Natural Heritage Assessment and Environmental Impact Study

K2 WIND POWER PROJECT
APPLICATION FOR A
RENEWABLE ENERGY APPROVAL

NATURAL HERITAGE ASSESSMENT AND
ENVIRONMENTAL IMPACT STUDY

FINAL

Submitted to:
K2 Wind Ontario Limited Partnership
100 Simcoe St.
Toronto, ON
M5H 3C6

Submitted by:
AMEC Environment & Infrastructure,
a Division of AMEC Americas Limited
160 Traders Blvd., Suite 110
Mississauga, Ontario
L4Z 3K7

May 2012
TC91606

EXECUTIVE SUMMARY

K2 Wind Ontario, in its capacity as General Partner of K2 Wind Ontario LP (together the "Proponent"), is proposing to develop, construct and operate the K2 Wind Power Project (the Project) north of Goderich, Ontario. The Proponent is a partnership among Capital Power LP, Samsung Renewable Energy Inc., and Pattern Renewable Holdings Canada ULC. The Project, will be located in the Township of Ashfield-Colborne-Wawanosh (ACW), and will supply approximately 270 megawatts (MW) of electricity to the Ontario power grid.

The General Project Area is bounded by Bruce County Road 86 (Amberley Road) to the north; Bluewater Highway (Highway 21) to the west; Golf Course Road to the south, and Hall's Hills/Lucknow Line/ Saratoga Line to the east in the Township of Ashfield-Colborne-Wawanosh. The development of the Project will help the province of Ontario meet its goal of increasing the proportion of electricity generated from renewable resources.

The basic components of the Project include: 141 potential turbine sites, four potential meteorological (met) tower locations and associated underground power and data cabling, an underground and overhead electrical power line collector and transmission system, data cabling from each turbine, a transformer station, a substation, an operation and maintenance building and protection control building, stormwater management systems, and turbine access roads, with culvert installations at associated watercourse crossings. For the purposes of the studies completed for the NHA, the lands encompassing the substation and the adjacent Hydro-One switchyard have been considered as one and have been termed the "substation/switchyard". Temporary components during construction generally include: staging areas at the turbine locations, along access roads, and at the substation/switchyard and transformer station, delivery truck turnaround areas, a central laydown area, access route to the met tower sites, construction pads at each turbine; and crane paths and associated watercourse crossings.

The Natural Heritage Assessment and Environmental Impact Study Reports are intended to satisfy the requirements outlined within O.Reg. 359/09 (Sections 24 through 28, 37 and 38) and is to be submitted as a component of the REA application under the *Green Energy and Green Economy Act*. The Records Review Report, Site Investigation Report, Evaluation of Significance Report and Environmental Impact Study Report are presented within this document. The Project Location is not located within the Niagara Escarpment Plan, the Oak Ridges Moraine Conservation Plan Area or the Protected Countryside of the Greenbelt Plan.

As per the requirements of the records review (O.Reg. 359/09, s.25), background data was collected and reviewed to identify natural features located in, or within 120 metres (m) of, the Project Location. The results of the records review were used to determine whether the Project Location is in, or within 120 m of, a natural feature, a Provincially Significant Wetland (PSW), a life science area of natural and scientific interest (ANSI) and/or within 50 m of an Earth Science ANSI. The record review revealed the Project Location was within 120 m of woodlands, wetlands, valleylands and ANSI's.

The site investigations (O.Reg 359/09, s. 26) were completed with the purpose of confirming the status and boundaries of natural features identified through the records review and identifying any additional features. Data collected during the records review concerning natural features, species occurrences and candidate significant wildlife habitat were used to guide the scope and direction of Site Investigations. The site investigation program involved detailed assessments and inventory of the vegetation communities, wetlands and wildlife. Natural features present in or within 120 m of the Project Location, as confirmed during the site investigation, thus requiring an Evaluation of Significance (O.Reg 359/09, s. 27), included wetlands, woodlands, ANSI's (earth and life science), valleylands and candidate significant wildlife habitat.

Natural heritage information collected from the records review and the site investigation were analyzed to determine the significance of the natural features (Evaluation of Significance) and the sensitivity of existing ecological features and functions. The significant features located in or within 120 m of the Project Location, requiring an Environmental Impact Study included: significant woodlands, significant wetlands, a regionally significant Life Science ANSI (Lucknow River), significant valleylands and significant wildlife habitat (seasonal concentration areas, specialized habitat for wildlife, habitat of species of conservation concern and animal movement corridors). The provincially significant Earth Science ANSI (Lothian-Lake Warren Shorelines) is located within the Project Location.

An Environmental Impact Study is provided for each significant natural feature that is found in or within 120 m of the Project Location (50 m for the Earth Science ANSI). The Environmental Impact Study identifies and assesses negative environmental effects and proposes mitigation measures to avoid or minimize the potential negative effects associated with the planning, design, construction, operation and decommissioning of the Project.

With the application of the mitigative measures identified in this report, construction, operation, and decommissioning of the Project are expected to have acceptable net residual effects on the significant natural features identified through the Natural Heritage Assessment process. A detailed post-construction monitoring plan, that includes a post-construction monitoring program, will be developed to confirm the accuracy of predicted effects, as well as to monitor the effects of the Project on wildlife (e.g., birds and bats).

The following table summarizes the requirements of this report as specified under O.Reg. 359/09:

Natural Heritage Assessment and Environmental Impact Study Report Requirements (as per O.Reg. 359/09)		
Requirements	**Completed**	**Section Reference**
Natural Heritage Assessment		
24. (1) A person who proposes to engage in a renewable energy project shall conduct a natural heritage assessment, consisting of the following:		
1. A records review conducted in accordance with section 25.	√	Section 2.0
2. A site investigation conducted in accordance with section 26.	√	Section 3.0
3. Subject to subsection (3), an evaluation of the significance or provincial significance of each natural feature identified in the course of the records review and site investigation, conducted in accordance with section 27.	√	Section 4.0
(2) For the purposes of this section and sections 25 and 26, in conducting a records review or a site investigation, identifying natural features and determining the boundaries of any natural features, a person mentioned in subsection (1) shall use applicable evaluation criteria or procedures established or accepted by the Ministry of Natural Resources, as amended from time to time.	√	Section 2.1 Section 3.1
Natural Heritage, Records Review		
25. (1) In conducting a records review mentioned in paragraph 1 of subsection 24 (1), a person who proposes to engage in a renewable energy project shall ensure that a search for and analysis of the records set out in Column 1 of the Table to this section are conducted in respect of the project location for the purpose of making the determinations set out opposite the records in Column 2 of the Table.	√	Section 2.1
(3) The person mentioned in subsection (1) shall prepare a report setting out a summary of the records searched and the results of the analysis conducted under subsection (1).	√	Section 2.2.1 to 2.2.7
Natural Heritage, Site Investigation		
26. (1) In conducting a site investigation mentioned in paragraph 2 of subsection 24 (1), a person who proposes to engage in a renewable energy project shall ensure that a physical investigation of the air, land and water within 120 metres of the project location is conducted for the purpose of determining,		
a) whether the results of the analysis summarized in the report prepared under subsection 25 (3) are correct or require correction, and identifying any required corrections;	√	Section 3.2.1 to 3.2.5
b) whether any additional natural features exist, other than those that were identified in the report prepared under subsection 25 (3);	√	Section 3.2.1 to 3.2.5 Table 3.3 (Appendix B)
c) the boundaries, located within 120 metres of the project location, of any natural feature that was identified in the records review or	√	Section 3.2.1 to 3.2.5

Natural Heritage Assessment and Environmental Impact Study Report Requirements (as per O.Reg. 359/09)		
Requirements	**Completed**	**Section Reference**
the site investigation; and,		Figure 3.1 to 3.29 (Appendix A)
d) the distance from the project location to the boundaries determined under clause (c).	√	Table 3.4 (Appendix B)
(3) The person mentioned in subsection (1) shall prepare a report setting out the following:		
1. A summary of any corrections to the report prepared under subsection 25 (3) and the determinations made as a result of conducting the site investigation under subsection (1).	√	Section 3.2.1 to 3.2.5
2. Information relating to each natural feature identified in the records review and in the site investigation, including the type, attributes, composition and function of the feature.	√	Table 3.3 (Appendix B)
3. A map showing, **i.** the boundaries mentioned in clause (1) (c), **ii.** the location and type of each natural feature identified in relation to the project location, and **iii.** the distance mentioned in clause (1) (d).	√	Figure 3.1 to 3.29 (Appendix A) Table 3.4 (Appendix B)
4. The dates and times of the beginning and completion of the site investigation.	√	Table 3.1 (Appendix B)
5. The duration of the site investigation.	√	Table 3.1 (Appendix B)
6. The weather conditions during the site investigation.	√	Table 3.1 (Appendix B)
7. A summary of methods used to make observations for the purposes of the site investigation.	√	Section 3.1.1 to 3.1.8
8. The name and qualifications of any person conducting the site investigation.	√	Section 3.3 Appendix H
9. Field notes kept by the person conducting the site investigation.	√	Appendix F
Natural Heritage, Evaluation of Significance		
27. (1) In conducting the evaluation of the significance or provincial significance of a natural feature for the purposes of paragraph 3 of subsection 24 (1), a person who proposes to engage in a renewable energy project shall evaluate any information available to the person relating to natural features, including all information obtained during, **a)** the records review conducted in accordance with section 25; **b)** the site investigation conducted in accordance with section 26; and, **c)** consultations conducted under sections 16, 17 and 18.	√	Section 4.1

Natural Heritage Assessment and Environmental Impact Study Report Requirements (as per O.Reg. 359/09)		
Requirements	**Completed**	**Section Reference**
(2) For the purposes of the evaluation under subsection (1), a person shall determine that a natural feature is significant if it is a woodland, a valleyland or a wildlife habitat, **a)** that the Ministry of Natural Resources has identified as significant; or **b)** that is considered to be significant when evaluated using evaluation criteria or procedures established or accepted by the Ministry of Natural Resources, as amended from time to time, for significant natural features.	√	Section 4.2.1, 4.2.3 and 4.2.4 Tables 4.3, 4.5 and 4.6 to 4.12 (Appendix B)
(3) For the purposes of the evaluation under subsection (1), a person shall determine that a natural feature is provincially significant if it is a southern wetland, a northern wetland, a coastal wetland, an area of natural and scientific interest (Earth Science) or an area of natural and scientific interest (Life Science), **a)** that the Ministry of Natural Resources has identified as provincially significant; or **b)** that is considered to be provincially significant when evaluated using evaluation criteria or procedures established or accepted by the Ministry of Natural Resources, as amended from time to time, for provincially significant natural features.	√	Section 4.2.2 and 4.2.4 Table 4.4 (Appendix B)
(4) The person mentioned in subsection (1) shall prepare a report that sets out the following: **1.** For each natural feature shown on the map mentioned in paragraph 3 of subsection 26 (3), a determination of whether the natural feature is provincially significant, significant, not significant or not provincially significant. **2.** A summary of the evaluation criteria or procedures used to make the determinations mentioned in paragraph 1. **3.** The name and qualifications of any person who applied the evaluation criteria or procedures mentioned in paragraph 2. **4.** The dates of the beginning and completion of the evaluation.	√	Section 4.1.1 to 4.1.5 and 4.3 Table 3.1 (Appendix B)
Specified Wetlands, Provincial Parks, Conservation Reserves		
37. No person shall construct, install or expand a renewable energy generation facility as part of a renewable energy project at a project location that is in any of the following locations: **1.** A provincially significant southern wetland. **2.** A provincially significant coastal wetland. **3.** A provincial park or a conservation reserve, unless the construction, installation or expansion of the facility is not prohibited by or under the Provincial Parks and Conservation Reserves Act, 2006.	√	Section 3.2.2 Figure 3.1 to 3.29 (Appendix B)

Natural Heritage Assessment and Environmental Impact Study Report Requirements (as per O.Reg. 359/09)		
Requirements	**Completed**	**Section Reference**
Specified Natural Features		
38. (1) No person shall construct, install or expand a renewable energy generation facility as part of a renewable energy project at a project location that is in any of the following locations: **1.** A provincially significant northern wetland or within 120 metres of a provincially significant northern wetland. **2.** Within 120 metres of a provincially significant southern wetland. **3.** Within 120 metres of a provincially significant coastal wetland. **4.** A provincially significant area of natural and scientific interest (Earth Science) or within 50 metres of a provincially significant area of natural and scientific interest (Earth Science). **5.** A provincially significant area of natural and scientific interest (Life Science) or within 120 metres of a provincially significant area of natural and scientific interest (Life Science). **6.** A significant valleyland or within 120 metres of a significant valleyland. **7.** A significant woodland or within 120 metres of a significant woodland. **8.** A significant wildlife habitat or within 120 metres of a significant wildlife habitat. **9.** Within 120 metres of a provincial park. **10.** Within 120 metres of a conservation reserve.	√	Section 5.0
(2) Subsection (1) does not apply if, as part of the application for the issue of a renewable energy approval in respect of the renewable energy project, the applicant submits, **a)** an environmental impact study report prepared in accordance with any procedures established by the Ministry of Natural Resources, as amended from time, that, **i.** identifies and assesses any negative environmental effects of the project on a natural feature, provincial park or conservation reserve referred to in paragraphs 1 to 10 of subsection (1),	√	Section 5.2 Table 5.1 (Appendix B)
ii. identifies mitigation measures in respect of any negative environmental effects mentioned in subclause (i),	√	Section 5.3 and 5.4
iii. describes how the environmental effects monitoring plan set out in paragraph 4 of item 4 of Table 1 addresses any negative environmental effects mentioned in subclause (i), and	√	Section 5.5 Table 5.2 (Appendix B)
iv. describes how the construction plan report prepared in accordance with Table 1 addresses any negative environmental effects mentioned in subclause (i);	√	Section 5.5 Table 5.2 (Appendix B)

TABLE OF CONTENTS

PAGE

LIST OF APPENDICES

LIST OF FIGURES (APPENDIX A)

LIST OF TABLES (APPENDIX B)

1.0 INTRODUCTION

1.1 Project Overview

K2 Wind Ontario Inc., in its capacity as General Partner for and on behalf of K2 Wind Ontario LP (the "Proponent"), is proposing to develop, construct and operate the K2 Wind Power Project (the Project) north of Goderich, Ontario. The Proponent is a partnership among affiliates of each of Capital Power LP, Samsung Renewable Energy Inc., and Pattern Renewable Holdings Canada ULC. The Project will be located in the Township of Ashfield-Colborne-Wawanosh (ACW) and will supply approximately 270 megawatts (MW) of electricity to the Ontario power grid. The development of the Project will help the province of Ontario meet its goal of increasing the proportion of electricity generated from renewable sources.

The Project will consist of the following components, which in their entirety comprise the 'buildable area':

- Approximately 141 Siemens SWT-2.3 wind-powered turbines, each located on agricultural lands with access roads, and associated water crossings where necessary;
- Padmount transformers located on the ground adjacent to each wind turbine to transform the electricity created in the nacelle to a standard operating power line voltage (i.e., 690 volt (V) to 34.5 kilovolt (kV));
- Siemens SWT-2.3 wind-powered turbines have an individual nameplate capacity between 1.824 and 2.221 MW for a combined nameplate capacity of approximately 270 MW. The individual nameplate capacity of each turbine cannot be increased through operational control;
- A K2 Wind Collector System (collector system) consisting of:
- Predominantly underground 34.5 kV collector lines and data cabling that will follow the access roads on turbine sites and the municipal road allowance (road allowance). Utility vaults or junction boxes will be used as necessary for splicing of the underground collector lines;
- Predominantly underground 138 kV transmission line following the road allowance. Utility vaults or junction boxes will be used as necessary for splicing of the underground collector lines;
- A K2 Wind Transformer Station (transformer station) to allow approximately one-half of the 34.5 kV lines from the turbines to step-up to 138 kV to reduce the number of circuits entering the substation/switchyard;
- A K2 Wind Substation (substation) located adjacent to a Hydro-One switchyard, to allow for interconnection of the collector system to the Hydro-One switchyard;
- Stormwater systems located at the transformer station and the substation to allow for appropriate management of stormwater;
- Up to four potential meteorological (met) tower locations, which will be free standing or supported by guy wires; and,
- An operation and maintenance building and protection control building on the substation site.

As part of the substation development, an existing residence and associated farm buildings will likely need to be removed from the site and the area graded according to the site design.

Temporary facilities will be provided during the construction phase that will be removed at the completion of the work. These will consist of:

- Crane paths between some of the turbine sites to minimize crane demobilization;
- Construction pads adjacent to each turbine location;
- Temporary enlargements of turbine sites, access lanes and entrances to allow for construction equipment, cranes and storage;
- Temporary enlargements of met tower sites and access roads to allow for construction equipment, cranes and storage;
- Access routes for met tower sites;
- Delivery truck turnaround areas;
- Temporary water crossings for crane paths and met tower access routes; and,
- A temporary laydown, storage, trailer and parking area at the substation site for the use of the construction team.

The Proponent has elected to assess and seek approval for some alternative Project configurations. The Renewable Energy Approval (REA) application process considers up to four potential met tower locations, and several alternate access road alignments. Final selection of the sites to be used will be based on the results of consultations, detailed design/ engineering work, and the conditions experienced during construction.

- The Project will span an area of approximately 230 km^2. The General Project Area is bounded by Bruce County Road 86 (Amberley Road) to the north; Bluewater Highway (Highway 21) to the west; Golf Course Road to the south, and Hall's Hills/Lucknow Line/ Saratoga Line to the east in the Township of Ashfield-Colborne-Wawanosh (Figure 1, Appendix A). The turbine sites will be located on privately owned lands leased to the Proponent pursuant to option agreements granted by landowners; and,
- For the purposes of the studies completed for the NHA, the lands encompassing the substation and the adjacent Hydro-One switchyard have been considered as one and have been termed the "substation/switchyard". The substation/switchyard is proposed at the junction of Tower Line and Glens Hill Road and the transformer station is proposed on the southwest corner at the junction of Belgrave Road and Lanesville Line. The Hydro-One switchyard, known as the K2 Wind Switchyard (switchyard) will be adjacent to the substation, to allow for an interconnect with a 500 kV Hydro-One transmission line.

Collector lines will follow access roads and municipal roads to the transformer station or the substation/switchyard. To allow for the collector system to be predominantly buried (as opposed to overhead on wooden poles) as requested by ACW and local residents, and to reduce the number of circuits entering the substation/switchyard, approximately one half of the 34.5 kV lines will be routed to the transformer station where there will be a step-up to 138 kV.

From the transformer station a proposed underground 138 kV transmission line will follow the road allowance to the substation/switchyard. All circuits (138 kV and 34.5 kV) will feed into the substation. At the substation voltage will be increased from either 34.5 kV or 138 kV to 500 kV for connection into the adjacent Hydro-One transmission line via the switchyard.

1.2 Proponent

The proponent's office and contact information are as follows:

K2 Wind Ontario LP
46 Victoria Street North
Goderich, ON
N7A 2R6
519.524.2760
Attn: Glenn Hubbers, P.Eng. Project Manager – K2 Wind Power Project
K2Wind@capitalpower.com

1.3 Project Requirements

To regulate the environmental approvals requirements for a renewable energy project, the Province has enacted Ontario Regulation (O.Reg.) 359/09 - Renewable Energy Approvals under Part V.0.1 of the *Environmental Protection Act*, 2009 (*EPA*). The Project is defined as a Class 4 Wind Facility under Section 6(3) of the Regulation. The Proponent must obtain a Renewable Energy Approval (REA) from the Ontario Ministry of the Environment (MOE) prior to developing the Project.

The Proponent and its environmental consultant, AMEC Environment & Infrastructure (AMEC), have prepared this Natural Heritage Assessment and Environmental Impact Study Report (NHAEIS), with input from Zephyr North Canada and Selde Corp., to provide the public, local communities, Aboriginal communities and interested agencies with an understanding of the plans for the Project. The NHAEIS is intended to satisfy the requirements outlined within O.Reg. 359/09 (s.24 through s.28, s.37 and s.38) and is submitted as a component of the REA application. The General Project Area is not located within the Niagara Escarpment Plan, the Oak Ridges Moraine Conservation Plan Area or the Protected Countryside of the Greenbelt Plan.

A Natural Heritage Assessment is required to determine whether any of the following features exist in or are within 120 metres of the Project Location[1]:

- Wetlands;
- Coastal wetlands;

[1] Project Location includes the wind turbines, access roads and associated culverts, substation, meteorological tower(s), laydown and construction areas, crane paths, collector lines and underground cabling, including the full extent of their construction disturbance footprints and associated airspace.

- Provincially Significant Wetland (PSW);
- Life Science Areas of Natural and Scientific Interest (ANSI);
- Earth Science ANSI (50 m);
- Valleylands;
- Woodlands;
- Wildlife habitat; and,
- Provincial parks and conservation reserves.

This report identifies the existence and boundaries of all natural features in, or within 120 m of, the Project Location based on a records review and site investigation as per O.Reg. 359/09 (s.25, s.26). In instances where the Project Location is within 120 m of natural features, this report provides an evaluation of significance as per O.Reg. 359/09 (s.27). The evaluation of significance for each identified feature is based on an existing Ontario Ministry of Natural Resources (OMNR) designation of the feature, or by using evaluation criteria and/or procedures established and/or accepted by the OMNR. OMNR documents referenced in preparation of this report include:

- Natural Heritage Assessment Guide (NHAG; OMNR, 2011a);
- Natural Heritage Reference Manual (NHRM; OMNR, 2010a);
- Ontario Wetland Evaluation System (OWES; OMNR, 2002a);
- Significant Wildlife Habitat Technical Guide (SWHTG) and its Significant Wildlife Habitat Decision Support System (SWH Decision Support System; OMNR, 2000); and,
- Draft Significant Wildlife Habitat Ecoregion Criterion Schedules (Draft SWH Ecoregion Criterion Schedules) – Ecoregion 6E (OMNR, 2009).

If the Project extends into the Zone of Investigation for any of the identified significant features (50 m of a provincially significant Earth Science ANSI, 120 m for all other specified natural features), an Environmental Impact Study (EIS) Report is required that identifies and assesses any potential negative environmental effects and provides measures to mitigate negative environmental effects, as per O.Reg. 359/09 (s.38).

2.0 RECORDS REVIEW REPORT

Section 24(1) of O.Reg. 359/09 requires that the proponent of a renewable energy project conducts a Records Review Report in accordance with Section 25. The table provided in s.25 of O.Reg. 359/09 requires records from various federal, provincial and municipal agencies be obtained, including:

1. Records that relate to provincial parks and conservation reserves and that are maintained by the OMNR; and,

2. Records related to natural features and are maintained by:

- the OMNR;
- the Crown in right of Canada;
- a Conservation Authority, if the Project Location is in the area of jurisdiction of the conservation authority;
- each local and upper-tier municipality in which the Project Location is situated;
- the planning board of an area of jurisdiction of a planning board in which the Project Location is situated;
- the municipal planning authority of an area of jurisdiction of a municipal planning authority in which the Project Location is situated;
- the local roads board of a local roads area in which the Project Location is situated;
- the Local Services Board of a board area in which the Project Location is situated; and,
- the Niagara Escarpment Commission, if the Project Location is in the area of the Niagara Escarpment Plan.

Of the above sources, items v, vii, viii and ix do not apply based on jurisdictional responsibilities within the General Project Area. In addition to the above noted sources, comments regarding natural heritage were also sought from stakeholders, as outlined in O.Reg. 359/09.

As per s.25 of O.Reg. 359/09, the purpose of the Records Review Report is to determine whether the Project Location is in, or within 120 m of, a natural feature, a PSW, a Life Science ANSI and/or within 50 m of an Earth Science ANSI. Furthermore, the purpose of the Records Review Report is to:

1. Obtain available baseline information about the area where the Project is being proposed.

2. Determine whether Project Location is within the O.Reg. 359/09 setback distances of the boundaries of known natural features.

This Records Review Report was prepared in accordance with O.Reg. 359/09, s.25(3).

2.1 Methods of Records Review

Background data were collected and reviewed to identify natural features located in, or within the General Project Area and/or 120 m of the Project Location. Documents reviewed and agencies contacted as part of the Records Review Report include, but were not limited to:

Federal Government:

- Email correspondence from Denise Fell, Environment Canada (September 16th, 2005; January 4th, 2006; March 1st, 2007, March 17th, 2010);
- Telephone correspondence with Denise Fell, Environment Canada (March 16th, 2010); and,
- Telephone correspondence with Lyle Friesen, Environment Canada/Canadian Wildlife Service (March 17th, 2010; October 7th, 2010).

Provincial Government

- Guelph District, Ontario (OMNR). Correspondence with: April Nix, Renewable Energy Planning Ecologist; Mike Stone, Renewable Energy Approvals; Tara Lessard, A/Area Biologist (January 4th, 2006; March, April, June, July and November 2010);
- Natural Heritage Information Centre (NHIC) database. Natural Areas and Species records search. OMNR, Peterborough; http://www.OMNR.gov.on.ca/OMNR/nhic/nhic.html (OMNR, 2010b);
- OMNR Land Information Ontario (LIO) digital mapping of natural features, provincial parks and conservation reserves (OMNR, 2010c); and,
- OMNR Renewable Energy Atlas - Bat hibernacula mapping (OMNR, 2010d).

Local Municipality

- Meetings with Township of ACW (April 15th, 2010 and November 15th, 2010);
- Correspondence from Monica Walker-Bolton, Planner, Huron County (September 8th, 2005);
- Meeting with Huron County (May 27th, 2010);
- Huron County Official Plan (2010). Amendment No. 3 to the County of Huron Official Plan. 5-Year Review; and,
- Huron County Online Interactive Mapping (http://gis.huroncounty.ca) – accessed October 2010.

Conservation Authority

- Meetings with Maitland Valley Conservation Authority (MVCA) staff (May 27th, 2010 and November 15th, 2010).

Other Organizations and Data Sources

- Important Bird Areas database (Bird Studies Canada and BirdLife International, http://iba.audubon.org/iba/siteSearch.do. Accessed October 2010);
- Ontario Partners in Flight – Ontario Landbird Conservation Plan: Lower Great Lakes/ St. Lawrence Plain North American Bird Conservation Region 13 (2008);
- Atlas of the Breeding Birds of Ontario (Cadman et al. 2007);
- Ontario Herpetofaunal Atlas (Oldham and Weller, 2000); and,
- Atlas of the Mammals of Ontario (Dobbyn, 1994).

For the purpose of the NHA, the Kingsbridge II Wind Power Project: Environmental Screening Report (ESR; Stantec, 2006), the Kingsbridge II Wind Power Project: Bird Report (Stantec, 2009), and the Kingsbridge II Bat Monitoring Pre-construction Risk Assessment Report (EchoTrack, 2009) were used as background information in the Records Review Report. As the data provided in these report is 'area' based and not 'feature' based, the data was not used to identify candidate significant wildlife habitats, but instead is used to identify the presence of species within the General Project Area for the purpose of identifying the potential for wildlife habitat features. Based on the presence of species in the General Project Area as identified in the ESR Report, Bird Report and Bat Report, the presence of candidate significant wildlife habitat will be confirmed during site investigations. Further, the ESR Report, Bird Report and Bat Report will not be used as habitat use studies for the purposes of the Evaluation of Significance Report as the data could be considered dated (2005-2006). The Kingsbridge II Wind Power Project: Environmental Screening Report, the Kingsbridge II Wind Power Project: Bird Report and the Kingsbridge II Bat Monitoring Pre-construction Risk Assessment Report are provided in Appendix C, Appendix D and Appendix E, respectively.

A review of available background information has indicated the presence of known natural features and potential natural features occurring within 120 m of the Project Location. The information gathered is detailed below (Section 2.2) and referenced where applicable.

2.2 Results of Records Review

2.2.1 Woodlands

The Project is located within the Great Lakes Forest Region's Huron-Ontario Section (Rowe, 1972). Natural upland forest cover is generally dominated by sugar maple (*Acer saccharum*), American beech (*Fagus Americana*), basswood (*Tilia Americana*), white ash (*Fraxinus Americana*), white oak (*Quercus alba*), bur oak (*Quercus macrocarpa*), eastern hemlock (*Tsuga Canadensis*), yellow birch (Betula alleghaniensis), and eastern white pine (*Pinus strobes*). Forests of silver maple (*Acer saccharinum*), Freeman maple (*Acer X freemanii*), white elm (*Ulmus Americana*), red elm (*Ulmus rubra*), black ash (Fraxinus nigra), and eastern white cedar (*Thuja occidentalis*) generally develop in lowland areas. Due to the elevation of this region, and a climate harsher than in the surrounding regions, there are northern forest affinities in certain types of communities; particularly those located in cooler-than-normal microclimatic locations (e.g., lowlands). These are demonstrated by the presence of white and black spruce

(*Picea glauca and Picea mariana)*, tamarack (*Larix laricina*), and balsam fir (*Abies balsamea)*. Most of the original forest cover was cleared during the last century for agricultural production. Huron County as a whole possesses an average forest cover of 15.3% (Riley and Mohr, 1994).

A review of the OMNR's LIO mapping (OMNR, 2010c) and Huron County Official Plan mapping (Huron County, 2010) revealed that the General Project Area contains a large number of isolated and highly fragmented woodlands of various sizes and some larger contiguous forest fragments, many of which are associated with watercourses. Based on LIO mapping (OMNR, 2010c), a total of 70 natural woodland features were identified within 120 m of the Project Location (Figure 2, Appendix A). Specific detailed information on these woodland features in not available through LIO mapping, the MVCA or Huron County.

In the absence of detailed information regarding the 70 woodland features identified through the records review, site investigations will be conducted to further assess their characteristics and to determine whether the natural features meet the definition of 'woodland' provided in O.Reg. 359/09, as amended in O.Reg. 521/10, which defines a "woodland" as "*a treed area, woodlot or forested area, other than a cultivated fruit or nut orchard or a plantation established for the purpose of producing Christmas trees, that is located south and east of the Canadian Shield as shown in Figure 1 in the Provincial Policy Statement issued under section 3 of the Planning Act and approved by the Lieutenant Governor in Council by Order in Council No. 140/2005.* Unique woodland identification numbers for woodlands within 120 m of the Project Location will be applied in the Site Investigation Report (Section 3).

2.2.2 Wetlands

Based on the records review, a number of evaluated (provincially and locally significant) and unevaluated wetlands occur within the General Project Area. A review of LIO mapping (OMNR, 2010c), the Huron County Official Plan mapping (Huron County, 2010), Natural Resources Canada (NRCan) mapping (NRCan, 2010) and the NHIC database (OMNR, 2010b) has indicated the presence of one PSW (Saratoga Swamp PSW), two locally significant wetlands (Colbourne 52A and Colbourne 52D) and 80 additional wetlands (unevaluated) within the General Project Area (see Figure 2, Appendix A). No coastal wetlands were identified within the General Project Area.

2.2.2.1 Provincially Significant Wetlands

Saratoga Swamp PSW

The Saratoga Swamp PSW is a complex of 19 individual wetland pockets, one pocket of which is present just within the eastern boundary of the General Project Area. The Saratoga Swamp PSW is composed of two wetland types (98.7% swamp and 1.3% marsh) and covers 2,047 ha. The vegetation is dominated by deciduous and coniferous species (maple, cedar, ash, birch and dogwood) with abundant narrow-leaved emergent sedges, grasses, ferns and herbs (Coultes *et al*., 1986). The Saratoga Swamp PSW was not identified as occurring within 120 m of the Project Location (see Figure 2, Appendix A).

2.2.2.2 Locally Significant Wetlands

Colbourne 52A

The Colbourne 52A wetland has been evaluated and designated as locally significant (OMNR, 2010b). The wetland is composed of one wetland type (100% swamp), covers 5.3 ha and is 100% palustrine with intermittent outflow (OMNR, 2010b). The vegetation is dominated by narrow-leaved emergents (grasses), bulrushes and willow species, and soils are composed of clay, loams and silt (OMNR, 2010b). The wetland provides winter cover for wildlife (locally significant for deer) and bullfrogs have been noted in the wetland (OMNR, 2010b). The Colbourne 52A wetland was not identified as occurring within 120 m of the Project Location (see Figure 2, Appendix A).

