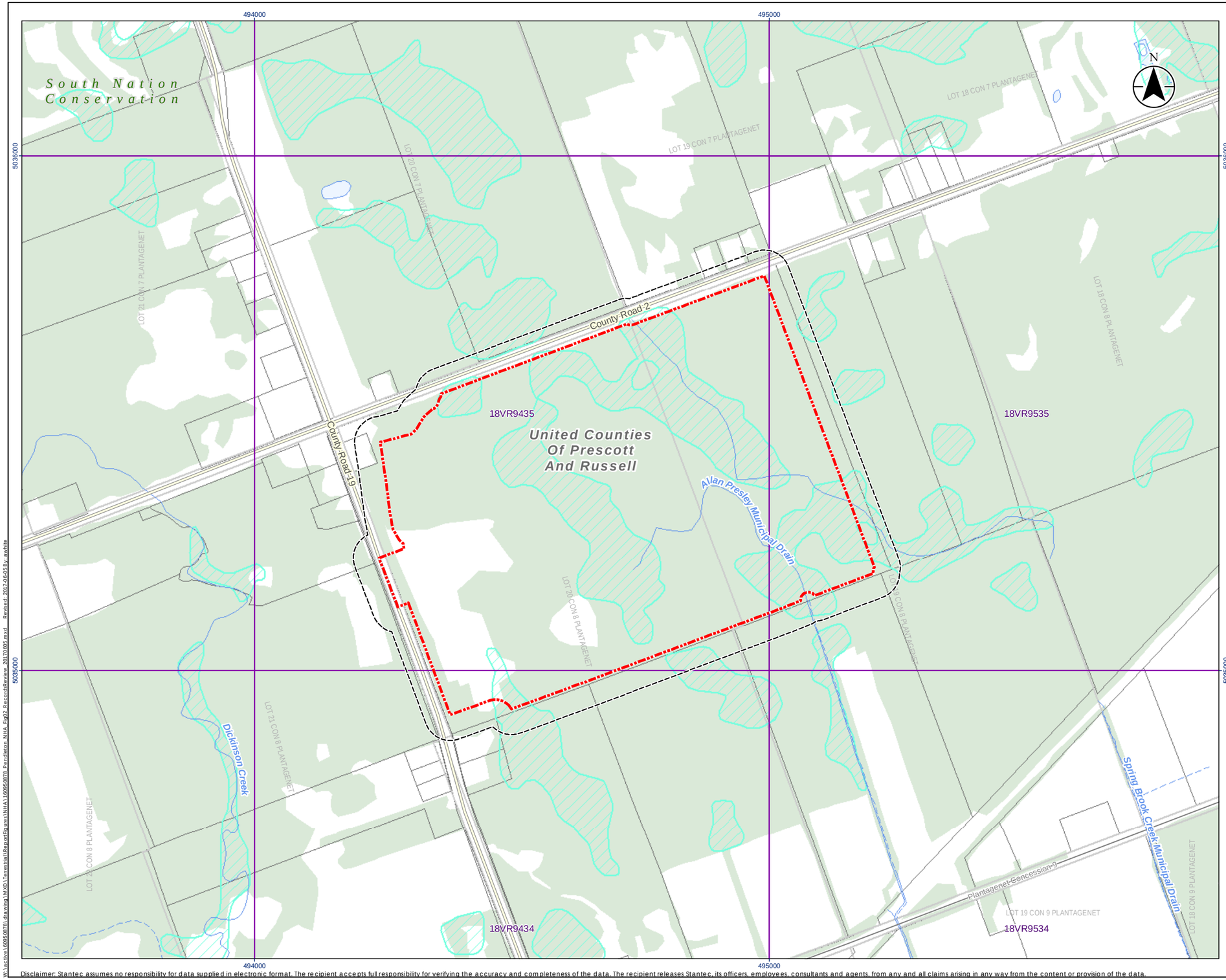


Stantec

PENDLETON solar energy centre

Legend

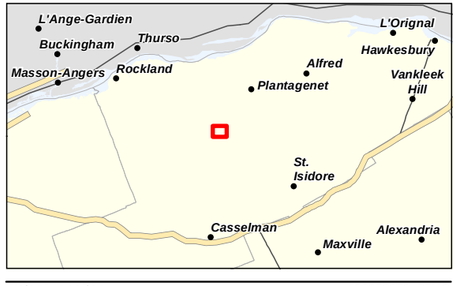
- Project Location
- Zone of Investigation (50 m from Project Location)
- Major Road
- Minor Road
- Watercourse (Intermittent, as per MNRF mapping)
- Watercourse (Permanent, as per MNRF mapping)
- Waterbody (as per MNRF mapping)
- Wetland, Not evaluated per OWES
- Wooded Area
- Lot
- Municipal Boundary, Upper
- Municipal Boundary, Lower
- Property Boundary
- 1 km UTM Grid

0 200 400 metres

1:7,500 (At original document size of 11x17)

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.



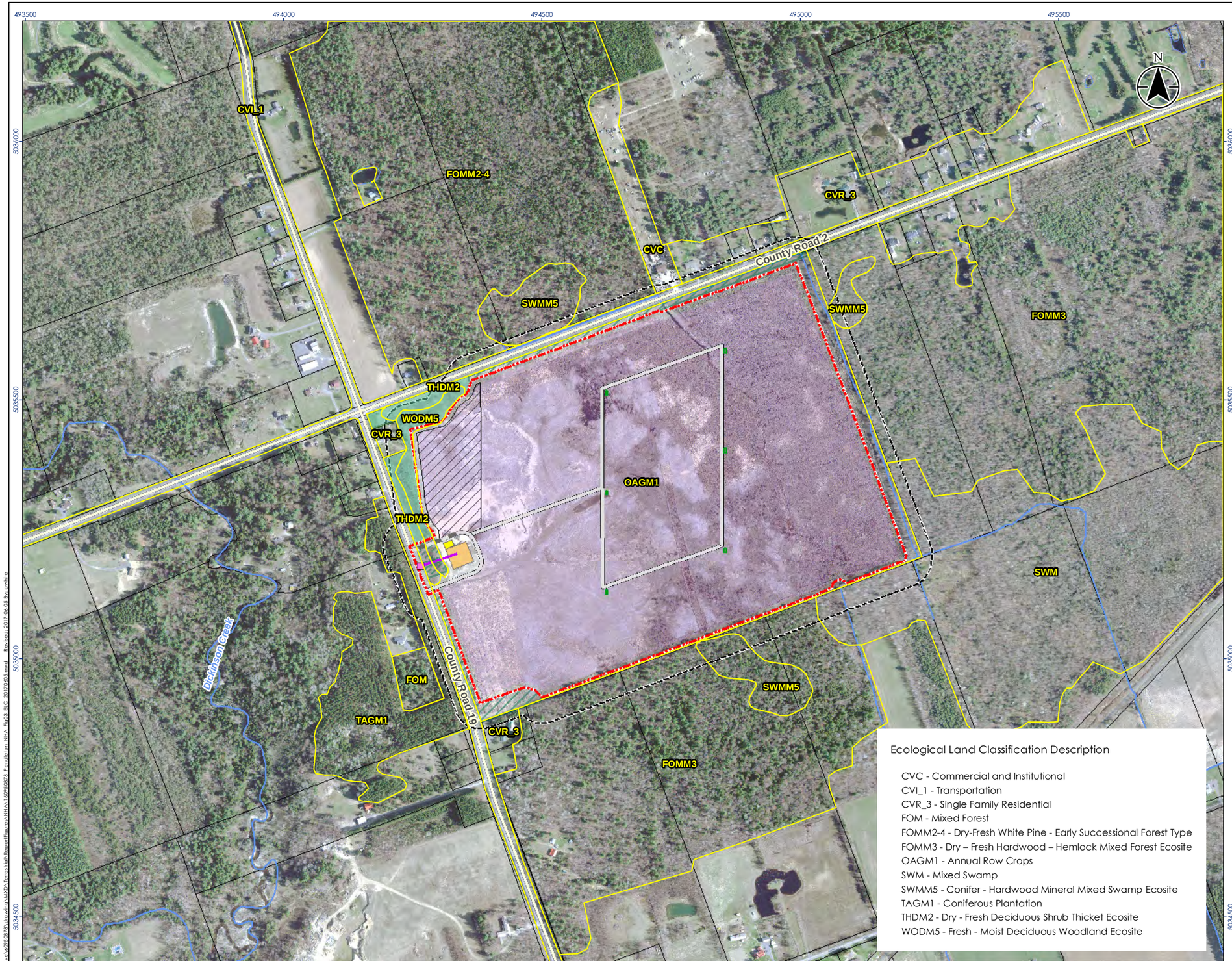
Project Location
United Counties Of Prescott And Russell

160950878 REVC
Prepared by AW on 2017-06-05
Technical Review by NK on 2016-11-30
Independent Review by NK on 2016-11-30

Client/Project
PENDLETON ENERGY CENTRE LP
PENDLETON SOLAR ENERGY CENTRE

Figure No.
2

Title
Records Review



Stantec

PENDLETON solar energy centre

Legend

- Ecological Land Classification
- Zone of Investigation (50 m from Project Location)

Proposed Project Components

- Point of Common Coupling
- Permanent Access
- Temporary Access During Construction
- Connection Line
- Inverter Step-up Transformer and Inverter
- Operations & Maintenance Storage Area
- Project Location
- Substation
- Temporary Construction Laydown and Parking Area
- Tree Preservation Area
- Tree Planting Area
- Tree Planting Area (Post-Construction)
- Solar Panel Area

Existing Features

- Major Road
- Minor Road
- Watercourse
- Property Boundary
- Waterbody

0 200 400 metres

1:7,500 (At original document size of 11x17)

Ecological Land Classification Description

CVC - Commercial and Institutional
CVI_1 - Transportation
CVR_3 - Single Family Residential
FOM - Mixed Forest
FOMM2-4 - Dry-Fresh White Pine - Early Successional Forest Type
FOMM3 - Dry – Fresh Hardwood – Hemlock Mixed Forest Ecosite
OAGM1 - Annual Row Crops
SWM - Mixed Swamp
SWMM5 - Conifer - Hardwood Mineral Mixed Swamp Ecosite
TAGM1 - Coniferous Plantation
THDM2 - Dry - Fresh Deciduous Shrub Thicket Ecosite
WODM5 - Fresh - Moist Deciduous Woodland Ecosite

Notes

1. Coordinate System: NAD 1983 UTM Zone 18N
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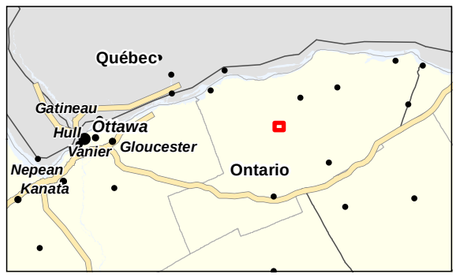
3. Imagery Source: Ontario Ministry of Natural Resources and Forestry, Digital Raster Acquisition Project East 2014 (DRAPE2014)
4. Waterbody and watercourse mapping within 120 m of the Project Location has been updated based on field studies completed as part of the REA process under O. Reg. 359/09. See the Water Assessment and Water Body Report for details.



Project Location
United Counties of Prescott and Russell

160950878 REVH
Prepared by AMW on 2017-06-05
Technical Review by NK on 2016-11-30
Independent Review by NK on 2016-11-30

Client/Project
PENDLETON ENERGY CENTRE LP
PENDLETON SOLAR ENERGY CENTRE

Figure No.
3

Title
Ecological Land Classification

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Stantec

PENDLETON solar energy centre

Legend

Natural Features

- Generalized Candidate Significant Wildlife Habitat
- Wetland
- Woodland

Proposed Project Components

- Project Location
- Zone of Investigation (50 m from Project Location)

Existing Features

- Major Road
- Minor Road
- Watercourse
- Waterbody

0 500 1,000 metres

1:25,000 (At original document size of 11x17)

Notes

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3. Imagery Source: © First Base Solutions, 2008 and Ontario Ministry of Natural Resources and Forestry. Digital Raster Acquisition Project East 2014 (DRAPE2014)
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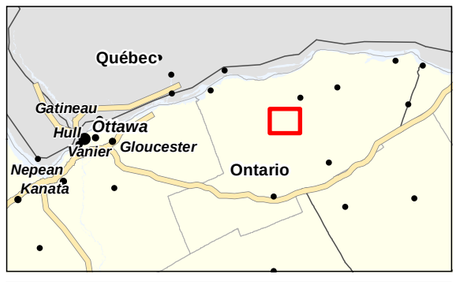

Project Location
United Counties of Prescott and Russell

160950878 REVG
Prepared by AMW on 2017-06-05
Technical Review by NK on 2016-11-30
Independent Review by NK on 2016-11-30

Client/Project
PENDLETON ENERGY CENTRE LP
PENDLETON SOLAR ENERGY CENTRE

Figure No.
4a

Title
Natural Features (Overview)

Stantec

PENDLETON solar energy centre

Legend

Natural Features

- Generalized Candidate Significant Wildlife Habitat
- Wetland
- Woodland

Proposed Project Components

- Project Location
- Zone of Investigation (50 m from Project Location)

Existing Features

- Major Road
- Minor Road
- Watercourse
- Waterbody

0 200 400 metres

1:7,500 (At original document size of 11x17)

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. Base data modified by Stantec.
3. Imagery Source: © First Base Solutions, 2008 and Ontario Ministry of Natural Resources and Forestry. Digital Raster Acquisition Project East 2014 (DRAPE2014)
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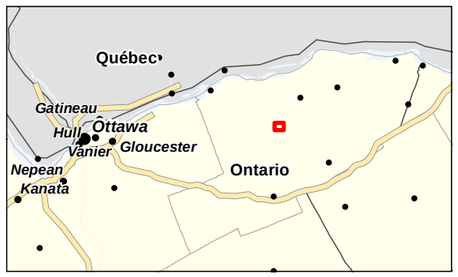


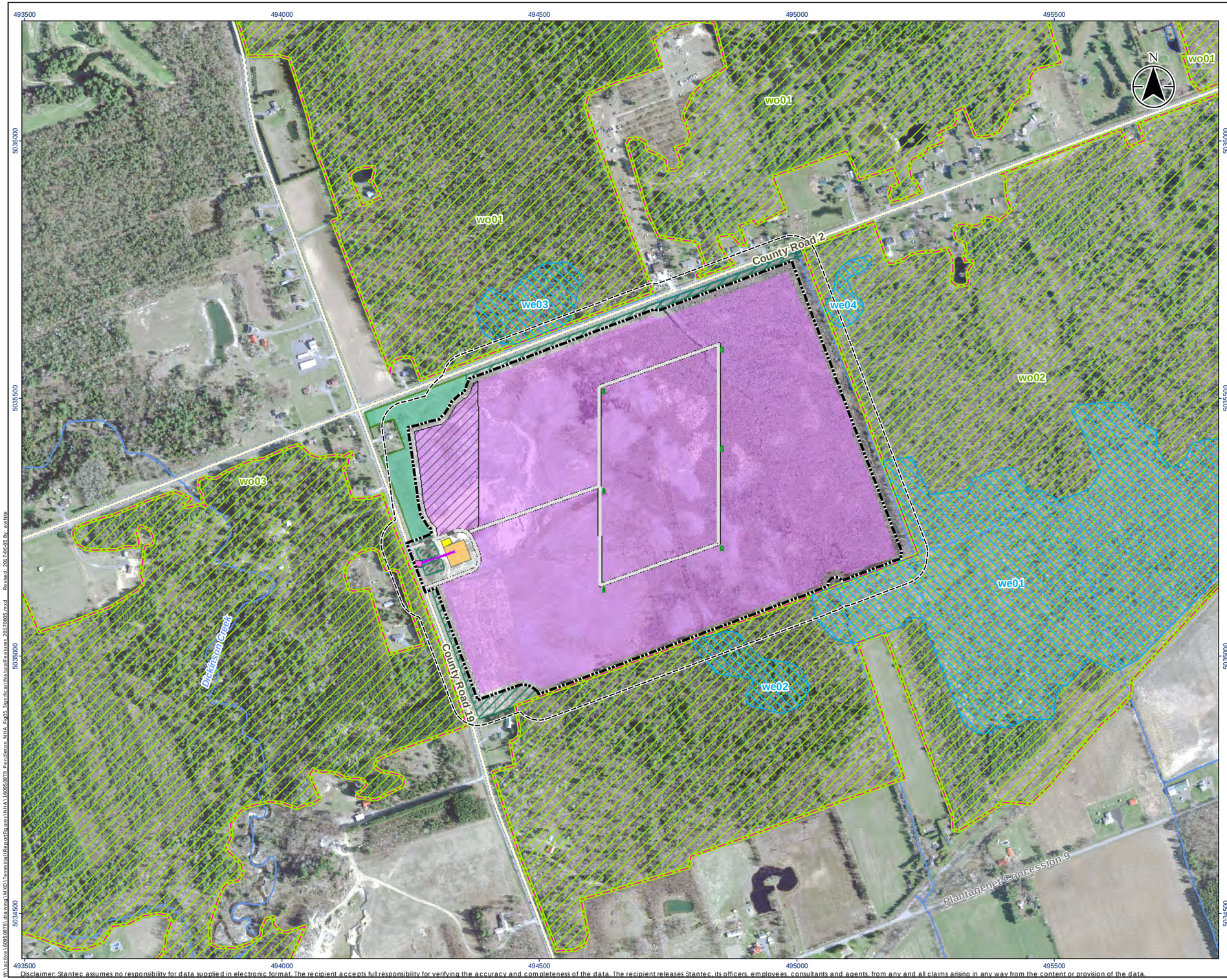
Project Location
United Counties of Prescott and Russell

160950878 REVG
Prepared by AMW on 2017-06-05
Technical Review by NK on 2016-11-30
Independent Review by NK on 2016-11-30

Client/Project
PENDLETON ENERGY CENTRE LP
PENDLETON SOLAR ENERGY CENTRE

Figure No.
4b

Title
Natural Features
Project Location



Stantec

PENDLETON solar energy centre

Legend

Natural Features

- Generalized Candidate Significant Wildlife Habitat
- Significant Wetland
- Significant Woodland

Proposed Project Component

- Project Location
- Connection Point
- Connection Line
- Inverter Step-up Transformer and Inverter
- Permanent Access
- Temporary Access During Construction
- Zone of Investigation (50 m from Project Location)
- Operations & Maintenance Storage
- Solar Panel Area
- Substation Area
- Temporary Construction Laydown and Parking Area
- Tree Preservation Area
- Tree Planting Area
- Tree Planting Area (Post-Construction)

Existing Features

- Major Road
- Minor Road
- Watercourse
- Waterbody

0 200 400 metres

1:7,500 (At original document size of 11x17)

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. Base data modified by Stantec.
3. Imagery Source: © First Base Solutions, 2008 and Ontario Ministry of Natural Resources and Forestry. Digital Raster Acquisition Project East 2014 (DRAPE2014)
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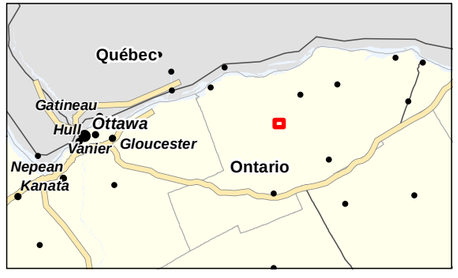

Project Location
United Counties of Prescott and Russell

160950878 REVH
Prepared by AMW on 2017-06-05
Technical Review by NK on 2016-11-30
Independent Review by NK on 2016-11-30

Client/Project
PENDLETON ENERGY CENTRE LP
PENDLETON SOLAR ENERGY CENTRE

Figure No.
5

Title
Significant Natural Features

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5035800 5035700 5035600 5035500 5035400 5035300 5035200 5035100 5035000 5034900

wo01 we03 wo01 we04 County Road 2 County Road 19 we01 wo02 we02 wo03

N

Stantec PENDLETON solar energy centre

Legend

Natural Features

- Generalized Candidate Significant Wildlife Habitat
- Significant Wetland
- Significant Woodland

Proposed Project Component

- Project Location
- Connection Point
- Connection Line
- Inverter Step-up Transformer and Inverter
- Permanent Access
- Temporary Access During Construction
- Zone of Investigation (50 m from Project Location)
- Operations & Maintenance Storage
- Solar Panel Area
- Substation Area
- Temporary Construction Laydown and Parking Area
- Tree Preservation Area
- Tree Planting Area
- Tree Planting Area (Post-Construction)

Existing Features

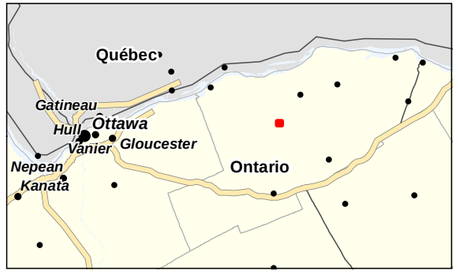
- Major Road
- Watercourse

0 100 200 metres

1:4,000 (At original document size of 11x17)

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. Base data modified by Stantec.
3. Imagery Source: © First Base Solutions, 2008 and Ontario Ministry of Natural Resources and Forestry. Digital Raster Acquisition Project East 2014 (DRAPE2014)
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
United Counties of Prescott and Russell

160950878 REVB
Prepared by AMW on 2017-06-05
Technical Review by NK on 2016-11-30
Independent Review by NK on 2016-11-30

Client/Project
PENDLETON ENERGY CENTRE LP
PENDLETON 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	Habitat Assessment
SEASONAL CONCENTRATION AREAS					
Waterfowl Stopover and Staging Area (Terrestrial)	• 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.	• The records review completed for the Project Location and Zone of investigation (ZOI) did not identify known occurrences of waterfowl stopover and staging habitat.	• ELC (Ecological Land Classification) was used to identify the presence of vegetation communities that would support waterfowl stopover and staging areas (terrestrial).	• 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.	• Habitat considered absent from the Project Location and ZOI.
Waterfowl Stopover and Staging Area (Aquatic)	• Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migration. • The following Community Types: Shallow Marsh (MAS), Shallow Aquatic (SA), Deciduous Swamp (SWD). • 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 records review completed for the Project Location and ZOI did not identify known occurrences of waterfowl concentrations in aquatic habitat.	• 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.	• No Shallow Marsh (MAS), Shallow Aquatic (SA), Deciduous Swamp (SWD) occurred at the Project Location or ZOI. • No candidate habitat for waterfowl stopover and staging (aquatic) occurred in the Project Location.	• Habitat considered absent from the Project Location and ZOI.
Shorebird Migratory Stopover Area	• 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.	• The Pendleton 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.	• 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.	• 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 occurred at the Project Location or ZOI.	• Habitat considered absent from the Project Location and ZOI.
Raptor Wintering Area	• Presence of upland 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 (CUS), Woodland (CUW)	• The records review did not identify any known raptor wintering areas at the Project Location or ZOI.	• ELC surveys were used to identify the presence of vegetation communities deciduous Forest (FOD), Mixed Forest (FOM) or Coniferous Forest (FOC), in addition to Meadow (CUM), Thicket (CUT), Savannah (CUS), Woodland (CUW) that would	• The Project Location is primarily in an actively managed agricultural field comprised of corn • A small WODM5 woodland (1.1 ha) associated with 0.5 ha ha of THDM2 thicket) occur within the project location, however the total area of these (1.6 ha) does	• Habitat considered absent from the Project Location and ZOI.

[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	Habitat Assessment
	• Sites need to be >20 ha with a combination of forest and upland • Idle/fallow or lightly grazed meadow (>15 ha) with adjacent woodlands		support Raptor Wintering Areas. GIS analysis was used to confirm habitat sizes.	not meet the >20 ha size criteria to be considered candidate significant wildlife habitat • No idle/fallow or lightly grazed meadow (>15 ha) occurs in the ZOI and no areas >20 ha with a combination of upland (CUM, CUW, CUT, CUW) and woodland (FOD, FOM, FOC) occur in the ZOI. • No candidate wildlife habitat for raptor wintering occurred at the Project Location or ZOI. •	
Bat Hibernacula	• Hibernacula may be found in caves, mine shafts, underground foundations and karsts. • May be found in these Community Types: Crevice (CCR), Cave (CCA).	• No known bat hibernacula were identified through the Records Review.	• ELC surveys and associated wildlife habitat assessments were used to identify the presence of crevices and caves.	• 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.	• Habitat considered absent from the Project Location and ZOI.
Bat Maternity Colonies	• Maternity colonies can be found in forested ecosites. • Community Types: Deciduous Forest (FOD) Mixed Forest (FOM), Deciduous Swamp (SWD), or Mixed Swamp (SWM) are ecosites which can be considered for candidate significant wildlife habitat.	• The records review did not identify any known maternity roosts within the Project Location or ZOI.	• ELC surveys were used to identify the presence of Deciduous Forest (FOD) or Mixed Forest (FOM) Deciduous Swamp (SWD), or Mixed Swamp (SWM) at the Project Location and ZOI.	• No FOD, FOM, SWD or SWM were found at the Project Location. • No candidate habitat for bat maternity roosts occurred at the Project Location. • FOM and SWM ecosite communities were present 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 in the ZOI. It is treated as existing and described as "Generalized Candidate SWH".	• Considered "Generalized Candidate SWH" in the ZOI • .
Turtle Wintering Areas	• 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.	• The records review completed for the Project Location and ZOI did not identify known occurrences of turtle wintering habitat.	• 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).	• The Project Location is sited primarily 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. • Mixed swamp was present within the ZOI. In accordance with Appendix D of the NHAG (MNRF, 2012) given the landscape and	• Considered "Generalized Candidate SWH" in the ZOI

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	Habitat Assessment
				geography (specifically the ELC assessment) this wildlife habitat type is considered to have the potential to occur in the ZOI. It is treated as existing and described as "Generalized Candidate SWH".	
Reptile Hibernacula	• 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 where the cover rock overlays granite bedrock that contains fissures.	• 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 Pendleton 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.	• 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.	• No Talus, Rock Barrens, Crevices, Caves or Alvar were identified at the Project Location or ZOI. 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 candidate habitat for reptile hibernacula occurred at the Project Location or ZOI.	• Habitat considered absent from the Project Location and ZOI.
Colonial-Nesting Bird Breeding Habitat (Bank and Cliff)	• 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.	• The records review completed for the Project Location and ZOI did not identify did not identify any known colonial bird nesting sites.	• 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.	• No eroding banks, sandy hills, borrow pits, steep slopes and sand piles with the potential to support a colony were present at the Project Location. • No candidate habitat for bank or cliff colonial nesting birds occurred at the Project Location or ZOI.	• Habitat considered absent from the Project Location and ZOI.
Colonial-Nesting Bird Breeding Habitat (Tree/Shrubs)	• Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used, in any of the following Community Types: Mixed Swamp (SWM), Deciduous Swamp (SWD), and Treed Fen (FET). • .	• The records review completed did not identify any known colonial bird nesting sites at the Project Location or ZOI.	• ELC Surveys were utilized to assess vegetation communities within the 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.	• No SWM, SWD or FET ecosites occurred at the Project Location. • SWM (mixed swamp) was present within the ZOI, however; no stick nests or colonies were recorded. • No candidate habitat for colonial nesting birds (trees/shrubs) occurred at the Project Location or ZOI. •	• Habitat considered absent from the Project Location and ZOI.
Colonial-Nesting Bird Breeding Habitat (Ground)	• 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.	• The records review completed did not identify any known colonial bird nesting sites at the Project Location or ZOI. The Project Location and ZOI are not located on a rocky island or peninsula within a lake or large river.	• N/A	• N/A	• Habitat considered absent from the Project Location and ZOI.