Colbourne 52D

The Colbourne 52D wetland has been evaluated and designated as locally significant. The wetland is composed of one wetland type (100% swamp), covers 9.3 ha and is 100% palustrine (OMNR, 2010b). The vegetation is dominated by willow, elderberry, grasses and sedge, and soils are composed of clay, loam and silt (OMNR, 2010b). No significant wildlife features are known in the wetland (OMNR, 2010b). The Colbourne 52D wetland was not identified as occurring within 120 m of the Project Location (see Figure 2, Appendix A).

2.2.2.3 Unevaluated Wetlands

Of the additional 80 unevaluated (and unnamed) wetlands mapped within the General Project Area, 17 wetlands or part thereof, were identified as occurring within 120 m of the proposed Project Location. No wetlands are known to exist within the Project Location. These additional 17 wetland features were identified through mapping; however, no data records describing their characteristics are available through a review of records. Each of these natural features will be further identified and assessed during site investigations though the principles of OWES (OMNR, 2002a) and Appendix C of the NHAG (*Wetland Characteristics and Ecological Functions Assessment for Renewable Energy Projects;* OMNR, 2011). The presence of other unmapped wetlands in and within 120 m of the Project Location will be determined during site investigations. Unique wetland identification numbers will be applied in the Site Investigation Report (Section 3).

2.2.3 Valleylands

Valleylands are natural areas that occur in a valley or other landform depression that has water flowing through or standing for some period of the year (OMNR, 2010a; OMNR 2011a). Based on LIO mapping (OMNR, 2010c), Huron County Official Plan Mapping (Huron County, 2010) and NHIC Natural Areas Mapping (OMNR, 2010b), no valleylands are present in the General Project Area; however, hazard line data and topographical mapping provided by MVCA indicates the presence of eight potential valleyland systems in, or within 120 m of, the Project Location (Figure 2, Appendix A). The eight potential valleylands identified include (from south to north): Boundary Creek, Nine Mile River, two unnamed watercourses, Kerry's Creek, Eskritt

Drain, Eighteen Mile River and Boyd Creek. Each of these valleylands is associated with a watercourse. Each of these potential valleyland features will be assessed and confirmed during site investigations. Unique valleyland identification numbers will be applied in the Site Investigation Report (Section 3).

2.2.4 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; OMNR, 2000; OMNR, 2011a). To ensure a comprehensive approach to identifying and evaluating significant wildlife habitat, the Significant Wildlife Habitat Technical Guide (SWHTG; OMNR, 2000) has grouped wildlife habitats into four categories: habitats of seasonal concentrations of wildlife; rare vegetation communities and specialized habitat for wildlife; habitat of species of conservation concern; and, animal movement corridors. The SWHTG further divides the four categories of wildlife habitat into sub-groups for the purpose of identifying and evaluating candidate significant wildlife habitat. The draft Significant Wildlife Habitat (SWH) Ecoregion Criteria Schedules (OMNR, 2009) provide further clarification on the identification and evaluation of candidate significant wildlife habitat. Both the SWHTG and the Draft SWH Ecoregion Criteria Schedules (for Ecoregion 6E) were applied in the records review for the purpose of identifying candidate significant wildlife habitat.

A compilation of secondary source background information on known wildlife in the General Project Area was undertaken. Inventories of wildlife were compiled from available literature and resources including the Atlas of the Mammals of Ontario (Dobbyn, 1994), the Ontario Herpetofaunal Summary (Oldham and Weller, 2000), the NHIC (OMNR, 2011a), the Atlas of the Breeding Birds of Ontario (Cadman *et al*., 2007), the Kingsbridge II Wind Power Project: Natural Environment Report (see Appendix C) and Kingsbridge II Wind Power Project: Bird Report (see Appendix D). Based on a review of the background information, 167 species of birds (of which 129 species are documented as possible, probable or confirmed breeding), 28 species of mammals, 14 species of amphibians and 12 species of reptiles are known to occur within the range of the General Project Area. Many of the species recorded within the General Project Area are ranked as S5/G5 (very common, demonstrably secure) or S4/G5 (common to very common); however, 37 wildlife species are considered species of conservation concern (see Section 2.2.4.3). Species identified through the review of background information was used to scope the identification of candidate significant wildlife habitat (discussed below in relevant sections). Six of the species identified are provincial and/or national listed as *Endangered* or *Threatened*). Species listed as *Endangered* or *Threatened* under Ontario's *Endangered Species Act, 2007* (*ESA*) were excluded from the NHA-EIS. Information on *Endangered* or *Threatened* species is provided under a separate document as part of the *K2 Wind Power Project APRD Report.*

It is important to note that the exact location of many species occurrences are not available from the resources reviewed and occurrences are, instead, recorded within 10 x 10 km squares. Consequently, while the species recorded from these databases may occur within the broader

General Project Area, it does not confirm the presence of these species or their habitat within 120 m of the Project Location. However, information gained through the records review regarding the occurrence of wildlife species within the General Project Area is informative and is used to assist the focus of site investigations, the identification of wildlife habitat features within 120 m of the Project Location and to determine whether the area contains candidate significant wildlife habitat.

2.2.4.1 Habitats of Seasonal Concentrations of Wildlife

Habitats of seasonal concentrations of wildlife are areas where animals occur in relatively high densities for that species at specific periods in their life cycles and/or in particular seasons. Seasonal concentration areas tend to be localized and relatively small in relation to the area of habitat used at other times of the year (OMNR, 2000).

The SWHTG (OMNR, 2000) identifies 14 potential types of seasonal concentration areas. Appendix D of the NHAG (OMNR, 2011a) and the Draft SWH Ecoregion Criteria Schedules (Schedule 2; OMNR, 2009) provide a further breakdown of seasonal concentration areas for the purpose of identifying candidate significant wildlife habitat. The 14 types of seasonal concentrations include:

- Winter Deer Yards;
- Colonial Bird Nesting Habitat (Herons, Gulls, Terns and Swallows);
- Waterfowl Stopover and Staging Areas (Aquatic and Terrestrial);
- Waterfowl Nesting Habitat;
- Shorebird Migratory Stopover Areas;
- Raptor Winter Feeding and Roosting Habitat;
- Reptile Hibernacula and Turtle Over-Wintering Habitat;
- Bat Hibernacula and Bat Maternal Colony Roost Habitat;
- Bullfrog Concentration Areas (now combined with Amphibian Wetland Breeding Habitat; see Specialized Habitat for Wildlife);
- Landbird Migratory Stopover Areas;
- Migratory Butterfly Stopover Areas;
- Moose Late Winter Habitat;
- Wild Turkey Winter Range; and,
- Turkey Vulture Summer Roosting Areas.

Based on consultations with the OMNR, five types of seasonal concentration areas identified in the SWHTG were excluded from the records review. The seasonal concentration areas excluded, including the rationale for exclusion, are as follows:

- Landbird Migratory Stopover Areas (the SWHTG includes criteria for only those sites associated within the 5 km shoreline of Lake Ontario in Ecoregion 6E; the Project Location is greater than 5 km from Lake Ontario and as such, this wildlife habitat does not apply);

- Migratory Butterfly Stopover Areas (the SWHTG includes criteria for only those sites associated within the 5 km shoreline of Lake Ontario in Ecoregion 6E; the Project Location is greater than 5 km from Lake Ontario and as such, this wildlife habitat does not apply);
- Moose Late Winter Habitat (habitat not considered to occur within Ecoregion 6E; OMNR, 2009);
- Wild Turkey Winter Range (no longer considered candidate significant wildlife habitat, as outlined in Appendix D of the NHAG; OMNR, 2011a); and,
- Turkey Vulture Summer Roosting Areas (no longer considered candidate significant wildlife habitat, as outlined in Appendix D of the NHAG; OMNR, 2011a).

Winter Deer Yards

Winter deer yards are areas of key winter habitat for white-tailed deer (*Odocoileus virginiamus*). Deer yards consist of a core area of mainly coniferous trees (e.g., pines, hemlock, cedar, spruce) with a canopy cover of more than 60% and provided shelter from snow and wind (OMNR, 2000). The land surrounding the core area is usually mixed or deciduous forest with understory shrubs and small trees, especially white cedar, providing winter food (OMNR, 2000).

According to OMNR mapping, there are no significant deeryards within 120 m of the Project Location (OMNR, 2011a). Several areas of significant deeryard are located to the east of the General Project Area, associated with the Saratoga Swamp PSW complex. Consequently, deer can be expected to be present in the General Project Area and correspondence with the OMNR suggests there will be some winter use and local movement in and out of the General Project Area. However, the determination and evaluation of significant winter deer yards (or congregation areas) is determined and mapped by OMNR staff only. For that reason, the determination of candidate significant winter deer yards within 120 m of the Project Location did not carry forward to the Site Investigation Report (Section 3) or Evaluation of Significance Report (Section 4).

Colonial Bird Nesting Habitat

Colonial birds are a diverse group of birds that nest in groups or colonies, which includes species of herons, gulls, terns, and swallows. Among colonial bird species, there are 3 distinct types of nesting habitats: banks and artificial structures (swallows), tree/shrub habitat (herons), and ground habitat (gulls and terns). As described in the Draft SWH Ecoregion Criteria Schedules (OMNR, 2009), two species of swallow (Cliff Swallow, *Petrochelidon pyrrhonota; and,* Bank Swallow, *Riparia riparia*), four species of herons (Great Blue Heron, *Ardea Herodias*; Black-crowned Night-Heron, *Nycticorax nycticorax;* Great Egret, *Ardea alba*; and, Green Heron, *Butorides virescens*) and five species of gulls and terns (Herring Gull, *Larus argentatus*; Great Black-backed Gull, *Larus marinus*; Little Gull, *Larus minutes;* Common Tern, *Sterna hirundo; and,* Caspian Tern, *Hydroprogne caspia*) are identified as colonial nesting birds in Ecoregion 6E.

As identified above, a review of the background information identified 129 bird species as possible, probable or confirmed breeders in the area, of which six are colonial nesting bird species (Cliff Swallow, Bank Swallow, Great Blue Heron, Green Heron, Herring Gull and Great Black-backed Gull). No candidate significant colonial bird nesting sites are known to occur within 120 m of the Project Location or the General Project Area. Nonetheless, based on air photo interpretation and a review of LIO mapping, candidate significant colonial bird nesting habitat may be available in woodlands, wetlands and valleylands situated within the 120 m of the Project Location. For that reason, the presence of candidate significant colonial bird nesting sites within 120 m of the Project Location will be confirmed during site investigations.

Candidate significant colonial nesting bird sites for ground nesting colonial birds is identified as any rocky island or peninsula (natural or artificial) within a lake or large river (OMNR, 2009). As the Project Location is at least 2 km from the Lake Huron shoreline and no large rivers with rocky islands or peninsulas are located within the General Project Area, colonial nesting sites for ground nesting birds were not carried forward to the Site Investigation Report (Section 3).

Waterfowl Stopover and Staging Areas

As described in the SWHTG, prior to migration many waterfowl congregate in large flocks and set up a pattern of pre-migration staging, whereby the birds move in groups between feeding ponds and a large night roosting pond (OMNR, 2000). During migration, waterfowl require stopover areas that supply food to replenish energy reserves, resting areas, and cover. There are two types of waterfowl stopover and staging areas: terrestrial and aquatic. Terrestrial areas can be fields that temporarily flood during spring, providing important habitat for migrating waterfowl. Aquatic areas will be ponds, marshes, lakes and other more permanently wet areas which provide important habitat for both local and migrating waterfowl (OMNR, 2009).

As described in the Draft SWH Ecoregion Criteria Schedules, 24 species of waterfowl use aquatic habitats as stopover and staging areas are identified in Ecoregion 6E (see OMNR, 2009). Of the 24 waterfowl species, 10 species (American Black Duck, *Anas rubripes;* Blue-winged Teal, *Anas discors*; Ruddy Duck, *Oxyura jamaicensis*; Common Merganser, *Mergus merganser;* Hooded Merganser, *Lophodytes cucullatus;* Red-breasted Merganser, *Mergus serrator;* Common Goldeneye, *Bucephala clangula;* Greater Scaup, *Aythya marila;* Bufflehead, *Bucephala albeola; and,* Wood Duck, *Aix sponsa*) were documented through a review of the background information as using the General Project Area.

As described in the Draft SWH Ecoregion Criteria Schedules, eight waterfowl use terrestrial habitats as stopover and staging areas in Ecoregion 6E (see OMNR, 2009). Of the eight waterfowl species, two species (American Black Duck and Blue-winged Teal) were documented through a review of the background information as using the General Project Area for migration.

No candidate waterfowl stopover and staging areas are known to occur within 120 m of the Project Location. The nearest wildlife management area (WMA) is the Hullett Provincial WMA, which has been designated based on its location along the path of two major waterfowl flyways (see Kingsbridge II Wind Power Project: Bird Report, Appendix D). Hullett Provincial WMA is

located approximately 18 km south-east of the General Project Area and is comprised of a variety of habitats, including wetlands, watercourses, agricultural fields, fallow fields, grasslands, hedgerows and upland woodlots.

Although the Hullett Provincial WMA is outside of the General Project Area, the WMA serves as an important stopover and staging area for migrating waterfowl which may pass through the General Project Area. There are a number of aquatic and terrestrial habitats situated within the General Project Area that could potentially serve as waterfowl stopover and staging areas. The General Project Area contains multiple wetlands, as well as several drainage features that flow westward towards the Lake Huron shoreline. Additionally, based on the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) Agricultural Land-Use Mapping (1:50,000), predominant use of the lands is for continuous row crop (e.g., corn, soybeans) and grain systems, which can provide foraging sites during the day for various waterfowl. However, active agricultural lands are not considered significant wildlife habitat unless they are used by Tundra Swans during spring migration and staging (OMNR, 2009). The presence of candidate significant waterfowl stopover and staging areas in or within 120 m of the Project Location will be determined during site investigations.

Waterfowl Nesting Habitat

Waterfowl nesting sites are generally large, undisturbed areas with an abundance of ponds and wetlands. Vegetation is an important component of waterfowl nesting sites as most species nest in grassy cover, shrubby fields adjacent to wetlands, or in tree cavities along shorelines or swamps (OMNR, 2000).

As described in the Draft SWH Ecoregion Criteria Schedules, nine species of waterfowl (American Black Duck, Northern Pintail, *Anas acuta;* Northern Shoveler, *Anas clypeata*; Gadwall, *Anas strepera*; Blue-winged Teal, Green-winged Teal, *Anas crecca*; Wood Duck, Hooded Merganser and Mallard, *Anas platyrhynchos*) are identified as potentially nesting in Ecoregion 6E (OMNR, 2009).

As identified above, a review of the background information identified 129 bird species as possible, probable or confirmed breeders in the area, of which four are waterfowl species (American Black Duck, Mallard, Blue-winged Teal, Wood Duck). No candidate significant waterfowl nesting sites are known to occur within 120 m of the Project Location. Nonetheless, based on air photo interpretation and a review of LIO mapping, the General Project Area contains both woodlands and wetlands which may be used as waterfowl nesting sites, if the wetlands are surrounded by suitable vegetation. For that reason, the presence of candidate significant waterfowl nesting sites in or within 120 m of the Project Location will be determined during site investigations.

Shorebird Migratory Stopover Areas

Migrating shorebirds often follow the shorelines of the Great Lakes because they provide some of the best shorebird migratory stopover habitat due to their location along migration routes and

because wave action maintains large and productive beaches (OMNR, 2000). During inclement weather, large numbers of shorebirds may accumulate in shoreline stopover areas that produce abundant food and provide safe places to rest.

As described in the Draft SWH Ecoregion Criteria Schedules, 29 species of shorebirds are identified as potentially using the region during migration (OMNR, 2009). Of the 29 shorebird species identified in the Draft SWH Ecoregion Criteria Schedules, four shorebirds (Killdeer, *Charadrius vociferous*; Solitary Sandpiper, *Tringa solitaria*; Spotted Sandpiper, *Actitis macularia*; and, Wilson's Snipe, *Gallinago delicate*) were documented through a review of the background information as using the General Project Area for migration.

The Lake Huron shoreline and associated inlets, bays and harbours typically provide the best habitat for migrating shorebirds. However, the Draft SWH Ecoregion Criteria Schedule identifies shorelines of riparian wetlands, usually muddy and non-vegetated, as key habitat characteristics of shorebird migratory stopover areas, whereas intensive agricultural fields are not included within these habitat criteria (OMNR, 2009). While the General Project Area itself is located approximately 2 to 4 km from the Lake Huron shoreline and no candidate significant shorebird stopover areas are known within 120 m of the Project Location, interpretation of aerial photography and LIO mapping suggest potentially suitable wetland habitats may be present within 120 m of the Project Location. For that reason, the presence of candidate significant shorebird migratory stopover areas in or within 120 m of the Project Location will be determined during site investigations.

Raptor Winter Feeding and Roosting Habitat

Open fields, including hayfields, pastures, and meadows that support large and productive small mammal populations (e.g., mice, voles) are important to the winter survival of many birds of prey (OMNR, 2000). In addition, scattered fence posts or snags for perches, and relatively mature woodlands and treed swamps nearby for roosting are important areas for wintering raptors (OMNR, 2000).

As described in the Draft SWH Ecoregion Criteria Schedules, six raptor species (Rough-legged Hawk, *Buteo lagopus*; Red-tailed Hawk, *Buteo jamaicensis*; Northern Harrier, *Circus cyaneus*; American Kestrel, *Falco sparverius*; Snowy Owl, *Bubo scandiaca*; and Short-eared Owl, *Asio flammeus*, *Special Concern*) are identified as potentially using winter feeding and rooting areas in Ecoregion 6E (OMNR, 2009). Based on a review of background information, 167 species of birds are known to occur within the range of the General Project Area, which includes all six winter raptor species found in Ecoregion 6E. No candidate significant raptor winter feeding and roosting areas are known to occur within 120 m of the Project Location. Nonetheless, based on air photo interpretation and a review of LIO mapping, a number of woodlands and wetlands with open fields likely to provide prey and potential perch sites are present in the General Project Area. For that reason, the presence of candidate significant raptor winter feeding and roosting areas in or within 120 m of the Project Location will be determined during site investigations.

Reptile Hibernacula and Turtle Over-Wintering Habitat

Reptile (snake) hibernacula are often in animal burrows, rock crevices, and other areas that enable the animals to hibernate below the frost line and are often in association with water to prevent desiccation (OMNR, 2000). Frequently, snake hibernacula are found among broken rocks at the base of cliffs or in karst areas, and in rock piles, rubble and old foundations because these landforms often provide suitable subterranean crevices ideal for hibernation. Turtle over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate dissolved oxygen (OMNR, 2009). These areas may support congregations of turtles if over-wintering habitats are limited (OMNR, 2009).

As described in the Draft SWH Ecoregion Criteria Schedules, eight snake species (Eastern Garter Snake, *Thamnophis sirtalis sirtalis*; Northern Brown Snake, *Couleuvre brune*; Smooth Green Snake, Liochlorophis vernalis*;* Northern Ring-necked Snake, Diadophis punctatus edwardsi*;* Northern Water Snake, *Nerodia sipedon sipedon*; Northern Red-bellied Snake, *Storeria occipitomaculata occipitomaculata*; Eastern Milk Snake, *Lampropeltis triangulum* (Special Concern) and Northern Ribbon Snake, Thamnophis sauritus septentrionalis *(Special Concern*)) and three turtle species (Midland Painted Turtle, *Chrysemys picta marginata*; Snapping Turtle, *Chelydra serpentine* (*Special Concern*); and Northern Map Turtle, *Graptemys geographica* (*Special Concern*)) are identified in Ecoregion 6E (OMNR, 2009).

Based on a review of background information, seven snake species identified in Ecoregion 6E (Smooth Green Snake is not known to be present in the General Project Area) and two turtle species identified in Ecoregion 6E (Northern Map Turtle is not known to be present in the General Project Area) are known to occur in the General Project Area. Consultation with the OMNR revealed there are no records available for candidate significant reptile hibernacula or turtle over-wintering sites in the General Project Area. Nonetheless, the presence of snake and turtle species within the General Project Area, the potential presence of reptile hibernacula features such as old building foundations and retaining walls, and the presence of wetlands potentially suitable for over-wintering turtles within 120 m of the Project Location suggest the potential presence of candidate significant reptile hibernacula and turtle over-wintering sites. As such, the presence of candidate significant reptile hibernacula and turtle over-wintering sites in or within 120 m of the Project Location will be determined during site investigations.

Bat Hibernacula

The locations and site characteristics of bat hibernacula are relatively poorly known (OMNR, 2009). Of the information available, bat hibernacula generally consist of caves, abandoned mine shafts, and underground foundations, features which are rare in south-central Ontario landscapes.

Inventories of wildlife were compiled from available literature and resources including the Atlas of the Mammals of Ontario (Dobbyn, 1994). Based on a review of background information, six species of bats are known to occur within the range of the General Project Area including Northern Long-eared Bat (*Myotis septentrionalis*), Little Brown Bat (*Myotis lucifugs*), Red Bat

(*Lasiurus borealis*), Big Brown Bat (*Eptesicus fuscus*), Silver-haired Bat (*Lasionycteris noctivagans*) and Hoary Bat (*Lasiurus cinerus*). Based on a review of the Renewable Energy Atlas (OMNR, 2010d), no known bat hibernacula or maternity roosts have been identified within the General Project Area. A review of karst mapping from the Ontario Ministry of Northern Development and Mines (OMNDM) indicates that a small area in the northern section of the General Project Area is considered 'known karst' and contains two sink holes (Figure 2, Appendix A). These sinkholes are potential sites for bat hibernacula and, therefore, require the application of a 1,000 m buffer as defined in the *Bats and Bat Habitats: Guidelines for Wind Power Projects.* The known karst area is located in the Project Location (underground collector line within municipal road allowance). One sinkhole is located 170 m from the Project Location and the second sinkhole is located 1,280 m from the Project Locations. With the application of the 1,000 m buffer around the sinkholes, one sinkhole is located within the Project Location (collector system within municipal road allowance; see Figure 2, Appendix A). As such, the sinkhole and the 1,000 m buffer area have been identified as candidate significant bat hibernacula and will be confirmed during site investigations. Other areas of potential bat hibernacula ('known karst' area) within the 120 m Zone of Investigation will be assessed during site investigations.

OMNDM mapping also identifies the remainder of the General Project Area as 'inferred karst', meaning '*Regions of carbonate bedrock units highlighted as most vulnerable or susceptible to karstification, where direct field observations have not been made by OGS staff or other sources*' (MNDM, 2011); however, no caves are known within the General Project Area.

Bat Maternal Colony Roost Habitat

The locations and site characteristics of bat maternal colony roost habitats are poorly known (OMNR, 2009). In Ontario, bats use two strategies for roosting during the day. Most species roost in small spaces or crevices found in loose bark, hollow trees, rock faces and human structures such as attics, walls and bat boxes and colony numbers may range from a few to hundreds of individuals (OMNR, 2011a). During the summer, females often roost in large maternity colonies while males tend to roost in small groups or individually (OMNR, 2011b). Other bat species roost in foliage in small groups or individually very high up in the tree canopy and as such are often difficult to detect.

No candidate significant bat maternal colony roost habitats are known to occur within 120 m of the Project Location. Nonetheless, based on air photo interpretation and a review of LIO mapping, a number of woodlands and wetlands potentially supporting suitable maternal colony roost habitat for bats are present within 120 m of the Project Location. As such, the presence of bat maternal colony roosts within 120 m of the Project Location will be determined during site investigations to identify the presence of any unrecorded features (e.g., large diameter trees, snags, caves, crevices) potentially suitable for supporting candidate significant bat hibernacula and/or maternal colony roosts.

Bullfrog Concentration Areas

As described in the SWHTG, American bullfrogs (*Rana catesbeiana)* are primarily aquatic and found in marsh habitat (OMNR, 2000). Bullfrogs require permanent waterbodies for survival as bullfrog tadpoles may take up to several years before undergoing metamorphosis (OMNR, 2000). Appendix D of the NHAG (OMNR, 2011a) and the Draft SWH Ecoregion Criteria Schedule outline bullfrog concentration areas within the context of amphibian wetland breeding habitat. For that reason, the records review for bullfrog concentration areas is discussed below in Section 2.2.4.2 (*Amphibian Wetland Breeding Habitat*).

Summary

Based on the records review, candidate significant wildlife habitats (seasonal concentration areas) that may potentially occur within 120 m of the Project Location include:

- Colonial Bird Nesting Habitat;
- Waterfowl Stopover and Staging Areas;
- Waterfowl Nesting Habitat;
- Shorebird Migratory Stopover Areas;
- Raptor Winter Feeding and Roosting Habitat;
- Reptile Hibernacula and Turtle Over-Wintering Habitat;
- Bat Hibernacula; and,
- Bat Maternal Colony Roost Habitat.

The potential presence of these candidate significant natural features within 120 m of the Project Location will be confirmed during site investigations.

2.2.4.2 Rare Vegetation Communities or Specialized Habitat for Wildlife

Rare Vegetation Communities

Rare vegetation communities are areas that contain a provincially rare vegetation community or are rare within the planning area. A list of rare vegetation communities for southern Ontario has been prepared and described in a document entitled "*Natural Heritage Resources of Ontario: S-ranks for Communities in Site Regions 6 and 7*" (Bakowsky, 1996). A review of this document indicated that there are over twenty (20) rare vegetation Ecosite communities which occur with the broader area of Ecoregion 6E. The SWHTG (Appendix M) identifies the Leatherleaf Shrub Kettle Peatland Type (BOS2-1) as the only rare vegetation community in Huron County (OMNR, 2000). A search of the NHIC database did not identify any records of rare vegetation communities within the General Project Area, and Ecological Land Classification (ELC) information is not available for the General Project Area (Geoff King, Maitland Valley Conservation, pers. comm.). The presence of candidate significant rare vegetation communities within 120 m of the Project Location will be confirmed during site investigations.

Specialized Habitat for Wildlife

Specialized wildlife habitats are areas that support wildlife species that have highly specific habitat requirements (e.g., area-sensitive birds, obligate wetland species), are areas with exceptionally high species diversity or community diversity (e.g., forest habitats with interior forest habitats, heterogeneous ecosystems), and are areas that provide habitat that greatly enhance species' survival (OMNR, 2000; OMNR, 2011a).

The SWHTG (OMNR, 2000) identifies many specialized habitats for wildlife, but has since been refined in the NHAG (see Appendix D; OMNR, 2011a) and Draft SWH Ecoregion Criteria Schedules (OMNR, 2009). As outlined in Appendix D of the NHAG, 19 types of specialized wildlife habitats are recognized, including:

- Interior Forest Breeding Bird Habitat (Area-Sensitive and Declining Species);
- Open Country Breeding Bird Habitat (Area-Sensitive and Declining Species);
- Old Growth or Mature Forest Stands;
- Forest Areas with Abundant Mast;
- Amphibian Woodland Breeding Habitat;
- Amphibian Wetland Breeding Habitat;
- Turtle Nesting Habitat;
- Specialized Woodland Raptor Nesting Habitat;
- Bald Eagle Nesting Habitat and Winter Feeding and Roosting Habitat;
- Osprey Nesting, Foraging and Perching Habitat;
- Moose Calving Habitat;
- Moose Aquatic Feeding Habitat;
- Mineral Licks;
- Denning Sites;
- Seeps and Springs;
- Marsh Breeding Bird Habitat;
- Wolf Rendezvous Sites;
- Sharp-tailed Grouse Leks; and,
- Terrestrial Crayfish Habitat.

Based on consultation with the OMNR and a review of Appendix D of the NHAG (OMNR, 2011a), two specialized wildlife habitats identified in the SWHTG are no longer considered in the assessment of candidate specialized habitats for wildlife, including:

- Forests Providing a High Diversity of Habitats; and,
- Highly Diverse Areas.

Based on consultation with the OMNR and a review of Draft SWH Ecoregion Criteria Schedule for Ecoregion 6E (OMNR, 2009), six types of specialized wildlife habitat are not considered to occur within the General Project Area, including:

- Moose Calving Habitat;
- Moose Aquatic Feeding Habitat;
- Cliffs;
- Denning Sites;
- Wolf Rendezvous Sites; and,
- Sharp-tailed Grouse Leks.

No specialized wildlife habitats are known to occur within the General Project Area; however, a GIS modelling exercise, aerial photo interpretation and a review of wildlife records indicate specialized habitats may be present within 120 m of the proposed Project Location.

Interior Forest Breeding Bird Habitat (Area-Sensitive and Declining Species)

Large, natural blocks of mature woodland habitat are important for interior forest breeding birds. Based on consultation with the OMNR and the SWHTG (OMNR, 2000), interior forest breeding bird habitat is within mature (> 60 years old) forest stands or woodlots 30 ha or greater in size with at least 4 ha of forest interior habitat (based on areas at least 200 m from the forest edge; OMNR, 2000). The application of a 4 ha minimum size threshold is to account for areas where larger habitats do not exist in the planning area. Area-sensitive birds are those species whose distribution is restricted to relatively large patches with forest interior habitat and are often missing from highly fragmented landscapes. Area-sensitive forest birds are heavily dependent on forest habitat metrics, such as percent forest cover and patch size, and forest quality (Sibley, 2001). Patch size appears to be dependent on forest cover, becoming more important in areas with less than 30 percent forest cover (Environment Canada, 2007a).

Based on a review of background information, 167 total species of birds are known to occur within the range of the General Project Area, which includes 28 area-sensitive and/or declining forest breeding birds. No candidate significant interior forest breeding bird habitats are known to occur within 120 m of the Project Location. Nonetheless, based on air photo interpretation and a review of LIO mapping, a number of large woodlands and wetlands providing forest interior habitat are potentially present in the General Project Area. For that reason, the presence of candidate significant interior forest breeding bird habitats in or within 120 m of the Project Location will be determined during site investigations.

Open Country Breeding Bird Habitat (Area-Sensitive and Declining Species)

Large fields with abundant vegetation and scattered trees and shrubs are important open country habitat for birds. A number of area-sensitive birds require areas of relatively large open grasslands as they are more likely to be buffered from disturbance, more likely to increase the distance of nesting habitat to woody edges (thereby reducing nest predation and parasitism), and provide more opportunities for nesting (OMNR, 2000). Grasslands with a variety of vegetation structure, density, and composition tend to support a greater diversity of grassland nesting birds because different species require different nesting habitat (OMNR, 2000). Other species nesting in these habitats may not require extensive areas, but have very specific habitat requirements which limit their distribution (OMNR, 2000). For these species, grasslands areas

provide essential food, cover and nesting habitat. Appendix Q of the SWHTG indicates large grasslands greater than 30 ha are likely most significant, and support and sustain a high diversity of these species, whereas open country habitats used for intense farming activity (i.e., row-cropping) are not considered candidate significant habitats for open country breeding birds (OMNR, 2000).

Based on a review of background information, 167 total species of birds are known to occur within the range of the General Project Area, which includes five area-sensitive open country breeding birds (Northern Harrier, Upland Sandpiper, *Bartramia longicauda*; Grasshopper Sparrow, *Ammodramus savannarum*; Savannah Sparrow, *Passerculus sandwichensis*); and Western Meadowlark, *Sturnella neglecta*). No candidate significant open country breeding bird habitats are known to occur within 120 m of the Project Location or the General Project Area. Nonetheless, based on OMAFRA Agricultural Land-Use Mapping (1:50,000), agriculture is the dominant land-use in the General Project Area, signifying a large area of open land is present. The presence of candidate significant open country breeding bird habitat (non-agriculture fields) in or within 120 m of the Project Location will be determined during site investigations.

Old Growth or Mature Forest Stands

True old growth, or mature, forest stands in southern Ontario are very rare due to past logging practices and development pressures (OMNR, 2000). Generally these forest sites are characterized by having a large proportion of trees in older age classes, many of them over 120 to 140 years old (OMNR, 2000). The undisturbed nature, closed canopy and moist growing conditions of mature forest stands allow environmental conditions to exist that cannot be found within younger wooded areas (OMNR, 2000). Mature forests that do exist provide significant habitat and contain a diversity of features such as various tree heights, species, and ages, tree cavities, fallen logs, fungi, and soil moisture conditions (OMNR, 2000).

The Project Location falls within the Great Lakes Forest Region's Huron-Ontario Section (Rowe, 1972). Most of the original forest cover was cleared during the last century for agricultural production and the remaining forest fragments have experienced intensive tree harvesting or are secondary growth forests. Huron County as a whole possesses an average forest cover of 15.3 percent (Riley and Mohr, 1994). No candidate significant old growth or mature forest stands are known to occur within 120 m of the Project Location. Nonetheless, a review of OMNR's LIO mapping (OMNR, 2010c) and Huron County Official Plan mapping (Huron County, 2010) indicates that the General Project Area contains a large number of isolated and highly fragmented woodlands of various sizes and some larger contiguous forest fragments. Based on LIO mapping (OMNR, 2010c), the General Project Area possesses approximately 13.6 percent forest cover. Forested areas will be examined during site investigations to determine the presence of old growth or mature forest stands in or within 120 m of the Project Location.

Foraging Areas with Abundant Mast

Mast-producing tree species are an important source of food for birds and mammals who consume the fruits and nuts (OMNR, 2000). Areas containing numerous mast-producing trees are important foraging areas, especially when the animals require energy rich food to help build fat reserves for the winter. Forest types which contain numerous American beech and red oak trees supply energy-rich beechnuts and acorns, and open areas containing large patches of berry-producing shrubs are examples of foraging areas with abundant mast (OMNR, 2000).

Maintenance of large woodland tracts with mast-producing tree species is important for bears. Within the 6E region, an isolated and distinct population of black bears is known to occur within the Bruce Peninsula (OMNR, 2009). As the Project Location is not proposed within the Bruce Peninsula area, the specialized habitat of foraging areas with abundant mast for bears does not apply.

The General Project Area overlaps with the range of American beech and red oak suggesting potential candidate significant foraging areas with abundant mast within 120 m of the Project Location for other wildlife dependent on food resources produced from mast trees. The presence of candidate significant foraging areas with abundant mast in or within 120 m of the Project Location will be determined during site investigations.

Amphibian Woodland Breeding Habitat

Amphibian woodland breeding habitats consist of pools, wetlands or lakes within or adjacent (120 m) to woodlands (OMNR, 2000). Such water bodies may be small and ephemeral (vernal), but nevertheless are important to local amphibian populations within a landscape, especially if they provide the only suitable habitat in the area (OMNR, 2000). The best breeding ponds are unpolluted, have a high degree of permanence (water until at least mid-July), contain a variety of vegetation structures, both in and around the edge of the pond, for egg-laying and calling by frogs, and have damp closed-canopy adjacent habitats with dense undergrowth and moist fallen logs (OMNR, 2000). Sites with several ponds and/or ponds close to creeks are especially valuable (OMNR, 2000).

As described in the Draft SWH Ecoregion Criteria Schedules, seven amphibian species (Eastern Red-spotted Newt, *Notophthalmus viridescens louisianensis*; Blue-spotted Salamander, Ambystoma laterale*;* Spotted Salamander, *Ambystoma maculatum*; Gray Treefrog, *Hyla versicolor*; Spring Peeper, *Pseudacris crucifer*; Chorus Frog, *Pseudacris triseriata*; and Wood Frog, *Rana sylvatica*) are identified in Ecoregion 6E (OMNR, 2009). None of these species are considered species of conservation concern. Based on a review of background information, 14 species of amphibian are known to occur within the range of the General Project Area, which includes six of the amphibian species identified in Ecoregion 6E (excludes Blue-spotted Salamander). Based on a review of available resources, no records of candidate significant amphibian woodland breeding habitats are available within 120 m of the Project Location. Nonetheless, based on air photo interpretation and a review of LIO mapping, the presence of woodland area within 120 m of the Project Location suggests the potential

presence of candidate significant amphibian woodland breeding habitat. As such, the presence of candidate significant amphibian woodland breeding habitat in or within 120 m of the Project Location will be determined during site investigations.

Amphibian Wetland Breeding Habitat

Wetland habitats support a high diversity of wildlife species, including amphibians such as bullfrogs (OMNR, 2000). Wetlands supporting breeding for these amphibian species are extremely important and fairly rare within Southern Ontario landscapes (OMNR, 2009). If logs and shrubs are present, the significance of the area increases because these habitat features provide additional shelter, concealment from predators, foraging opportunities and locations to call for mates (OMNR, 2009). Areas supporting breeding amphibians are important within southern Ontario landscapes, and any wetland supporting breeding bullfrog populations (or bullfrog concentration areas) is considered significant.

Current OMNR guidance (i.e., SWHTG) identifies open wetland habitats suitable for concentrated populations of American bullfrogs as significant. American bullfrogs are primarily aquatic and found in marsh habitat (OMNR, 2000). Bullfrogs require permanent waterbodies for survival as bullfrog tadpoles may take up to several years before undergoing metamorphosis (OMNR, 2000). Based on a review of available resources, no records of candidate significant amphibian wetland breeding habitats are available within 120 m of the Project Location. Nonetheless, based on air photo interpretation and a review of wetlands mapping, the presence of wetland area within 120 m of the Project Location suggests the potential presence of candidate significant amphibian wetland breeding habitat. As such, the presence of candidate significant amphibian wetland breeding habitat within 120 m of the Project Location will be confirmed during site investigations.

Turtle Nesting Habitat

Turtle nesting areas must provide sand and/or gravel where turtles can dig their nests in, and are often south to south-west facing to maximize exposure to sunlight for egg incubation (OMNR, 2000). Sand and gravel beaches adjacent to shallow areas of marshes, lakes, and rivers are most frequently used (OMNR, 2009). If the turtle travels from the aquatic environment in search of a suitable nesting area, optimally, safe movement corridors will be present between the nesting and aquatic habitat (OMNR, 2000).

As described in the Draft SWH Ecoregion Criteria Schedules, three reptile species (Midland Painted Turtle, Snapping Turtle (*Special Concern*) and Northern Map Turtle (*Special Concern*)) are identified in Ecoregion 6E (OMNR, 2009). Based on a review of background information, two species of turtle (Midland Painted Turtle and Snapping Turtle) are known to occur within the General Project Area. Based on a review of available resources, no records of candidate significant turtle nesting habitats are available within 120 m of the Project Location. Nonetheless, based on air photo interpretation, the presence of woodlands and wetlands potential supporting turtle nesting habitat within 120 m of the Project Location suggests the potential presence of candidate significant turtle nesting habitat. As such, the presence of

candidate significant turtle nesting habitat in or within 120 m of the Project Location will be determined during site investigations.

Specialized Woodland Raptor Nesting Habitat

Raptors typically nest in intermediate-aged to mature woodlands that provide large sturdy trees for nesting and perching, and open understory flight and hunting prey (OMNR, 2000). Important factors in woodland nesting habitat selection for several species of raptors are species composition, size, and age of forest stand (OMNR, 2000).

As described in the Draft SWH Ecoregion Criteria Schedules, nine raptor species (Northern Goshawk, *Accipiter gentilis*; Cooper's Hawk, *Accipiter cooperii*; Sharp-shinned Hawk, *Accipiter striatus*; Red-shouldered Hawk, *Buteo lineatus*; Northern Saw-whet Owl, *Aegolius acadicus*; Barred Owl, *Strix varia*; Long-eared Owl, *Asio otus*; Merlin, *Falco columbarius*; and Broad-winged Hawk, *Buteo platypterus*) are identified in Ecoregion 6E (OMNR, 2009). Based on a review of background information, four species of raptor listed above (Cooper's Hawk, Sharp-shinned Hawk, Long-eared Owl and Broad-winged Hawk) are known to occur within the General Project Area. Based on a review of available resources, no records of candidate significant specialized woodland raptor nesting habitats are available within 120 m of the Project Location. Nonetheless, the presence of raptor species within the General Project Area and the presence of woodlands and wetlands potentially supporting specialized woodland raptor nesting habitats within 120 m of the Project Location, suggest the potential presence of candidate significant specialized woodland raptor nesting habitat. As such, the presence of candidate significant specialized woodland raptor nesting habitat in or within 120 m of the Project Location will be determined during site investigations.

Bald Eagle Nesting Habitat and Winter Feeding and Roosting Habitat

Bald Eagles ((*Haliaeetus leucocephalus*) use shoreline habitat associated with lakes and large rivers (rarely small lakes and rivers) for nesting and foraging (OMNR, 2000). As Bald Eagles are predominantly fish-eating birds, productive areas of open water or deep-water marshes supporting large quantities of fish are required to feed growing young (OMNR, 2000). Nests are usually built in large trees near shore or over water and are often reused, becoming extremely large as new nest material is added each year (OMNR, 2000). The Bald Eagle shows a distinct preference for islands with no particular preference for mixed, coniferous, or deciduous forest, but do show a preference for live trees and conifers in Ontario for nesting purposes (OMNR, 2000). Large trees greater than 60 cm diameter at breast height (dbh) with crotches large enough to support the huge nest is essential. Nests are typically near the top of the nest tree, which must provide an unobstructed view and flight path in all directions (OMNR, 2000).

Bald Eagles winter along shorelines of large waterbodies that provide areas of open water, with abundant and accessible fish (OMNR, 2000). Bald Eagles roost in large trees growing in shoreline forest stands or on cliffs (OMNR, 2000). The location of winter roosting sites changes within and among winters depending upon ice conditions and fish distribution, but the same general areas are used traditionally and often the same trees will be used year after year

(OMNR, 2000). An abundant supply of undisturbed mature trees or snags distributed evenly along a shoreline is important to ensure that eagles can alter their winter distribution patterns depending upon ice conditions and fish distribution (OMNR, 2000). Snags are preferred for perches and roosts, as are tall trees with large horizontal branches and should provide an unobstructed view (OMNR, 2000).

Based on a review of background information, Bald Eagles are known to occur in the area (see Appendix D - Kingsbridge II Wind Power Project: Bird Report), but no evidence of breeding has been documented in the Atlas of the Breeding Birds of Ontario (Cadman *et al*., 2007). Based on the absence of Bald Eagle sightings during the breeding season, the absence of large lakes or rivers suitable for nesting, and the habitat preferences of Bald Eagles in Ontario, it is unlikely that this species is nesting within 120 m of the proposed Project Location. Nonetheless, the rare status of the Bald Eagle (*Special Concern*) justifies the identification of candidate significant Bald Eagle nesting habitat. For that reason, the presence of candidate significant Bald Eagle nesting habitat in or within 120 m of the Project Location will be determined during site investigations.

Bald Eagle sighting outside the breeding season suggest the potential for winter feeding and roosting areas within the General Project Area. The presence of candidate significant Bald Eagle winter feeding and roosting areas in or within 120 m of the Project Location will be determined during site investigations.

Osprey Nesting, Foraging and Perching Habitat

Similar to Bald Eagles, Osprey (*Pandion haliaetus*) use shoreline habitat associated with lakes and large rivers (rarely small lakes and rivers) for nesting and foraging (OMNR, 2000). As Osprey are obligate fish-eating birds, productive areas of open water or deep-water marshes supporting large quantities of fish are required to feed growing young (OMNR, 2000). Most nesting sites are located in mixed forest habitat, but nests may also occur in coniferous and deciduous stands (OMNR, 2000). Dead coniferous trees are preferred for nesting; nests are usually at the top of the tree, but occasionally are in crotches and isolated trees are usually selected as opposed to groups of trees (OMNR, 2000). Almost all nests have an unobstructed view, and there is usually a tall perch nearby for the male (OMNR, 2000). Nests are typically used year after year, sometimes for decades (OMNR, 2000).

Based on a review of background information, Ospreys are not known to occur in the area (see Appendix D - Kingsbridge II Wind Power Project: Bird Report) and no evidence of breeding has been documented in the Atlas of the Breeding Birds of Ontario (Cadman *et al*., 2007). Based on the absence of Osprey sightings during the breeding season, the absence of large lakes or rivers suitable for nesting, and the habitat preferences of Ospreys, it is unlikely that this species is nesting within 120 m of the proposed Project Location. Therefore, the determination of candidate significant Osprey nesting, foraging and perching habitat in or within 120 m of the Project Location was not carried forward to the site investigation.

Mineral Licks

Mineral licks are upwellings of sodium rich groundwater that are visited by wildlife to replenish sodium levels which had been depleted from the consumption of plants that are much higher in potassium than sodium in the spring (OMNR, 2000). In Ecoregion 6E, mineral licks are most commonly sought after by white-tailed deer in the spring. These sites are rare, occurring most frequently in areas of sedimentary and volcanic bedrock and rarely in areas of granitic bedrock except where the site is overlain by calcareous glacial till (OMNR, 2000). Based on a review of background information, there are no mineral licks known from General Project Areas. The region is also characterized by limited calcareous till and sediments of lacustrine clays, underlain by clay till materials with a minimum of pebbles and boulders. Subsequently, the identification of mineral licks was not carried forward to the site investigations.

Seeps and Springs

Seeps and springs are areas where groundwater has come to the surface, often within forested headwater areas of coldwater streams (OMNR, 2000). These groundwater seepages may support numerous species, potentially providing habitat for plants, animals (e.g., fish), and/or feeding and drinking areas. Those that occur within forested areas where the canopy maintains cool, shaded conditions are most important (OMNR, 2000).

As described in the Draft SWH Ecoregion Criteria Schedules, White-tailed Deer, Wild Turkey (*Meleagris gallopava*) and Ruffed Grouse (*Bonasa umbellus*) typically use seeps and springs in Ecoregion 6E (OMNR, 2009). Based on a review of background information, there are no known seeps or springs in the General Project Area; however, based on topographical maps and aerial photographs, headwater areas for coldwater streams associated with rolling topography are present within the General Project Area suggesting the potential presence of seeps and springs within 120 m of the proposed Project Location. The presence of candidate significant seeps and springs in or within 120 m of the Project Location will be determined during site investigations.

Marsh Breeding Bird Habitat

Wetlands for marsh bird species are typically productive and fairly rare in Southern Ontario landscapes, but are the preferred habitat of many of Ontario's birds (OMNR, 2000). As outlined in the Draft SWH Ecoregion Criteria Schedules, all wetland habitat is to be considered candidate significant marsh breeding bird habitat as long as there is shallow water with emergent aquatic vegetation present (OMNR, 2009).

As described in the Draft SWH Ecoregion Criteria Schedules, 11 species of marsh birds (American Bittern, *Botaurus lentiginosus*; Virginia Rail, *Rallus limicola*; Sora, *Porzana Carolina*; Common Moorhen, *Gallinula chloropus*; American Coot, *Fulica Americana*; Pied-billed Grebe, *Podilymbus podiceps*; Marsh Wren, *Cistothorus palustris*; Sedge Wren, *Cistothorus platensis*; Common Loon, *Gavia immer;* Sandhill Crane, *Grus Canadensis;* and Green Heron) are identified as potentially occurring in Ecoregion 6E (OMNR, 2009). Based on a review of background information, six marsh birds (Virginia Rail, Sora, Pied-billed Grebe, Sedge Wren,

Common Loon and Green Heron) have been identified within the General Project Area. Based on a review of available resources, no records of candidate significant marsh breeding bird habitats are known within 120 m of the Project Location. Nonetheless, the presence of marsh birds within the General Project Area and the presence of wetlands potentially supporting marsh breeding habitat within 120 m of the Project Location suggests the potential presence of candidate significant marsh breeding habitat. As such, the presence of candidate significant marsh breeding habitat in or within 120 m of the Project Location will be determined during site investigations.

Terrestrial Crayfish Habitat

Terrestrial crayfish are burrowers which spend most of their life constructing and living within a network of tunnels (OMNR, 2009). Tunnels are usually built in soils that are not too dry or moist so that the tunnels remain well formed. Therefore, constructed in marshes, mudflats, and meadows where the ground is the right moisture level (OMNR, 2009). In Canada, terrestrial crayfish are only found within southwestern Ontario and their habitat is very rare. Accordingly, Meadow Crayfish (*Cambarus diogenes*) are considered a rare species (S3 species). Meadow marsh ecosites should be surveyed for terrestrial crayfish (OMNR, 2009).

ELC information is not available for the General Project Area (Geoff King, Maitland Valley Conservation, pers. comm.) and there are no known records indicating whether there are any meadow marsh ecosites within 120 m of the Project Location. The presence of candidate significant terrestrial crayfish habitat in or within 120 m of the Project Location will be determined during site investigations.

Summary

Based on the records review, candidate significant wildlife habitats (specialized habitat for wildlife) that may potentially occur within 120 m of the Project Location include:

- Interior Forest Breeding Bird Habitat (Area-Sensitive and Declining Species);
- Open Country Breeding Bird Habitat (Area-Sensitive and Declining Species);
- Old Growth or Mature Forest Stands;
- Foraging Areas with Abundant Mast;
- Amphibian Woodland Breeding Habitat;
- Amphibian Wetland Breeding Habitat;
- Turtle Nesting Habitat;
- Specialized Woodland Raptor Nesting Habitat;
- Bald Eagle Nesting Habitat and Winter Feeding and Roosting Habitat;
- Seeps and Springs;
- Marsh Breeding Bird Habitat; and,
- Terrestrial Crayfish Habitat.

The potential presence of these candidate significant natural features within 120 m of the Project Location will be confirmed during site investigations.

2.2.4.3 Habitat of Species of Conservation Concern

Special Concern and rare species occurrences are significant due to their status or due to the relative number of occurrences within Ontario (OMNR, 2009). As outlined in the NHAG (OMNR, 2011a), five categories of species of conservation concern which require identification of habitat for the purpose of identifying candidate significant habitat of species of conservation concern include:

- Rare or substantially declining, or have a high percentage of their global population in Ontario and are rare or uncommon in the planning area;
- Species that are rare within the planning area, even though they may not be provincially rare;
- *Special Concern* species identified under the *ESA* on the SARO List, which were formally referred to as "vulnerable" in the *Significant Wildlife Habitat Technical Guide*;
- Species that are listed as rare or historical in Ontario based on records kept by the NHIC (S1 is extremely rare, S2 is very rare, S3 is rare to uncommon); and,
- Species identified as nationally *Endangered* or *Threatened* by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), which are not protected in regulation under Ontario's *ESA*

Fifty-one (51) species identified in the review of background information as occurring within the General Project Area are considered species of conservation concern (see Table 2.1, Appendix B).

Based on Appendix D of the NHAG (OMNR, 2011a), habitats for species of conservation concern are divided into three categories, including:

- *ESA Special Concern* and Provincially Rare – Plant Species;
- *ESA Special Concern* and Provincially Rare – Other Species; and
- Declining Guilds - Shrubland Birds.

Within the context of O.Reg. 359/09, habitat of species of conservation concern does not include habitats of species that have been designated *Endangered* or *Threatened* under the ESA. Information on *Endangered* or *Threatened* is provided under a separate document as part of the *K2 Wind Power Project APRD Report*.

ESA Special Concern and Provincially Rare – Plant Species

Of the 51 species identified in the review of background information considered species of conservation concern within the General Project Area, 16 species are plants (see Table 2.1, Appendix B). Two species are listed as S1 (heart-leaved alexanders, *Zizia aptera*; and, *Bryum gemmiparum,* a moss), five species are listed as S2 (soft-hairy false gromwell, *Onosmodium molle* ssp. *hispidissimum*; slim-flowered muhly, *Muhlenbergia tenuiflora*; Chinese hemlock parsley, *Conioselinum chinense*; deer-tongue panic grass, *Dichanthelium clandestinum*; and

eastern green-violet, *Hybanthus concolor*), one species is listed as S2S3 (mat muhly, *Muhlenbergia richardsonis*), and eight species are listed as S3 (green dragon, *Arisaema dracontium*; tuberous Indian-plantain, *Arnoglossum plantagineum*; Great Lakes sand reed, *Calamovilfa longifolia* var. *magna*; Schweinitz's sedge, *Carex schweinitzii*; rigid sedge, *Carex tetanica*; ram's-head lady's-slipper, *Cypripedium arietinum*; Great Lakes wild rye, *Elymus lanceolatus* ssp. *psammophilus*; and American gromwell, *Lithospermum latifolium*). Green dragon and tuberous Indian-plantain are also listed as *Special Concern* under the provincial *ESA.*

The exact locations of these plant species are not available through the NHIC database and therefore, it is unknown if these species are present within 120 m of the Project Location. The presence of candidate significant habitat of species of conservation concern (plant species) will be confirmed during the site investigations.

ESA Special Concern and Provincially Rare – Other Species

Of the 51 species identified in the review of background information considered species of conservation concern within the General Project Area, there are 28 bird species (*ESA* species, PIF species and low-ranking species), three reptile species (*ESA* species and low-ranking species), three lepidoptera species (*ESA* species and low-ranking species) and one odonata species (low-ranking species) that are categorized as 'other species' (see Table 2.1, Appendix B). Twelve (12) of the species are listed as *Special Concern* under the *ESA*, including seven bird species, all three reptile species and two lepidoptera species.

Bald Eagles (*Special Concern*) are noted as potentially occurring within the General Project Area. The habitat for this species is addressed in Section 2.2.4.2 (Bald Eagle Nesting Habitat and Winter Feeding and Roosting Habitat).

Rough-legged Hawks (S1B, S4N) are noted as potentially occurring within the General Project Area. The habitat for this species is addressed in Section 2.2.4.2 (Winter Raptor Feeding and Roosting Habitat).

Great Black-backed Gulls (S2B) were identified in the review of background information; however, habitat for this species is not expected to occur in the General Project Area (see Section 2.2.4.1 – Colonial Bird Nesting Habitat).

The exact locations of these species are not available through the NHIC database, nor could they be determined from a review of original ESR conducted by Stantec in 2006. As a result, it is unknown if these species are present within 120 m of the Project Location. The presence of candidate significant habitat of species of conservation concern (other species) will be confirmed during site investigations. The identification of habitats for species of conservation concern are provided in the Site Investigation Report (Section 3).

Declining Guilds - Shrubland Birds

The general decline of avian species associated with shrubland/successional habitats has been identified as a conservation concern in southern Ontario (Cadman *et al.*, 2007; Ontario Partners in Flight, 2008). The review of background information indicated that shrubland/successional species designated by PIF as conservation priorities are known to occur within the General Project Area. These shrubland/successional species include Willow Flycatcher (*Empidonax traillii*), Black-billed Cuckoo (*Coccyzus erythropthalmus*), Brown Thrasher (*Toxostoma rufum*) and Eastern Towhee (*Pipilo erythrophthalmus*). As the Project Location is mainly associated with agricultural lands and woodlands, shrubland/successional habitat is limited in the General Project Area. Nonetheless, the presence of shrubland/successional species within the General Project Area suggests the potential presence of candidate significant habitat of species of conservation concern (declining guilds – shrubland birds) within 120 m of the Project Location. As such, the presence of candidate significant habitat of species of conservation concern (declining guilds – shrubland birds) within 120 m of the Project Location will be confirmed during site investigations.

2.2.4.4 Animal Movement Corridors

Animal movement corridors are habitats that link two or more wildlife habitats that are critical to the maintenance of a population of a particular species or group of species (particularly in highly fragmented landscapes; OMNR, 2000). These corridor habitats serve a key ecological function to enable wildlife to move between areas of significant wildlife habitat or core natural areas with a minimum of mortality (OMNR, 2009; OMNR, 2011a). Animal movement corridors are elongated, naturally vegetated parts of the landscape used by animals to move from one habitat to another (OMNR, 2000). These corridors may include valleylands, dense vegetated riparian buffer areas, and hedgerows, and are potentially used by a variety of wildlife species including migratory and breeding birds, reptiles and amphibians; however, as outlined in the SWHTG (OMNR, 2000), hedgerows should not be considered significant unless they provide the only animal movement corridors in the area.

As outlined in Appendix D of the NHAG (OMNR, 2011a), two types of animal movement corridors are recognized, including:

- Deer Migration corridors; and,
- Amphibian Corridors.

Deer Migration corridors

Deer migration corridors can be extremely important in allowing access to habitats that provide cover and food from harsh winter elements and are important for deer movement between their summer and winter range (OMNR, 2009). However, it is often difficult to observe deer using corridors (OMNR, 2000). Deer migration corridors typically follow riparian areas, woodlots, and/or areas of physical geography (ravines or ridges).

As outlined in the Draft SWH Ecoregion Criteria Schedules (OMNR, 2009), winter deer yards and the movement corridors between deer winter and summer ranges must be confirmed by the OMNR. As no winter deer yard areas (or congregation areas) have been identified within the General Project Area, the identification of candidate significant deer migration corridors did not progress to the Site Investigations Report (Section 3).

Amphibian Corridors

Movement corridors for amphibians migrating from their terrestrial habitat to breeding habitat can be extremely important for local populations as they can provide safe movement between the two seasonal habitats (OMNR, 2009). As identified in the Draft SWH Ecoregion Criteria Schedules, amphibian movement corridors must be determined when amphibian breeding habitat is confirmed as significant wildlife habitat. As the records review has identified that amphibian breeding habitat (woodland and wetland) is unknown is the General Project Area (see Sections 2.2.4.2), the presence of candidate significant amphibian corridors is unknown. Nonetheless, the presence of woodland and wetland habitats potentially supporting amphibian breeding population and the presence of large wooded ravines associated with riparian areas within the General Project Area, suggests the presence of candidate significant amphibian movement corridors within the General Project Area. The presence of candidate significant amphibian movement corridors within 120 m of the Project Location will be confirmed during site investigations.

As the SWHTG outlines that hedgerows should not be considered significant unless they provide the only animal movement corridors in the planning area, the presence of large wooded ravines associated with riparian areas justifies exclusion of hedgerows unless they provided connection between amphibian breeding habitats and terrestrial habitats. The presence of hedgerows within 120 m of the Project Location that may be considered candidate significant amphibian corridors will be confirmed during site investigations.

2.2.5 Areas of Natural and Scientific Interest (ANSI)

A review of the NHIC database (OMNR, 2010b), LIO mapping (OMNR, 2010c) and Huron County mapping (Huron County, 2010) identified the presence of three ANSI's within the General Project Area including the provincially significant Lothian-Lake Warren Shorelines ANSI (Earth Science), the regional significant Mafeking ANSI (Earth Science) and the regional significant Lucknow River ANSI (Life Science) within the General Project Area (see Figure 2, Appendix A). Information on the Mafeking (Lake Warren Raised Beach) ANSI does not exist within the OMNR records and based on consultation with the OMNR (Donald Kirk, pers. comm.); the feature may be a relic in the database. As such, the Mafeking ANSI is not discussed further in this report.

The Project Location is located within the boundaries of the Lothian-Lake Warren Shorelines ANSI complex. The Lothian-Lake Warren Shorelines ANSI complex consists of a variety of glaciolacustrine features including a wide depositional raised beach ridge and bar complex truncated by an erosional shorebluff (Lothian-Lake Warren Shorelines ANSI) and an erosional

shorebluff cut into hummocky till moraine (Lothian South ANSI; OMNR, 2002b). The dominant landform in this area is the Wyoming Moraine which lies to the east and south of the glaciolacustrine features (OMNR, 2002b). The division between the northern and southern sections (Lothian-Lake Warren Shorelines ANSI and Lothian South ANSI, respectively) coincides closely with the OMNR's jurisdictional boundary between the Midhurst District (Bruce County) and the Guelph District (Huron County).

More specifically, the proposed Project Location is within the Lothian South ANSI section. The glaciolacustrine features dominating the Lothian South ANSI consist principally of wave-washed till moraine truncated in the west by a gently sloping shorebluff. The till is referred to as the St. Joseph Till (Cowan *et al*., 1986; Cowan and Pinch, 1986). The till is composed of clayey silt with low stone content and was deposited as a basal till during the Port Huron re-advance approximately 13,000 years ago (Cowan and Pinch, 1986). Two prominent sand offshore bars lie immediately below the shorebluff trending almost directly east-west, slightly acute to the trend of the shore (OMNR, 2002b). Each bar extends approximately 1.5 km and do not appear to be connected to the shorebluff (OMNR, 2002b). As a whole, the complex is ranked as provincially significant because the ANSI consists of a series of ancient beach ridges that are considered to be one of the best developed examples of beach ridges older than Lake Nipissing and the best representing Glacial Lake Warren (OMNR, 2002b). Current land use within the ANSI is low intensity agriculture, with the primary impacts being road construction and small sand and gravel pits in the northern section (Bruce County).

The regionally significant Lucknow River ANSI (Life Science) was identified within 120 m of the Project Location. The Lucknow River ANSI is linked with the Nine Mile River, the associated valleyland system and upland vegetation communities, and is characterized by a high level of topographic and vegetation diversity. The riverbank is a mix of cedar-basswood-red maple-ash-willow and wet mesic upland white birch-balsam poplar-ash-basswood-sugar maple forest along a creek (OMNR, 2010b). The upland is composed of young to semi-mature (some regenerated areas) forest of ash-sugar maple-black cherry-basswood with area of dense regenerating cedar (OMNR, 2010b). Some small portions have been selectively cut (OMNR, 2010b). The ANSI is bisected by two roads (River Mill Road and Cransford Line).

2.2.6 Provincial Parks and Conservation Reserves

A review of the NHIC database (OMNR, 2010b) revealed that there are no provincial parks within 120 m of the proposed Project Location. The nearest provincial park is Point Farms Provincial Park, located approximately 3 km southwest of proposed Project Location (see Figure 2, Appendix A).

The proposed Project Location is not located within the Niagara Escarpment Plan, the Oak Ridges Moraine Conservation Plan Area or the Protected Countryside of the Greenbelt Plan.

2.2.7 Summary of Records Review

The results of the records review indicated that the following natural features occur or may occur within 120 m of the K2 Wind Project Location:

- Woodlands (70 features);
- Wetlands (17 'unevaluated' wetland features);
- Valleylands (8 features);
- Wildlife Habitat;
- Habitats of Seasonal Concentrations of Wildlife;
- Colonial Bird Nesting Habitat;
- Waterfowl Stopover and Staging Areas;
- Waterfowl Nesting Habitat;
- Shorebird Migratory Stopover Areas;
- Raptor Winter Feeding and Roosting Habitat;
- Reptile Hibernacula and Turtle Over-Wintering Habitat;
- Bat Hibernacula and Maternal Colony Roost Habitat;
- Rare Vegetation Communities or Specialized Habitat for Wildlife;
- Rare Vegetation Communities;
- Interior Forest Breeding Bird Habitat (Area-Sensitive and Declining Species);
- Open Country Breeding Bird Habitat (Area-Sensitive and Declining Species);
- Old Growth or Mature Forest Stands;
- Foraging Areas with Abundant Mast;
- Amphibian Woodland Breeding Habitat;
- Amphibian Wetland Breeding Habitat;
- Turtle Nesting Habitat;
- Specialized Woodland Raptor Nesting Habitat;
- Bald Eagle Nesting Habitat and Winter Feeding and Roosting Habitat;
- Seeps and Springs;
- Marsh Breeding Bird Habitat;
- Terrestrial Crayfish Habitat;
- Habitat of Species of Conservation Concern;
- *ESA Special Concern* and Provincially Rare – Plant Species;
- *ESA Special Concern* and Provincially Rare – Other Species;
- Declining Guilds - Shrubland Birds;
- Animal Movement Corridors;
- Amphibian Corridors;
- Earth Science ANSI (within 50 m) (Lothian-Lake Warren Shorelines ANSI); and,
- Life Science ANSI (Lucknow River ANSI).