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	Habitat Assessment
	• 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).	• The Project is not located within the known range of Brewer's Blackbird (Cadman et al., 2007).			
Migratory Butterfly Stopover Areas	• 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.	• The Project Location and ZOI are not located within 5 km of a Great Lakes shoreline.	• N/A	• N/A	• Habitat considered absent from the Project Location and ZOI.
Landbird Migratory Stopover Areas	• 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.	• The Project Location and ZOI are not located within 5 km of the Lake Ontario shoreline.	• N/A	• N/A	• Habitat considered absent from the Project Location and ZOI.
Deer Yarding Areas	• The identification and delineation of deer yards is the responsibility of the MNRF (MNRF, 2015). • Deer yarding areas consisting of the following community types: FOM, FOC, SWM, SWC, as well as CUP2, CUP3, FOD3, and CUT. • .	• Review of the NHIC and LIO databases, and consultation with the MNRF Kemptville District did not identify any deer yarding areas within the ZOI or 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.	• N/A	• N/A	• Habitat considered absent from the Project Location and ZOI.
Deer Winter Congregation Areas	• MNRF undertakes the identification and delineation of significant deer winter congregation areas (MNRF, 2015). • Woodlots typically > 100 ha in size unless otherwise determined by the MNRF 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	• Review of the NHIC and LIO databases, and consultation with the MNRF Kemptville District did not identify any deer wintering areas within the ZOI or Project Location (MNRF, 2015; LIO, 2016; NHIC, 2015). • The Project Location and ZOI are not located in an area that would constitute candidate significant wildlife habitat for deer winter congregation areas.	• N/A	• N/A	• Habitat considered absent from the Project Location and ZOI.
RARE VEGETATION COMMUNITIES					
Cliffs and Talus Slopes	• Any ELC Ecosite within Community Series: TAO, TAS, TAT, CLO, CLS, CLT. • Most cliff and talus slopes occur along the Niagara Escarpment.	• 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 or Project Location (LIO, 2016; NHIC, 2015).	• ELC surveys were utilized to assess vegetation communities within the Project Location and ZOI that would be considered cliffs or talus slope communities.	• No cliffs or talus slope communities were identified at the Project Location or ZOI. • No candidate wildlife habitat for cliffs or talus slope communities	• Habitat considered absent from the Project Location and ZOI.

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	Habitat Assessment
				occurred at the Project Location or ZOI.	
Sand Barrens	• 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 is size.	• A search of the NHIC database and other background information did not identify any records of known sand barren communities in the ZOI or Project Location (LIO, 2016; NHIC, 2015).	• ELC surveys were utilized to assess vegetation communities within the Project Location and ZOI that would be considered sand barren communities.	• 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.	• Habitat considered absent from the Project Location and ZOI.
Alvars	• 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	• A search of the NHIC database and other background information did not identify any records of known alvar communities in the ZOI or Project Location (LIO, 2016; NHIC, 2015).	• ELC surveys were utilized to assess vegetation communities within the Project Location and ZOI that would be considered alvar communities.	• 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.	• Habitat considered absent from the Project Location and ZOI.
Old-growth Forest	• 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 at least 10 ha interior habitat (interior habitat considered with a 100 m buffer).	• A search of the NHIC database and other background information did not identify any records of known old-growth forest in the ZOI or Project Location (LIO, 2016; NHIC, 2015).	• ELC were used to assess vegetation communities within the Project Location and ZOI for the potential presence of old-growth forests.	• One woodland (WODM5) occurs within the Project Location (woo4); it is 1.1 ha and does not contain any interior habitat. No old growth forests were identified in the Project Location. • • Three woodlands occur in the ZOI (wo01, wo02 and wo03), all of which are greater than 30 ha (1042.7 ha, 224.6 ha and 88.4 ha respectively) and all of which contain greater than 10 ha of interior habitat (>100 m). Candidate wildlife habitat for old growth forests 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 in the ZOI. It is treated as existing and described as "Generalized Candidate SWH".	• Considered "Generalized Candidate SWH" in the ZOI.
Savannahs	• A Savannah is a tallgrass prairie habitat that has tree cover between 25 – 60% with no minimum size.	• A search of the NHIC database and other background information did not identify any records of known savannah communities in the ZOI or	• ELC surveys were utilized to assess vegetation communities within the Project Location and ZOI that	• No savannah communities were identified at the Project Location or ZOI.	• Habitat considered absent from the Project Location and ZOI.

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	Habitat Assessment
	• Remnant sites such a railway right of ways are not SWH. • 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).	Project Location (LIO, 2016; NHIC, 2015).	would be considered savannah communities.	• No candidate wildlife habitat for savannah communities occurred at the Project Location or ZOI.	
Tall-grass Prairies	• 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).	• A search of the NHIC database and other background information did not identify any records of known tall grass prairie communities in the ZOI or Project Locations (LIO, 2016; NHIC, 2015).	• ELC surveys were utilized to assess vegetation communities within the Project Location and ZOI that would be considered for tall grass prairie communities.	• 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.	• Habitat considered absent from the Project Location and ZOI.
Other Rare Vegetation Communities	• 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.	• A search of the NHIC database and other background information did not identify any records of known rare vegetation communities in the ZOI or Project Locations (LIO, 2016; NHIC, 2015).	• 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.	• 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.	• Habitat considered absent from the Project Location and ZOI.
SPECIALIZED HABITAT FOR WILDLIFE					
Waterfowl Nesting Area	• Any upland areas extending >120m away from a wetland (>0.5 ha), or a wetland (>0.5 ha) and any small wetlands (0.5 ha) within 120 m, or a cluster of 3 or more small (<0.5 ha) wetlands within 120 m of each individual wetland where waterfowl nesting is 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. • Note: includes adjacency to Provincially Significant Wetlands	• The records review completed for the Project Location and ZOI did not identify known occurrences of waterfowl nesting areas.	• 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.	• No MAS, SAS, SAM, SAF, MAM, SWT or SWD communities are found at the Project Location or ZOI. • No candidate wildlife habitat for waterfowl nesting areas occurred at the Project Location. •	• • Habitat considered absent from the Project Location and ZOI.

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	Habitat Assessment
Bald Eagle and Osprey nesting, Foraging, and Perching Habitat	• Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water. • ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas – rivers, lakes, ponds and wetlands	• The records review completed for the Project Location and ZOI did not identify known occurrences of Osprey or Bald Eagle nests within the Pendleton Energy Solar Centre.	• ELC surveys were utilized to assess vegetation communities within the Project Location and ZOI. •	• No FOD, FOM, FOC, SWD, SWM and SWC forest communities directly adjacent to riparian areas occurred within the Project Location or the ZOI. • No candidate wildlife habitat for Osprey or Bald Eagle habitat occurred at the Project Location or ZOI.	• Habitat considered absent from the Project Location and ZOI.
Woodland Raptor Nesting Habitat	• 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. • May be found in all forested ELC Ecosites. • May also be found in SWC, SWM, SWD and CUP3.	• The records review did not identify any known woodland raptor nesting habitat at the Project Location or ZOI.	• ELC surveys were utilized to assess vegetation communities within the Project Location and ZOI. •	• The Project Location is sited primarily in in actively managed agricultural fields. One small cultural woodland (1.1 ha) is present at the Project Location but is too small (<30 ha) to be candidate habitat for woodland raptor nesting.. • No candidate wildlife habitat for woodland raptor nesting habitat occurred at the Project Location. • Forested ELC ecosites >30 ha with >10 ha of interior habitat (measured with a 200 m buffer) occurred within the ZOI in wo01 and 02. In accordance with Appendix D of the NHAG (MNRF, 2012), these woodland features in the ZOI have been identified as “Generalized Candidate SWH”.	• Considered “Generalized Candidate SWH” in the ZOI
Turtle Nesting Areas	• 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.	• The records review did not identify any known turtle nesting habitat in the ZOI or Project Location.	• ELC surveys were utilized to assess ELC Ecosites at the Project Location and ZOI that may support turtle nesting areas.	• 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 or ZOI.	• Habitat considered absent from the Project Location and ZOI.
Seeps and Springs	• 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.	• The records review did not identify any known seeps and springs in the ZOI or Project Location.	• 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.	• No seeps or springs were identified at the Project Location or ZOI. • The Project Location is located primarily in actively managed agricultural fields with a small, cultural woodland and associated shrub thicket present that was a dry, upland feature with no watercourses within it.	• Considered “Generalized Candidate SWH” in the ZOI

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	Habitat Assessment
				• 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 in the ZOI have been identified as "Generalized Candidate SWH".	
Amphibian Breeding Habitat (Woodland)	• All Ecosites associated with these ELC Community Series; FOC, FOM, FOD, SWC, SWM, SWD. •	• The records review did not identify any known woodland amphibian breeding habitat at the Project Location.	• Natural vegetation communities with the potential to support amphibian breeding habitat (woodland) within the Project Location and ZOI were identified through ELC surveys. •	• No FOC, FOM, FOD, SWC, SWM, SWD were identified at the Project Location. • No candidate wildlife habitat for amphibian breeding habitat (woodland) occurred at the Project Location. • FOM and SWM ecosites occurred within 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 in the ZOI. It is treated as existing and described as "Generalized Candidate SWH".	• Considered "Generalized Candidate SWH" in the ZOI
Amphibian Breeding Habitat (Wetland)	• ELC Community Classes SW, MA, FE, BO, OA and SA that are isolated (>120 m) from woodland habitats. • Bullfrogs require permanent water bodies with abundant emergent vegetation.	• The records review did not identify any known wetland amphibian breeding habitat at the Project Location or ZOI. • No known bullfrog concentration areas were identified during the records review.	• ELC surveys were utilized to identify SW, MA, FE, BO, OA and SA communities within the Project Location and ZOI that are >120m from woodland habitats. •	• No SW, MA, FE, BO, OA and SA communities occurred at the Project Location • No permanent water bodies occurred in the ZOI • SWM communities were identified in the ZOI however all are within woodland habitats ; none are isolated (>120m) from woodland • No candidate wildlife habitat for amphibian breeding habitat (wetland) occurred at the Project Location or ZOI.	• Habitat considered absent from the Project Location and ZOI.
Woodland Area-Sensitive Bird Breeding Habitat	• Where interior forest birds typically breed; large mature forest (>60 years old) that are >30 ha in size. Interior habitat determined with a 200 m buffer. • All Ecosites associated with these ELC Community Series; FOC, FOM, FOD, SWC, SWM, SWD.	• The records review did not identify any known woodland area-sensitive bird breeding habitat at the Project Location or ZOI.	• ELC field surveys and GIS analysis were used to determine ELC communities and woodlots that occurred at the Project Location and ZOI that were >30 ha •	• No FOC, FOM, FOD, SWC, SWM, SWD occur at the Project Location. One small cultural woodland (1.1 ha) was present at the Project Location but is less than 30 ha and does not contain any interior habitatto be	• Considered "Generalized Candidate SWH" in the ZOI

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	Habitat Assessment
				candidate habitat for woodland area-sensitive bird breeding. • No candidate wildlife habitat for woodland area-sensitive breeding bird habitat occurred at the Project Location. • Forest and swamps occurred within the ZOI within woodlands wo1, wo2 and wo3. These three woodlands are greater than 30 ha (1042.7 ha, 224.6 ha and 88.4 ha respectively and contain interior habitat (measured 200m from edge). 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 in the ZOI. It is treated as existing and described as "Generalized Candidate SWH".	
SPECIES OF CONSERVATION CONCERN					
Marsh Bird Breeding Habitat	• 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.	• The records review did not identify any known marsh bird breeding habitat at the Project Location.	• Vegetation community classification surveys were used to identify marshes with shallow water and emergent vegetation that occurred at the Project Location and ZOI.	• No marsh, swamp or shallow aquatic communities were identified at the Project Location. • No candidate wildlife habitat for marsh bird breeding habitat occurred at the Project Location. • Swamp (SWM) communities occurred within 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 in the ZOI. It is treated as existing and described as "Generalized Candidate SWH".	• Considered "Generalized Candidate SWH" in the ZOI
Open Country Bird Breeding Habitat	• 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).	• The records review did not identify any open country bird breeding habitat at the Project Location or ZOI.	• ELC surveys were conducted to assess the presence of grassland communities at the Project Location and ZOI to support area-sensitive bird species.	• 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.	• Habitat considered absent from the Project Location and ZOI.
Shrub/Early Successional Bird Breeding Habitat	• Large field areas succeeding to shrub and thicket habitats >10 ha, not Class 1 or Class 2	• The records review did not identify any shrub/early successional bird	• ELC surveys were conducted to assess the presence of thicket and	• The Project Location is sited primarily in in actively managed	

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	Habitat Assessment
	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.	breeding habitat at the Project Location or ZOI.	savannah type communities at the Project Location and ZOI.	agricultural fields. One small thicket is present at the Project Location but is too small (<10 ha) to be candidate habitat for shrub/early successional bird breeding. • No thickets occurred in ZOI that are not already in the Project Location. • No candidate wildlife habitat for shrub/early successional breeding bird habitat occurred at the Project Location or ZOI.	• Habitat considered absent from the Project Location and ZOI.
Terrestrial Crayfish	• 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.	• The Project Location and ZOI are not located within the Canadian range of terrestrial crayfish, which is restricted to southwestern Ontario (MNRF, 2015).	• N/A	• N/A	Habitat considered absent from the Project Location and ZOI.
SPECIAL CONCERN AND RARE WILDLIFE SPECIES (I.E. ALL SPECIAL CONCERN AND S1-S3 SPECIES)					
Monarch	• Monarch is found primarily wherever milkweed and wildflowers (including goldenrods, asters and purple loosestrife) exist (COSEWIC, 2010). This includes abandoned farmland, along roadsides, and other open spaces where these plants grow (COSEWIC, 2010). • The Significant Wildlife Habitat Technical Guide (SWHTG) states that butterflies such as Monarch require grasslands for food and host plant as a general habitat requirement (MNR, 2000).	• The records review identified Monarch as being recorded historically within the regional area of the Project Location or ZOI. • The Project Location or ZOI are not located within 5 km of Lake Ontario shoreline, and are not considered candidate habitat for migratory butterfly stopover areas.	• 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.	• The Project Location is primarily active corn agriculture with a small cultural woodland and thicket feature that does not provide habitat to support Monarch. • The ZOI is mostly forest features that lack open habitats that support Monarch. • No candidate wildlife habitat for Monarch occurred at the Project Location or ZOI.	• Habitat considered absent from the Project Location and ZOI.
Snapping Turtle	• 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, 2008c).	• The records review identified Snapping Turtle as being recorded historically within the regional area of the Project Location or ZOI.		• No wetland habitats with permanent bodies of water occurred at the Project Location or ZOI. • No candidate wildlife habitat for Snapping Turtle occurred at the Project Location or ZOI.	• Habitat considered absent from the Project Location and ZOI.

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	Habitat Assessment
Canada Warbler	• The Canada Warbler is usually found in moist, mixed forests with a well-developed understorey. It may also occur in shrub marshes, red maple stands, coniferous riparian woodlands, ravines and steep brushy slopes, and regenerating forests (COSEWIC 2008a; COSSARO 2009). • The structure of a woodlot has a higher impact on the breeding success of the Canada Warbler in comparison to the woodlot's species composition (Reitsma et. al., 2009)	• The records review identified Canada Warbler as being recorded historically within the regional area of the Project Location or ZOI (Cadman et al., 2007). • Information provided by Kemptville District MNRF did not identify Canada Warbler as potentially occurring within the regional area of the Project Location and ZOI.		• The Project Location is primarily active corn agriculture with a young, small cultural woodland with a poorly developed understorey layer that does not provide habitat to support Canada Warbler. • No candidate wildlife habitat for Canada Warbler occurred at the Project Location. • 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 Canada is considered to have the potential to occur in the ZOI. Its habitat is treated as existing and described as "Generalized Candidate SWH".	• Considered "Generalized Candidate SWH" in the ZOI
Eastern Wood Pewee	• 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). • Usually associated with forest clearings or edges (McCarty, 1996).	• The records review identified Eastern Wood Pewee as being recorded historically within the regional area of the Project Location or ZOI (Cadman et al., 2007). • Information provided by Kemptville District MNRF did not identify Eastern Wood-Pewee as potentially occurring within the regional area of the Project Location and ZOI.		• The Project Location is primarily active corn agriculture with a young, successional, cultural woodland that does not provide habitat to support Eastern Wood Pewee. • No candidate wildlife habitat for Eastern Wood Pewee occurred at the Project Location. • 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 in the ZOI. Its habitat is treated as existing and described as "Generalized Candidate SWH".	• Considered "Generalized Candidate SWH" in the ZOI
Short-eared Owl	• Short-eared Owl inhabits open habitats > 20 ha(SWHMiST; MNRF, 2014) such as grasslands, wetlands, old pasture, and occasionally agricultural fields. Breeding success in agricultural habitats is low. This area sensitive species nests on the ground usually in tall vegetation (COSEWIC, 2008b; Clark, 1975).	• The records review identified Short-eared Owl as being recorded historically within the regional area of the Project Location or ZOI (Cadman et al., 2007).. • Information provided by Kemptville District MNRF did not identify short-eared Owlas potentially occurring within the regional area of the Project Location and ZOI.		• The Project Location is primarily active corn agriculture. • No open habitats (i.e. grasslands) >20 ha occurred at the Project Location or ZOI. No candidate wildlife habitat for Short-eared Owl occurred at the Project Location or ZOI.	• Habitat considered absent from the Project Location and ZOI.

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	Habitat Assessment
Wood Thrush	• The Wood Thrush inhabits deciduous woodlots, with preferred habitat including tall trees for singing perches and a thick understorey for nesting (Cadman et al, 2007). • Wood Thrush more frequently uses trees >16 m in height in well developed, larger forest stands (Evans et. al., 2011).	• The records review identified Wood Thrush as being recorded historically within the regional area of the Project Location or ZOI. • Information provided by Kemptville District MNRF did not identify Wood Thrush as potentially occurring within the regional area of the Project Location and ZOI.		• The Project Location is primarily active corn agriculture with a young, small, cultural woodland that does not provide habitat to support Wood Thrush. • No candidate wildlife habitat for Wood Thrush occurred at the Project Location. • No deciduous forest habitats occurred at the ZOI. • No candidate wildlife habitat for Wood Thrush occurred at the Project Location or ZOI.	• Habitat considered absent from the Project Location and ZOI.
ANIMAL MOVEMENT CORRIDORS					
Amphibian Movement Corridor	• Corridors may be found in all ecosites associated with water. • Determined based on identifying significant amphibian breeding habitat (wetland).	• The records review did not identify any known wetland amphibian movement corridors at the Project Location or ZOI, however an animal movement corridor was identified at the Project Location and ZOI (United Counties of Prescott and Russell Official Plan, 2016). This movement corridor was not specific to which species it was designated for and was likely associated with woodland that was identified as occurring at the Project Location through the records review that no longer exists at the Project Location. • During the site investigation, the Project locations was confirmed to be agricultural fields consisting of corn. The animal movement corridor was not present.	• Identified after Amphibian Breeding Habitat - Wetland is confirmed. •	• No wetland amphibian breeding habitat was identified at the Project Location or ZOI in site investigations, therefore, an amphibian movement corridor is absent from the Project Location and ZOI.	• Habitat considered absent from the Project Location and ZOI.
Deer Movement Corridors	• Corridors may be found in all forested ecosites. • Determined based on identifying significant deer wintering habitat.	• The records review did not identify any known deer movement corridors at the Project Location or ZOI, however an animal movement corridor was identified at the Project Location and ZOI (United Counties of Prescott and Russell Official Plan, 2016). This movement corridor was not specific to which species it was designated for and was likely associated with woodland that was identified as occurring at the Project Location through the records review that no longer exists at the Project Location.	• Identified after Deer Wintering Habitat is confirmed.	• No deer wintering habitat was identified at the Project Location or ZOI, therefore no deer movement corridors are located within the Project Location or ZOI.	• Habitat considered absent from the Project Location and ZOI.

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	Habitat Assessment
		• During the site investigation, the Project locations was confirmed to be agricultural fields consisting of corn. The animal movement corridor was not present. • Deer yarding and deer winter congregation habitats were not located at the Project Location or ZOI (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 movement Corridors.			

Table B2: Site Investigation Record

Survey Date	Completed By	Start Time (24Hr)	Weather Conditions
July 7, 2015	C. Staples	11:00-15:00	28^{0}C, 25 km/h wind, <25% cloud, no precipitation during survey, no precipitation in the last 24hrs
April 10, 2017	J. Mansell	12:45- 15:00	17-21^{0}C, wind 1-3 (Beaufort Scale), 30% cloud cover, no precipitation.

Table B3: Ecological Land Classification (ELC) Vegetation Types

ELC TYPE	Community Description
Thicket (TH)	
Deciduous Thicket (THD)	
THDM2 Dry - Fresh Deciduous Shrub Thicket	Linear thicket adjacent to County Road 19, comprised of trembling aspen saplings and pin cherry. Red raspberry and common lilac dominated the understory with various grasses in the ground layer.
Woodland (WO)	
Deciduous Woodland (WOD)	
WODM5 Fresh – Moist Deciduous Woodland	Young disturbed woodland dominated by trembling aspen with Manitoba maple and sugar maple associates. Trembling aspen and pin cherry dominated the subcanopy and understorey. Various grasses with vetch, goldenrods and horsetails comprised the ground layer.
Forest (FO)	
Mixed Forest (FOM)	
FOMM3* Dry – Fresh Hemlock – White Pine Mixed Forest	Mature community dominated by white pine and sugar maple with hemlock as an associate. Mountain ash, white elm and common buckthorn occurred in the sub-canopy with white pine in the understorey. Wild lily-of-the-valley and raspberry species appeared dominant in the ground layer.
FOMM2-4* Dry – Fresh White Pine – Early Successional Forest	Trembling aspen and white pine dominated community with common buckthorn as an associate in the sub-canopy. Awnless brome and goldenrod species were documented in the ground layer.

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

Table B3: Ecological Land Classification (ELC) Vegetation Types

ELC TYPE	Community Description
Cultural	
Treed Agriculture (TAG)	
TAGM1* Coniferous Plantation	Mature red pine plantation. Understorey and ground cover were not documented due to a lack of property access.
Swamp (SW)	
Mixed Swamp (SWM)	
SWM Mixed Swamp	Mixed swamp dominated by green ash, sugar maple and trembling aspen with eastern white cedar, eastern hemlock, and American elm as associates in the sub-canopy. The ground layer consisted of red raspberry, sensitive fern, spotted jewelweed and reed canary grass.
SWMM5	Mid-aged mixed swamp community dominated by a variety of regenerating tree species such as green ash, sugar maple, trembling aspen, eastern white cedar, eastern hemlock and American elm. The ground layer was dominated by herbaceous wetland flora such as sensitive fern and spotted jewelweed. Other ferns were also common such as bracken fern, interrupted fern and wood ferns (*Dryopteris spp.*).

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
we01	30.5	Solar Panel Area –(15 m)	5 m	SWM Mixed Swamp	Mixed swamp dominated by green ash, sugar maple and trembling aspen with eastern white cedar, eastern hemlock, and American elm as associates in the sub-canopy. The ground layer consisted of red raspberry, sensitive fern, spotted jewelweed and reed canary grass. No surface water or seasonal pooling was observed in this community.

* Visually assessed from edge of feature 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
We02	1.7	Solar Panel Area – (17.5 m)	5 m	SWMM5 Conifer-Hardwood Mineral Mixed Swamp	Mid-aged mixed swamp community dominated by a variety of regenerating tree species such as green ash, sugar maple, trembling aspen, eastern white cedar, eastern hemlock and American elm. The ground layer was dominated by herbaceous wetland flora such as sensitive fern and spotted jewelweed. Other ferns were also common such as bracken fern, interrupted fern and wood ferns (*Dryopteris spp.*).
We03	2.1	Solar Panel Area – (41.7 m)	31 m	SWMM5 Conifer-Hardwood Mineral Mixed Swamp	Mid-aged mixed swamp community dominated by a variety of regenerating tree species such as green ash, sugar maple, trembling aspen, eastern white cedar, eastern hemlock and American elm. The ground layer was dominated by herbaceous wetland flora such as sensitive fern and spotted jewelweed. Other ferns were also common such as bracken fern, interrupted fern and wood ferns (*Dryopteris spp.*).
We04	0.6	Solar Panel Area – (36 m)	28 m	SWMM5 Conifer-Hardwood Mineral Mixed Swamp	Mid-aged mixed swamp community dominated by a variety of regenerating tree species such as green ash, sugar maple, trembling aspen, eastern white cedar, eastern hemlock and American elm. The ground layer was dominated by herbaceous wetland flora such as sensitive fern and spotted jewelweed. Other ferns were also common such as bracken fern, interrupted fern and wood ferns (*Dryopteris spp.*).

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 and Characteristics	
wo1	1042.7	Solar Panel Area – adjacent (40 m)	31 m	FOMM2-4 Dry –- Fresh White Pine – Early Successional Forest Type	Trembling aspen and white pine dominated community with common buckthorn as an associate in the sub-canopy. Awnless brome and goldenrod species were documented in the ground layer.	This woodland feature is located north of the Project Location. It is bordered by agriculture, roads, residential units and industrial units.	
				SWMM5 Conifer-Hardwood Mineral Mixed Swamp	Mid-aged mixed swamp community dominated by a variety of regenerating tree species such as green ash, sugar maple, trembling aspen, eastern white cedar, eastern hemlock and American elm. The ground layer was dominated by herbaceous wetland flora such as sensitive fern and spotted jewelweed. Other ferns were also common such as bracken fern, interrupted fern and wood ferns (*Dryopteris spp.*).		
wo2	224.6	Solar Panel Area – adjacent (15 m)	5 m			This woodland feature is located south and east of the Project Location. It is bordered by a recreational trail, agriculture, roads and residential units.	
				SWM Mixed Swamp	Mixed swamp dominated by green ash, sugar maple and trembling aspen with eastern white cedar, eastern hemlock, and American elm as associates in the sub-canopy. The ground layer consisted of red raspberry, sensitive fern, spotted jewelweed and reed canary grass.		
				SWMM5 Conifer-Hardwood Mineral Mixed Swamp	Mid-aged mixed swamp community dominated by a variety of regenerating tree species such as green ash, sugar maple, trembling aspen, eastern white cedar, eastern hemlock and American elm. The ground layer was dominated by herbaceous wetland flora such as sensitive fern and spotted jewelweed. Other ferns were also common such as bracken fern, interrupted fern and wood ferns (*Dryopteris spp.*).		
				FOMM3 Dry – Fresh Hardwood – Hemlock Mixed Forest Ecosite	Mature community dominated by white pine and sugar maple with hemlock as an associate. Mountain ash, white elm and common buckthorn occurred in the sub-canopy with white pine in the understorey. Wild lily-of-the-valley and raspberry species appeared dominant in the ground layer.		
wo3	88.4	Point of Connection/Connection Line – adjacent (19 m)	11 m	TAGM1 Coniferous Plantation	Mature red pine plantation. Understorey and ground cover were not documented due to a lack of property access.	This woodland feature is located west of the Project Location. It is bordered by other woodlands and residential units, with County Road 19 to the east.	
wo4	1.1	Point of Connection/Connection Line – intersects (0 m)	Intersects (0 m)	WODM5 Fresh - Moist Deciduous Woodland Ecosite	Young disturbed woodland dominated by trembling aspen with Manitoba maple and sugar maple associates. Trembling aspen and pin cherry dominated the subcanopy and understorey. Various grasses with vetch, goldenrods and horsetails comprised the ground layer.	This woodland feature is located within and west of the Project Location. It is a small, isolated woodland bordered by a residential unit and thicket, with agricultural land to the north and County Road 19 to the west.	