Provincial Parks, Conservation Areas, PSW's and LSW's are not present within 120 m of the Project Location. A site investigation is required to confirm the presence and boundaries of

these features, as well as determine whether any additional natural features exist in, or within 120 m of, the proposed Project Location (see Section 3.0).

3.0 SITE INVESTIGATION REPORT

Section 24(2) of O.Reg. 359/09 requires that the proponent of a renewable energy project conduct a site investigation, in accordance with Section 26 of the Regulation. As outlined in Section 26(1), the purpose of the site investigation, which consists of a "*physical investigation of the air, land and water within 120 metres of the Project Location*", includes a determination of attributes that include the following:

- Confirm the accuracy of the assessment made in the Records Review Report (Section 2) and identify any required corrections (s.26(1)(a));
- Determine if there are any additional natural features present within 120 m of a Project Location that were not identified in the Records Review Report (s.26(1)(b));
- Determine the boundaries of natural features located within 120 metres of a Project Location that were identified during the Records Review Report (s.26(1)(c)); and,
- Determine the distance from the Project Location to the boundaries of the natural features identified within 120 metres of a Project Location (s.26(1)(d)).

Data collected during the records review concerning natural features, species occurrences and candidate significant wildlife habitat were used to guide the scope and direction of site investigations. The following subsections explain any corrections to the results presented in Section 2.2 of the Records Review Report and additional information on natural features identified throughout the Records Review Report.

3.1 Site Investigation Methodology

Site investigations were undertaken to confirm and refine the boundaries of natural features identified in Section 2 (Records Review Report), to supplement existing background information with any additional natural features not previously identified, and to assess the characteristics (i.e., type, attributes, composition and function) of the natural features within the Project Location and the 120 m Zone of Investigation surrounding the Project Location.

Site investigations were conducted by AMEC between May 2010 and November 2011 within the 120 m Zone of Investigation surrounding the Project Location. The site investigation program involved detailed reviews of the vegetation communities, wildlife and wildlife habitat, and bird and bat use of the General Project Area. The location of all field investigations was based on an assessment of possible habitat in the General Project Area, and information about the Project lands and Project Location siting current at the time of the respective survey. Non-leased properties with natural features within 120 m of the proposed Project Location were also assessed where possible; however, many of the features were inaccessible (see Section 3.1.1).

The site investigations identify current conditions within the Project Location and the 120 m Zone of Investigation. Survey dates, times, field personnel and weather conditions are presented in Table 3.1 (Appendix B) and field notes are provided in Appendix F. All candidate significant natural features identified during site investigations are provided in Figure 3.1 to 3.29 (Appendix A). The following sub-sections provide details of the survey methodology.

3.1.1 Alternate Site Investigation

In accordance with section 26(3)(7) of O.Reg. 359/09, as amended through O.Reg. 521/10, alternative site investigations were conducted where it was not reasonable to conduct site specific investigations. Site investigations were completed within the Zone of Investigation surrounding the Project Location (turbine locations, access roads, crane pads, collector lines, and construction areas) for all participating lands and where access to non-participating lands was available. The Proponent initiated contact with non-participating landowners to obtain permission in support of the Project. Site investigations were only completed on lands where access was granted by the landowner. Where permission was not granted to access adjacent properties, or where it was not deemed reasonable to complete a site investigation for other reasons (e.g., unsafe conditions), an alternative site investigation was completed. In all such cases, these methods included a combination of aerial photograph interpretation and visual observations in the field from the nearest property line, fence line or municipal road allowance. Observations of vegetation, species, communities, wildlife, wildlife habitat features and structures were recorded were possible. The properties where site investigations and alternative site investigations were completed are identified on Figure 4.1 and 4.2 (Appendix A). The dates of the visual observation for alternate site investigations are provided in Table 3.1 (Appendix B).

The following situations necessitated the need for an alternative site investigation within the Zone of Investigation because it was not reasonable to physically access these properties:

- **Collector lines**: Due to the large number of non-participating properties along the approximately 106 km of collector lines (approximately 215 properties), it was not deemed reasonable to contact each landowner to request and obtain access to their property. Aside from collector lines following access roads, the proposed collector lines are restricted to the already-disturbed, existing road allowances; therefore, roadside surveys were considered a sufficient level of effort to supplement air photo interpretation, confirm the records review information, identify additional natural features and describe existing conditions to an appropriate level necessary to assess significance and potential impacts of the collector lines, where necessary;
- **Access permission specifically denied by landowner**: Access to several properties within the Zone of Investigation was requested and not provided by landowners (e.g., Feature 63). In these cases, property line or fence line surveys were completed (as described in the following subsections); and,
- **Other non-participating landowners**: In some cases, adjacent properties did not contain natural features requiring a physical site investigation. These cases included properties that did not contain a natural feature, such as residential properties or agricultural fields. Site characteristics and conditions were recorded to an appropriate level of detail through an interpretation of aerial photographs and observations from the nearest property line or road.

3.1.2 Vegetation Community and Vascular Plant Assessment

Field investigations to identify vegetation communities and vascular plants located within 120 m of the Project Location were conducted between June and November, 2010, April and May 2011, and October and November, 2011. Due to the timing of some of the site investigations (i.e., April, October and November), a complete list of plant species was not attainable; however, confirmation of ELC communities was possible based on the prevailing vegetation in the canopy, sub-canopy and understory. Survey dates, times, field personnel and weather conditions are presented in Table 3.1 (Appendix B) and field notes are provided in Appendix F.

Prior to the commencement of the site investigations, a preliminary review of vegetation communities was conducted through aerial photograph interpretation and a review of existing natural features mapping. The Project Location and associated 120 m Zone of Investigation was traversed on foot and vegetation communities were described based on the Ecological Land Classification (ELC) for Southern Ontario manual (Lee *et al.*, 1998). Vegetation communities were described to '*Vegetation Type*' (e.g., FOD5-8), where possible. Common and scientific nomenclature of plant species generally follows the NHIC database.

For areas where alternative site investigations were conducted (roadside locations or property lines), a visual inspection from the nearest vantage point from the municipal road allowance of way or adjacent property line was supplemented with aerial photograph interpretation for the purpose of identifying natural features and species composition, including wildlife and wildlife habitat features, and confirming natural feature boundaries. In such cases, vegetation communities were described to either 'ELC Community Series' (e.g., FOD), 'Ecosite' (e.g., FOD5) or 'Vegetation Type' (e.g., FOD5-8), depending on the ability to identify vegetative species from the nearest vantage point.

3.1.3 Woodlands

As described in the Records Review Report (Section 2.2.1), treed areas, woodlots or forest areas, including plantations, were identified and delineated through aerial photograph interpretation prior to undertaking site investigations. The true boundaries of woodland features within 120 m of the Project Location were confirmed during the vegetation surveys. Woodland areas identified during vegetation surveys were compared to the definition of woodlands provided in O.Reg. 359/09, as amended in O.Reg. 521/10, which defines a "woodland" as *"a treed area, woodlot or forested area, other than a cultivated fruit or nut orchard or a plantation established for the purpose of producing Christmas trees, that is located south and east of the Canadian Shield as shown in Figure 1 in the Provincial Policy Statement issued under section 3 of the Planning Act and approved by the Lieutenant Governor in Council by Order in Council No. 140/2005"*.

The boundaries of woodlands were determined based on the definition provided in the NHAG (OMNR, 2011a). Woodlands bisected by an opening greater than 20 m (such as a road or rail crossing) were considered distinct woodlands. In circumstances where woodlands are bisected by an area 20 m or less, the developed opening was not included in the woodland area

calculation. Based on criteria outlined in the NHAG (OMNR, 2011a), information regarding woodland size, ecological function (e.g., woodland interior, proximity to other woodlands or other habitats, linkages, water protection and woodland diversity) and uncommon characteristics (rare or uncommon community types, old or large mature trees) was gathered during site investigations to identify candidate significant woodlands. Woodland stand structure, estimated woodland age and wildlife habitat features were also documented for woodland feature, where possible. Survey dates, times, field personnel and weather conditions are presented in Table 3.1 (Appendix B) and field notes are provided in Appendix F.

For woodland areas extending beyond the 120 m Zone of Investigation, the woodland characteristics and boundaries were determined based on aerial photograph interpretation (alternate site investigations).

3.1.4 Wetlands

Principles of the *Ontario Wetland Evaluation System (OWES) Southern Manual* (OMNR, 2002a) protocol were applied to verify and delineate all wetland features within 120 m of the Project Location. Wetlands extending beyond the 120 m Zone of Investigation were delineated based on aerial photograph interpretation in accordance with the methods outlined in the *OWES Southern Manual*. Field verification following aerial photo interpretation was based on presence of seasonally or permanently shallow water and at least 50% dominance of hydrophytic vegetation at the edge of a wetland, as well as soil types (hydric soils), where necessary. All identified wetlands were either classified as bog, fen, marsh or swamp depending on the observations made during the site investigation. These four types are recognized by the Canadian Wetland Classification System (Warner and Rubec, 1997) and OWES.

Areas of previously unidentified wetlands discovered during the course of the site investigations, as well as those wetlands identified in the Record Review Report that are within 120 m of the Project Location, were assessed and delineated between June and October 2010 and between October and November 2011 (see Table 3-1, Appendix B). In most cases, the edge of the wetland could be determined based on the application of the 50/50 rule of hydrophytic versus hydrophilic vegetation, as per the OWES guidelines; however, where wetland boundaries could not be readily determined based on the presence of seasonally or permanently shallow water and at least 50% dominance of hydrophytic vegetation at the edge of a wetland, evidence of hydrological indicators (e.g., moss lined trees, water stained leaves and/or buttressed trees) and hydric soils (as necessary) were assessed.

All delineations and assessments were completed by an OMNR certified OWES evaluator. Survey dates, times, weather conditions and field personnel are summarized in Table 3.1 (Appendix B) and field notes are provided in Appendix F. The criteria found in Appendix C of NHAG (OMNR, 2011a) were used to determine the characteristics and ecological functions of identified wetlands (see Table 4.2, Appendix B).

3.1.5 Valleylands

A valleyland is defined as a natural area that is south and east of the Canadian Shield and occurs in a valley or other landform depression that has flowing or standing water for some period of the year (OMNR, 2010a; OMNR, 2011a). The purpose of the site investigation was to verify the boundaries of valleylands identified through the records review and establish the presence of any additional valleylands and their boundaries. The assessments of valleylands were conducted concurrently with ELC and wildlife habitat assessments and were verified by comparing the edge of the valleyland within 120 m of the Project Location, as identified in the field, versus the estimated edge identified in the Records Review Report.

The evaluation of valleylands was based on guidelines outlined in the NHRM (OMNR, 2010a) and the NHAG (OMNR, 2011a). For well-defined valleylands, the physical boundary was generally defined by the stable top-of-bank or the predicted top-of-bank (also known as top of slope or top of valley) and for a less well-defined valley or stream corridor, the physical boundary was defined through the consideration of riparian vegetation, the flooding hazard limit, the meander belt or the highest general level of seasonal inundation. Survey dates, times, and field personnel are summarized in Table 3.1 (Appendix B).

For valleyland areas extending beyond the 120 m Zone of Investigation, the valleyland characteristics and ELC boundaries were determined based on aerial photograph interpretation (alternate site investigations).

3.1.6 Wildlife Habitat

Field investigations to identify wildlife habitat located within 120 m of the Project Location were conducted concurrently with ELC surveys, and woodland, wetland and valleyland assessments between June and November 2010, between April and May 2011, and between October and November 2011. Survey dates, times, weather conditions and field personnel are summarized in Table 3.1 (Appendix B).

Surveys focused on identifying any wildlife habitat features within 120 m of the Project Location, as identified in Appendix D of the NHAG (OMNR, 2011a). Wildlife habitat characteristics such as vernal pools, snags, tree cavities and downed woody debris (DWD) were identified to provide further support for the assessment of significant wildlife habitat. All species, including species of conservation concern, observed over the course of the site investigations were noted and were considered in the assessment of wildlife habitat located in, and within 120 m of, the Project Location. The spatial extent of the site investigations and the habitats covered provide a comprehensive set of field observations for various flora and fauna species in the General Project Area.

As described in the SWHTG (OMNR, 2000) and Appendix D of the NHAG (OMNR, 2011a), four categories of wildlife habitats are recognized including habitats of seasonal concentrations of wildlife (seasonal concentration areas), rare vegetation communities and specialized habitat for wildlife, habitat of species of conservation concern and animal movement corridors.

Methodologies for identifying candidate significant wildlife habitat were based on key significance criteria outlined in the SWHTG. Where applicable, the Draft SWH Ecoregion Criteria Schedules (OMNR, 2009) were applied to determine the ELC communities that support wildlife habitat and the critical defining criteria for determining significance. The significance criteria were applied to scope candidate significant wildlife habitat.

3.1.6.1 Bird and Bird Habitat Surveys

With respect to candidate significant wildlife habitat for birds, site investigations were conducted based on the *Birds and Bird Habitats: Guidelines for Wind Power Projects* (OMNR, 2011c) for the purpose of identifying potential bird habitat as it pertains to seasonal concentration areas and specialized wildlife habitat. These wildlife habitats include:

- Colonial Bird Nesting Habitat;
- Waterfowl Stopover and Staging Areas;
- Waterfowl Nesting Habitat;
- Shorebird Migratory Stopover Areas;
- Raptor Winter Feeding and Roosting Habitat;
- Interior Forest Breeding Bird Habitat (Area-Sensitive and Declining Species);
- Open Country Breeding Bird Habitat (Area-Sensitive and Declining Species);
- Specialized Woodland Raptor Nesting Habitat;
- Bald Eagle Nesting Habitat and Winter Feeding and Roosting Habitat; and,
- Marsh Breeding Bird Habitat.

The criteria outlined in Appendix Q of the SWHTG (OMNR, 2000) and the Draft SWH Ecoregion Criteria Schedules (OMNR, 2009) for identifying bird habitat were applied during site investigation surveys, including the application of ELC criteria specific to the identification of candidate significant wildlife habitat.

Surveys included searching for the following:

- Banks, artificial structure and tree/shrub habitats capable of supporting colonial nesting birds;
- Flooded fields, ponds, marshes, lakes and other more permanently wet habitats for migrating waterfowl;
- Undisturbed habitats with an abundance of ponds and wetlands with dense surrounding vegetation for nesting waterfowl;
- Muddy and non-vegetated shoreline habitats of riparian wetlands for migrating shorebirds (agricultural fields not included);
- Open cultural habitats with adjacent woodlands, scattered fence posts or snags for winter raptors;
- Large (>30 ha) natural blocks of mature woodland habitat with at least 10 ha of forest interior habitat for area-sensitive breeding birds;

- Large fields (>30 ha) with abundant vegetation and scattered trees and shrubs for open country area sensitive species;
- Mid-aged to mature woodlands that provide large sturdy trees for nesting, perching and open understory flight for woodland nesting raptors;
- Shoreline habitats associated with lakes and large rivers (with abundant fish populations) with large isolated trees and/or snags that provide suitable Bald Eagle nesting, roosting and/or perching sites; and,
- Wetlands with shallow water and emergent aquatic vegetation for nesting marsh birds.

Throughout all bird habitats, evidence of large stick nests, open cup nests and cavity nests were searched concurrently with ELC surveys. The application of ELC ecosites for the purpose of identifying candidate significant wildlife habitats for birds is described in Sections 3.2.4.1 and 3.2.4.2.

Survey dates, times, field personnel and weather conditions are presented in Table 3.1 (Appendix B) and field notes are provided in Appendix F.

3.1.6.2 Bat and Bat Habitat Surveys

With respect to candidate significant wildlife habitat for bats, site investigations were focused on the identification of potential bat habitat as it pertains to seasonal concentration areas. These habitats include:

- Bat Hibernacula; and,
- Bat Maternal Colony Roost Habitat.

The *Bats and Bat Habitats: Guidelines for Wind Power Projects* (OMNR, 2011b) outlines the requirement for a physical investigation of the air, land and water within 120 m of the Project Location to determine the presence of candidate significant bat hibernacula and bat maternal colony roosts.

With respect to bat hibernacula, the physical site investigation requires the identification of caves/crevices and/or abandoned mines. As the General Project Area contains known karst areas (including sink holes) and inferred karst areas, site investigations were conducted for the purpose of identifying caves/crevices capable of supporting bat hibernacula sites (abandoned mines are not expected to occur in the General Project Area).

With respect to bat maternal colony roosts, the physical site investigation requires the use of ELC to determine the presence of mixed wood forests or deciduous forests and a determination of the density of snags/cavity trees ≥25 cm dbh within the forest site. ELC surveys for this Project were conducted prior to the most recently published bat guidelines noted above; therefore, an alternate strategy was employed. ELC data sheets were evaluated to determine where snag/cavity trees ≥25 cm dbh were documented as '*occasional*' or '*abundant*'. ELC ecosites documented as having '*rare*' snags ≥25 cm dbh were not assessed as the term '*rare'* in the ELC definition means '*represented by only one to a few standing woody stems'*.

The forest sites were re-evaluated in October and November 2011 to determine if the presence of snags/cavity trees ≥25 cm dbh is ≥10 per hectare, as outlines in the *Bats and Bat Habitats: Guidelines for Wind Power Projects* (OMNR, 2011b). Snag/cavity tree sampling was conducted based on protocols outlined in Appendix A of the *Bats and Bat Habitats: Guidelines for Wind Power Projects* (OMNR, 2011b). The protocol requires a minimum of 10 survey plots for sites ≤10 ha (and one additional plot for each extra hectare up to a maximum of 35 plots). The survey plots are a fixed 12.6 m-radius (equates to 0.05 ha) and all snags/cavity trees within the plot are documented.

Survey dates, times, field personnel and weather conditions are presented in Table 3.1 (Appendix B) and field notes are provided in Appendix F.

3.1.6.3 Amphibian and Amphibian Habitat Surveys

With respect to candidate significant wildlife habitat for amphibians, site investigations were focused on the identification of potential amphibian habitat as it pertains to specialized wildlife habitat. These habitats include:

- Amphibian Woodland Breeding Habitat; and,
- Amphibian Wetland Breeding Habitat.

The criteria outlined in Appendix Q of the SWHTG (OMNR, 2000) and the Draft SWH Ecoregion Criteria Schedules (OMNR, 2009) for identifying amphibian woodland and wetland breeding habitats were applied during site investigation surveys. Surveys included searching for vernal pools and standing water within and adjacent to woodlands and wetlands, and assessing the presence of key habitat characteristics critical for amphibian breeding (e.g., presence of shrubs and downed woody debris, and absence of predatory fish). Surveys were conducted in October and November 2011 when the majority of amphibian woodland breeding habitats (vernal pools) were dry; therefore, in these cases the water depth during spring time was estimated based on evidence of moss lined, water stained and/or buttressed trees (hydrological indicators). The application of ELC ecosites for the purpose of identifying candidate significant wildlife habitat for amphibians is described in the Section 3.2.4.2.

Survey dates, times, field personnel and weather conditions are presented in Table 3.1 (Appendix B) and all field notes are provided in Appendix F.

3.1.6.4 Reptile and Reptile Habitat Surveys

With respect to candidate significant wildlife habitat for reptiles, site investigations were focused on the identification of potential reptile habitat in and within 120 m of the Project Location, as it pertains to seasonal concentration areas and specialized wildlife habitat. These habitats include:

- Reptile Hibernacula;

- Turtle Over-Wintering Habitat; and,
- Turtle Nesting Habitat.

Surveys for potential reptile hibernacula, turtle nesting habitat and over-wintering habitat were conducted concurrently with ELC surveys, and woodland and wetland assessments between June and September 2010. The criteria outlined in Appendix Q of the SWHTG (OMNR, 2000) and the Draft SWH Ecoregion Criteria Schedules (OMNR, 2009) for identifying reptile hibernacula, turtle over-wintering habitat and turtle nesting habitats were applied during site investigation surveys. Potential hibernacula were identified as features that would provide a route underground, including buried concrete or rock (e.g., old building foundations), rock crevices or animal burrows. Turtle over-wintering habitat was identified as features capable of supporting turtles during harsh winter conditions that prevent freezing and desiccation such as shallow water wetlands with abundant aquatic vegetation, deep ponds and marshy meadows. Turtle nesting habitat was identified as areas providing sand and/or gravel for nesting, usually in a bank or hillside and located adjacent to shallow areas of marshes, lakes, and rivers. The application of ELC ecosites for the purpose of identifying candidate significant wildlife habitat for reptiles is described in Sections 3.2.4.1 and 3.2.4.2.

Survey dates, times, field personnel and weather conditions are presented in Table 3.1 (Appendix B) and all field notes are provided in Appendix F.

3.1.6.5 Habitats of Species of Conservation Concern

Surveys for species of conservation concern were conducted as a component of the overall site investigation program. Site investigations were intended to identify the presence, or potential habitat for, species of conservation concern. As outlined in Appendix D of the NHAG (OMNR, 2011a), site investigations were focused on the identification of three categories of potential habitat of species of conservation concern. These habitats include:

- *ESA Special Concern* and Provincially Rare – Plant Species;
- *ESA Special Concern* and Provincially Rare – Other Species; and,
- Declining Guilds - Shrubland Birds.

Habitats for species identified within these three categories were conducted concurrently with ELC vegetation community surveys and wildlife surveys described above. The application of ELC ecosites for the purpose of identifying candidate significant wildlife habitat for species of conservation concern is described in Section 3.2.4.3.

Survey dates, times, field personnel and weather conditions are presented in Table 3.1 (Appendix B) and all field notes are provided in Appendix F.

3.1.6.6 Animal Movement Corridor Surveys

As identified in the Records Review Report (Section 2), amphibian corridor habitat is potentially present within the 120 m Zone of Investigation. Amphibian corridors are described as corridors

connecting significant amphibian breeding habitats. Candidate significant amphibian corridors were determined based on the presence of candidate significant amphibian breeding habitat (woodland and wetland) and the potential to support safe movements of amphibians between breeding habitats. Generally, safe movement corridors are unbroken by major roads and provide dense vegetation cover or leaf litter to minimize detection by predators.

3.1.6.7 Other Wildlife Habitat Surveys

For the purpose of this assessment, other wildlife habitats are those that include crustacean habitat and those that do not fit into the wildlife groups described above (e.g., birds, bats, amphibians and reptiles), but instead support habitat for a broad range of wildlife species across many groups. These habitats include:

- Rare Vegetation Communities;
- Old Growth or Mature Forest Stands;
- Foraging Areas with Abundant Mast;
- Seeps and Springs; and,
- Terrestrial Crayfish Habitat;

The application of ELC ecosites for the purpose of identifying candidate significant wildlife habitat for amphibians is described in Section 3.2.4.2.

Survey dates, times, field personnel and weather conditions are presented in Table 3.1 (Appendix B) and all field notes are provided in Appendix F.

3.1.7 Areas of Natural and Scientific Interest (ANSI)

Site investigations at ANSI's were conducted concurrently during ELC and wildlife habitat assessment. As these areas have been deemed significant features, site investigations were conducted for the purpose of confirming the accuracy of the assessment made in the Records Review Report (Section 2).

Site investigations (i.e., topographical surveys) were undertaken at the provincially significant earth science ANSI to confirm the locations of landscape features associated with the ANSI (offshore sand bar areas) in relation to the Project Location. Survey dates, times, field personnel and weather conditions are presented in Table 3.1 (Appendix B).

3.1.8 Candidate vs. Generalized Candidate Significant Wildlife Habitat

As described in Appendix D of the NHAG (OMNR, 2011a), the identification of candidate significant wildlife habitats occurring within 120 m of the Project Location can be scoped depending on the expected impacts of project components (i.e., construction versus operational). The OMNR has scoped the candidate significant wildlife habitats that the applicant must address within 120 m of certain project components based on the potential for that project component to affect the use of the habitat by wildlife (e.g., disturbance/avoidance, movement

corridors, vectors). Habitats listed in Table 16 of the NHAG which are not required to be identified for a particular project component, but may exist within 120 m of that component based on landscape and geography, must be assumed to be existing and significant, and described as generalized Candidate Significant Wildlife Habitat". The NHAG also states that these habitats are not required to be listed individually.

In order to classify natural features as candidate significant wildlife habitat versus generalized candidate significant wildlife habitat, each Project component, as described in Table 16 of the NHAG, was separated out and their distance to each natural feature was determined. Those features within 120 m of the Project Location that interact with a project component identified with an 'X' in Table 16 of the NHAG were considered candidate significant wildlife habitat. Conversely, those features within 120 m of the Project Location that interact with a project component not identified with an 'X' in Table 16 of the NHAG were considered generalized candidate significant wildlife habitat. The closest distances of each natural feature to each Project component is provided in Table 3.4 (Appendix B).

In order to apply Appendix D of the NHAG to species of conservation concern that fall under the '*ESA Special Concern* and Provincially Rare – Other Species' category, the OMNR was consulted to determine which project components within 120 m of the Project Location require the characterization of candidate significant wildlife habitat or can be considered generalized candidate significant wildlife habitat. Based on consultations, species were matched with the "best fit" habitat type in Table 16 of the NHAG (Appendix D) based on biology and life history of each species and the subsequent "X" system was applied to determine candidate significant wildlife habitat versus generalized candidate significant wildlife habitat. If a species could not be matched with habitat type in Table 16 of the NHAG (Appendix D), Appendix G of the SWHTG was applied to identify habitat. Rationale for habitats being treated as candidate significant wildlife habitat versus generalized candidate significant wildlife habitat is provided, where necessary, based on biology and life history of species.

3.2 Site Investigation Results

The General Project Area, Project Location and lands within 120 m of the Project Location are comprised primarily of actively cultivated cropland. Crops consist largely of soybeans, corn, hay and grazed pasture. Based on ELC, natural features consist of deciduous, coniferous and mixed-wood forests, deciduous and mixed swamps, thicket swamps, meadow marshes and cultural areas (woodlands, meadow, thickets and plantation). The vegetation communities (ELC ecosites) found within 120 m of the Project Location are described in Table 3.2 (Appendix B) and shown on Figures 5.1 to 5.29 (Appendix A). ELC sheets are provided in Appendix F and a complete list of vascular plant species recorded within 120 m of the Project Location is provided in Appendix G.[2] The mixture of vegetation communities identified within the Project Location reflects both the natural history of the area and disturbances caused through human activity.

[2] Based on consultation with the OMNR, several areas identified as upland during site investigation were identified as wetland by the OMNR through a review aerial photography. As a result, several ELC codes identified in Table 3.3 (denoted with an asterisk) are not consistent with wetland ecosites.

Watercourses commonly traverse the Project Location, generally flowing west towards Lake Huron. Many of the natural features were associated with a watercourse and were often associated with riparian vegetation communities.

Each feature (except valleylands and some wildlife habitat) has been delineated based on contiguous woodland, wetland and cultural boundaries and assigned a unique identification or 'Feature' number (Table 3.3, Appendix B; Figures 3.1 to 3.29, Appendix A). The individual woodlands, wetlands and wildlife features are discussed in the context of each feature and are individually assigned unique identifiers to assist with cross-referencing and discussions in the Evaluation of Significance Report (Section 4) and EIS Report (Section 5). This approach allows for the abridging and grouping of natural features for ease of presentation and discussion. Valleylands and wildlife features not associated with woodlands, wetlands or cultural areas (e.g., wildlife movement corridors) are assigned separate unique natural feature numbers.

A summary of the suggested corrections to the natural features as a result of the site investigation program, as identified through the records review, and new features identified as a result of the site investigation are provided in relevant sections below. The boundaries and types of each candidate significant natural features located within 120 m of the Project Location are illustrated in Figures 3.1 to 3.29 (Appendix A). The size, attributes, composition and function of each natural feature (e.g., wetland, woodland, valleyland and wildlife habitat) is discussed in relevant section below. Site investigation field notes are provided in Appendix F.

3.2.1 Woodlands Assessment

As noted in Section 3.1.3, woodlands were defined in accordance with O.Reg. 359/09, as amended through O.Reg. 521/10. Any features (or portions thereof) that did not satisfy this definition, such as meadow marshes, cultural meadows or thickets, homesteads and cultivated trees, were not considered "woodlands" for the purposes of this assessment. Of the 70 woodland features identified through the records review, 61 were confirmed as woodlands during site investigations based on O.Reg. 359/09, as amended through O.Reg. 521/10. The limits of all 61 woodland features are identified on Figures 3.1 to 3.29 (Appendix A).

The average size of the woodlands within 120 m of the Project Location was approximately 33.7 ha, with sizes ranging from 0.5 ha to 314.7 ha and the median size of 6.8 ha. Thirty-one (31) of these woodlands (51%) contain interior forest habitat, which for the purpose of the woodlands assessment, includes interior portions of the woodlands that are greater than 100 m from the woodland edge. A description of the size, attributes, composition and functions for each woodland found within 120 m of the Project Location is provided in Table 3.3 (Appendix B). The closest distance of each candidate significant woodland feature to each Project component within the 120 m Zone of Investigation is provided in Table 3.4 (Appendix B).

As a result of the site investigations (ELC, vegetation survey and woodland assessment), the following suggested corrections were made to the records review for woodlands within 120 m of the Project Location:

- Seven features identified as 'woodland' in the records review were identified as cultural thicket, cultural meadow and/or cultural savannah during the site investigations, including Features 2, 21, 34, 41, 50, 58b and 60 (see Figures 3.1 to 3.29, Appendix A and Table 3.3, Appendix B). These features do not meet the definition of 'woodland', as per O.Reg. 359/09 (as amended through O.Reg. 521/10);
- Parts of 11 features identified as 'woodland' in the records review were identified as cultural thicket and/or cultural thicket during the site investigations, including Features 9, 12, 14, 16, 19, 24, 33, 37, 43, 52 and 59 (see Figures 3.1 to 3.29, Appendix A and Table 3.3, Appendix B). These areas within the features listed above do not meet the definition of 'woodland', as per O.Reg. 359/09 (as amended through O.Reg. 521/10);
- Parts of three features identified as 'woodland' in the records review were identified as mineral meadow marsh during the site investigations, including Features 28, 47 and 49 (see Figures 3.1 to 3.29, Appendix A and Table 3.3, Appendix B). These areas within the features listed above do not meet the definition of 'woodland', as per O.Reg. 359/09 (as amended through O.Reg. 521/10);
- Parts of two features (Feature 9 and 44) identified as 'woodland' in the records review was identified as mineral thicket swamps through the site investigations (see Figures 3.1 to 3.29, Appendix A and Table 3.3, Appendix B). These areas within Features 9 and 44) does not meet the definition of 'woodland', as per O.Reg. 359/09 (as amended through O.Reg. 521/10);
- Two features identified as 'woodland' in the records review were identified as wetlands (19a and 61) during the site investigations (see Figures 3.1 to 3.29, Appendix A and Table 3.3, Appendix B) and do not meet the definition of 'woodland' (O.Reg. 359/09, as amended through O.Reg. 521/10); and,
- Twenty-five (25) woodland areas required re-delineation of the woodland boundary, including woodlands associated with Features 1, 3, 5c, 6, 8, 9, 12, 13, 14, 16, 18, 19, 21, 33, 34, 35, 37, 42, 44, 49, 51, 55, 59, 67 and 68 (see Figures 3.1 to 3.29, Appendix A and Table 3.3, Appendix B).

All woodland vegetation communities found within 120 m of the Project Location are ranked S5 (common and secure in Ontario). The woodlands within 120 m of the Project Location are a mix of young, mid-aged and mature forests, with dominant canopy species consisting of sugar maple, white ash and eastern white cedar. American beech, black and red ash, ironwood, white pine and hemlock were rare to occasional in most woodlots. Coniferous plantations of white pine, red pine, white spruce and scotch pine were observed.

During the site investigations, 206 species of vascular plants were recorded within 120 m of the Project Location, of which 159 species (77%) were native and 47 (23%) were exotic. Many of the exotic species existed primarily in the anthropogenic communities and along the edges of agricultural fields; however, exotic species were present in many woodlands. The majority (95%) of the native species observed are ranked S5 (secure in Ontario) and only five percent are ranked S4 or S4S5 (apparently secure in Ontario).

3.2.2 Wetlands Assessment

Wetlands in the General Project Area were typically deciduous and mixed swamps, dominated by soft maples (red, silver, Freeman), eastern white cedar, red and black ash and yellow birch. Thicket swamps consisting of species such as red-osier dogwood, gray dogwood and willows species were also present, as were cattail marshes, reed canary grass meadow marshes and shallow marshes.

During the site investigations, 52 candidate significant wetlands were identified within 120 m of the Project Location (see Figure 3.1 to 3.29, Appendix A). No wetlands were identified within the Project Location. As a full wetland assessment using the OWES methodology was not undertaken at each wetland as part of the site investigations, these wetlands will be treated as provincially significant. As stated in the NHAG, "*applicants proposing projects within 120 meters of an unevaluated wetland (but not within the wetland itself) can choose to treat the wetland as provincially significant and conduct an EIS, provided the criteria and procedures found in the Wetland Characteristics and Ecological Functions Assessment for Renewable Energy Projects are followed (Appendix C)*" (NHAG, 2011). This approach was applied to each wetland feature found within 120 m of the Project Location and, therefore, these features were advanced directly to the EIS Report (Section 5). The *Wetland Characteristics and Ecological Functions Assessment* is provided in the Evaluation of Significance Report (Section 4).

No rare species were identified within the wetland features listed above. One provincially rare thicket swamp community (Buttonbush Mineral Thicket Swamp (SWT2-4; S3) was found in one wetland feature (Feature 44; Figure 5.20, Appendix B).

A description of the size, attributes and composition of each wetland feature found within 120 m of the Project Location is presented in Table 4.2 (Appendix B). The closest distance of each significant wetland feature to each Project component within the 120 m Zone of Investigation is provided in Table 3.4 (Appendix B). Wetland vegetation communities (ELC ecosites) occurring within 120 m of the Project Location, as identified in the field, are shown on Figures 5.1 to 5.29 (Appendix A). Functional wetland assessments are provided in the Evaluation of Significance Report (Section 4).

3.2.2.1 Provincially Significant Wetlands

As stated in the Records Review Report (Section 2.2.2), the Saratoga Swamp PSW does not exist within 120 m of the Project Location. The wetland boundary as mapped by LIO is provided in Figure 3.14 (Appendix A). The boundary is considered to have an accuracy of 10 m (OMNR, 2010c).

3.2.2.2 Locally Significant Wetlands

One locally significant wetland (Colbourne 52D) is part of Feature 8, but is not located within 120 m of the Project Location. The wetland area associated with this feature is on private, non-participating lands. The wetland boundaries as mapped by LIO are provided in Figure 3.4 (Appendix A). Colbourne 52D is not located within 120 m of the Project Location.

3.2.2.3 Unevaluated Wetlands and Corrections

As stated above, 52 wetland features were identified as a result of the site investigations, of which 15 wetlands were previously identified in the records review as 'unevaluated wetlands' and 37 wetlands were previously identified as only woodlands in the records review. Multiple wetland features are located within Features 5, 6, 9, 12, 28, 34, 37, 44 and 47 (see Figures 3.1 to 3.29, Appendix A). Based on the ELC system, deciduous swamp ecosites (SWD), thicket swamp ecosites (SWT), mixed swamps ecosites (SWM), meadow marsh ecosite (MAM), shallow water ecosites (SAS) and shallow marsh ecosites (MAS) were identified within 120 m of the Project Location (see Figure 5.1 to 5.29, Appendix A and Table 3.3, Appendix B).

Based on site investigations conducted within 120 m of the Project Location (ELC, vegetation survey), the following corrections were made to the records review for wetlands;

- Ten natural features identified as 'wetlands' in the records review (Wetlands 17, 18, 25, 30, 35, 36, 44a, 44b, 51 and 59) were delineated as larger in area through the site investigations and/or alternate site investigations (see Figures 3.1 to 3.29, Appendix A);
- Three natural features identified as 'wetlands' in the records review (Wetlands 63, 65 and 66) were delineated as smaller in area through the site investigations and/or alternate site investigations (see Figures 3.1 to 3.29, Appendix A). The wetland associated with Feature 66 is no longer within 120 m of the Project Location;
- One natural feature not identified in the records review (Wetland 15) was identified as a 'wetland' ecosite through the site investigations (see Figures 3.1 to 3.29, Appendix A and Table 3.3, Appendix B);
- One natural feature identified as a 'waterbody' in the records review (Wetland 61) was identified as a wetland through the site investigations (see Figures 3.1 to 3.29, Appendix A and Table 3.3, Appendix B);
- Parts of 30 natural features identified as 'woodland' in the records review were identified as wetlands (Wetlands 5a, 5b, 5c, 6a, 6b, 7, 9a, 9b, 9c, 12a, 12b, 12c, 14, 23, 24, 28a, 28b, 37a, 37b, 37c, 37d, 37e, 37f, 37g, 39, 47c, 47d, 48, 49 and 69) through the site investigations (see Figures 3.1 to 3.29, Appendix A);
- Part of one natural feature identified as a 'wetland' in the records review (Feature 48) was identified as a 'woodland' through site investigations (see Figures 3.20, Appendix A and Table 3.3, Appendix B); and,
- Two features identified as a 'wetland' in the records review were not wetlands. These wetlands were identified as an agricultural crop and a cattle watering hole through the site investigations (see Figures 3.1 to 3.29, Appendix A and Table 3.3, Appendix B). The wetland identified as an agricultural field is associated with the proposed collector line on Tower Line between Belfast Road and Zion Road. The wetland identified as a cattle watering hole is associated with Feature 45.

3.2.3 Valleylands Assessment

As identified in the Records Review Report (Section 2), eight valleylands were documented in, or within 120 m of, the Project Location including: Boundary Creek (Valleyland 1), Nine Mile River (Valleyland 2), two unnamed watercourses (Valleylands 3 and 4), Kerry's Creek (Valleyland 5), Eskritt Drain (Valleyland 6), Eighteen Mile River (Valleyland 7) and Boyd Creek (Valleyland 8). Site investigations for valleylands were conducted concurrently with ELC and wildlife habitat assessments.

Boundary Creek Valleyland (Valleyland 1)

The Boundary Creek valleyland lies both within the Project Location (collector system) and within 120 m of the Project Location (access road, turbine, temporary construction area). This valleyland is associated with Feature 9 (see Figure 3.4 and 3.5, Appendix A). Boundary Creek flows into Lake Huron, draining approximately 30.9 km^2, and is located within the Mid Shore sub-watershed (MVCA, 2010). Overall, this feature is surrounded by agriculture, but major, continuous vegetated areas extend through the majority of the valleyland system. Some minor portions in the valleyland are comprised of pasture and agricultural production. The western portion of the valleyland system ranges in size from approximately 100 to 200 m wide and approximately 8 to 10 m deep. As the valleyland extends east, it becomes mainly deciduous forest and ranges from approximately 100 to 300 m wide and approximately 6 to 8 m deep. Continuous vegetation is present along much of the sloped edges and major portions of the valleyland are forested. The area provides good wildlife corridor habitat and generally has a moderate level of disturbance. In the context of the Maitland Valley Watershed, this valleyland meets the criteria outlined in the NHAG (OMNR, 2011a); therefore, this feature is considered a candidate significant valleyland and progresses to the Evaluation of Significance Report (Section 4).

Nine Mile River Valleyland (Valleyland 2)

The Nine Mile River valleyland lies both within the Project Location (collector system) and within 120 m of the Project Location (access road, temporary construction area). This valleyland is associated with Features 13 and 16 (see Figure 3.7 and 3.8, Appendix A). Nine Mile River flows into Lake Huron, draining approximately 246.9 km^2, and is located within the Nine Mile sub-watershed. A major component of the Lucknow River ANSI is located within this valleyland. Overall, this feature is surrounded by agriculture, but major continuous vegetated areas extend across the majority of the valleyland system. Some minor portions on the valleyland are comprised of pasture and agricultural production. The size of the valleyland ranges from approximately 250 to 450 m wide and approximately 20 to 30 m deep. Continuous vegetation is present along much of the sloped edges and major portions of the western section of the valleyland are completely forested. The area provides excellent wildlife corridor habitat and generally has a low level of disturbance. In the context of the Maitland Valley Watershed, this valleyland meets the criteria outlined in the NHAG (OMNR, 2011a); therefore, this feature is considered a candidate significant valleyland and progresses to the Evaluation of Significance Report (Section 4).

Unnamed Valleylands (Valleylands 3 and 4)

The two unnamed valleylands lie within the Project Location (collector system, Valleyland 3) and within 120 m of the Project Location (access road, turbine, temporary construction area; Valleyland 4). These valleylands are associated with Features 33 and 34 (see Figure 3.12 and 3.15, Appendix A). The two unnamed valleylands flow into Lake Huron and are part of the North Shore subwatershed (MVCA, 2010) and drains approximately 12.2 km^2 (Valleyland 3) and 13.3 km^2 (Valleyland 4). Overall, these features are surrounded by agriculture. The western edge of Valleyland 4 has been converted to agricultural land, whereas the eastern section is surrounded by a small woodland fragment. Valleyland 3 is completely surrounded by agriculture. Neither valleyland is completely vegetated (naturally) throughout their extent. The valleylands are moderately shallow throughout their extent, ranging from approximately 5 to 6 m and 40 to 90 m wide (Valleyland 3), and 5 to 6 m deep and 40 to 60 m wide (Valleyland 4). These areas provide limited wildlife corridor habitat and generally have a moderate to high level of disturbance. In the context of the Maitland Valley Watershed, these valleylands meet the criteria outlined in the NHAG (OMNR, 2011a); therefore, these features are considered candidate significant valleylands and progress to the Evaluation of Significance Report (Section 4).

Kerry's Creek Valleyland (Valleyland 5)

The Kerry's Creek valleyland lies both within the Project Location (collector system) and within 120 m of the Project Location (access roads, turbines, temporary construction areas). This valleyland is associated with Feature 37 (see Figure 3.18 and 3.19, Appendix A). Kerry's Creek drains into Lake Huron, draining approximately 103.7 km^2. The valleyland spans from east to west approximately 7 km. Overall, this feature is surrounded by agriculture and limited woodland areas. The valleyland generally slopes steeply towards riparian wetland areas; however, some portions of the valleyland have been converted to agriculture and pasture land. Continuous vegetation is present along much of the sloped edges. The area encroached upon by the Project Location is a mix of deciduous, coniferous and mixed forest and deciduous and mixed swamp. The valleyland is moderately shallow throughout its extent, ranging from approximately 5 to 8 m deep and from 40 to 100 m wide. The valleyland provides good wildlife corridor habitat and generally has a moderate to high level of disturbance. In the context of the Maitland Valley Watershed, this valleyland meets the criteria outlined in the NHAG (OMNR, 2011a); therefore, this feature is considered a candidate significant valleyland and progresses to the Evaluation of Significance Report (Section 4).

Eskritt Drain Valleyland (Valleyland 6)

The Eskritt Drain valleyland lies within 120 m of the Project Location (access road, turbines, temporary construction areas) and is associated with Feature 39 (see Figure 3.18, Appendix A). The Eskritt Drain drains into Kerry's Creek west of Highway 21, which subsequently drains into Lake Huron. The Eskritt Drain is located within the Kerry's Creek sub-watershed, which drains approximately 28.7 km^2. Overall, this feature is surrounded by agriculture and a small woodland area. The western area of the valleyland generally slopes towards a vegetated watercourse and the eastern edge slopes move gradually towards a treed ravine. The area encroached

upon by the Project Location is deciduous forest; however, a portion of the far eastern section of the valleyland may have been historically converted to agriculture production. The size of the valleyland ranges from approximately 40 to 70 m wide and approximately 5 m deep. Continuous vegetation is present along much of the sloped edges and major portions of the eastern section of the valleyland are completely forested. The area provides limited wildlife corridor habitat and generally has a moderate level of disturbance. In the context of the Maitland Valley Watershed, this valleyland meets the criteria outlined in the NHAG (OMNR, 2011a); therefore, this feature is considered a candidate significant valleyland and progresses to the Evaluation of Significance Report (Section 4).

Eighteen Mile River Valleyland (Valleyland 7)

The Eighteen Mile River valleyland lies both within the Project Location (collector system) and within 120 m of the Project Location (access roads, temporary construction areas); this valleyland is associated with Feature 68 (see Figure 3.29, Appendix A). Eighteen Mile River drains into Lake Huron, draining approximately 103.7 km^2, and is located within the Eighteen Mile sub-watershed. This feature is predominantly surrounded by agriculture. The western area of the valleyland generally has greater vegetation cover and becomes less vegetated (<25%) progressing east. The area encroached upon by the Project Location is mainly deciduous forest; however, a major portion of the valleyland has been converted to agriculture production. The size of the valleyland ranges from approximately 100 to 350 m wide and approximately 9 to 17 m deep. Continuous vegetation is present along much of the sloped edges and major portions of the western section of the valleyland are completely forested. The area provides good wildlife corridor habitat and generally has a moderate level of disturbance. In the context of the Maitland Valley Watershed, this valleyland meets the criteria outlined in the NHAG (OMNR, 2011a); therefore, this feature is considered a candidate significant valleyland and progresses to the Evaluation of Significance Report (Section 4).

Boyd Creek (Valleyland 8)

The Boyd Creek valleyland lies within 120 m of the Project Location (access road) and is associated with Feature 69 (see Figure 3.29, Appendix A). Boyd Creek flows into Lake Huron, draining approximately 28.1 km^2, and is located within the Eighteen Mile sub-watershed. This feature is predominantly surrounded by agriculture. The western area of the valleyland generally has greater vegetation cover and becomes less vegetated (<25%) progressing east. The area encroached upon by the Project Location is pasture land with very little shrub and herbaceous vegetation. Major components of the valleyland have been filled by private landowners and in several areas, the hydrology of Boyd Creek has been converted to a small channel running east-west. Aside from the components of the valleyland that have been filled, the valleyland ranges from approximately 100 to 400 m wide and approximately 7 to 9 m deep; however, continuous natural vegetation is absent from the valleyland. The area provides little wildlife corridor habitat and generally has a high level of disturbance. In the context of the Maitland Valley Watershed, this valleyland meets the criteria outlined in the NHAG (OMNR, 2011a); therefore, this feature is considered a candidate significant valleyland and progresses to the Evaluation of Significance Report (Section 4).

Site investigations within 120 m of the Project Location revealed that all eight valleyland features are considered candidate significant valleylands as described in the NHAG (OMNR, 2011a). All candidate significant valleylands are illustrated in Figure 3.1 to 3.29 (Appendix A). The closest distance of each candidate significant valleyland feature to each Project component within the 120 m Zone of Investigation is provided in Table 3.4 (Appendix B).

No corrections to the hazard line data and topographical mapping that was used as a proxy for potential valleyland features within 120 m of the Project Location were required based on field observations during the site investigations.

3.2.4 Wildlife Habitat Assessment

Results of the site investigation program are provided to assist in identifying wildlife habitat natural features within the Project Location and the 120 m Zone of Investigation. The results are considered within the context of criteria for significant wildlife habitat, as outlined in the SWHTG and its SWH Decision Support System (OMNR, 2000) and the Draft SWH Ecoregion Criteria Schedules (Ecoregion 6E; OMNR, 2009), to determine whether the Project Location and the 120 m Zone of Investigation supports candidate significant wildlife habitat.

3.2.4.1 Habitats of Seasonal Concentrations of Wildlife

Seasonal concentration areas are those sites where large numbers of a species gather together at one time of the year, or where several species congregate (OMNR, 2000). The seven types of seasonal concentrations areas identified in the Records Review Report (see Section 2) and carried forward to the site investigations include:

- Colonial Bird Nesting Habitat;
- Waterfowl Stopover and Staging Areas;
- Waterfowl Nesting Habitat;
- Shorebird Migratory Stopover Areas;
- Raptor Winter Feeding and Roosting Habitat;
- Reptile Hibernacula and Turtle Over-Wintering Habitat; and,
- Bat Hibernacula and Maternal Colony Roost Habitat.

The results of the site investigation were used to confirm the presence/absence of these features within 120 m of the Project Location, as well as identify additional seasonal concentration areas that may exist within 120 m of the Project Location.

Colonial Bird Nesting Habitat

Colonial birds are a diverse group including several species of herons, gulls, terns, and swallows. The Draft SWH Ecoregion Criteria Schedules outline three distinct guilds of colonial nesting birds including swallows, herons (tree/shrub habitat), and terns/gulls (ground habitat). Site investigations were conducted to identify candidate significant colonial nesting bird sites

within 120 m of the Project Location. As identified in the Records Review Report (see Section 2.2.4.1), colonial nesting ground birds were not identified within 120 m of the Project Location.

Swallows

Two species of swallow are identified in the Draft SWH Ecoregion Criteria Schedules including Cliff Swallow and Bank Swallow. Eroding banks, sandy hills, pits, steep slopes, rock faces or piles found within cliffs (CL), bluffs (BL) and cultural/upland (CU) community series are considered candidate significant colonial nesting sites for Cliff Swallows and Bank Swallows (OMNR, 2009). Based on site investigations, no eroding banks, sandy hills, pits, steep slopes or rock faces/piles within the critical community series listed above were identified within 120 m of the Project Location.

Gulls and Terns

Five species of ground nesting colonial birds are identified in the Draft SWH Ecoregion Criteria Schedules including Herring Gull, Great Black-backed Gull, Common Tern, Caspian Tern and Little Gull. Any rocky island or peninsula (natural or artificial) within a lake or large river (two-lined on a 1:50,000 NTS map) are considered candidate significant colonial nesting sites for the gull and tern species listed above (OMNR, 2009). As the Project Location is at least 2 km from the Lake Huron shoreline and no large rivers with rocky islands or peninsulas are located within the General Project Area, no colonial nesting sites for ground nesting gulls and terns were identified within 120 m of the Project Location.

Herons

Four species of tree/shrub colonial nesting birds are identified in the Draft SWH Ecoregion Criteria Schedules including Great Blue Heron, Black-crowned Night-Heron, Great Egret and Green Heron. ELC community series identified in the Draft SWH Ecoregion Criteria Schedule as colonial nesting bird habitats (tree/shrub) includes mixed swamp ecosites (SWM2, SWM3, SWM5 and SWM6), deciduous swamp ecosites (SWD1, SWD2, SWD3, SWD4, SWD5, SWD6 and SWD7) and fen ecosites (FET1). Based on site investigations and alternate site investigations of lands within 120 m of the Project Location, 15 features contain ELC ecosites that meet the criteria outlined in the Draft SWH Ecoregion Criteria Schedules for colonial nesting bird sites (tree/shrub), including Features 5, 7, 9, 23, 25, 28, 30, 35, 36, 37, 44, 46, 47, 63 and 65 (see Table 3.3, Appendix B).

As described in Appendix D of the NHAG (OMNR, 2011a), a physical site investigation conducted for the purpose of identifying candidate significant colonial nesting bird habitat (tree/shrub) within 120 m of the Project Location is required for wind turbine and access road components of the Project. Based on this approach, 10 features contain habitat within 120 m of a wind turbine or access road that meets the criteria for colonial nesting bird habitat (tree/shrub), including Features 5, 9, 28, 35, 36, 37, 44, 46, 47 and 63. The colonial nesting bird habitat (tree/shrub) within 120 m of other Project components, should they meet the habitat criteria described above, are considered generalized candidate significant wildlife habitat.

Appendix Q of the SWHTG (OMNR, 2000) provides suggested criteria for determining significant wildlife habitat that can be used to scope candidate significant colonial nesting habitat (tree/shrub). Key criteria include the size of site, the quality of habitat, the level of disturbance and the presence of nests. These criteria were used to scope the features identified above to determine candidate significant colonial nesting bird habitat (tree/shrub). Other criteria are suggested in Appendix Q of the SWHTG; however, these are applied in the evaluation of significance for natural features meeting the criteria for candidate significant wildlife habitat.

Based on the criteria above, only one feature was identified as candidate significant colonial nesting habitat (tree/shrub; Figure 3.25, Appendix A). A potential colonial nesting site (Great Blue Heron colony) was identified within Feature 63 during the site investigations on June 25th, 2010. The natural feature is located on non-participating lands and access to this feature was not granted by the landowner. Based on aerial photography interpretation and investigations from the surrounding properties (alternate site investigations), the natural feature was identified as a mixture of deciduous swamp and deciduous forest ecosites (see Table 3.3, Appendix B). The colony could not be observed during the breeding season due to the dense foliage; therefore, the size of the heron colony was assessed after leaf fall on November 11th, 2010. The heron colony could be observed from the edges of the woodland (and the road) and was comprised of 2-3 nests (the third nest appeared to be a collection of sticks, potentially used for roosting or additional nest material). The sizes of Great Blue Heron colonies in Ontario average approximately 35 nests, but larger colonies can exceed 150 nests (Cadman *et al.*, 2007). The colony is located in the deciduous swamp component of the woodland, approximately 30 to 50 m from the southern edge. The closest distance of the candidate significant colonial bird nesting habitat feature to each Project component within the 120 m Zone of Investigation is provided in Table 3.4 (Appendix B).

None of the other features located within 120 m of a wind turbine or access road with colonial nesting bird habitat for herons merited inclusion as candidate significant colonial nesting habitat based on their size, level of disturbance and/or the absence of nesting activity.

Based on the criteria outlined in the SWHTG, none of the potential colonial nesting bird habitats (tree/shrub) within 120 m of Project components other than a wind turbine or access road were considered generalized candidate significant wildlife habitat.

Waterfowl Stopover and Staging Areas

As described in the SWHTG, waterfowl require stopover and staging habitat during spring and fall migration that supplies adequate food supplies to replenish energy reserves, resting areas, and cover from predators and adverse weather conditions (OMNR, 2000). Migrating waterfowl usually prefer larger wetland ecosystems, especially those adjacent to large bodies of water, and relatively undisturbed shorelines with vegetation; however, terrestrial ecosystems may also be used during spring and fall migration. Accordingly, the Draft SWH Ecoregion Criteria Schedules describe two types of waterfowl stopover and staging areas: aquatic and terrestrial.

Aquatic Areas

Twenty-four (24) species of waterfowl are identified in the Draft SWH Ecoregion Criteria Schedules as using aquatic ecosystems as stopover and staging areas (see OMNR, 2009). The Criteria Schedules outline ELC community series critical for the determination of candidate significant waterfowl stopover and staging areas (aquatic). The critical ELC community series include meadow marsh ecosites (MAM1, MAM2, MAM3, MAM4, MAM5 and MAM6), shallow marsh ecosites (MAS1, MAS2 and MAS3), shallow water ecosites (SAS1, SAM1 and SAF1) and deciduous swamps (SWD1 and SWD3). Based on site investigations, seven features contain ELC ecosites that meet criteria outlined in the Draft SWH Ecoregion Criteria Schedules for waterfowl stopover and staging areas (aquatic) including Features 12, 28, 46, 47, 49, 63 and 65 (see Table 3.3, Appendix B).

As described in Appendix D of the NHAG (OMNR, 2011a), a physical site investigation conducted for the purpose of identifying candidate significant waterfowl stopover and staging areas (aquatic) within 120 m of the Project Location is required for wind turbine components of the Project. Based on this approach, three features contain habitat within 120 m of a wind turbine that meets the criteria for waterfowl stopover and staging areas (aquatic), including Features 28, 46 and 49. The waterfowl stopover and staging areas (aquatic) within 120 m of other Project components, should they meet the habitat criteria described above, are considered generalized candidate significant wildlife habitat.

Appendix Q of the SWHTG (OMNR, 2000) provides suggested criteria for determining significant wildlife habitat that can be used to scope candidate significant waterfowl stopover and staging areas, but does not distinguish between aquatic or terrestrial habitat. Key criteria include the presence of spring flooding, the size of site and the quality of habitat. The Draft SWH Ecoregion Criteria Schedules (OMNR, 2009) provides further guidance for the determination of candidate significant waterfowl stopover and staging areas (aquatic), indicating that aggregations of 100 or more waterfowl from the species listed and 2-3 birds/ha for 7-20 days are required for the habitat to be considered significant. These criteria were used to scope the features identified above to determine the potential for candidate significant waterfowl stopover and staging areas (aquatic). Other criteria are suggested in Appendix Q of the SWHTG; however, these would be applied in the evaluation of significance for natural features meeting the criteria for candidate significant wildlife habitat.

Although spring flooding is the main indicator of suitable habitat for waterfowl, the size of the site is critical for meeting the requirements established in the SWH Ecoregion Criteria Schedules for significant habitat use (aggregations of 100 or more waterfowl and 2-3 birds/ha for 7-20 days). Due to the small size of these habitats, and thus low probability of supporting the number of waterfowl required to be considered significant (see Table 4.4 for wetland sizes), the aquatic waterfowl stopover and staging areas associated with Features 28, 46 and 49 do not meet criteria for candidate significant waterfowl stopover and staging areas (aquatic). Based on the same criteria and rationale, none of the potential waterfowl stopover and staging areas (aquatic) within 120 m of Project components other than a wind turbine were considered generalized candidate significant wildlife habitat.

Terrestrial Areas

Eight species of waterfowl are identified in the Draft SWH Ecoregion Criteria Schedules as using terrestrial ecosystems as stopover and staging areas including American Black Duck, Northern Pintail, Gadwall, Blue-winged Teal, Green-winged Teal, American Wigeon, Northern Shoveler and Tundra Swan (OMNR, 2009). The Criteria Schedules outline ELC community series critical for the determination of candidate significant waterfowl stopover and staging areas (terrestrial). The critical ELC community series include cultural/upland ecosites (CUM1 and CUT1); however, evidence of annual spring flooding from melt water or run-off within these ecosites is a requirement of candidate significant waterfowl stopover and staging area (terrestrial) as these areas provide important invertebrate foraging habitat for migrating waterfowl. The Draft SWH Ecoregion Criteria Schedules (OMNR, 2009) further outlines that aggregations of 100 or more of the species listed is required. Based on site investigations, no cultural ecosites (CUM1 or CUT1) with 120 m of the Project Location experienced flooding or inundation during the spring migration period (mid-March to May), nor were they large enough to support large aggregations of waterfowl. Subsequently, no areas within 120 m of the Project Location were identified as candidate significant waterfowl stopover and staging areas (terrestrial).

Waterfowl Nesting Habitat

As described in the SWHTG, the most significant waterfowl nesting sites are usually relatively large, undisturbed upland areas with abundant ponds and wetlands that provide nesting cover (OMNR, 2000). The majority of species nest in grassy or shrubby fields adjacent to wetlands and most nests occur in relatively dense vegetation that is about 50 cm tall. Some species, including Wood Duck and Hooded Merganser, nest in tree cavities located in swamps or on the shorelines of water bodies, and sometimes in adjacent upland woods (OMNR, 2000). Species such as Mallard and Green-winged Teal commonly nest near small ponds surrounded by grassy cover (OMNR, 2000).

The Draft SWH Ecoregion Criteria Schedule identifies that sites with an aggregation of several small ponds may be significant for waterfowl nesting as well, and that upland areas should be at least 120 m wide to reduce the chance of predation (OMNR, 2009). In addition, waterfowl nesting areas extend up to 120 m from a wetland (>0.5 ha) or a cluster of three or more small (<0.5 ha) wetlands within 150 m of each other where waterfowl nesting is known to occur (OMNR, 2009). All upland habitats located adjacent to the following wetland ELC ecosites are candidate significant waterfowl nesting sites: meadow marsh ecosites (MAM1, MAM2, MAM3, MAM4, MAM5 and MAM6), shallow marsh ecosites (MAS1, MAS2 and MAS3), shallow water ecosites (SAM1, SAF1 and SAS1), deciduous thicket swamp ecosites (SWT1 and SWT2) and deciduous woodland ecosites (SWD1, SWD2, SWD3 and SWD4). Based on site investigations, 25 features located within 120 m of the Project Location contain ELC ecosites that meet the criteria for waterfowl nesting habitat, including Features 5, 7, 9, 12, 15, 17, 18, 19a, 23, 25, 28, 30, 35, 36, 37, 44, 46, 47, 49, 51, 59, 61, 63, 65 and 69 (see **T**able 3.3, Appendix B**)**.

As described in Appendix D of the NHAG (OMNR, 2011a), a physical site investigation conducted for the purpose of identifying candidate significant waterfowl nesting habitat within 120 m of the Project Location is required for wind turbine components of the Project. Based on this approach, 13 features contain ELC ecosites within 120 m of a wind turbine that meet the criteria for waterfowl nesting habitat, including Features 5, 15, 17, 18, 28, 35, 36, 37, 44, 46, 47, 49 and 51. The waterfowl nesting habitat within 120 m of other Project components, should they meet the habitat criteria described above, are considered generalized candidate significant wildlife habitat.

Appendix Q of the SWHTG (OMNR, 2000) provides suggested criteria for determining significant wildlife habitat that can be used to scope candidate significant waterfowl nesting habitat. Key criteria include the size of site, the quality of habitat, species diversity and level of disturbance. The Draft SWH Ecoregion Criteria Schedules (OMNR, 2009) provide further guidance for the determination of candidate significant waterfowl nesting habitat, indicating that upland areas around wetland ecosites should be at least 120 m wide so that nest predators have difficulty finding nests. These criteria were used to scope the features identified above to determine candidate significant waterfowl nesting habitat. Other criteria are suggested in Appendix Q of the SWHTG; however, these are applied in the evaluation of significance for natural features meeting the criteria for candidate significant wildlife habitat.

Based on the criteria above, five features contain habitats within 120 m of the Project Location that meet the criteria for candidate significant waterfowl nesting habitat, including Features 17, 18, 44, 49 and 51 (see Table 3.3, Appendix B). These habitats are identified as distinct 'natural features' and progressed to the Evaluation of Significance Report (Section 4). The size, attributes, composition and function of these natural features are provided in Table 3.3 (Appendix B) and are illustrated in Figures 3.1 to 3.29 (Appendix A). The closest distance of each candidate significant waterfowl nesting habitat feature to each Project component within the 120 m Zone of Investigation is provided in Table 3.4 (Appendix B).

Based on the criteria outlined in the SWHTG and Draft SWH Ecoregion Criteria Schedules, only one feature within 120 m of Project components other than a wind turbine (Feature 59) contain habitat considered generalized candidate significant waterfowl nesting habitat. An individual description and evaluation of significance of generalized candidate significant wildlife habitat is not required, as per Appendix D of the NHAG (OMNR, 2011a); instead, the waterfowl nesting habitat associated with Feature 59 is to be treated as existing and significant and progress directly to the EIS Report (Section 5).

Shorebird Migratory Stopover Areas

As described in the SWHTG, migrating shorebirds often follow the Great Lakes shorelines between their winter and summer ranges (OMNR, 2000). Traditionally used areas provide safe places to rest and feed to replenish energy reserves needed to continue migration and often large numbers of shorebirds accumulate in stopover areas during poor flying conditions (OMNR, 2000).

The Draft SWH Ecoregion Criteria Schedule identifies shorelines of lakes, rivers, and wetlands, including beach areas, bars, and seasonally flooded shoreline, usually muddy and non-vegetated, are key habitat characteristics of shorebird migratory stopover areas (OMNR, 2009). Intensive agricultural fields are not included within these habitat criteria. ELC communities critical for the identification of candidate significant shorebird migratory stopover areas include beach/bar ecosites (BBO1, BBO2, BBS1, BBS2, BBT1 and BBT2), sand dune ecosites (SDO1, SDS2 and SDT1) and meadow marsh ecosites (MAM1, MAM2, MAM3, MAM4 and MAM5). Sod farms and other intensive agricultural fields are not included within these habitat criteria (OMNR, 2009). Based on site investigations, two features contain ELC ecosites that meet the criteria outlined in the Draft SWH Ecoregion Criteria Schedules for shorebird migratory stopover areas, including Features 28 and 49 (see Table 3.3, Appendix B**)**.