Table B6: Wetland Characteristics and Ecological Functions Assessment for Wetlands Found within the ZOI

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 01	30.5	Swamp	Palustrine	h*, c ts, gc	46 m*	44	Mid-reach; 82.6 hectare catchment	Type 1	Intermittent inflow and intermittent outflow; Over 50% forested or other natural vegetation; wetland with live trees and herbaceous ground cover.	Swamp with <50% coverage of organic soil	No evidence of discharge observed	Not applicable	Palustrine feature with predominantly fine sand soil	Palustrine swamp on fine sand soil with intermittent 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 02	1.7	Swamp	Palustrine	h* c ls gc ne m	90 m	19	Mid-reach; 2.5 hectare catchment	Type 1	No inflow and intermittent outflow; Over 50% forested or other natural vegetation; wetland with live trees and herbaceous ground cover.	Swamp with <50% coverage of organic soil	No evidence of discharge observed	Not applicable	Palustrine feature with predominantly fine sand soil		None known to be present	Generalized Candidate SWH	Present
We 03	2.1	Swamp	Palustrine	h* c ls gc ne m	471 m	21	Mid-reach; 19.9 hectare catchment	Type 1	Intermittent inflow and intermittent outflow; Over 50% forested or other natural vegetation; wetland with live trees and herbaceous ground cover.	Swamp with <50% coverage of organic soil	No evidence of discharge observed	Not applicable	Palustrine feature with predominantly fine sand soil		None known to be present	Generalized Candidate SWH	Present
We 04	0.6	Swamp	Palustrine	h* c ls gc ne m	270 m	21	Mid-reach; 3.1 hectare catchment	Type 1	No inflow and intermittent outflow; Over 50% forested or other natural vegetation; wetland with live trees and herbaceous ground cover herbs.	Swamp with <50% coverage of organic soil	No evidence of discharge observed	Not applicable	Palustrine feature with predominantly fine sand soil		None known to be present	Generalized Candidate SWH	Present (adjacent in channel)

* Distance from closest, adjacent wetland identified by field investigations and/or LIO, 2016 that was not assessed during site investigation.

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	1042.7 - Y	Y	Y	Y	Y	N	N	Y
wo02	224.6 - Y	Y	Y	Y	Y	Y	N	Y
wo03	88.4 - Y	Y	Y	Y	Y	N	N	Y
wo04	1.1 - N	N	N	N	N	N	N	N

[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 any 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 B8: 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 significant wetland and significant woodland habitats, generalized candidate significant wildlife habitat	Silt barriers to be erected along the edge of the construction area where activities occur within 30 m of significant natural features	Silt barriers to remain in good repair No deposition or erosion 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)
Disturbance and encroachment into significant natural features during construction	Limits of construction to be staked in the field	No work beyond staked limits	Visual inspections to ensure stakes are present and works stay within demarcated areas	All areas adjacent to natural features	Weekly	n/a	Monthly	Replace any missing stakes Immediately stop work in off-limit areas and replant or reseed as needed
Contamination of significant natural heritage features through accidental spill	Proper storage of materials off-site in storage containers Adherence to Emergency Response Plan	Minimize likelihood of spill Contain spill material	Visual inspections to ensure proper storage	Storage areas	Weekly	n/a	Monthly	Follow-up monitoring /inspections in the event of an accidental spill/leak Remedial actions may be required in the

Table B8: Monitoring Plan

Potential Negative Effect	Mitigation Strategy	Performance Objective	Monitoring Plan					Contingency Measures
			Methods	Location	Frequency	Rationale	Reporting	
	Contact Ministry of Environment and Climate Control Spills Action Centre							event monitoring indicates a negative effect to natural features

APPENDIX C:
BACKGROUND WILDLIFE LIST

COMMON NAME	SCIENTIFIC NAME	ONTARIO STATUS	GLOBAL STATUS	COSSARO	COSEWIC	Source
BUTTERFLIES						
Monarch	Danaus plexippus	S4B, S2N	G5	SC	SC	MNRF
AMPHIBIANS						
American Toad	Anaxyrus americanus	S5	G5			OHA
Spring Peeper	Pseudacris crucifer	S5	G5			OHA
Bullfrog	Lithobates catesbeiana	S4	G5			OHA
Northern Green Frog	Lithobates clamitans	S5	G5			OHA
Wood Frog	Lithobates sylvatica	S5	G5			OHA
Northern Leopard Frog	Lithobates pipiens	S5	G5	NAR	NAR	OHA
REPTILES						
Snapping Turtle	Chelydra serpentina	S3	G5	SC	SC	MNRF
Blanding's Turtle	Emydoidea blandingi	S3	G4	THR	THR	MNRF
Spotted Turtle	Clemmys guttata	S3	G5	END	END	OHA
Eastern Gartersnake	Thamnophis sirtalis	S5	G5			OHA
Redbelly Snake	Storeria occipitomaculata	S5	G5			OHA
Ringneck Snake	Diadophis punctatus	S4	G5			OHA
BIRDS						
Canada Goose	Branta canadensis	S5	G5			OBBA
Wood Duck	Aix sponsa	S5	G5			OBBA
American Black Duck	Anas rubripes	S4	G5			OBBA
Mallard	Anas platyrhynchos	S5	G5			OBBA
Northern Pintail	Anas acuta	S5	G5			OBBA
Gray Partridge	Perdix perdix	SNA	G5			OBBA
Ruffed Grouse	Bonasa umbellus	S5	G5			OBBA
Least Bittern	Ixobrychus exilis	S4B	G5	THR	THR	OBBA
Great Blue Heron	Ardea herodias	S5	G5			OBBA

COMMON NAME	SCIENTIFIC NAME	ONTARIO STATUS	GLOBAL STATUS	COSSARO	COSEWIC	Source
Turkey Vulture	Cathartes aura	S5B	G5			OBBA
Northern Harrier	Circus cyaneus	S4B	G5	NAR	NAR	OBBA
Sharp-shinned Hawk	Accipiter striatus	S5	G5	NAR	NAR	OBBA
Red-shouldered Hawk	Buteo lineatus	S4B	G5		NAR	OBBA
Broad-winged Hawk	Buteo platypterus	S5B	G5			OBBA
Red-tailed Hawk	Buteo jamaicensis	S5	G5	NAR	NAR	OBBA
American Kestrel	Falco sparverius	S4	G5			OBBA
Killdeer	Charadrius vociferus	S5B, S5N	G5			OBBA
Spotted Sandpiper	Actitis macularia	S5	G5			OBBA
Upland Sandpiper	Bartramia longicauda	S4B	G5			OBBA
Wilson's Snipe	Gallinago delicata	S5B	G5			OBBA
American Woodcock	Scolopax minor	S4B	G5			OBBA
Rock Pigeon	Columba livia	SNA	G5			OBBA
Mourning Dove	Zenaida macroura	S5	G5			OBBA
Black-billed Cuckoo	Coccyzus erythropthalmus	S5B	G5			OBBA
Eastern Screech-Owl	Megascops asio	S5	G5	NAR	NAR	OBBA
Short-eared Owl	Asio flammeus	S2N, S4B	G5	SC	SC	OBBA
Eastern Whip-poor-will	Antrostomus vociferus	S4B	G5	THR	THR	OBBA/MNRF
Ruby-throated Hummingbird	Archilochus colubris	S5B	G5			OBBA
Belted Kingfisher	Ceryle alcyon	S4B	G5			OBBA
Yellow-bellied Sapsucker	Sphyrapicus varius	S5B	G5			OBBA
Downy Woodpecker	Picoides pubescens	S5	G5			OBBA
Hairy Woodpecker	Picoides villosus	S5	G5			OBBA
Northern Flicker	Colaptes auratus	S4B	G5			OBBA
Pileated Woodpecker	Dryocopus pileatus	S5	G5			OBBA
Eastern Wood-Pewee	Contopus virens	S4B	G5	SC	SC-NS	OBBA

COMMON NAME	SCIENTIFIC NAME	ONTARIO STATUS	GLOBAL STATUS	COSSARO	COSEWIC	Source
Yellow-bellied Flycatcher	Empidonax flaviventris	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
Common Raven	Corvus corax	S5	G5			OBBA
Horned Lark	Eremophila alpestris	S5B	G5			OBBA
Tree Swallow	Tachycineta bicolor	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
Black-capped Chickadee	Poecile atricapillus	S5	G5			OBBA
Red-breasted Nuthatch	Sitta canadensis	S5	G5			OBBA
White-breasted Nuthatch	Sitta carolinensis	S5	G5			OBBA
House Wren	Troglodytes aedon	S5B	G5			OBBA
Ruby-crowned Kinglet	Regulus calendula	S4B	G5			OBBA
Eastern Bluebird	Sialia sialis	S5B	G5	NAR	NAR	OBBA
Veery	Catharus fuscescens	S4B	G5			OBBA
Hermit Thrush	Catharus guttatus	S5B	G5			OBBA
Wood Thrush	Hylocichla mustelina	S4B	G5	SC	THR-NS	OBBA

COMMON NAME	SCIENTIFIC NAME	ONTARIO STATUS	GLOBAL STATUS	COSSARO	COSEWIC	Source
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
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
Yellow-rumped Warbler	Setophaga coronata	S5B	G5			OBBA
Black-throated Green Warbler	Setophaga virens	S5B	G5			OBBA
Canada Warbler	Wilsonia canadensis	S4B	G5	SC	THR	OBBA
Chipping Sparrow	Spizella passerina	S5B	G5			OBBA
Field Sparrow	Spizella pusilla	S4B	G5			OBBA
Vesper Sparrow	Pooecetes gramineus	S4B	G5			OBBA
Savannah Sparrow	Passerculus sandwichensis	S4B	G5			OBBA
Song Sparrow	Melospiza melodia	S5B	G5			OBBA
Swamp Sparrow	Melospiza georgiana	S5B	G5			OBBA
White-throated Sparrow	Zonotrichia albicollis	S5B	G5			OBBA

COMMON NAME	SCIENTIFIC NAME	ONTARIO STATUS	GLOBAL STATUS	COSSARO	COSEWIC	Source
Dark-eyed Junco	Junco hyemalis	S5B	G5			OBBA
Scarlet Tanager	Piranga olivacea	S4B	G5			OBBA
Northern Cardinal	Cardinalis cardinalis	S5	G5			OBBA
Rose-breasted Grosbeak	Pheucticus ludovicianus	S4B	G5			OBBA
Indigo Bunting	Passerina cyanea	S4B	G5			OBBA
Bobolink	Dolichonyx oryzivorus	S4B	G5	THR	THR-NS	OBBA
Red-winged Blackbird	Agelaius phoeniceus	S4	G5			OBBA
Eastern Meadowlark	Sturnella magna	S4B	G5	THR	THR-NS	OBBA/MNRF
Common Grackle	Quiscalus quiscula	S5B	G5			OBBA
Brown-headed Cowbird	Molothrus ater	S4B	G5			OBBA
Baltimore Oriole	Icterus galbula	S4B	G5			OBBA
Purple Finch	Haemorhouspurpureus	S4B	G5			OBBA
American Goldfinch	Carduelis tristis	S5B	G5			OBBA
Evening Grosbeak	Coccothraustes vespertinus	S4B	G5			OBBA
House Sparrow	Passer domesticus	SNA	G5			OBBA
MAMMALS						
Pygmy Shrew	Sorex hoyi	S4	G5			OMA
Northern Short-tailed Shrew	Blarina brevicauda	S5	G5			OMA
Star-nosed Mole	Condylura cristata	S5	G5			OMA
Small-footed Myotis	Myotis leibii	S2S3	G3	END		MNRF
Little Brown Myotis	Myotis lucifugus	S4	G5	END	END	MNRF
Northern Myotis	Myotis septentrionalis	S3?	G4	END	END	OMA
Eastern Cottontail	Sylvilagus floridanus	S5	G5			OMA
Snowshoe Hare	Lepus americanus	S5	G5			OMA
Eastern Chipmunk	Tamias striatus	S5	G5			OMA
Woodchuck	Marmota monax	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
Meadow Vole	Microtus pennsylvanicus	S5	G5			OMA
Coyote	Canis latrans	S5	G5			OMA
Red Fox	Vulpes vulpes	S5	G5			OMA
Raccoon	Procyon lotor	S5	G5			OMA
Mink	Mustela vison	S4	G5			OMA
Striped Skunk	Mephitis mephitis	S5	G5			OMA
River Otter	Lutra canadensis	S5	G5			OMA

SUMMARY

Total Butterflies:	1
Total Amphibians:	6
Total Reptiles:	6
Total Birds:	102
Total Mammals:	20

SIGNIFICANT SPECIES

Global (G1-G3):	*1*
National: (SC, THR, END):	*16*
Provincial (SC, THR, END):	*17*

Explanation of Status and Acronymns

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

Butterflies: July 2014

Amphibans: 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 Herptofauna 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

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: 160950781 | Project Name: Pendleton Solar Farm

Date: 2015/07/07 | Field Personnel: Ceryne Staples

Weather Conditions:	TEMP (°C):	WIND:	CLOUD	PPT:	PPT (in last 24 hrs):
	28°C	25 km/h	<25%	Ø	Ø

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

POLYGON: 1

START TIME:

END TIME:

POLYGON DESCRIPTION

TOPOGRAPHIC FEATURE		HISTORY
☐ LACUSTRINE	☐ TALUS	☐ NATURAL
☐ RIVERINE	☐ CREVICE / CAVE	
☐ BOTTOMLAND	☐ ALVAR	☒ CULTURAL
☐ TERRACE	☐ ROCKLAND	
☐ VALLEY SLOPE	☐ BEACH / BAR	
☒ TABLELAND	☐ SAND DUNE	
☐ ROLL. UPLAND	☐ BLUFF	
☐ CLIFF		

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (>>MUCH GREATER THAN; >GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			Red pine
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	N/O	25 – 50	N/O	>50

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

STAND MATURITY:		PIONEER		YOUNG		MID-AGE	X	MATURE		OLD GROWTH

VEGETATION TYPE: coniferous plantation - red pine	CODE: TAGM1
☐ COMPLEX	CODE:

Evidence of Disturbance / Notes:

Did not get a good look @ this feature - understorey species unknown.