As described in Appendix D of the NHAG (OMNR, 2011a), a physical site investigation conducted for the purpose of identifying candidate significant shorebird migratory stopover areas within 120 m of the Project Location is required for wind turbine components of the Project. Both features contain habitat within 120 m of a wind turbine that meets the criteria for candidate significant shorebird migratory stopover areas.

Appendix Q of the SWHTG (OMNR, 2000) provides suggested criteria for determining significant wildlife habitat that can be used to scope candidate significant shorebird migratory stopover areas. Key criteria include the size of site, the quality of habitat, species diversity and level of disturbance. The Draft SWH Ecoregion Criteria Schedules (OMNR, 2009) provides further guidance for the determination of candidate significant waterfowl nesting habitat, indicating that three or more of listed species must be present and the habitat have greater than 1,000 shorebird use days (accumulated number of shorebirds counted per day over the course of the fall or spring migration period) during spring or fall migration period. These criteria were used to scope the features identified above to determine candidate significant waterfowl nesting habitat. Other criteria are suggested in Appendix Q of the SWHTG; however, these are applied in the evaluation of significance for natural features meeting the criteria for candidate significant wildlife habitat.

Based on the small size of the wetland features, the quality of habitat, the potential disturbance from surrounding areas and the reality that these small features could not support abundant numbers of migrating shorebirds, shorebird migratory stopover areas associated with Features 28 and 49 do not meet the criteria for significant wildlife habitat and are not considered candidate significant shorebirds migratory stopover areas.

Raptor Winter Feeding and Roosting Habitat

As outlined in the SWHTG, open fields, including hayfields, pastures, and meadows that support large and productive small mammal populations (e.g., mice, voles) are important to the winter survival of many birds of prey (OMNR, 2000). In addition, scattered fence posts or snags for perches, and relatively mature mixed or coniferous woodlots nearby for roosting are important areas for wintering raptors (OMNR, 2000). The Draft SWH Ecoregion Criteria Schedules further outlines that a combination of ELC community series must be present, including forest ecosites

(FOC, FOM and FOD) and upland ecosites (CUM, CUT, CUS and CUW), to meet the criteria for raptor winter feeding and roost areas. Although not identified in the Draft SWH Ecoregion Criteria Schedules, consultation with the OMNR indicates that forested swamp ecosites (SWD, SWM and SWC) also constitute raptor winter feeding and roosting areas. One community series from each land class (forest/swamp and upland) must be present and combine for >20 ha to be identified as candidate significant wildlife habitat. Based on a site investigation and the identification of forest and upland community series, nine features contain ELC ecosites that potentially meet the criteria outlined in the SWHTG and Draft SWH Ecoregion Criteria Schedules for raptor winter feeding and roosting areas, including Features 9, 13, 14, 16, 19, 35, 37, 59 and 68 (see Table 3.3, Appendix B**)**.

As described in Appendix D of the NHAG (OMNR, 2011a), a physical site investigation conducted for the purpose of identifying candidate significant raptor winter feeding and roosting areas is required for the wind turbine and overhead collector line components of the Project Location. Based on this approach, all nine features contain habitat within 120 m of a wind turbine or access road that meets the criteria for candidate significant raptor winter feeding and roosting areas.

Appendix Q of the SWHTG (OMNR, 2000) and Index #10 of the SWHTG Decision Support System provide suggested criteria for determining significant wildlife habitat that can be used to scope candidate winter raptor feeding and roosting areas. Key criteria in the SWHTG include the size of site, the quality of the habitat, species diversity and the level of disturbance. Index #10 of the SWHTG Decision Support System further outlines roosting habitat consists of large enough fields (usually >20 ha) so that they are not disturbed, and that provide adequate cover and appropriately-coloured vegetation to camouflage the birds, and a nearby source of prey, which is typically meadow voles.

Although all nine features listed above provide large suitable areas of woodland and/or wetland habitat, only four features contain large areas (>20 ha) of combined cultural habitat and woodland habitat suitable for providing adequate cover and sources of food during the winter (associated with Features 13, 14, 16 and 59). The cultural savannah, pasture and surrounding woodland area associated with Features 13, 14 and 16, and the cultural meadows and surrounding woodland and wetland habitats associated with Feature 59 were identified as candidate significant raptor winter feeding and roosting areas. The size, attributes, composition and function of these natural features are provided in Table 3.3 (Appendix B) and are illustrated in Figures 3.6, 3.7, 3.8 and 3.25 (Appendix A). The closest distance of each candidate significant winter raptor winter feeding and roosting habitat to each Project component within the 120 m Zone of Investigation is provided in Table 3.4 (Appendix B).

Reptile Hibernacula and Turtle Over-Wintering Habitat

Reptile Hibernacula

As described in the SWHTG, reptile hibernacula are often in animal burrows, rock crevices, and other areas that enable the animals to hibernate below the frost line and often in association

with water to prevent desiccation (OMNR, 2000). Frequently, hibernacula are found in rock piles, rubble and old foundations that provide an abundance of suitable subterranean crevices. Suitable areas for hibernation within 120 m of the Project Location were searched for potential reptile hibernacula sites, including rock piles or slopes, stone fences, and crumbling foundations. Areas where access to hibernacula below the frost line was deemed not possible based on visual inspection (e.g., shallow and sub-optimal rock piles) were not considered candidate significant reptile hibernacula. Two features with potential to support reptile hibernacula were identified within 120 m of the Project Location. One feature, associated with the access road, crane path and collector line for Turbine 317, was identified as an old foundation surrounded by grassy areas and a nearby watercourse. The foundation is small (~12 m x 8 m) and stands 1 m to 2 m tall with grasses and loose rock within the interior. The other feature (associated with Feature 61), is within 120 m of the access road, crane path, collector line and construction pad for Turbine 345. This feature is a wetland (Willow Mineral Deciduous Swamp) that is encircled with large amounts of rocks providing potential reptile hibernacula sites. Due to low quality of surrounding habitat, these features were not identified as candidate significant wildlife habitat and did not progress to the Evaluation of Significance Report.

Turtle Over-Wintering Habitat

As described in the SWHTG, turtle over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate dissolved oxygen (OMNR, 2009). These areas may support congregations of turtles if over-wintering habitats are limited (OMNR, 2009).

The Draft SWH Ecoregion Criteria Schedules (OMNR, 2009) outline that all ELC marsh communities (MAM1, MAM2, MAM3, MAM4, MAM5 and MAM6), all shallow water communities (SAS1, SAM1 and SAF1) and open bog and fen communities (BOO1 and FEO1) should be evaluated to determine if suitable turtle over-wintering habitat is present within, adjacent or nearby to these communities. Based on site investigations, three features contain ELC ecosites within 120 m of the Project Location that meet the criteria outlined in the Draft SWH Ecoregion Criteria Schedules for turtle over-wintering habitat, including Features 12, 28 and 49 (see Table 3.3, Appendix B).

As described in Appendix D of the NHAG (OMNR, 2011a), a physical site investigation conducted for the purpose of identifying candidate significant turtle over-wintering habitat within 120 m of the Project Location is required for wind turbine and access road components of the Project. Based on this approach, two features contain habitat within 120 m of a wind turbine or access road that meets the criteria for turtle over-wintering habitat, including Features 28 and 49 (see Table 3.4, Appendix B). The turtle over-wintering habitat within 120 m of other Project components, should they meet the habitat criteria described above, are considered generalized candidate significant wildlife habitat.

As stated above, turtle over-wintering sites are permanent water bodies or large wetlands with adequate dissolved oxygen. Turtles typically over-winter in water deep enough to avoid freezing and desiccation, but some species, particularly snapping turtles, are known to over-

winter in cattail marshes, under logs, burrowing in the sediment and in river channels with water depths <0.5 m where deeper waters are not available (Ultsch, 2006). Site investigations for snapping turtle habitat are discussed in Section 3.2.4.3. Northern Painted Turtles over-winter under the ice and can survive even under anoxic (low dissolved oxygen) environments (Ultsch, 2006). Based on site investigations conducted in November 2011, the wetland ecosites associated with Features 28 and 49 do not provide suitable over-wintering habitat for northern painted turtles as permanent standing water is likely not present during the winter months (no standing water was present during surveys conducted in November 2011). Based on the criteria for turtle over-wintering habitat, the turtle over-wintering habitat associated with these two features were not considered candidate significant turtle over-wintering habitat. Turtle over-wintering habitat relative to snapping turtles is provided in Section 3.2.4.3 (Habitats of Species of Conservation Concern).

Based on the criteria outlined in the SWHTG, Feature 12 is within 120 m of Project components other than a wind turbine or access road that contains habitat considered generalized candidate significant turtle over-wintering habitat. An individual description and evaluation of significance of generalized candidate significant wildlife habitat is not required, as per Appendix D of the NHAG (OMNR, 2011a); instead, the turtle over-wintering habitat within Feature 12 is to be treated as existing and significant and progress directly to the EIS Report (Section 5).

Based on a visual inspection of aerial photography (alternate site investigations), multiple deep pools potentially suitable as turtle over-wintering habitat are located within several valleyland features, including Valleyland 2 (associated with Features 13 and 16), Valleyland 5 (associated with Feature 37) and Valleyland 7 (associated with Feature 68). These habitats may provide suitable over-wintering habitat for both painted turtles and snapping turtles and as such, were not considered separately. Based on consultation with the OMNR, Valleylands 2, 5 and 7 were identified as generalized candidate significant turtle over-wintering habitat (see Figures 3.7, 3.8, 3.18, 3.19 and 3.29, Appendix A) and as such, are treated as existing and significant and progress directly to the EIS Report (Section 5). Pre-construction monitoring studies will not be conducted for these habitats.

Bat Hibernacula and Maternal Colony Roost Habitat

Bat Hibernacula

As described in the SWHTG, many species of bats overwinter in caves or abandoned mines with remote and restricted openings with sufficient space for entry. Interior air temperatures are usually slightly above freezing, with relative humidity levels above 90% and sufficient space for roosting (OMNR, 2000). Based on the Ontario Geological Survey (OGS), a small area in the northern section of the General Project Area is considered 'known karst' and contains two sink holes (Figure 2, Appendix A), and the remainder of the General Project Area is identified as '*inferred karst*', meaning '*Regions of carbonate bedrock units highlighted as most vulnerable or susceptible to karstification, where direct field observations have not been made by OGS staff or other sources'* (MNDM, 2011).

As identified in the Records Review Report (Section 2), one candidate significant bat hibernacula (the sinkhole) was identified as occurring with 120 m of the Project Location. Based on a review of aerial photography, two potential areas located near the sinkhole (location based on 1:50,000 scale) were identified. Site investigations of these areas were undertaken to confirm the presence of the sinkhole as candidate significant bat hibernacula. Site investigations revealed that one area was used for agriculture purposed as a cattle feeding area and the other area was a small pond filled with water year-round. Based on the results of the site investigation, candidate significant bat hibernacula was not determined to be present in the sinkhole area and did not progress to the evaluation of significance.

As the 'known karst' area is located on non-participating properties, an alternate site investigation using aerial photography interpretation was conducted on the 'known karst' area to determine other potential bat hibernacula within 120 m of the Project Location. The alternate site investigations included searching for potential unmapped sinkholes, caves, abandoned mine shafts and underground foundations visible from aerial photographs. Based on this approach, no features with potential for providing bat hibernacula were identified within the 'known karst' area. The area is dominated by active agriculture, scattered hedgerows, woodlands, wetlands, isolated ponds and residences. As such, no candidate significant bat hibernacula were identified within 120 m of the Project Location.

The Draft SWH Ecoregion Criteria Schedule identifies all caves, abandoned mine shafts, underground foundations, and crevice and cave ELC community series (CCR1, CCR2, CCA1 and CCA2) as candidate significant bat hibernacula. Based on site investigations, no karst or evidence of caves, abandoned mine shafts, underground foundations, or crevice/cave ELC ecosites were identified within 120 m of the Project Location; subsequently, no candidate significant bat hibernacula were identified during site investigations.

Bat Maternal Colony Roost Habitat

Loose bark, hollow trees, snags or rock faces may provide maternal roosts, but buildings are also commonly used roosts structures (Fenton, 1970). Large diameter trees (living or dead) that are relatively open from adjacent vegetation are requirements for important natural roosts of forest-dwelling bats (Kunz and Lumsden, 2003). The *Bats and Bat Habitats: Guidelines for Wind Power Projects* (OMNR, 2011b) was applied to identify candidate significant bat maternal colony roosts. ELC ecosite were examined to determine mixed and deciduous forest ecosites in order to evaluate the density of snags/cavity trees (and decay class) ≥25 cm dbh within the forest site. If snag/ cavity tree density was ≥10 snags/ha of trees ≥25 cm dbh, then the feature was considered candidate significant maternal colony roost habitat. The boundaries of the ELC communities identified as forest (FOD, FOC, FOM) and treed swamps (SWD, SWC, SWM) within the feature was used to delineate the extent of the candidate significant maternity colony roost habitat. Based on the criteria outlined above, nine features contain ELC ecosite that meet the criteria for maternal colony roost habitat, including Features 5, 10, 13, 28, 32, 33, 36, 39 and 48 (see Table 3.3, Appendix B).

As described in Appendix D of the NHAG (OMNR, 2011a), a physical site investigation conducted for the purpose of identifying candidate significant bat maternal colony roosts within 120 m of the Project Location is required for wind turbine components of the Project. Based on this approach, eight features contain habitat within 120 m of a wind turbine that meets the criteria for candidate significant bat maternal colony roost habitat (excludes Feature 10). The bat maternal colony roost habitat within 120 m of other Project components (Feature 10), should it meet the habitat criteria described above, is considered generalized candidate significant wildlife habitat.

The *Bats and Bat Habitats: Guidelines for Wind Power Projects* (OMNR, 2011b) provides suggested criteria for determining significant wildlife habitat that can be applied to scope candidate significant bat maternal colony roost habitat. Due to the sensitivity of bats to wind turbines, all of the eight features listed above have been identified as candidate significant bat maternal colony roost habitat and progressed to the Evaluation of Significance Report (Section 4). The closest distance of each candidate significant bat maternal colony roost feature to each Project component within the 120 m Zone of Investigation is provided in Table 3.4 (Appendix B).

Based on the significance criteria outlined in the *Bats and Bat Habitats: Guidelines for Wind Power Projects,* potential bat maternal colony roost habitat was not present in Feature 10 due to the lack of suitable snag/cavity trees. Subsequently, Feature 10 was not considered to be generalized candidate significant bat maternal colony roost habitat.

Detailed results from the bat studies are provided in the Kingsbridge II Wind Power Project: Natural Environment Report and the Kingsbridge II Bat Monitoring Pre-construction Risk Assessment Report (Appendix E).

Summary

Based on site investigations, candidate significant seasonal concentration areas identified as occurring within 120 m of the Project Location includes:

- Colonial Bird Nesting Habitat (Herons);
- Waterfowl Nesting Habitat;
- Raptor Winter Feeding and Roosting Habitat; and,
- Bat Maternal Colony Roost Habitat.

An evaluation of these candidate significant natural features within 120 m of the Project Location will be undertaken in the Evaluation of Significance Report (Section 4).

Based on the site investigations, generalized candidate significant seasonal concentration areas identified as existing and significant within 120 m of the Project Location includes:

- Waterfowl Nesting Habitat; and,
- Turtle Over-Wintering Habitat.

An evaluation of these generalized candidate significant natural features within 120 m of the Project Location is not required, as per Appendix D of the NHAG (OMNR, 2011a); instead, these features are to be treated as existing and significant and progress directly to the EIS Report (Section 5).

3.2.4.2 Rare Vegetation Communities or Specialized Habitat for Wildlife

Rare Vegetation Communities

Rare vegetation communities are those that are considered rare in the province. Generally, community types with S-Ranks of S1 to S3 (extremely rare to rare – uncommon in Ontario), as defined by the NHIC, could qualify. These habitats are considered to be at risk and are likely to support additional wildlife species that are considered significant.

Vegetation communities found in or within 120 m of the Project Location are summarized in Figures 5.1 to 5.29 (Appendix A) and Table 3.3 (Appendix B). One provincially rare thicket swamp community (Buttonbush Mineral Thicket Swamp – S3 Rank (SWT2-4) was found within 120 m of the Project Location in Feature 44. The rare vegetation community is identified on Figure 5.20 (Appendix A).

As described in Appendix D of the NHAG (OMNR, 2011a), a physical site investigation conducted for the purpose of identifying candidate significant rare vegetation communities within 120 m of the Project Location is not required for any component of the Project. Therefore, the Buttonbush Mineral Thicket Swamp identified during site investigations is considered generalized candidate significant wildlife habitat. An individual description of this habitat is not required for generalized candidate significant wildlife habitat, as per Appendix D of the NHAG (OMNR, 2011a); instead, this feature is to be treated as existing and significant and progress directly to the EIS Report (Section 5). The Buttonbush Mineral Thicket Swamp is discussed in the context of candidate significant wetlands (see Section 3.2.2).

Specialized Habitat for Wildlife

Specialized habitats are microhabitats that are critical to some wildlife species and often support species that have highly specific habitat requirements (OMNR, 2000). The 12 types of specialized habitats for wildlife identified in the Records Review Report (see Section 2.2.4.2) and carried forward to the site investigations include:

- Interior Forest Breeding Bird Habitat (Area-Sensitive and Declining Species);
- Open Country Breeding Bird Habitat (Area-Sensitive and Declining Species);
- Old Growth or Mature Forest Stands;
- Foraging Areas with Abundant Mast;
- Amphibian Woodland Breeding Habitat;
- Amphibian Wetland Breeding Habitat;
- Turtle Nesting Habitat;
- Specialized Woodland Raptor Nesting Habitat;

- Bald Eagle Nesting Habitat and Winter Feeding and Roosting Habitat;
- Seeps and Springs;
- Marsh Breeding Bird Habitat; and,
- Terrestrial Crayfish Habitat.

The results of the site investigation were used to confirm the presence/absence of these features in or within 120 m of the Project Location, as well as identify additional specialized habitat for wildlife that might exist in or within 120 m of the Project Location.

Interior Forest Breeding Bird Habitat (Area-Sensitive and Declining Species)

As described in the SWHTG, area-sensitive birds are those species whose distribution is restricted to relatively large patches with forest interior habitat and are often missing from highly fragmented landscapes (OMNR, 2000). Area-sensitive forest birds are heavily dependent on forest habitat metrics, such as percent forest cover and patch size, and forest quality (Sibley, 2001). Patch size appears to be dependent on forest cover, becoming more important in areas with less than 30 percent forest cover (Environment Canada, 2007a). Based on the Draft SWH Ecoregion Criteria Schedules, ELC ecosites meeting the criteria for area-sensitive forest habitats include forest ecosites (FOC, FOD and FOM) and forested swamp ecosites (SWC, SWD and SWM).

Based on Appendix Q of the SWHTG, woodlands that are 30 ha or greater are considered to be most significant for area-sensitive forest species (OMNR, 2000). There are 18 woodlands that meet these criteria found within 120 m of the proposed Project Location. For the purpose of identifying interior forest habitat for birds, interior habitats are considered those areas greater than 200 m from the forest edge and containing at least 4 ha of interior habitat (OMNR, 2000). Subsequently, of the 18 woodland features greater than 30 ha, nine are considered to contain forest interior habitat greater than 4 ha, including Features 8, 9, 13, 16, 17, 18, 42, 44 and 66 (see Table 3.3, Appendix B).

As described in Appendix D of the NHAG (OMNR, 2011a), a physical site investigation conducted for the purpose of identifying candidate significant interior forest breeding bird habitat within 120 m of the Project Location is not required for any component of the Project. Therefore, all interior forest breeding bird habitats identified during site investigations are considered generalized candidate significant wildlife habitat. An individual description and evaluation of significance of generalized candidate significant wildlife habitat is not required, as per Appendix D of the NHAG (OMNR, 2011a); instead, the interior forest breeding bird habitat associated with these features are to be treated as existing and significant and progress directly to the EIS Report (Section 5).

Open Country Breeding Bird Habitat (Area-Sensitive and Declining Species)

The Atlas of the Breeding Birds of Ontario (Cadman *et al.*, 2007) indicates that the General Project Area contains records of grassland breeding birds (see Kingsbridge II Wind Power Project: Bird Report, Appendix D). Grassland bird species with aerial courtship displays such

as Horned Lark and Vesper Sparrow may be particularly at risk from wind turbines (Environment Canada, 2007a). These species are known to fly high enough at times during these displays to potentially collide with turbines and accordingly, are frequent collision victims (e.g., Kerlinger and Dowdell, 2003, Erickson *et al.*, 2003).

Based on OMAF Agricultural Land-Use Mapping (1:50,000), agriculture is the dominant land-use in the General Project Area. The mapping indicates that the predominant use of the lands within the General Project Area is for continuous row crop (e.g., corn, soybeans), grain systems (e.g., spring/winter wheat), hayfields and pastures. Hayfield and overgrown pasture areas provide optimum habitat for grassland birds; however, grain systems and row crops also provide foraging and sub-optimal breeding habitat for grassland birds. Tilled agricultural fields also provide habitat for flocking birds (e.g., Canada geese, mixed blackbird flocks, Horned Larks, American Pipits) during the migratory periods.

Based on Appendix Q of the SWHTG, large grasslands greater than 30 ha are likely most significant and support and sustain a high diversity of these species. The Draft SWH Ecoregion Criteria Schedules further clarify that ELC cultural meadow ecosites (CUM1), grassland sites with a history of longevity, either abandoned fields, mature hayfields or pasturelands (at least 5 years old), and open country not identified as Class 1 or 2 agricultural lands and not being actively used for farming (i.e., no row-cropping in the last 5 years) are candidate significant habitat for open country area-sensitive breeding birds. Based on site investigations, no extensive open country habitats meeting the ELC criteria outlined in the SWHTG or the Draft SWH Ecoregion Criteria Schedule for open country area-sensitive species are located within 120 m of the Project Location. A 33.3 ha pasture area located at the junction of Feature 13 and 16 was identified during site investigations (see Figure 3.7 and 3.8, Appendix A). This area is heavily grazed by cattle during the breeding bird season, as was evident by the short grass and abundant cow dung in the pasture. Overgrazed pastures such as this one are considered sub-optimal habitat for grassland birds and do not provide suitable habitat. As such, no candidate significant open country breeding habitats for area-sensitive birds were identified during site investigations.

Old Growth or Mature Forest Stands

According to the SWHTG (Appendix Q), old-growth and mature forest stands are most significant when the forest contains numerous trees >140 years old (OMNR, 2000) and when the canopy vegetation is dominated by trees >100 years old (OMNR, 2009). Additionally, Uhlig *et al*. (2003) states that old growth forests within the deciduous forest region of southern Ontario begin to take on ‘old growth’ characteristics when forests stands are between 110 to 140 years of age. Old growth ecosystems also show little or no evidence of human disturbance (OMNR, 2000). Although many woodland stands contained mature trees, the mature woodland features showed evidence of forest management and/or human disturbance and the physical features associated with old-growth forests (110 to 140 year old trees) were absent from the woodland features. Subsequently, the woodland features within 120 m of the Project Location are not considered within the age range for old growth or mature forest stands. Based on site

investigations, no candidate significant old growth or mature forest stands were identified within 120 m of the Project Location.

Foraging Areas with Abundant Mast

As discussed in the Records Review Report (Section 2.2.4.2), mast-producing tree species are an important source of food for birds and mammals who consume the fruits and nuts, particularly those produced from American beech and red oak. Red oak was absent from the 120 m Zone of Investigation and American beech was very uncommon, only documented in a small number of woodland areas (see Table 3.3, Appendix B). No large mast producing American beech trees were identified during site investigations; therefore, no candidate significant foraging areas with abundant mast were identified within 120 m of the Project Location.

Amphibian Woodland Breeding Habitat

As discussed in the Records Review Report (Section 2.2.4.2), amphibian woodland breeding habitats consist of pools, wetlands or lakes within or adjacent (120 m) to woodlands (OMNR, 2000). Such water bodies may be small and ephemeral (vernal), but nevertheless are important to local amphibian populations within a landscape, especially if they provide the only suitable habitat in the area (OMNR, 2000).

The Draft SWH Ecoregion Criteria Schedules (OMNR, 2009) outline that all ELC forest communities (FOD, FOM and FOC) and forested swamp wetland communities (SWD, SWM and SWC) should be evaluated for amphibian woodland breeding habitats. Closed-canopy woodlands with rather dense undergrowth that maintains a damp environment is preferred for salamanders in particular (OMNR, 2000). Based on site investigations, 56 features contain ELC ecosites that meet the criteria outlined in the Draft SWH Ecoregion Criteria Schedules for amphibian woodland breeding habitat (see Table 3.3, Appendix B). During ELC surveys, potential woodland amphibian breeding habitat was identified in 34 of the 56 features, including Features 3, 5, 6, 7, 9, 10, 11, 13, 14, 17, 18, 20, 23, 24, 25, 28, 30, 31, 32, 33, 35, 36, 37, 39, 44, 46, 47, 48, 51, 57, 59, 63, 65 and 66.

As described in Appendix D of the NHAG (OMNR, 2011a), a physical site investigation conducted for the purpose of identifying candidate significant amphibian woodland breeding habitat within 120 m of the Project Location is required for access road components of the Project. Based on this approach, 12 features contain habitat within 120 m of an access road that meets the criteria for candidate significant amphibian woodland breeding habitat, including Features 3 (3a, 3b, 3c, 3d, 3e, 3f and 3g), 11 (11a), 13 (13a), 28 (28a and 28b), 32 (32a), 33 (33a and 33b), 37 (37a and 37b), 44 (44a), 47 (44a and 44d), 48 (48a, 48b, 48c, 48d, 48e, 48f, 48g, 48h, 48i and 48j), 57 (57a, 57b, 57c) and 66 (see Figures 3.1 to 3.29, Appendix A and Table 3.3, Appendix B). Based on consultation with the OMNR, Features 12, 24, 35, 36 and 39, and additional areas of Features 13, 33 and 37 were also considered candidate significant amphibian woodland breeding habitat (see Figures 3.1 to 3.29, Appendix A). As Features 12, 24, 35, 36 and 39 were determined to be significant amphibian woodland breeding habitat by

the OMNR, these features are not included in Table 3.3 (Appendix A). The amphibian woodland breeding habitat within 120 m of other Project components, should they meet the habitat criteria described above, are considered generalized candidate significant wildlife habitat.

According to the SWHTG (Decision Support System Index #40), characteristics of significant amphibian woodland breeding habitat must contain the following three elements: (a) permanent or temporary shallow water with no fish, (b) emergent or submergent vegetation, woody shrubs, logs and/or other shoreline structures and (c) a closed-canopy surrounding woodland with an abundance of downed woody debris. These criteria were used to scope the features identified above to determine candidate significant amphibian breeding habitat. Other criteria are suggested in Appendix Q of the NHAG; however, these are applied in the evaluation of significance for natural features meeting the criteria for candidate significant wildlife habitat.

Based on the habitat criteria described above, all features with vernal pools and/or standing water located within 120 m of an access road are considered candidate significant amphibian woodland breeding habitat and progress to the Evaluation of Significance Report (Section 4); however, based on consultation with the OMNR, only amphibian woodland breeding habitats associated with Features 12, 13, 24, 33, 35, 36, 37 and 39 will undergo pre-construction habitat use studies. Characteristics of the woodland pools are described in Table 3.3 (Appendix B) and are illustrated on the Figures 3.1 to 3.29 (Appendix A). The closest distance of each candidate significant amphibian woodland breeding habitat feature to each Project component within the 120 m Zone of Investigation is provided in Table 3.4 (Appendix B).

All features with potential amphibian woodland breeding habitat within 120 m of Project components other than an access road (associated with Features 5, 6, 7, 9, 10, 14, 17, 18, 20, 23, 25, 30, 31, 39, 46, 51, 59, 63 and 65) are considered generalized candidate significant amphibian woodland breeding habitat. An individual description and evaluation of significance of generalized candidate significant wildlife habitat is not required, as per Appendix D of the NHAG (OMNR, 2011a); instead, the amphibian woodland breeding habitat associated with these features are to be treated as existing and significant and progress directly to the EIS Report (Section 5).

Amphibian Wetland Breeding Habitat

Amphibian wetland breeding areas provide critical habitat for several species of frogs and salamanders, including bullfrogs, as these habitats are extremely important and fairly rare within Southern Ontario landscapes (OMNR, 2009). The presence of logs and shrubs increases the significance of these features because they provide additional shelter, concealment from predators, foraging opportunities and locations to call for mates (OMNR, 2009).

Bullfrogs, in particular, are highly aquatic and live in permanent water near the shorelines of lakes, large marshes, and slow-moving rivers and extensive areas of emergent shoreline vegetation are required for breeding (OMNR, 2000). Bullfrogs hibernate in bottom sediments

and are intolerant of freezing; therefore, water depths must be deep enough to prevent freezing of the wetland and sediments during the winter.

The Draft SWH Ecoregion Criteria Schedules (OMNR, 2009) outline that all ELC marsh communities (MAM1, MAM2, MAM3, MAM4, MAM5 and MAM6), all shallow water communities (SAS1, SAM1 and SAF1) and bedrock thicket swamp ecosites (SWT1) should be evaluated for amphibian wetland breeding habitat. Based on site investigations, two features contain ELC ecosites that meet the criteria outlined in the Draft SWH Ecoregion Criteria Schedules for amphibian wetland breeding habitat. These include Features 12 (identified as having multiple amphibian wetland breeding habitats) and 49 (see Table 3.3, Appendix B).

As described in Appendix D of the NHAG (OMNR, 2011a), a physical site investigation conducted for the purpose of identifying candidate significant amphibian wetland breeding habitat within 120 m of the Project Location is required for access road components of the Project. Based on this approach, neither feature is within 120 m of an access road. The amphibian wetland breeding habitat within 120 m of other Project components, should these meet the habitat criteria described above, are to be considered generalized candidate significant wildlife habitat.

The SWHTG (OMNR, 2000) and Draft SWH Ecoregion Criteria Schedules (OMNR, 2009) provide criteria for identifying candidate bullfrog habitat, which outlines the requirement for ponds deep enough to prevent freezing of the deeper water and sediments during the winter months. Based on the habitat criteria described above, the features with potential amphibian wetland breeding habitat within 120 m of Project components other than an access road (associated with Feature 12 and 49) are considered generalized candidate significant amphibian wetland breeding habitat. An individual description and evaluation of significance of generalized candidate significant wildlife habitat is not required, as per Appendix D of the NHAG (OMNR, 2011a); instead, the bullfrog habitats associated with Features 12 and 49 are to be treated as existing and significant and progress directly to the EIS Report (Section 5).

Turtle Nesting Habitat

As described in the Records Review Report (Section 2.2.4.2), candidate significant turtle nesting areas must provide sand and/or gravel for nesting, are often south to south-west facing and typically are located adjacent to shallow areas of marshes, lakes, and rivers (OMNR, 2009). The most significant sites should have safe movement corridors between the nesting and aquatic habitat (OMNR, 2000).

The Draft SWH Ecoregion Criteria Schedules (OMNR, 2009) outline that all ELC marsh communities (MAM1, MAM2, MAM3, MAM4, MAM5 and MAM6), all shallow water communities (SAS1, SAM1 and SAF1) and open bog and fen communities (BOO1 and FEO1) should be evaluated to determine if suitable turtle nesting habitat is present adjacent or nearby to these communities. Two MAM2 ecosites (associated with Feature 28 and 49) and one SAS1 ecosite (associated with Feature 12) were identified during site investigations; however, no evidence of

suitable nesting habitat was identified adjacent or nearby the wetland ecosite. Surrounding areas are dominated by deciduous forest and agriculture with no sandy or gravelly sites.

OMAFRA soils mapping indicates the eight valleylands within the General Project Area are considered 'bottomland' with variable soils and may contain sandy or gravel soils suitable for nesting. Based on site investigations, no turtle nesting habitat meeting the criteria outlined in the SWHTG or the Draft SWH Ecoregion Criteria Schedule are located within 120 m of the Project Location; however, visual inspection of aerial photography (alternate site investigation) suggests sandy areas may be present throughout Valleyland 2 (associated with Features 13 and 16), Valleyland 5 (associated with Feature 37) and Valleyland 7 (associated with Feature 68). Based on consultation with the, Valleylands 2, 5 and 7 were identified as generalized candidate significant turtle nesting habitat (see Figures 3.7, 3.8, 3.1, 3.19 and 3.29, Appendix A) and as such, are treated as existing and significant and progress directly to the EIS Report (Section 5).

Specialized Woodland Raptor Nesting Habitat

As described in the Record Review Report (Section 2.2.4.2), raptors typically nest in intermediate-aged to mature woodlands that provide large sturdy trees for nesting and perching, and open an understory for flight and hunting prey (OMNR, 2000). Tree species composition, size, and age of forest stand are important factors in woodland nesting habitat selection for several species of raptors (OMNR, 2000).

The Draft SWH Ecoregion Criteria Schedules (OMNR, 2009) outline that ELC ecosites meeting the criteria for specialized woodland raptor nesting habitat include coniferous forest and swamp ecosites (FOC and SWC), mixed forest and swamp ecosites (FOM and SWM), deciduous forest and swamp ecosites (FOD and SWD) and coniferous plantations (CUP3). Further, the SWHTG (OMNR, 2000) and the Draft SWH Ecoregion Criteria Schedules specify that all natural or conifer plantation forest stands greater than 10 ha in size should be evaluated as candidate significant specialized woodland raptor nesting habitat. During site investigations, ELC communities meeting these criteria for specialized woodland raptor nesting habitat and assessed as intermediate to mature aged with an open understory were searched for evidence of active stick nests. Although suitable habitat was identified in several woodlands greater than 10 ha, no evidence of active stick nest of Cooper's Hawk, Sharp-shinned Hawk, Long-eared Owl or Broad-winged Hawk were identified within 120 m of the Project Location. For that reason, no woodlands within 120 m of the Project Location were identified as candidate significant woodland raptor nesting habitat.

Bald Eagle Nesting Habitat and Winter Feeding and Roosting Habitat

Bald Eagle nesting habitat and winter feeding and roosting areas are selected mainly for their proximity to abundant food resources, which predominantly includes fish (OMNR, 2000). Only one river (Nine Mile River) potentially supporting abundant fish populations able to support Bald Eagles during the breeding and wintering seasons was identified within 120 m of the Project Location. This area is associated with the collector line proposed along Lanesville Line and

crossing Nine Mile River. Visual observations for nests and potential winter feeding and roosting areas were undertaken in this area, but no evidence of nests or large trees/snags preferred for perching and roosting were documented. Although Bald Eagles were documented within the General Project Area, no areas within 120 m of the Project Location were identified as candidate significant Bald Eagle nesting habitat and winter feeding and roosting areas.

Seeps and Springs

As described in the Records Review Report (Section 2.2.4.2), seeps and springs are areas where groundwater has come to the surface, often within forested headwater areas of coldwater streams (OMNR, 2000). Criteria for determining the significance of seeps is outlined in Appendix Q of the SWHTG (OMNR, 2000). Suggested factors include the abundance and location of seeps, the nature of the adjacent area, the presence of rare species, and duration of surface water. Forested areas mapped as headwaters of coldwater streams within 120 m of the Project Location were assessed for evidence of seeps or springs.

Based on site investigations, no coldwater steams originating in forested areas and no small unmapped seeps or springs were identified within 120 m of the Project Location. Conversely, no areas within 120 m of the Project Location were identified as candidate significant seeps or springs.

Marsh Breeding Bird Habitat

As described in the Records Review Report (Section 2.2.4.2), all wetland habitat is to be considered candidate significant marsh breeding bird habitat as long as there is shallow water with emergent aquatic vegetation present (OMNR, 2009). The Draft SWH Ecoregion Criteria Schedules (OMNR, 2009) outline that ELC ecosites meeting the criteria for candidate significant marsh breeding bird habitat includes all marsh communities (MAM1, MAM2, MAM3, MAM4, MAM5 and MAM6), all shallow water communities (SAS1, SAM1 and SAF1) and open bog and fen communities (BOO1 and FEO1).

Based on site investigations, two MAM2 ecosites were identified in Features 28 and 49 and one SAS1 ecosite was identified in Feature 12; however, no evidence of suitable nesting habitat for known marsh species in the area (Virginia Rail, Sora, Pied-billed Grebe, Sedge Wren, Common Loon and Green Heron) was identified adjacent to or within the wetland ecosites (see Table 3.3, Appendix B). The marsh ecosites were dominated by red-canary grass with few other grass or sedge species present and no standing water, and the SAS1 ecosite was dominated by open water with sparse vegetation (cattails and bulrushes) around the edges. Virginia Rails nest in dense vegetation with shallow water, including marshes, beaver ponds, ditches, and openings in swamps. Preferred vegetation includes cattails, bulrushes, sedges, or grasses and avoids areas without shallow standing water (OMNR, 2000). Pied-billed Grebes prefer marsh-lined ponds, lakes, and rivers with water depths of 30 to 100 cm and usually nest in dense stands of cattails, bulrushes, bur-reeds, spike-rushes, or arrowheads (OMNR, 2000). Sora nest in marshes with emergents and shallow water and prefer water depths of 8 to 20 cm and generally avoid areas without standing water (OMNR, 2000). Sedge Wrens nest mostly in sedge fens,

occasionally in bogs, and frequently in clumps of sedges (OMNR, 2000). Green Herons, a colonial nesting bird, typically nest in shrubs adjacent to or in wetlands and generally occur over water (OMNR, 2000). Common Loons habitat is associated with large lakes, preferring lakes with many small wooded islands (Evers *et al.*, 2010). As no habitats for marsh breeding birds were identified in the wetland ecosites, no candidate significant marsh breeding bird habitat was identified within 120 m of the Project Location.

Terrestrial Crayfish Habitat

As identified in the Draft SWH Ecoregion Criteria Schedules, terrestrial crayfish are burrowers which spend most of their life constructing and living within a network of tunnels (OMNR, 2009). Terrestrial crayfish burrows are usually built in soils that are not too dry or moist and typically built in marshes, mudflats, and meadows where the ground is the right moisture level (OMNR, 2009). The Draft SWH Ecoregion Criteria Schedule for ecoregion 6E does not provide criteria for terrestrial crayfish as they are typically not present within Ecoregion 6E; however, due to the documented occurrence of meadow crayfish within the General Project Area (see Section 3.2.4.3), habitat criteria for terrestrial crayfish in Ecoregion 7E was applied to ecoregion 6E. The Draft SWH Ecoregion Criteria Schedules identify ELC ecosites meeting the criteria for terrestrial crayfish include meadow marshes (MAM1, MAM2, MAM3, MAM4, MAM5 and MAM6). Based on site investigation, two features containing ELC ecosites that meet the criteria for terrestrial crayfish were identified within 120 m of the Project Location, including Features 28 and 49 (see Table 3.3, Appendix B). Evidence of this species was also identified in moist soil areas of Features 33, 44 and 58b (see Table 3.3, Appendix B).

As described in Appendix D of the NHAG (OMNR, 2011a), a physical site investigation conducted for the purpose of identifying candidate significant terrestrial crayfish habitat within 120 m of the Project Location is not required for any component of the Project. Therefore, all terrestrial crayfish habitats identified during site investigations are considered generalized candidate significant wildlife habitat. An individual description and evaluation of significance of generalized candidate significant wildlife habitat is not required, as per Appendix D of the NHAG (OMNR, 2011a); instead, the terrestrial crayfish habitat associated with Features 28, 33, 44, 49 and 58b are to be treated as existing and significant and progress directly to the EIS Report (Section 5).

Summary

Based on the site investigations, candidate significant specialized habitats for wildlife identified as occurring within 120 m of the Project Location includes:

- Amphibian Woodland Breeding Habitat.

An evaluation of these candidate significant natural features within 120 m of the Project Location will be undertaken in the Evaluation of Significance Report (Section 4).

Based on the site investigations, generalized candidate significant seasonal concentration areas identified as existing within 120 m of the Project Location includes:

- Interior Forest Breeding Bird Habitat (Area-Sensitive and Declining Species);
- Amphibian Woodland Breeding Habitat;
- Amphibian Wetland Breeding Habitat;
- Turtle Nesting Habitat; and,
- Terrestrial Crayfish Habitat.

An evaluation of these generalized candidate significant natural features within 120 m of the Project Location is not required, as per Appendix D of the NHAG (OMNR, 2011a). Instead, these features are to be treated as existing and significant and progress directly to the EIS Report (Section 5).

3.2.4.3 Habitat of Species of Conservation Concern

Many species of conservation concern do not normally exhibit high population densities and other species that have a narrow tolerance or resilience for survival and fairly specialized habitat requirements are poorly understood (OMNR, 2000). Subsequently, seemingly minor alterations to their habitats may result in the local or regional decline of the species (OMNR, 2000).

The availability of suitable habitats for species identified in the Records Review Report (see Table 2.1, Appendix B) was determined based on the results of the site investigations. As outlined in the NHAG (OMNR, 2011a), five categories of species of conservation require the identification of habitat for the purpose of identifying candidate significant habitat of species of conservation concern (see Section 2.2.4.3).

The three categories of habitats of species of conservation concern (*ESA Special Concern* and Provincially Rare – Plant Species; *ESA Special Concern* and Provincially Rare – Other Species; and Declining Guilds - Shrubland Birds) are identified in Appendix D of the NHAG (OMNR, 2011a). The following subsection discuss the potential presence of candidate significant habitat of species of conservation concern identified in Table 2.1 (Appendix B**)**, as well as additional habitats for species of conservation concern not identified during the records review process.

ESA Special Concern and Provincially Rare – Plant Species

As identified in the Records Review Report (Section 2.2.4.3), 16 plant species are documented in the NHIC database as occurring within, or in the general vicinity of, the General Project Area (see Table 2.1, Appendix B). Two species are considered *Special Concern* under the *ESA* and all species are considered provincially rare to uncommon (S1-S3). The habitat preferences of each rare plant species are provided below, as well as the potential presence of candidate significant habitat of species of conservation concern (plants species) within 120 m of the Project Location.

ESA Special Concern Species

Green dragon and tuberous Indian-plantain are listed as *Special Concern* under the provincial *ESA* and are ranked S3 in Ontario. Green dragon is restricted to rich floodplains and bottomlands along rivers and creeks in the Carolinian Forest Zone, particularly maple forests and forest dominated by red ash and American elm (Argus *et al.,* 1982-1987). Tuberous Indian-plantain inhabits fens, wet meadows, wetlands, and wet, calcareous sandy areas along river banks near Lake Huron (Argus *et al.*, 1982-1987). Based on site investigations, habitats associated with the floodplain of Nine Mile River (Features 13 and 16) may support habitat for these two species (see Table 3.3, Appendix B); however, these species were not identified during site investigations.

As described in Appendix D of the NHAG (OMNR, 2011a), a physical site investigation conducted for the purpose of identifying candidate significant habitat of species of conservation concern (plant species) within 120 m of the Project Location is required for access road components of the Project. Potential habitats of green dragon and tuberous Indian-plantain within 120 m of the Project Location are associated with overhead collector lines; therefore, habitats for these species are considered generalized candidate significant wildlife habitat. An individual description and evaluation of significance of generalized candidate significant wildlife habitat is not required, as per Appendix D of the NHAG (OMNR, 2011a); instead, these features are to be treated as existing and significant and progress directly to the EIS Report (Section 5). Candidate significant wildlife habitat for these species was, therefore, not identified within 120 m of the Project Location.

Low S-Ranked Species

Heart-leaved alexanders and *B. gemmiparum* are ranked S1 in Ontario (extremely rare throughout its range in the province). Heart-leaved alexanders typically prefer rocky calcareous river flats and shorelines, dry, open scrubby woods, and clearings in cedar-spruce woods (Argus *et al.*, 1982-1987). *B. gemmiparum* prefer wet, usually calcareous soil or rock in or along streams, also in seepage on cliffs or ditch banks or around springs (Crum and Anderson, 1980).

Soft-hairy false gromwell, slim-flowered muhly, Chinese hemlock parsley, deer-tongue panic grass and eastern green-violet are ranked S2 in Ontario (rare throughout its range in the province). Soft-hairy false gromwell inhabits riverbanks and flats, stable dune ridges, dry rocky woods and fields, gravelly soil, and alvars; often on floodplains (Argus *et al.*, 1982-1987). Slim-flowered muhly prefers sandy or rocky woods (Argus *et al.*, 1982-1987). Chinese hemlock parsley inhabits swampy thickets, moist clearings, damp roadsides, calcareous seepages, river margins, and white cedar swamps (Argus *et al.*, 1982-1987). Deer-tongue panic grass primarily inhabits floodplain woods in southwestern Ontario and eastern green-violet prefers rich moist floodplain woods.

Mat muhly is ranked S2S3 in Ontario (rare to uncommon throughout its range in the province). Mat muhly typically inhabits calcareous shorelines and seepages of rivers flowing into James Bay and prairies fens and calcareous river shores in southern Ontario (Argus *et al.*, 1982-1987).

Great Lakes sand reed, Schweinitz's sedge, rigid sedge, ram's-head lady's-slipper, Great Lakes wild rye and American gromwell are ranked S3 in Ontario (uncommon throughout its range in the province, or found only in a restricted range, even if abundant in at some locations). Great Lakes sand reed is endemic to the Great Lakes, largely restricted to the sandy shores of Lake Huron and occasionally introduced along roadsides and railways (Argus *et al.*, 1982-1987). Schweinitz's sedge inhibits seepages, river banks and wooded swamps and rigid sedge inhabits moist prairies, wet meadows, seepages, fens, sandy shorelines and ditches (Argus *et al.*, 1982-1987). Ram's-head lady's-slipper typically inhabits moist coniferous swamps, dry, sandy woods, and limestone barrens. Great Lakes wild rye is typically restricted to sandy shores along the Great Lakes and American gromwell typically inhabits floodplains, woodlands and open areas near edges of woods.

None of the S-ranked species listed above were identified during site investigations; however, habitats associated with the floodplain of Nine Mile River (Features 13 and 16) may support habitat for Heart-leaved alexanders, *B. gemmiparum,* soft-hairy false gromwell, Chinese hemlock parsley, deer-tongue panic grass, eastern green-violet, Schweinitz's sedge and American gromwell.

As described in Appendix D of the NHAG (OMNR, 2011a), a physical site investigation conducted for the purpose of identifying candidate significant habitat of species of conservation concern (plant species) within 120 m of the Project Location is required for access road components of the Project. Potential habitats of heart-leaved alexanders, *B. gemmiparum, s*oft-hairy false gromwell, Chinese hemlock parsley, deer-tongue panic grass, eastern green-violet, Schweinitz's sedge and American gromwell within 120 m of the Project Location are associated with overhead collector lines; therefore, habitats for these species are considered generalized candidate significant wildlife habitat. An individual description and evaluation of significance of generalized candidate significant wildlife habitat is not required, as per Appendix D of the NHAG (OMNR, 2011a); instead, these features are to be treated as existing and significant and progress directly to the EIS Report (Section 5). Candidate significant wildlife habitat for these species was, therefore, not identified within 120 m of the Project Location.

ESA Special Concern and Provincially Rare – Other Species

As identified in the Records Review Report (Section 2.2.4.3), 26 bird species, three reptile species, three lepidoptera species and one odonata species categorized as ‘other species’ are documented as occurring within, or in the general vicinity of, the General Project Area (see Table 2.1, Appendix B). Twelve (12) of the species are listed as *Special Concern* under the *ESA*, including seven bird species, all three reptile species and two lepidoptera species. The potential presence of candidate significant habitat of species of conservation concern (other species) is described below. Note that candidate significant habitat for Bald Eagle is discussed in Section 3.2.4.2 - *Bald Eagle Nesting Habitat and Winter Feeding and Roosting Areas*.

ESA Special Concern Species

Short-eared Owls (*Special Concern*) were identified as 'possible' breeders (observed in its breeding season in suitable nesting habitat) outside the General Project Area (south of Goderich) in the *Atlas of the Breeding Birds of Ontario* (Cadman *et al.*, 2007), but were identified within, or in the immediate vicinity of, the General Project Area in the NHIC database (1988 record; OMNR, 2010b). Short-eared Owls generally prefer open habitats, including dense grasslands, peat bogs, marshes, sand-sage concentrations, arctic tundra and old pastures (COSEWIC, 2008b). As described in Index #31 of the SWH Decision Support System (OMNR, 2000), Short-eared Owls require about 75 to 100 ha of contiguous open habitat and nests tend to be in grass 30 to 50 cm tall, occasionally in vegetation as tall as 1 m. As noted in section 3.2.4.2, no large (>30 ha) grasslands (cultural meadow ecosites, grassland sites with a history of longevity, either abandoned fields, mature hayfields or pasturelands, and open country not identified as Class 1 or 2 agricultural lands and not being actively used for farming) are present within 120 m of the Project Location. As such, candidate significant habitat for this species was not identified within 120 m of the Project Location (see Table 3.3, Appendix B).

The Red-headed Woodpecker (*Melanerpes erythrocephalus; Special Concern*) prefers open deciduous woods, particularly oak savannahs, fields, pastures, city parks, river edges and roadsides where scattered large trees occur (Cadman *et al.*, 1987). This species shows a preference for dead or dying trees and at least a few snags or large dead limbs in more open habitats (Smith *et al.*, 2000). The species presence also correlates with the abundance of acorns and beechnuts. Red oaks were absent from the woodland areas within 120 m of the Project Location, as were large mast producing American beech trees. As such, candidate significant habitat for this species was not identified within 120 m of the Project Location (see Table 3.3, Appendix B).

In Ontario, the Hooded Warbler (*Wilsonia citrine; Special Concern*) breeds almost entirely in the Carolinian forest region near Lake Erie, though scattered breeding records extend north to Georgian Bay and summering activity has been recorded in the Kingston region (COSEWIC, 2000). The Hooded Warbler nests in mature hardwood forests with tall trees and a relatively closed canopy (COSEWIC, 2000). In particular, they make use of small clearings where low dense shrubby vegetation has sprung up (COSEWIC, 2000). Although large woodland areas with small clearings were noted during site investigations, the breeding range of Hooded Warblers is mainly restricted to the Carolinian Forest region (Ecoregion 7E); therefore; candidate significant habitat for this species was not identified within 120 m of the Project Location (see Table 3.3, Appendix B).

The Canada Warbler (*Wilsonia canadensis; Special Concern*) is found in a variety of forest types, but it is most abundant in wet, mixed deciduous-coniferous forests with a well-developed shrub layer (COSEWIC, 2008a). Nests are typically located on or near the ground on mossy logs or roots, along stream banks or on hummocks. Canada Warblers are also less commonly found in riparian shrub forests on slopes and ravines, old-growth forests with canopy openings and a high density of shrubs and in stands regenerating after disturbances, such as forest fires or logging (COSEWIC, 2008a). Breeding records of Canada Warbler within, or in the vicinity of

(Saratoga Swamp PSW), the General Project Area was documented in the Atlas of the Breeding Birds of Ontario (Cadman *et al*., 2007). Although potential habitat may exist within, or in the vicinity of, the General Project Area, candidate significant habitat for Canada Warblers was not identified within 120 m of the Project Location (see Table 3.3, Appendix B).

The Common Nighthawk (*Chordeiles minor; Special Concern*) breeds in a wide range of open habitats, such as beaches, recently logged or burned-over areas, forest clearings, short-grass prairies, pastures, open forests, marshes, lakeshores, gravel roads, river banks, rocky outcrops or barrens, railways and urban parks (COSEWIC, 2007). Although urban habitat is used by nighthawks, they generally prefer natural sites (COSEWIC, 2007). Since the middle of the 19th Century, the Common Nighthawk has adapted to use flat gravel roofs in urban areas as suitable nest sites (COSEWIC, 2007). As documented in the Atlas of the Breeding Birds of Ontario (Cadman *et al*., 2007), the maximum breeding evidence of Common Nighthawks in the General Project Area was identified as 'probable' (pair observed in suitable nesting habitat in nesting season). Although open habitats such as pastures and gravel roads were noted during site investigations, natural and undisturbed habitat for Common Nighthawks was not detected within 120 m of the Project Location; therefore, candidate significant habitat for this species was not identified within 120 m of the Project Location (see Table 3.3, Appendix B).

Based on site investigation, two snapping turtles were identified within the General Project Area, but not within 120 m of the Project Location. One snapping turtle was identified in a small pond in the south-western section of the General Project Area (outside the Project Location and 120 m Zone of Investigation) and the other was found dead on the road in the Nine Mile River valleyland (Valleyland 2). The snapping turtles preferred habitat is characterized by slow-moving water with a soft mud bottom and dense aquatic vegetation; however, snapping turtles have been observed in shallow water in almost every kind of freshwater habitat (COSEWIC, 2008c). Populations are most often located in ponds, sloughs, shallow bays or river edges, and slow streams, or areas combining several of these wetland habitats. During hibernation, snapping turtles are known to over-winter in cattail marshes, under logs, burrowing in the sediment and in river channels with water depths <0.5 m where deeper waters are not available (Ultsch, 2006). The 'best fit' wildlife habitats for the snapping turtle are 'turtle over-wintering habitat' and 'turtle nesting habitat'. Based on the criteria for snapping turtle over-wintering habitat, three features contain candidate significant habitat for snapping turtles, including Features 12, 28 and 49 (see Table 3.3, Appendix B). As described in Appendix D of the NHAG (OMNR, 2011a), a physical site investigation conducted for the purpose of identifying candidate significant turtle over-wintering habitat within 120 m of the Project Location is required for wind turbine and access road components of the Project. Based on this approach, two features contain habitat within 120 m of a wind turbine or access road that meets the criteria for candidate significant snapping turtle over-wintering habitat, including Features 28 and 49 (see and Figures 3.14 to 3.19, Appendix A**)**. Therefore, the candidate significant habitat for snapping turtles associated with these two features progressed to the Evaluation of Significance Report (Section 4). Feature 12 is within 120 m of Project components other than a wind turbine or access road and therefore, is considered generalized candidate significant wildlife habitat. An individual description and evaluation of significance of generalized candidate significant wildlife habitat is not required, as per Appendix D of the NHAG (OMNR, 2011a); instead, this feature is

to be treated as existing and significant and progresses directly to the EIS Report (Section 5). As identified in section 3.2.4.2, no candidate significant snapping turtle nesting habitat was identified within 120 m of the Project Location.

The eastern ribbonsnake is semi-aquatic and most frequently found in sunny, grassy areas with low dense vegetation near bodies of shallow permanent quiet water and in wet meadows, grassy marshes or sphagnum bogs that border ponds, lakes or streams (SWHTG - Appendix G; OMNR, 2000; COSEWIC, 2002a). Based on the feature descriptions provided in Table 3.3 (Appendix B), no suitable habitat for this species was identified in or within 120 m of the Project Location. Meadow marsh habitats are dominated by tall grasses (~1.5 m; reed canary grass) and the narrow grassy areas around watercourses (e.g., Feature 21) were upland and not consistent with permanent quiet water, wet meadows, grassy marshes or sphagnum bogs. As such, candidate significant habitat for the eastern ribbonsnake was not identified within 120 m of the Project Location during site investigations.

The milksnake is best known for occurring in rural areas and most frequently reported in and around buildings, especially old structures (COSEWIC, 2002b); however, the milksnake is found in a wide variety of habitats, from prairies, pastures, and hayfields, to rocky hillsides and a wide variety of forest types. Proximity to water and suitable locations for basking and egg-laying are also important features of milksnake habitat. Two natural features within 120 m of the Project Location were identified during site investigations as potential reptile hibernacula (see Section 3.2.4.1), but were ruled out as candidate significant wildlife habitat based on the poor quality of surrounding habitat. As such, no candidate significant habitat for milksnakes was identified within 120 m of the Project Location during site investigations.

Monarch habitat exists primarily wherever milkweed (*Asclepius* spp.) and wildflowers (such as Goldenrod, asters, and Purple Loosestrife) exist, including abandoned farmland, along roadsides, and other open spaces where these plants grow (COSEWIC, 2010); however, significant habitat for monarchs is generally associated with area of considerably dense patches of milkweed. As much of the area is active agriculture lands with herbicide control programs and cultural meadow areas were generally small with little to no milkweed, candidate significant habitat for this species was not identified in, or within 120 m of, the Project Location during site investigations.

West Virginia White habitat consists of deciduous woodlands that support toothwort (*Cardamine diphylla; Cardamine x maxima*), which is a small, spring-blooming plant of the forest floor (OMNR, 2005). The larvae of this species only feed on the leaves of toothwort. Toothwort was not identified during site investigations and as such, no candidate significant habitat for this species was identified in, or within 120 m of, the Project Location.

Partners In Flight (PIF) Species

Grassland Habitat Species

The decline of grassland birds has been identified as a conservation concern (Cadman *et al.*, 2007). Grassland/agricultural PIF priority species observed within the General Project Area include Grasshopper Sparrow, Savannah Sparrow, Vesper Sparrow, Field Sparrow, American Kestrel, Northern Harrier and Eastern Kingbird. Western Meadowlarks have also been identified as a low ranking (S3) grassland species within the General Project Area.

Grasshopper Sparrows prefer moderately open grasslands and prairies with patchy bare ground and avoid intensively cultivated agriculture (i.e., row crops), but will use hay fields for nesting purposes. Grasshopper Sparrows are highly area-sensitive requiring patch sizes >30 ha (Vickery, 1996). Savannah Sparrows require similar habitats as Grasshopper Sparrows, but are less area-sensitive, readily breed in grassy meadows, cultivated fields (especially alfalfa), lightly grazed pastures and roadsides (Wheelwright and Rising, 2008). Field sparrows generally inhabit open areas with low shrubs or trees, abandoned pastures and farm fields, overgrown power line corridors, thickets and forest edges (OMNR, 2000). Vesper Sparrow generally inhabit open areas with short, herbaceous vegetation, fields with hedgerows or re-growth, well-drained dry grassland areas with scattered trees or shrubs and short grass meadows and pastures (OMNR, 2000). Eastern Kingbirds generally occupy open fields and pastures near shrubby, forest edges and hedgerows with sufficient perches (OMNR, 2000). Western Meadowlark nest primarily in western North America and prefer grassland habitats, including native prairies and grasslands >10 ha in size.

Suitable habitat for these species is primarily limited to small isolated patches of agricultural grassland habitat (e.g., hay fields). Hay fields are considered sub-optimal given that the first removal of hay occurs during the breeding season (mid-late June). The Project Location and 120 m Zone of Investigation is primarily active cropland (soybean, wheat and corn). Suitable habitat within this area is limited, consisting of very few small isolated patches. The 'best fit' wildlife habitat for the species noted above is 'open county breeding bird habitat'. As stated in Section 3.2.4.2, large grasslands greater than 30 ha are likely most significant and support and sustain a high diversity of these species. Based on site investigations, no extensive open country habitats meeting the criteria outlined in Appendix Q of the SWHTG or the Draft SWH Ecoregion Criteria Schedule for open country breeding birds are located within 120 m of the Project Location. As such, candidate significant habitat for open country/grassland rare and declining birds (PIF species and low s-ranked species) was not identified during site investigations and did not progress to the Evaluation of Significance Report (Section 4).

Forest Habitat Species

Four forest PIF priority species were observed in the General Project Area including Wood Thrush, Rose-breasted Grosbeak, Northern Flicker and Eastern Wood-Pewee. All are considered secure or apparently secure in Ontario (S4 or S5). The Wood Thrush inhabits undisturbed, moist mature deciduous or mixed forest with deciduous sapling growth and prefers to nest in forest areas greater than 4 ha in size (OMNR, 2000). The Rose-breasted Grosbeak

inhabits immature and mature broad-leaved deciduous forests, swamp borders and thickets (OMNR, 2000). The Northern Flicker inhabits open deciduous, coniferous or mixed woodlands, forest edges, wetlands and mostly use dead or dying trees with a dbh >30 cm for nesting (OMNR, 2000). The Eastern Wood-Pewee inhabits open, deciduous, mixed or coniferous forest, oak forests with little understory, forest clearings and edges (OMNR, 2000). PIF forest priority breeding bird species occurred in 20 woodland features (see Table 3.3, Appendix B).

The 'best fit' wildlife habitat for the species noted above is 'interior forest breeding bird habitat'. As described in Appendix D of the NHAG (OMNR, 2011a), a physical site investigation conducted for the purpose of identifying candidate significant interior forest breeding bird habitat within 120 m of the Project Location is not required for any component of the Project. Therefore, all woodland features containing forest PIF species are considered generalized candidate significant habitat for rare forest dependent species of conservation concern, including Features 3, 5, 6, 9, 10, 11, 12, 13, 17, 19, 20, 28, 33, 37, 39, 42, 44, 47, 49, 59, 64, 65 and 68 (see Table 3.3, Appendix B). In addition, any other woodland feature containing greater than 4 ha of forest and/or deciduous/mixed swamp ecosites (FOD, FOM, FOC, SWD, SWM) was considered generalized candidate significant habitat for rare forest dependent species of conservation concern, including Features 5c, 7, 8, 14, 16, 18, 23, 27, 32, 35, 48, 51, 53, 54, 55, 57, 63, 66 and 67. Four hectares was selected as the minimum woodland size threshold based on the criteria for evaluating significant woodlands (see Section 4.1.1) and the habitat requirements of these species. An individual description and evaluation of significance of generalized candidate significant wildlife habitat is not required, as per Appendix D of the NHAG (OMNR, 2011a); instead, these features are to be treated as existing and significant and progress directly to the EIS Report (Section 5).

Other Habitat Species

As identified in the Records Review Report (Section 2), three PIF species of birds (Bank Swallow, *Riparia riparia*; Belted Kingfisher, *Megaceryle alcyon*; Baltimore Oriole, *Icterus galbula*) were identified as 'other habitat species' (see Table 2.1, Appendix B). Bank Swallows select sand, clay or gravel river banks or steep riverbank cliffs for nesting, as well as lakeshore bluffs of easily crumbled sand or gravel and gravel pits. Grasslands and cultivated field are often used for foraging, but nesting sites are generally the limiting factor for this species (OMNR, 2000). Belted Kingfishers select sand, clay and gravelly banks within 1.6 km of water bodies with fish for nesting, as well as eroded stream or river banks, lakeshore bluffs and gravel pits (OMNR, 2000). Baltimore Orioles prefer deciduous, wooded areas with natural openings, and may occupy hedgerows, deciduous groves, orchards, shade trees in parks, gardens, backyards (OMNR, 2000).

The 'best fit' wildlife habitat for the Bank Swallow is 'colonial bird nesting habitat'. As identified in Section 3.2.4.1, no colonial nesting bird habitat for swallow was identified within 120 m of the Project Location. As such, candidate significant habitat for Bank Swallows was not identified during site investigations and did not progress to the evaluation of significance. Bank Swallows were also not identified within 120 m of the Project Location during site investigations.

Belted Kingfishers occupy similar habitats as Bank Swallows, but are dependent on aquatic habitats as they are obligate piscivores. Although Belted Kingfishers were observed along watercourses in the General Project Area and may be using watercourses within 120 m of the Project Location for foraging, no suitable nesting habitat including sand, clay or gravelly banks, or eroded streams or river banks (cliff and bluff ELC community series) were identified within 120 m of the Project Location during site investigations. As such, candidate significant habitat for Belted Kingfishers is not present and did not progress to the Evaluation of Significance Report (Section 4).