LAYERS: 1=CANOPY >10m 2=SUB-CANOPY 3=UNDERSTOREY 4=GROUND (GRD.)

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

SPECIES CODE	LAYER 1	2	3	4	DISTANCE FROM ≤5 m	>5
TREES:						
Red pine	D					
SHRUBS:						
GROUND:						

Quality Control: This form is complete

Print Name: Ceryne Staples (Field Notes Author)

Signature: (Field Notes QA/QC

ELC Polygon: # | **Assessment Type:** x-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):

Ignore this snake through-o

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 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					
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 observed.					
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; however potential for stick nests in polygon area is present.					
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 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.					
Terrestrial Crayfish Habitat: Edges of shallow marshes and meadows (no minimum size) with crayfish chimneys	Number of chimneys	N/A					

Quality Control This form is complete ☐ & legible ☐

Print Name Cenyse Staples (Field Notes Author) Signature (Field Notes QA/QC personnel)

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: 160950781 | Project Name: Pendleton Solar Farm

Date: 2015/07/07 | Field Personnel: Ceryne Staples

Weather Conditions:	TEMP (°C):	WIND:	CLOUD:	PPT:	PPT (in last 24 hrs):
	28°C	25 km/h	<25%	0	0

ELC — COMMUNITY DESCRIPTION & CLASSIFICATION

POLYGON: 2

START TIME:

END TIME:

POLYGON DESCRIPTION

TOPOGRAPHIC FEATURE		HISTORY
☐ LACUSTRINE	☐ TALUS	☐ NATURAL
☐ RIVERINE	☐ CREVICE / CAVE	
☐ BOTTOMLAND	☐ ALVAR	☐ CULTURAL
☐ TERRACE	☐ ROCKLAND	
☐ VALLEY SLOPE	☐ BEACH / BAR	
☐ TABLELAND	☐ SAND DUNE	
☐ ROLL. UPLAND	☐ BLUFF	
☐ 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	N/O	25 – 50	N/O	>50

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

STAND MATURITY:	PIONEER	YOUNG	MID-AGE	X MATURE	OLD GROWTH

VEGETATION TYPE: Dry-fresh hemlock mixed FO — CODE: FOMM3

COMPLEX — CODE:

Evidence of Disturbance / Notes:

~50 ha patch of mature FOM, adjacent to ~120 ha SW FO hab. to east of project site - may provide habitat for forest nesting birds + bat roosting potential.

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 1	2	3	4	DISTANCE FROM RD. ≤5 m	>5 m	COLL.
TREES:							
White pine	A		A		✓		
Sugar maple	A				✓		
hemlock	O				✓		
bur oak			O		✓		
Am beech			O				
red maple			O				
mountain ash		O					
white elm		O					
SHRUBS:							
Common buckthorn		O			✓		
blueberry			R				
red raspberry			O				
black hawy (bristly)			A				
~~interrupted fern~~			~~O~~				
~~SR~~							
GROUND:							
ground cedar				D			
wild lily of the valley				A			
ground pine				O			
fern sp.				R			
violet			R	R			
sensitive fern			O				
interrupted fern			O				

Quality Control: This form is complete ☐ & legible ☐

Print Name: Ceryne Staples (Field Notes Author)

Signature: (Field Notes QA/QC personnel)

ELC Polygon: # 2 **Assessment Type:** x-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):

None 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)	None known in area					
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 obs.					
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 obs.					
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 obs.					
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 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	Soil is coarse/sandy = ideal; no MAM/SA/BOO/FEO observed nearby.					
Terrestrial Crayfish Habitat: Edges of shallow marshes and meadows (no minimum size) with crayfish chimneys	Number of chimneys	n/a					

Quality Control: This form is complete ☐ & legible ☐

Print Name: Cayne Staples (Field Notes Author) Signature: _____ (Field Notes QA/QC personnel)

REV: 2016-11-09

Stantec Consulting Ltd.
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Guelph, ON
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Tel: (519) 836-6050
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Roadside ELC, Woodland & Wildlife Habitat Assessment Form

Project Number: 160950781 | Project Name: Pendleton Solar Farm

Date: 2015/07/07 | Field Personnel: Cerynne Staples

Weather Conditions:	TEMP (°C):	WIND:	CLOUD:	PPT:	PPT (in last 24 hrs):
	28°C	25 km/h	<25%	0	0

ELC – COMMUNITY DESCRIPTION & CLASSIFICATION

POLYGON: 3

START TIME:

END TIME:

POLYGON DESCRIPTION

TOPOGRAPHIC FEATURE		HISTORY
☐ LACUSTRINE	☐ TALUS	☐ NATURAL
☐ RIVERINE	☐ CREVICE / CAVE	☐ CULTURAL
☐ BOTTOMLAND	☐ ALVAR	
☐ TERRACE	☐ ROCKLAND	
☐ VALLEY SLOPE	☐ BEACH / BAR	
☐ TABLELAND	☐ SAND DUNE	
☐ ROLL. UPLAND	☐ BLUFF	
☐ 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: Single family residential | CODE: CVR3

COMPLEX | CODE:

Evidence of Disturbance / Notes:

Potential for BARS, EAPH nesting on rural residential properties.

- wood piles, ~~soil~~ & grass piles, outbuildings + older foundations may provide habitat (basking, overwintering) for snakes.
  swamp, forest & open ~~area~~ meadow/ lawn provide potent. forage. hab. for snakes
- No Butternut trees observed.

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 1	2	3	4	DISTANCE FROM RD. ≤5 m	>5 m	COLL
TREES:							
wh. pine	O				✓		
spruce x	O				✓		
willow x	O				✓		
E. white cedar	O				✓		
Trembling aspen	O				✓		
maple sp.	O				✓		
SHRUBS:							
GROUND:							
Poa sp.	D				✓		

Page 1 of 1

Print Name: Cerynne Staples (Field Notes Author)

Quality Control: This form is complete ☐ & legible ☐

Signature: (Field Notes QA/QC personnel)

ELC Polygon: # 3 **Assessment Type:** x-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):

None 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					

None observed.

None observed.

None observed.

N/A.

*

None observed

None observed.

N/A

Quality Control: This form is complete ☐ & legible ☐

Print Name: Cerynne Staples (Field Notes Author)

Signature: _____ (Field Notes QA/QC personnel)

REV: 2016-11-09

* Limited time was spent observing CVR polygons during initial site visit; however no features were observed.

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Roadside ELC, Woodland & Wildlife Habitat Assessment Form

Project Number: 160950781 | Project Name: Pendleton Solar Farm

Date: 2015/07/07 | Field Personnel: Ceryne Staples

Weather Conditions:	TEMP (°C):	WIND:	CLOUD:	PPT:	PPT (in last 24 hrs):
	28°C	25 km/h	<25%	0	0

POLYGON DESCRIPTION

ELC — COMMUNITY DESCRIPTION & CLASSIFICATION

POLYGON: 4

START TIME: /

END TIME: /

TOPOGRAPHIC FEATURE		HISTORY
☐ LACUSTRINE	☐ TALUS	☒ NATURAL
☐ RIVERINE	☐ CREVICE / CAVE	☐ CULTURAL
☐ BOTTOMLAND	☐ ALVAR	
☐ TERRACE	☐ ROCKLAND	
☐ VALLEY SLOPE	☐ BEACH / BAR	
☒ TABLELAND	☐ SAND DUNE	
☐ ROLL. UPLAND	☐ BLUFF	
☐ CLIFF		

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (>>MUCH GREATER THAN; >GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			white pine > trembling aspen, red maple
2	SUB-CANOPY			common buckthorn
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: Dry-Fresh PW early successional — CODE: Forom 2-4

COMPLEX — CODE:

Evidence of Disturbance / Notes:

Google imagery from 2006 shows evidence of disturbance w/in this polygon (old farmland?).

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 1	2	3	4	DISTANCE FROM RD. ≤5 m	>5 m	COLL.
TREES:					✓		
trembling aspen	A				✓		
white pine	A				✓		
~~sok~~ maple - red	O						
SHRUBS:							
common buckthorn		O			✓		
GROUND:							
awnless brome			O		✓		
goldenrods			O		✓		

Quality Control: This form is complete ☐ & legible ☐

Print Name: Ceryne Staples (Field Notes Author)

Signature: (Field Notes QA/QC personnel)

ELC Polygon: # 4 **Assessment Type:** x-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):

None 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)	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					
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 observed					
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	Not 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 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	Not observed					
Terrestrial Crayfish Habitat: Edges of shallow marshes and meadows (no minimum size) with crayfish chimneys	Number of chimneys	N/A					

Quality Control: This form is complete ☐ & legible ☐

Print Name: Cenye Staples (Field Notes Author) Signature: (Field Notes QA/QC personnel)

REV: 2016-11-09

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Roadside ELC, Woodland & Wildlife Habitat Assessment Form

Project Number: 160950781 | Project Name: Pendleton Solar Farm

Date: 2015/07/07 | Field Personnel: Ceryne Staples

Weather Conditions:	TEMP (°C):	WIND:	CLOUD:	PPT:	PPT (in last 24 hrs):
	28°C	25km/h	<25%	0	0

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

POLYGON: 5

START TIME:

END TIME:

POLYGON DESCRIPTION

TOPOGRAPHIC FEATURE		HISTORY
☐ LACUSTRINE	☐ TALUS	☐ NATURAL
☐ RIVERINE	☐ CREVICE / CAVE	
☐ BOTTOMLAND	☐ ALVAR	☐ CULTURAL
☐ TERRACE	☐ ROCKLAND	
☐ VALLEY SLOPE	☐ BEACH / BAR	
☐ TABLELAND	☐ SAND DUNE	
☐ ROLL. UPLAND	☐ BLUFF	
☐ 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	N/O 25 – 50	N/O >50

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

STAND MATURITY:	PIONEER	YOUNG	MID-AGE	X MATURE	OLD GROWTH

VEGETATION TYPE: fresh- moist sugar maple [illegible] CODE: FOCM6-3

COMPLEX: CODE:

Evidence of Disturbance / Notes: yellow birch FOD.

* transitioning to (FOMM6 or FOCM3) along north end of polygon, possibly (SWMM3) near SE edge of project area - not enough info. to confirm this.

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 1	LAYER 2	LAYER 3	LAYER 4	DISTANCE FROM RD. ≤5 m	DISTANCE FROM RD. >5 m	COLL.
TREES:							
white pine	D				✓		
yellow birch	O				✓		
Am. beech		O			✓		
hemlock	O		O		✓		
sugar maple	O		O		✓		
E. white cedar	O	O			✓		
bur oak			R		✓		
trembling aspen		O	O		✓		
SHRUBS:							
honeysuckle sp.		R	R		✓		
viburnum sp.			R		✓		
GROUND:							
ground cedar			O		✓		
ground pine			↓		✓		
wild lily of the valley					✓		
jack in the pulpit					✓		
royal fern					✓		
sensitive fern					✓		
interrupted fern					✓		
sedges					✓		
trillium sp.					✓		

Page 1 of 2

Quality Control: This form is complete ☐ & legible ☐

Print Name: Ceryne Staples (Field Notes Author)

Signature: (Field Notes QA/QC personnel)

ELC Polygon: # 5 **Assessment Type:** (x-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):

NONE

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)	N/A					
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.					
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 observed					
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 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	Excavated soil (sandy) around drain-tile ~~None observed~~ 6439-6466 outflow is south-facing; d/s connectivity to suitable habitat?			18T	495072	5035128
Terrestrial Crayfish Habitat: Edges of shallow marshes and meadows (no minimum size) with crayfish chimneys	Number of chimneys	N/A					

Quality Control: This form is complete ☐ & legible ☐

Print Name: Cenyne Staples (Field Notes Author) Signature (Field Notes QA/QC personnel)

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Roadside ELC, Woodland & Wildlife Habitat Assessment Form

Project Number: 160950781
Project Name: Pendleton Solar Farm
Date: 2015/07/07
Field Personnel: Cerynne Staples

Weather Conditions:	TEMP (°C):	WIND:	CLOUD:	PPT:	PPT (in last 24 hrs):
	28	23 km/h	<25%	Ø	Ø

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

POLYGON: 6
START TIME:
END TIME:

POLYGON DESCRIPTION

TOPOGRAPHIC FEATURE		HISTORY
☐ LACUSTRINE	☐ TALUS	☒ NATURAL
☐ RIVERINE	☐ CREVICE / CAVE	☐ CULTURAL
☐ BOTTOMLAND	☐ ALVAR	
☐ TERRACE	☐ ROCKLAND	
☐ VALLEY SLOPE	☐ BEACH / BAR	
☐ TABLELAND	☐ SAND DUNE	
☐ ROLL UPLAND	☐ BLUFF	
☐ 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<HTs1m 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:	N/O	<10	N/O	10 – 24	N/O	25 – 50	N/O	>50

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

STAND MATURITY:	PIONEER	YOUNG	MID-AGE	MATURE	OLD GROWTH
		X	X		

VEGETATION TYPE: Mixed swamp — CODE: SWM
COMPLEX — CODE:

Evidence of Disturbance / Notes:

- See photos 6418 – 6438
- Very large (3x3m; 2m tall) wood pile located @ corner of project area/SWM (ph. 6433)
- area of SWM immediately visible from corner of project area looks historically cleared, veg not taller than 15m

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 ob

SPECIES CODE	LAYER 1	LAYER 2	LAYER 3	LAYER 4	DISTANCE FROM RD. ≤5 m	DISTANCE FROM RD. >6 m
TREES:	A					
green ash	O				✓	
white elm		O			✓	
Sugar maple	O	O			✓	✓
trembling aspen	O	O			✓	
Silver maple		O			✓	✓
hemlock		R			✓	
E white cedar		O			✓	
Yellow birch		R			✓	
SHRUBS:						
red raspberry			O		✓	
GROUND:						
Evening primrose			R		✓	
Sensitive fern			A		✓	
bracken fern			O		✓	
Jack in the pulpit			O		✓	
interrupted fern			O		✓	
wood fern sp.			O		✓	
Spotted jewelweed			A		✓	
water plantain			R	R	✓	
Grass spp.			O		✓	
reed canarygrass			A		✓	
common milkweed			R		✓	

Print Name: Cerynne Staples
Quality Control: Signature:

CONTINUED SITE: Pendleton Solar Farm DATE: July 7, 2015 Roadside ELC, Woodland & Wildlife Habitat Assessment Form

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):

NONE

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) Number of access points	None observed					
Snake Hibernacula: Burrows, rock crevices, fissures that extend below the frost line (i.e. at least 1 m)	Size of opening(s) Substrate	None observed					
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 observed					
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 **Seeps and Springs:** Locations where groundwater comes to the surface in forests (see document for indicator species)	Number of features Feature size (diameter) Water depth Sub/emergent veg present Shrubs/logs at edge present Water permanency	} none observed					
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					
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: Cerynne Staples Signature:

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Roadside ELC, Woodland & Wildlife Habitat Assessment Form

Project Number: 160950781 | Project Name: Pendleton Solar Farm

Date: 2015/07/07 | Field Personnel: Cerynne Staples

Weather Conditions:	TEMP (°C)	WIND	CLOUD	PPT	PPT (in last 24 hrs):
	28	25 km/h	<25%	Ø	Ø

POLYGON DESCRIPTION

ELC – COMMUNITY DESCRIPTION & CLASSIFICATION

POLYGON: 7

START TIME:

END TIME:

TOPOGRAPHIC FEATURE		HISTORY
☐ LACUSTRINE	☐ TALUS	☐ NATURAL
☐ RIVERINE	☐ CREVICE / CAVE	☒ CULTURAL
☐ BOTTOMLAND	☐ ALVAR	
☐ TERRACE	☐ ROCKLAND	
☐ VALLEY SLOPE	☐ BEACH / BAR	
☐ TABLELAND	☐ SAND DUNE	
☐ ROLL UPLAND	☐ BLUFF	
☐ 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:	N	<10	N	10 – 24	M	25 – 50	N	>50

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

STAND MATURITY:	X	PIONEER		YOUNG		MID-AGE		MATURE		OLD GROWTH

VEGETATION TYPE: Annual row crop — CODE: OAGM1

COMPLEX — CODE:

Evidence of Disturbance / Notes:

- P. australis observed in ditchline along NW edge of project area
- ragweed & thistle spp listed were observed along margins of corn field.

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 1	2	3	4	DISTANCE FROM RD ≤5 m	>5 m	COLL.
TREES							
white spruce			R		✓		
red pine			R		✓		
E. white cedar				R	✓		
E. white pine				R	✓		
trembling aspen			D		✓		
SHRUBS:							
blackberry sp.			R		✓		
b-l cattail			R			✓	
GROUND *							
corn	D				✓	✓	
grasses			D		✓	✓	
common reedgrass (P. australis) *			O		✓		
bracken fern			R		✓		
goldenrod spp.			R		✓		
Am. vetch				O	✓		
Sensitive fern			R		✓		
Canada thistle				R	✓		
common milkweed				R	✓		
water plantain				R	✓		
bluebead lily				R	✓		
sedges				R	✓		

Quality control: This form is complete ☐ & legible ☐

Print Name: Cerynne Staples Signature:

CONTINUED

SITE: Pendleton Solar Farm

DATE: July 7, 2015

Roadside ELC, Woodland & Wildlife Habitat Assessment Form

ELC Polygon: # 7 **Assessment Type:** X-Walk through feature **Extent of Physical Investigation of Feature:** X-Entire / ☐-Partial, walk through polygon *(indicate on map)*

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

NONE

Wildlife Habitat Type & Description	Site Assessment		Photo ID	Map ID	Zone	UTM Coordinates 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					
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 observed					
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 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	Margins of corn field could be utilized, however no wetland features observed nearby.					
Terrestrial Crayfish Habitat: Edges of shallow marshes and meadows (no minimum size) with crayfish chimneys	Number of chimneys	N/A					

Cayne Staples

REV. 2016-11-10

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: 160950781
Project Name: Pendleton Solar Farm
Date: 2015/07/07
Field Personnel: Coryne Staples

Weather Conditions:	TEMP (°C):	Wind:	CLOUD:	PPT:	PPT (in last 24 hrs):
	28	25 km/h	25%	0	0

POLYGON DESCRIPTION

ELC — COMMUNITY DESCRIPTION & CLASSIFICATION

POLYGON: 8
START TIME:
END TIME:

TOPOGRAPHIC FEATURE		HISTORY
☐ LACUSTRINE	☐ TALUS	☐ NATURAL
☐ RIVERINE	☐ CREVICE / CAVE	☒ CULTURAL
☐ BOTTOMLAND	☐ ALVAR	
☐ TERRACE	☐ ROCKLAND	
☐ VALLEY SLOPE	☐ BEACH / BAR	
☒ TABLELAND	☐ SAND DUNE	
☐ ROLL UPLAND	☐ BLUFF	
☐ CLIFF		

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (>>MUCH GREATER THAN; >GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			Trembling aspen >> otherspp
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:	☐ N/O	<10	☐ N/O	10 – 24	☐ N/O	25 – 50	☐ N/O	>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 deciduous woodland	CODE: WODM5
COMPLEX	CODE:

Evidence of Disturbance / Notes:

- Polygon is re-growth/remnant vegetation from site clearing activities
- Large debris piles (wood, metal,) and discarded soybeans (ph.6484) are present along the margins of this polygon (ph.6482, 6494, 6496, 6493; ph 6486-87)
- Large (~4m x 3m x 1.5m ht) coarse soil piles are present along the south edge of the polygon (ph.6483)

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 1	2	3	4	DISTANCE FROM RD. ≤5 m	>5 m	COLL.
TREES:							
Trembling aspen	A	A	A		✓	✓	
Manitoba maple	O				✓	✓	
Sugar maple	O				✓	✓	
Pin cherry		A	A		✓	✓	
Green ash		O	O		✓	✓	
Basswood		O				✓	
SHRUBS:							
red-osier dogwood			O				
red raspberry			A		✓	✓	
Poison ivy			O			✓	
Staghorn sumac		O	O			✓	
lilac		O			✓	✓	
GROUND:							
horsetail			O			✓	
grasses			O			✓	
American vetch			O		✓	✓	
goldenrods			O		✓	✓	
corn			O			✓	

Coryne Staples
Print Name

Signature

CONTINUED SITE: Pendleton Solar Farm DATE: July 7, 2015 Roadside ELC, Woodland & Wildlife Habitat Assessment Form

ELC Polygon: # 8 **Assessment Type:** x-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):

NONE

Wildlife Habitat Type & Description	Site Assessment		Photo ID	Map ID	Zone	UTM Coordinates 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					
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	Soil piles observed onsite (ph. 6488) are not believed to be tall enough. piles may also not be present for long.					
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 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	Sandy piles mentioned above do not appear to be close to waterbodies					
Terrestrial Crayfish Habitat: Edges of shallow marshes and meadows (no minimum size) with crayfish chimneys	Number of chimneys	N/A					

Print Name: Cayne Staples Signature:

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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: 160950781
Date: 2015/07/07
Project Name: Pendleton Solar Farm
Field Personnel: Ceryne Staples

Weather Conditions: TEMP (°C): 28 | WIND: 25 km/h | CLOUD: <25% | PPT: Ø | PPT (in last 24 hrs): Ø

POLYGON DESCRIPTION

ELC COMMUNITY DESCRIPTION & CLASSIFICATION		TOPOGRAPHIC FEATURE		HISTORY
POLYGON:	9	☐ LACUSTRINE	☐ TALUS	☐ NATURAL
START TIME:		☐ RIVERINE	☐ CREVICE / CAVE	☒ CULTURAL
END TIME:	—	☐ BOTTOMLAND	☐ ALVAR	
		☐ TERRACE	☐ ROCKLAND	
		☐ VALLEY SLOPE	☐ BEACH / BAR	
		☐ TABLELAND	☐ SAND DUNE	
		☐ ROLL. UPLAND	☐ BLUFF	
		☐ 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			trembling aspen = pin cherry
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	N/O	25 – 50	N/O	>50

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

STAND MATURITY:		PIONEER	X	YOUNG		MID-AGE		MATURE		OLD GROWTH

VEGETATION TYPE: Dry-Fresh deciduous Shrub	CODE: THDM2
COMPLEX	CODE:

Evidence of Disturbance / Notes:

Site has been cleared; this polygon and adjacent woods are remnant/re-growth vegetation from site vegetation clearing activities.

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 1	LAYER 2	LAYER 3	LAYER 4	DISTANCE FROM RD ≤5 m	DISTANCE FROM RD >5 m	COLL.
TREES:							
pin cherry		A			✓		
trembling aspen		A			✓		
SHRUBS:							
Red raspberry			A		✓		
Willow sp.			O		✓		
Lilac		A	A		✓		
GROUND:							
grasses				A	✓		

Print Name: Ceryne Staples   Signature:

CONTINUED SITE: Pendleton Solar Farm DATE: July 7, 2015 Roadside ELC, Woodland & Wildlife Habitat Assessment Form

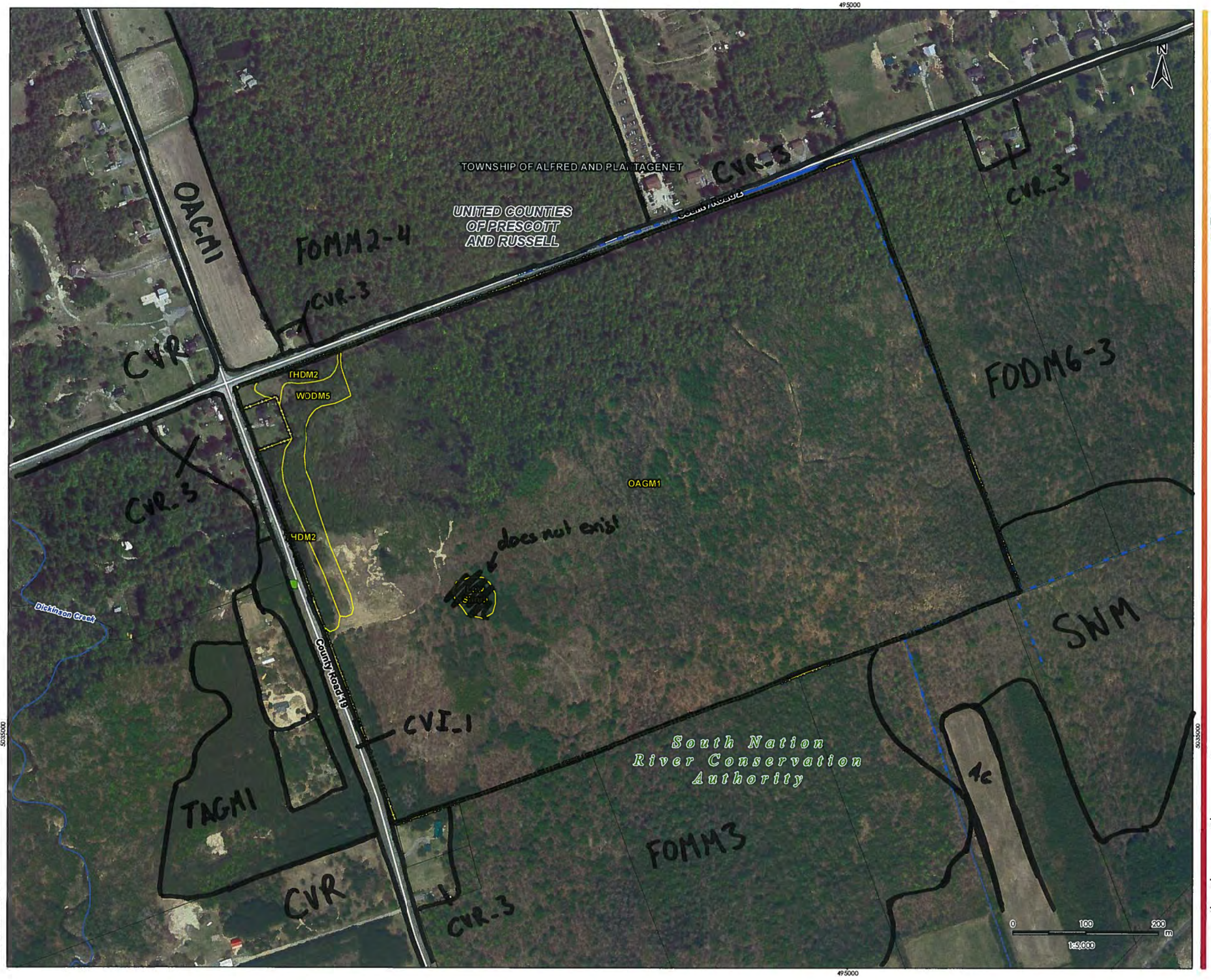
ELC Polygon: # 9 **Assessment Type:** (x-Visual; no access / ☐-Walk through feature) **Extent of Physical Investigation of Feature:** ☐-Entire / ☐-Partial, walk through polygon *(indicate on map)*

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

NONE

Wildlife Habitat Type & Description	Site Assessment		Photo ID	Map ID	Zone	UTM Coordinates 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					
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 observed					
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 **Seeps and Springs:** Locations where groundwater comes to the surface in forests (see document for indicator species)	Number of features Feature size (diameter) Water depth Sub/emergent veg present Shrubs/logs at edge present Water permanency	N/A					
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					
Terrestrial Crayfish Habitat: Edges of shallow marshes and meadows (no minimum size) with crayfish chimneys	Number of chimneys	N/A					

Print Name: Cerynn Staples Quality Control: This form is complete ☐ & legible ☐ Signature:



\\Cd1215-f01\work_group\01609\Active\160950781\planning\drawing\MXD\Pendleton\Terrestrial\Memo\160950781_Fig01_Pendleton_ELC.mxd
Revised: 2015-08-18 By: sallen

Stantec

Legend

- Drainage Channel
- Drainage Channel (Water Present)
- ELC Boundary
- Study Area
- Connection Point
- Major Road
- Watercourse (Permanent)
- Watercourse (Intermittent)
- Parcel Boundary
- Municipal Boundary - Lower Tier
- Municipal Boundary - Upper Tier
- Conservation Area Administrative Boundary

ELC Code	Description
OAGM1	Annual Row Crops
THDM2	Dry - Fresh Deciduous Shrub Thicket Ecosite
WODM5	Fresh - Moist Deciduous Woodland Ecosite

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, 2015.

August 2015
160960978

Client/Project

EDF EN Canada Development Inc.
Pendleton Solar Project

Figure No.

1

Title

Ecological Land Classification

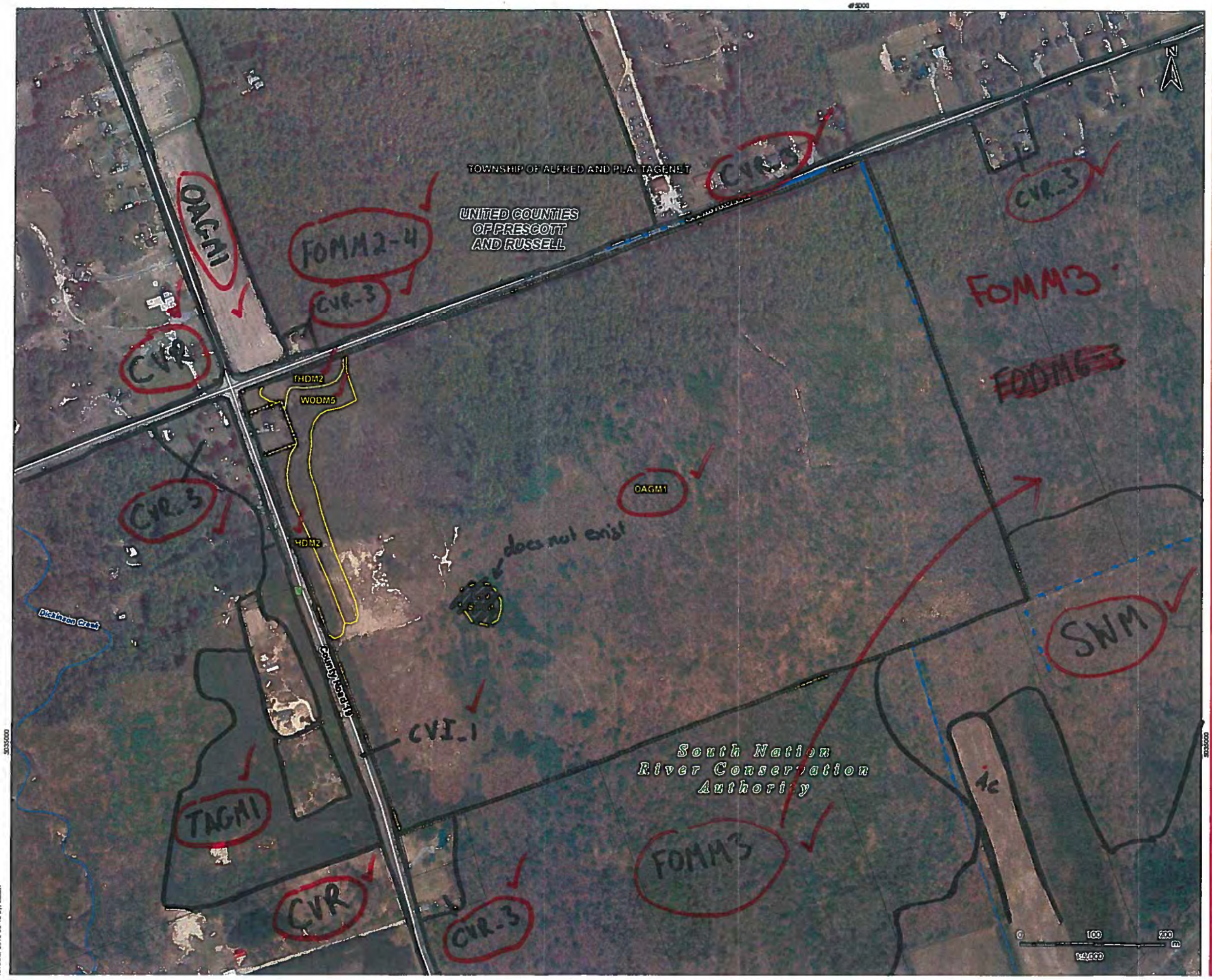
Pendleton Solar Centre - 16095878
April 10/2017 @ 1245 - 1500 hrs.
Weather: 17°c, overcast + warm, wind (1-3)
Josh Mussell

Incidental observations

Within ZOI

DEJU AMCR CAGO BCCH
Moose (Sign)
Wild Turkey (Sign).

Scale: 1 square = _____



Stantec

Legend

- Drainage Channel
- Drainage Channel (Water Present)
- ELC Boundary
- Study Area
- Connection Point
- Major Road
- Watercourse (Permanent)
- Watercourse (Intermittent)
- Parcel Boundary
- Municipal Boundary - Lower Tier
- Municipal Boundary - Upper Tier
- Conservation Area Administrative Boundary

ELC Code	Description
OAGM1	Annual Row Crops
THDM2	Dry - Fresh Deciduous Shrub Thicket Ecosite
WODM5	Fresh - Moist Deciduous Woodland Ecosite

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, 2015.

August 2015
160960978

Client/Project

EDF EN Canada Development Inc.
Pendleton Solar Project

Figure No.

1

Title

Ecological Land Classification

Updated April 10/2017
Tom Mansell

\\Cd1215-f01\work_group\01\609\Active\160950781\planning_drawing\MXD\Pendleton\Terrestrial\Memo\160950781_fig01_Pendleton_ELC.mxd
Revised: 2015-08-18 By: sallen

South Nation Conservation

United Counties Of Prescott And Russell

18VR9435

18VR9434

18VR9535

18VR9534

County Road 2

County Road 19

Allan Presley Municipal Drain

Dickinson Creek

Spring Brook Creek Municipal Drain

Plantagenet Concession 3

494000

495000

5035000

5034000

N

Stantec

PENDLETON solar energy centre

Legend

- Project Location
- Zone of Investigation (50 m from Project Location)
- Major Road
- Minor Road
- Watercourse (Intermittent, as per MNRF mapping)
- Watercourse (Permanent, as per MNRF mapping)
- Waterbody (as per MNRF mapping)
- Wetland, Not evaluated per OWES
- Wooded Area
- Lot
- Municipal Boundary, Upper
- Municipal Boundary, Lower
- Property Boundary
- 1 km UTM Grid

* No wetland communities observed on the Site.

0 200 400 metres

1:7,500 (At original document size of 11x17)

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.

Project Location
United Counties Of Prescott And Russell

160950878 REVB
Prepared by AW on 2017-01-26
Technical Review by NK on 2016-11-30
Independent Review by NK on 2016-11-30

Client/Project
PENDLETON ENERGY CENTRE LP
PENDLETON SOLAR ENERGY CENTRE

Figure No.
2

Title
Records Review

OWES Evaluation April 12, 2017. Josh Mansell. 1300 - 1500 hrs.

○ ✓/✗ - wetlands observed or NOT observed ▨ - wetlands confirmed.

ELC — COMMUNITY DESCRIPTION & CLASSIFICATION

SITE (project no./name): 16095 0912.		POLYGON: n/a.	
SURVEYOR(S): J. Mansell	DATE: Apr. 10/2017	PHOTO No.:	
START: 1300	END: 1400	ZONE & UTM: 15T 495133E, 5035623N	

POLYGON DESCRIPTION

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

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (>>MUCH GREATER THAN; >GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2	4	FRAPEN > ACERRUB ?? BETUALL
2	SUB-CANOPY	3	3	FRAPEN > ACERRUB = ABIEBAL = FRAPNIG
3	UNDERSTOREY	4	2	SPIR-SP > ACERRUB > FRAPE = FRAPNIG
4	GRD. LAYER	6	3	CAREX-SP = DRYOINT

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: FRAPEN, ACERRUB, BETUALL — BA: n/a.

SIZE CLASS ANALYSIS:	D	<10	A	10 – 24	R	25 – 50	N	>50
STANDING SNAGS:	O	<10	O	10 – 24	N	25 – 50	N	>50
DEADFALL/LOGS:	O	<10	A	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
		X	X		

SOIL ANALYSIS: n/a

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

COMMUNITY CLASSIFICATION:

COMMUNITY CLASS: Swamp		CODE: SW
COMMUNITY SERIES: Mixed Swamp		CODE: SWM
ECOSITE: Conifer - Hardwood Mineral		CODE: SWMM3
VEGETATION TYPE: /		CODE: /
INCLUSION	/	CODE: /
COMPLEX	/	CODE: /

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

Packets of ecosite SWMM3 found throughout FOMM3 ecosite. Limited species list due to [illegible]

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 1	2	3	4	COLL.
FRAPEN	O	A	O		
ACERRUB	A	A	A		
ABIEBAL		O			
BETUALL	R	R			
FRAPNIG		O	R		
THUJOCC		O	O		
SPIR-SP			A		

SPECIES CODE	LAYER 1	2	3	4	COLL.
CAREX-SP				A	
DRYOINT				A	
MOSS-SP				A	

Page 1 of 1

Print Name: Josh Mansell (Field Notes Author)

Quality Control: This form is complete ☐ & legible ☐

Signature: _____ (Field Notes QA/QC personnel)

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: 160950912 Polygon No.: n/a.

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	1-3	Scattered	0	~1-2mm

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

None.

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					

None observed

Many vernal pools found throughout ecosite/feature.

None observed

Print Name: Josh Mansell (Field Notes Author)

Quality Control: This form is complete ☐ & legible ☐

Signature: _____ (Field Notes QA/QC personnel)

APPENDIX E: CURRICULUM VITAE

Anna L. Corrigan B.Sc. (Hons)

Ecologist

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.

** denotes projects completed with other firms*

Anna L. Corrigan B.Sc. (Hons)

Ecologist

PUBLICATIONS

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

Brian M. Miller Tech. Dipl.

Botanist / Terrestrial Ecologist

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

** denotes projects completed with other firms*

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.

Ceryne Staples B.Sc.

Biologist

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, Kemptville, Ontario, 2014

** denotes projects completed with other firms*

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 MNRF'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 conductfield studies to support the Environmental Impact Statement (Municipal). Conducted wildlife and species at risk surveys.

** denotes projects completed with other firms*

Josh Mansell Can-CISEC

Biologist

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*

Josh Mansell Can-CISEC

Biologist

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.

Fitztroy 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.

** denotes projects completed with other firms*

Josh Mansell Can-CISEC

Biologist

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*

Josh Mansell Can-CISEC

Biologist

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*

Josh Mansell Can-CISEC

Biologist

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 Developpement 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.

** denotes projects completed with other firms*

Josh Mansell Can-CISEC

Biologist

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*

Josh Mansell Can-CISEC

Biologist

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.

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.

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.

Melissa A. Straus M.Sc.

Terrestrial Ecologist

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 Gartnersnake

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 Butlers' 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. *Minstry 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.

Nicole Kopysh BES

Ecologist / Project Manager

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)

** denotes projects completed with other firms*

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

Prolon 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*

- 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 Sighificance and Level II Natural Environment Technical Report

Proposed Bromberg Pit, Ayr, Ontario (Project Assistant, Ecologist)
Natural environment field inventories and Level I Natural Environment Techncial Report

Commercial / Retail Development
First Capital Holdings Trust, Guelph, Ontario (Project Manager)
Envrionmental 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

Glaspell 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 Coures, Uxbridge, Ontario (Project Manager)
Natural heritage assessment and development of environmental report addendum and significant species plan

** denotes projects completed with other firms*

Nicole Kopysh BES

Ecologist / Project Manager

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.