Baltimore Orioles occupy a very broad range of habitats, making it difficult to scope habitat for this species. As stated above, Baltimore Oriole habitat includes deciduous, wooded areas with natural openings and may also include hedgerows, deciduous groves, orchards, shade trees in parks, gardens and backyards. Although Baltimore Oriole habitat is present throughout the General Project Area, only Feature 25 was identified as Baltimore Oriole habitat. Only the collector line component of the Project in located within 120 m of this feature; therefore, Feature 25 was identified as generalized candidate significant habitat for Baltimore Orioles. An individual description and evaluation of significance of generalized candidate significant wildlife habitat is not required, as per Appendix D of the NHAG (OMNR, 2011a); instead, this feature is to be treated as existing and significant and progresses directly to the EIS Report (Section 5).

Low S-Ranked Species

Arthropod Species

As identified in the Records Review Report (Section 2), two low S-Ranking species of arthropods including the tulip tree silk moth (*Callosamia angulifera*) and clamp-tipped emerald (*Somatochlora tenebrosa*) are identified within the General Project Area. As the namesake suggests, the tulip tree silk moth (S1) is found in deciduous forests with tulip trees (*Liriodendron tulipifera*), of which the caterpillar and pupae stage are dependent upon (Opler *et al*., 2011). As no deciduous forests with tulip trees were identified within 120 m of the Project Location, candidate significant habitat for the tulip tree silk moth was not identified during site investigations and is not carried forward to the evaluation of significance.

The clamp-tipped emerald (S2S3) is found in shady forest steams from trickles to about 1 m wide, often partly dry, and occasionally boggy or swampy (Dunkle, 2000). Small forested streams are present throughout the General Project Area; however, no woodland features contained forested streams suitable as clamp-tipped emerald habitat within 120 m of the Project Location. Subsequently, candidate significant habitat for the clamp-tipped emerald was not identified during site investigations and is not carried forward to the evaluation of significance.

Meadow crayfish, a species with an S-Rank of S3, was identified during the site investigations. As described in Section 3.2.4.2, two features (Features 28 and 49) contain ELC ecosites consistent with terrestrial crayfish habitats (MAM ecosites) and evidence of meadow crayfishes (burrows) were identified in three other features during site investigations (Features 33, 44 and 58b). Candidate significant habitat for terrestrial crayfish is discussed in Section 3.2.4.2.

Mammals

Two species of bat (Northern Long-eared Bat and Eastern Pipistrelle) with S-Ranks of S3? were identified in relatively low numbers during the late summer bat surveys (see Kingsbridge II Bat Monitoring Pre-construction Risk Assessment Report; Appendix E). Candidate significant habitat for bat species (bat hibernacula and maternal colony roosts) is discussed in Section 3.2.4.1.

Declining Guilds - Shrubland Birds

As identified in the Records Review Report (Section 2.2.4.3), the general decline of avian species associated with shrubland/successional habitats has been identified as a conservation concern in southern Ontario (Cadman et al., 2007; Ontario Partners in Flight, 2008). Shrubland/successional habitats are large, older field areas (typically in abandoned agricultural fields) that are succeeding to shrub and thicket habitats, with larger habitats (>30 ha) generally more significant than smaller habitats (OMNR, 2009). Four species of shrubland birds were identified in the Records Review Report (Willow Flycatcher, Black-billed Cuckoo, Brown Thrasher and Eastern Towhee).

The Willow Flycatcher prefers open areas with secondary shrubby growth or low trees of willow, red osier dogwood and hawthorn, damp to dry brushy, abandoned fields or clearcuts, and open forest or orchards with clearings (OMNR, 2000). The Black-billed Cuckoo inhabits dense, shrubby deciduous vegetation of low to medium height, interspersed with clearings, brushy pasture, dry open upland woods with dense shrubs and overgrown old fields with hawthorn (OMNR, 2000). The Eastern Towhee prefers dense, brushy cover with leaf litter, abandoned fields or pastures with developing young trees or shrubs, woodland edges with dense undergrowth, streamside thickets and brushy hillsides (OMNR, 2000). The Brown Thrasher inhabits open pastures, hedgerows or woodland edges with dense bushes, low trees or tangles of vines, areas of low, dense woody vegetation, early successional habitat, overgrown hawthorn pasture or marginal farmland.

Based on the Draft SWH Ecoregion Criteria Schedules (OMNR, 2009), ELC ecosites supporting shrubland/successional species include cultural savannahs and cultural thickets (CUS1 and CUT1). The Draft SWH Ecoregion Criteria Schedules also outlines criteria for candidate significant habitat for shrubland/early successional species, stating fields 30 ha or larger in size that are not class 1 or 2 agricultural lands and not being actively used for farming (i.e., no row-cropping in the last 5 years) are to be considered candidate significant wildlife habitat. Based on site investigations, large extensive shrubland/successional habitats or cultural savannah (CUS1) or cultural thicket (CUT1) ecosites 30 ha or larger in size were not identified within 120 m of the Project Location. As such, candidate significant habitat for shrub/successional species was not identified during site investigations and did not progress to the Evaluation of Significance Report (Section 4).

Summary

Based on the site investigations, candidate significant habitats of species of conservation concern identified as occurring within 120 m of the Project Location includes:

- *ESA Special Concern* and Provincially Rare – Other Species (snapping turtle habitat).

An evaluation of these candidate significant natural features within 120 m of the Project Location will be undertaken in the Evaluation of Significance Report (Section 4).

Based on the site investigations, generalized candidate significant seasonal concentration areas identified as existing within 120 m of the Project Location includes:

- *ESA Special Concern* and Provincially Rare – Plant Species; and,
- *ESA Special Concern* and Provincially Rare – Other Species.

An evaluation of these generalized candidate significant natural features within 120 m of the Project Location is not required, as per Appendix D of the NHAG (OMNR, 2011a). Instead, these features are to be treated as existing and significant and progress directly to the EIS Report (Section 5).

3.2.4.4 Animal Movement Corridors

Animal movement corridors are elongated, naturally vegetated parts of the landscape used by animals to move from one habitat to another (OMNR, 2000). Significant corridors will usually be wider, often without roads, and structurally and compositionally diverse and link two or more important natural features to allow wildlife to move to one habitat from another (OMNR, 2000). In southern Ontario, wildlife corridors usually consist of naturally vegetated areas that traverse through more developed and open landscapes and may consist of forested river valleys and shrubby riparian vegetation along smaller watercourses such as creeks. Hedgerows and windbreaks may also be considered animal movement corridors; however, as outlined in the SWHTG (OMNR, 2000), hedgerows should not be considered significant unless they provide the only animal movement corridors in the area.

Amphibian Corridors

As outlined in the Draft SWH Ecoregion Criteria Schedules, amphibian movement corridors can be extremely important for local populations as they can provide safe movement between seasonal habitats (OMNR, 2009). The Draft SWH Ecoregion Criteria Schedules further outline that amphibian movement corridors must be determined when amphibian breeding habitat is confirmed as significant wildlife habitat. Habitat features considered in the assessment of candidate significant amphibian corridors will include forested river valleys and shrubby riparian vegetation along smaller watercourses such as creeks that connect significant amphibian breeding habitats with summer habitat. Active agricultural fields will not be considered amphibian corridor habitats as these do not provide safe movement between seasonal habitats (although some species, such as Pickerel Frogs, may be found in wet pastures and meadows during the summer). For the purposes of identifying candidate significant amphibian corridors,

hedgerows are not considered amphibian corridors unless they provide direct connectivity between amphibian woodland and/or wetland breeding habitats and are identified as wet or containing a drainage feature. Watercourses and hedgerows that do not link woodlands and/or wetlands (i.e., end in an agricultural field or continue without entering a woodland and/or wetland feature) will not be considered candidate significant amphibian movement corridors. As per consultation with the OMNR, candidate significant amphibian corridors were not determined for amphibian breeding habitat features (woodland and wetland) identified as generalized candidate significant wildlife habitat. As candidate significant amphibian movement corridors cannot be determined at this stage, natural features identified as candidate significant amphibian corridors are described in the Evaluation of Significance Reports (Section 4).

3.2.5 Areas of Natural and Scientific Interest (ANSI)

ANSI's are defined as areas with life or earth science values. The OMNR identifies ANSI's as important natural features found outside provincial parks and conservation reserves based on scientific surveys of the province's ecodistricts.

One regionally significant Life Science ANSI (Lucknow River ANSI) was identified within 120 m of the Project Location (see Figure 2D, Appendix A). As this feature has been identified as regionally significant, site investigations were conducted to confirm the boundaries of the ANSI relative to the Project Location. Site investigation confirmed that the OMNR's boundaries coincide with the edge of the feature using a scale of approximately 1:1,000; therefore, no corrections were required to the Lucknow River ANSI as a result of the site investigation. Site investigations also confirmed the ANSI is composed of young to semi-mature forest of ash-sugar maple-black cherry-basswood with areas of dense regenerating cedar. The characteristics and functions of the ANSI are discussed in the above sections in the context of candidate (or generalized candidate) significant wildlife habitat and candidate significant woodlands (see Sections 3.2.1 and 3.2.4).

One provincial Earth Science ANSI called the Lothian-Lake Warren Shorelines ANSI is located within the Project Location (see Figure 3.25, Appendix A). No corrections were required to the natural feature as a result of the site investigation. The glaciolacustrine features dominating the Lothian South portion of the Lothian-Lake Warren Shorelines ANSI consist principally of wave-washed till moraine truncated in the west by a gently sloping shorebluff. Two prominent sand offshore bars lie immediately below the shorebluff trending almost directly east-west, slightly acute to the trend of the shore (OMNR, 2002b). Each bar extends approximately 1.5 km and do not appear to be connected to the shorebluff (OMNR, 2002b). Within 120 m of the Project Location, these sand bar areas were mildly visible in the field and are topographically presented in Figure 6.1 and 6.2 (Appendix A). The topographical survey suggests the sand bars are raised approximately 2 m above the surrounding landscape. The feature functions as one of the best developed examples of beach ridges older than Lake Nipissing and the best representing Glacial Lake Warren. Current land use within the ANSI is row crops (i.e., soy, corn, wheat) and small woodland fragments.

3.2.6 Summary

Based on site investigations, several candidate significant natural features are located within the Project Location, including the five candidate significant valleylands (Valleylands 1, 2, 3, 5 and 7) and eight candidate significant amphibian corridors (Amphibian Corridors 2, 3, 4, 5, 6, 7, 8 and 9). In addition, the provincially significant Lothian-Lake Warren Shorelines ANSI in located with the Project Location. The large majority of natural features are located within 120 m of the Project Location. As such, candidate significant natural features that require an evaluation of significance (habitat use studies for wildlife habitat features) include:

- Woodlands;
- Wetlands;
- Valleylands;
- Wildlife Habitats;
- Habitats of Seasonal Concentration of Wildlife;
- Colonial Bird Nesting Habitat (Herons);
- Waterfowl Nesting Habitat;
- Raptor Winter Feeding and Roosting Habitat;
- Bat Maternal Colony Roost Habitat;
- Specialized Habitat for Wildlife;
- Amphibian Woodland Breeding Habitat;
- Animal Movement Corridors;
- Amphibian Corridor; and,
- ANSI (Life Science and Earth Science).

Based on the site investigations, generalized candidate significant wildlife habitats present within 120 m of the Project Location not requiring an evaluation of significance include:

- Habitats of Seasonal Concentration of Wildlife;
- Turtle Over-Wintering Habitat;
- Rare Vegetation Communities and Specialized Habitat for Wildlife;
- Rare Vegetation Communities;
- Interior Forest Breeding Bird Habitat (Area-Sensitive and Declining Species);
- Amphibian Woodland Breeding Habitat;
- Amphibian Wetland Breeding Habitat;
- Waterfowl Nesting Habitat;
- Terrestrial Crayfish Habitat;
- Habitats of Species of Conservation Concern;
- *ESA Special Concern* and Provincially Rare – Plant Species; and,
- *ESA Special Concern* and Provincially Rare – Other Species.

3.3 Qualifications

Personnel responsible for conducting the site investigations are listed, with their respective role indicated, in Table 3.1 (Appendix B). Curricula vitae are provided in Appendix G.

4.0 EVALUATION OF SIGNIFICANCE REPORT

4.1 Methods of Evaluation

All features identified as candidate significant natural features in the Site Investigation Report (Section 3) that exist within 120 m of the Project Location were evaluated for significance, as per Section 27.2 of O.Reg. 359/09, unless a natural feature has been previously evaluated by the province (e.g., ANSI's, PSW). Evaluation criteria and procedures established or accepted by OMNR were used to make the determination of significance. Guidance documents used in the evaluation of significance of natural features within 120 m of the Project Location included:

- Natural Heritage Assessment Guide (NHAG; OMNR, 2011a);
- Natural Heritage Reference Manual (NHRM; OMNR, 2010a);
- Ontario Wetland Evaluation System (OWES; OMNR, 2002a);
- Significant Wildlife Habitat Technical Guide (SWHTG) and its Significant Wildlife Habitat Decision Support System (SWH Decision Support System; OMNR 2000);
- Draft Significant Wildlife Habitat Ecoregion Criterion Schedules (Draft SWH Ecoregion Criterion Schedules) – Ecoregion 6E (OMNR, 2009);
- Bats and Bat Habitats: Guidelines for Wind Power Projects (OMNR, 2011b); and,
- Birds and Bird Habitats: Guidelines for Wind Power Projects (OMNR, 2011c).

As established through the records review and site investigations, candidate significant natural features present within 120 m of the Project Location requiring evaluation of significance in accordance with s. 27 of O.Reg 359/09 include:

- Woodlands;
- Wetlands;
- Valleylands;
- Candidate Significant Wildlife Habitat, including:
  - Habitats of Seasonal Concentration of Wildlife;
  - Colonial Bird Nesting Habitat (Herons);
  - Waterfowl Nesting Habitat;
  - Turtle Over-Wintering Habitat; and,
  - Bat Maternal Colony Roosts.
- Specialized Habitat for Wildlife;
- Amphibian Woodland Breeding Habitat;
- Turtle Nesting Habitat;
- Habitats of Species of Conservation Concern;
- *ESA Special Concern* and Provincially Rare – Other Species;
- Animal Movement Corridors;
- Amphibian Corridor; and,
- ANSI's (Life Science and Earth Science).

The significance of these natural features is evaluated in Sections 4.2, according to the evaluation methods described below.

4.1.1 Woodlands

Huron County planning authorities have not identified significant woodlands or established protocols for designating local woodlands as significant. Therefore, woodlands were evaluated for significance based on guidelines provided in the NHAG (OMNR, 2011a). Woodlands were evaluated for significance based on the following criteria listed in the NHRM:

- Woodland Size Criterion;
- *Woodland Size*: Refers to the spatial extent of the woodland, even if intersected by narrow gaps 20 m or less in width. Size value is related to the scarcity of woodland in the landscape. Huron County possesses approximately 15.3 percent forest cover (Riley and Mohr, 1994) and the General Project Area possesses approximately 13.6 percent forest cover. Based on significant woodland size criteria outlined in the NHAG for landscapes with 5-15 percent forest cover, woodlands 4 ha in size or larger are considered significant;
- Ecological Functions Criteria;
- *Woodland interior*: Interior habitat is within the woodland and constitutes areas more than 100 m from the edge. As per the NHAG, a maintained public road would create an edge even if the opening was not wider than 20 m and did not create separate woodlands. Similar to the size criterion above, Huron County possesses approximately 15.3 percent forest cover (Riley and Mohr, 1994) and the General Project Area possesses approximately 13.6 percent forest cover; therefore, any forest interior habitats are considered significant;
- *Proximity to other woodlands or habitats*: Woodlands are considered significant if a portion of the woodland is located within 30 m of a significant natural feature or fish habitat and the entire woodland meets the area threshold according to the woodland cover in the municipality;
- *Linkages*: Woodlands are considered significant if they are located between two other significant features, each of which is within 120 m, and the woodland meets the area threshold according to the woodland cover in the municipality;
- *Water protection*: Woodlands are considered significant if they are located within 50 m (or top of valley bank if greater) of a sensitive groundwater discharge, sensitive recharge, sensitive headwater area, watercourse or fish habitat and the woodland within this distance meets the minimum area threshold according to the woodland cover in the municipality;
- *Woodland diversity*: Woodlands are considered significant if they have an area dominated, singly or in combination, by native naturally occurring (not planted) sugar maple, black maple, silver maple, red maple, yellow birch, hickory, beech, black ash, walnut, tamarack, spruce, pine, oak, basswood or hemlock which meets the minimum area threshold according to the woodland cover in the municipality;
- Uncommon Characteristics Criteria; and,

- Woodlands that contain rare or uncommon community types (e.g., provincial rating of S1, S2, or S3) and are 0.5 ha or more in size; habitat of a rare, uncommon or restricted woodland plant species (natural, not planted), including vascular plant species for which the NHIC's Southern Ontario Coefficient of Conservatism is 8, 9 or 10, tree species of restricted distributions, or species existing in only a limited number of sites within the planning area, and are 0.5 ha or more in size; or has characteristics of older woodlands or woodlands with larger tree size structure in native species, including older woodlands having 10 or more trees per hectare greater than 100 years old, or larger trees size structure including 10 or more trees per hectare at least 50 cm in diameter, or a basal area of 8 m^2/ha that are at least 40 cm in diameter meeting the minimum area threshold according to the woodland cover in the municipality.

As stated above, Huron County planning authorities have not established protocols for designating woodlands as significant; therefore, as per the NHAG, woodlands that meet a minimum standard for any one of the criteria listed above are considered significant. The evaluation of candidate significant woodlands is provided in Section 4.2.1.

4.1.2 Wetlands

The OMNR is responsible for determining the significance of wetlands using methods outlined in OWES (OMNR, 2002a). Evaluated wetlands are determined to be provincially or locally significant. Locally significant wetlands are those that have been evaluated, but did not receive a sufficient score to be considered provincially significant. Unevaluated or 'other' wetlands are those yet to be evaluated by the OMNR. For the purposes of the wetland evaluation, wetlands previously identified and confirmed by OMNR as provincially significant or locally significant are considered to meet the requirements for a determination of significance. Unless site investigations provided support to challenge these assessments, the designation as assigned by OMNR is used. Full OWES evaluation were not conducted for wetlands within 120 m of the Project Location (no wetlands are located within the Project Location). Subsequently, as per the NHAG (OMNR, 2011a), unevaluated wetlands within 120 m of the Project Location were treated as provincially significant and progressed to the EIS Report (Section 5).

In order to complete the evaluation of significance and determine the identification of potential negative environmental effects and mitigation as required for the EIS Report, the 'unevaluated' wetlands were evaluated following the *Wetland Characteristics and Ecological Functions Assessment for Renewable Energy Projects* - Appendix C of the NHAG (OMNR, 2011a). No ranking or rating of these wetland features (as either provincially significant or not significant) was calculated, as according to the OWES manual, habitat evaluations must be scored by OMNR. This assessment does provide procedures where significance of wetlands can be assumed and their functions assessed based on criteria within the OWES manual.

Wetland characteristics and ecological functions assessed following the Wetland Characteristics and Ecological Functions Assessment for Renewable Energy Projects, including:

- Biological Components;

- *Wetland type*: Assists in understanding whether changes in hydrology will impact wetland function. Provides a gauge for the presence of Species at Risk or provincially significant species;
- *Site type*: Assists in understanding if changes in hydrology will impact wetland function;
- *Vegetation communities*: Assists in establishing wetland types. Can be used to predict faunal types and provides a gauge for the presence of Species at Risk and special features;
- *Proximity to other wetlands*: Provides hydrological connections in order to estimate downstream impacts;
- *Interspersion*: Interspersion can be estimated once vegetation communities are known;
- *Open water type*: Assists in understanding whether changes in hydrology will impact wetland function. There are eight open water types (page 52 of the OWES manual) which represent varying percentages of open water, with type 1 being the least (less than 5%) and type 8 being the most (more than 95%);
- Hydrological Components;
- *Flood attenuation*: Flood attenuation is used to assess the efficiency of a wetland in attenuating flood peaks. A wetland's flood attenuation potential receives a designation of High, Moderate, or Low based on its type and relative position. Isolated wetlands would have high flood retention, other wetland types would have moderate, and wetlands associated with rivers would have low;
- *Water quality improvement*: Provides information to determine whether activities will change components of the wetlands water budget. Assists in understanding whether changes in hydrology will impact wetland function. Water quality improvement is based on connectivity/isolation to other wetland habitats, adjacent land use, and pollutant uptake factor (based on most dominant vegetation form);
- *Shoreline erosion control*: Shoreline wetlands provide a measure of protection from shoreline erosion caused by flowing water or waves. High shoreline erosion control would be designated to wetlands with shoreline vegetation dominated by trees and shrubs. Wetlands with medium shoreline erosion control would have shoreline vegetation dominated by emergent or submergent vegetation, and low erosion control wetlands would be dominated by other, or no, shoreline vegetation, or is entirely isolated or palustrine;
- *Groundwater recharge*: Important to understanding effects of alterations to topography and water flow, and whether changes in hydrology would impact wetland function. Wetlands are rated as high ground water recharge (isolated or palustrine wetland), moderate (riverine wetland), or low (lacustrine wetland);
- Special Features Components;
- *Species rarity*: All species observed during field surveys and documentation of species known to be present;
- *Significant features and habitats*: Essential to determining whether fundamental changes to habitat would occur. Significant features and habitats of interest include those listed in the SWHTG and OWES. Data was obtained through field surveys, background data and correspondence with agencies when possible; and,

- *Fish habitat*: Provides understanding necessary to devise strategies for ensuring that discharges and concentration of sediments do not affect fish habitat. Field and background data gathered for the project was reviewed to determine presence/absence of fish habitat.

The *Wetland Characteristics and Ecological Functions Assessment* for each wetland is provided in Section 4.2.2.

4.1.3 Valleylands

Huron County planning authorities have not identified significant valleylands or established protocols for designating local valleylands as significant. Therefore, AMEC applied the criteria outline in the NHAG (OMNR, 2011a) to assess the significance of valleylands located in, and within 120 m of, the Project Location. Criteria listed in the NHAG (OMNR, 2011a) that were used during the evaluation of candidate significant valleylands include:

- Landform Related Functions and Attributes;
- *Surface water functions*: Areas of water conveyance from catchment areas of 50 ha or greater, as defined by a stream channel conveying or holding water for at least two months of the year, or as defined by floodlines or by the meander belt width. Areas of active or historic erosion as characterized by exposed soils on shorelines, river banks, valley walls and instream islands areas of active or historic deposition characterized by alluvial soils forming bottomlands, terraces, levees and instream or river-mouth deltas or islands;
- Ecological Features;
- *Degree of naturalness*: Areas of contiguous woodland, wetland and/or meadow considered cumulatively. The proportion of valleyland that has natural vegetation cover versus cultural use. Valleylands greater than 25% natural vegetation cover is considered significant. Riparian vegetation greater than 30 m in width on each side of surface water features is considered significant;
- *Linkage function*: The portion of the valleyland with continuous natural vegetation corridors with a minimum width of 100 m. Areas with functional ecological connections to other natural areas within the watershed both inside and outside the valleylands. Areas that are determined to provide important wildlife corridors;
- Restored Ecological Functions; and,
- *Restoration - existing/committed projects*: Valleylands that contain restoration projects already underway or planned and awaiting implementation are considered significant.

As stated above, Huron County planning authorities have not established protocols for designating valleylands as significant; therefore, as per the NHAG, valleylands that meet a minimum standard for any one of the criteria listed above are considered significant. The evaluation of candidate significant valleylands is provided in Section 4.2.3.

4.1.4 Wildlife Habitat

The following sections outline the methods used to evaluate candidate significant wildlife habitat features identified during site investigations. Evaluation methodologies outline the approach for determining significant habitats of seasonal concentrations of wildlife, specialized habitat for wildlife, habitats of species of conservation concern and animal movement corridors.

The application of habitat use studies to identify significant wildlife habitat was conducted where possible; however, for the most part, habitat use studies were not conducted within natural features, but instead were conducted in the General Project Area. For that reason, data gathered from wildlife surveys were used to determine general habitat use within features and not necessarily habitat use within 'natural features'. For example, roadside amphibian surveys were used to assist in documenting amphibians within woodlands and wetlands, but not to determine habitat use of the candidate significant amphibian woodland breeding habitats within woodlands and wetlands.

The wildlife surveys conducted for the purpose of assisting in the evaluation of significance are described below.

To determine amphibian (anuran) habitat use in the General Project Area, 52 stations were surveyed for calling frogs. The surveys followed protocols outlined in the OMNR's Wildlife Monitoring Programs and Inventory Techniques for Ontario (Konze and McLaren, 1997). Surveys were conducted within the recommended timing window (April, May and June), between a half hour after sunset and midnight. May and June surveys were conducted in 2010 while the April surveys were conducted in 2011. Surveys involved the surveyor standing at each selected station and listening for 3-minutes. Observations at all distances were recorded to account for features located within optioned and non-optioned lands. All calling activity was ranked using one of the following three abundance code categories:

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

The results of the amphibian surveys were used to assist in the identification of generalized candidate significant wildlife habitats, but were not used to determine habitat use within candidate significant natural features. Survey dates, times, weather conditions and field personnel are summarized in Table 3.1 (Appendix B). Monitoring station locations are shown in Figure 7.1 and 7.2 (Appendix A). All amphibian species identified during standardized surveys are provided in Table 4.1 (Appendix B). Field notes are provided in Appendix F.

Breeding bird surveys were undertaken on June 10, 11 and 12 and June 24, 25 and 30, 2010 by qualified biologists. Forty-four (44) listening posts were located throughout the General Project Area and were positioned to target optioned lands containing suitable habitat. Surveys were conducted on roadsides and represented a range of habitats and communities (e.g., agricultural, woodland, wetland, valleyland). Surveys were conducted for 10-minutes at

each listening post and consisted of recording the diversity and density of bird species. Bird observations were recorded at four distance regimes: within a 50 m radius; 50 to 100 m; outside the 100 m radius, and flyovers. Surveys were initiated prior to sunrise and extended to late morning depending on the weather conditions. Point counts were aborted or postponed if weather conditions were not optimal. The order of the surveys was reversed during the second round to correct for temporal sampling bias. Survey dates, times, weather conditions and field personnel of these surveys are summarized in Table 3.1 (Appendix B). Survey locations are provided in Figure 7.1 and 7.2 (Appendix A). All bird species identified during standardized surveys are provided in Table 4.2 (Appendix B). Key bird species associated with natural features that were either identified during standardized point count surveys or during ELC and wildlife habitat surveys are provided in Table 3.3 (Appendix B). Field notes are provided in Appendix F.

4.1.4.1 Habitats of Seasonal Concentrations of Wildlife

Four types of candidate significant habitats of seasonal concentration of wildlife were documented within 120 m of the Project Location in the Site Investigation Report (Section 3.0). These candidate significant wildlife habitats include colonial bird nesting habitat (for herons), waterfowl nesting habitat, reptile hibernacula and bat maternal colony roosts. The following headings provide evaluation criteria for determining significant habitats of seasonal concentration of wildlife.

Colonial Bird Nesting Habitat – Herons

Evaluation criteria and guidelines provided in Appendix Q (Table Q-1) of the SWHTG (OMNR, 2000) and Schedule 2 (Table 1.1) of the Draft SWH Ecoregion Criteria Schedules (OMNR, 2009) were applied in the evaluation of significance of candidate significant colonial bird nesting habitat for herons. Habitat descriptions provided in Index #36 of the SWH Decision Support System (OMNR, 2000) was considered in the evaluation.

Evaluation criteria and guidelines outlined in the SWHTG include:

- *Relative importance of the site to local bird populations*: Significant sites are generally the only known sites in the planning area; significant sites may be one of only a few in the area;
- *Presence of species of conservation concern*: Most significant sites support several species of concern; significant sites support one species;
- *Number of nests in the colony:* Sites with the greatest number of nests are more significant;
- *Species diversity and abundance:* Sites with the greatest number of species are more significant;
- *Quality of habitat*: Significant sites generally have better habitat (e.g., optimal vegetation composition, ratio of open water to emergent vegetation; stable water level; abundant food) capable of supporting more birds for a longer time period;

- *Size of the site*: Larger sites may be more significant (especially for area-sensitive species);
- *Level of disturbance:* Least disturbed sites are more significant; and,
- *Historical use*: Sites with a longer history of use may be more significant.

Evaluation criteria outlined in the Draft SWH Ecoregion Criteria Schedules (OMNR, 2009) identifies the presence of five or more active nests of any of the listed species (Great Blue Heron, Black-crowned Night-Heron, Great Egret, Green Heron) as a defining criteria for significant colonial bird breeding habitat for herons. The evaluation of candidate significant colonial bird nesting habitat for herons is provided in Section 4.2.4.1.

Waterfowl Nesting Habitat

Evaluation criteria and guidance provided in Appendix Q (Table Q-1) and Appendix K (OMNR, 2000), and Schedule 2 (Table 1.2.2) of the Draft SWH Ecoregion Criteria Schedules were applied in the evaluation of significance of candidate significant waterfowl nesting habitat. Habitat descriptions provided in Index #11 of the SWH Decision Support System (OMNR, 2000) was considered in the evaluation.

Evaluation criteria outlined in Appendix Q of the SWHTG include:

- *Relative importance of the site to local waterfowl populations*: Most significant sites are the only known sites in the planning area; significant sites may be one of only a few in the area;
- *Presence of species of conservation concern*: Most significant sites support several species of concern; significant sites support one species;
- *Species diversity and abundance*: Sites with the greatest number of species are more significant. Sites with the highest number of individuals are more significant;
- *Quality of habitat*: Most significant sites have better habitat (e.g., optimal vegetation structure, stable water levels, abundant cover, and a wetland/water body within 150 m);
- *Size of the site*: Larger sites of suitable habitat (e.g., grasslands adjacent to wetlands, ponds, lakes for many species) are more significant;
- *Location of site*: Sites providing safe movement of broods from nest to wetland/water body (i.e., no roads) are more significant;
- *Nest predation*: Sites with lower rates of nest predation are more significant; and,
- *Level of disturbance*: Sites with little disturbance (e.g., haying, cattle grazing) are more significant.

In addition, Appendix Q (Table Q-1) of the SWHTG outlines that all sites with nesting and brood habitat for American black ducks should be considered significant, as well as all nesting areas for Gadwall, Green-winged Teal, Northern Pintail, Northern Shoveler, and American Wigeon.

Evaluation criteria outlined in the Draft SWH Ecoregion Criteria Schedules state that significant waterfowl nesting habitat must have the presence of three or more nesting pairs for listed species except Mallard or the presence of 10 or more nesting pairs for listed species including

Mallard. The evaluation of candidate significant waterfowl nesting habitat is provided in Section 4.2.4.1.

Winter Raptor Feeding and Roosting Habitat

Evaluation criteria and guidance provided in Appendix Q (Table Q-1) and Schedule 2 (Table 1.1) of the Draft SWH Ecoregion Criteria Schedules were applied in the evaluation of significance of candidate significant waterfowl nesting habitat. Habitat descriptions provided in Index #8 and #10 of the SWH Decision Support System (OMNR, 2000) were considered in the evaluation.

Evaluation criteria outlined in Appendix Q of the SWHTG include:

- *Relative importance of the site*: Significant sites are generally the only known sites in the planning area; significant sites may be one of only a few in the area;
- *Presence of species of conservation concern*: Most significant sites support several species of concern; significant sites support one species;
- *Species diversity*: Sites with the greatest number of species are more significant;
- *Abundance*: Sites with the highest number of individuals are more significant;
- *Size of site*: Large sites (e.g., at least 20 ha) are more significant than smaller sites;
- *Level of disturbance*: Least disturbed sites may be more significant;
- *Location of site*: Sites located near other open field areas, with adjacent woods are more significant;
- *Habitat quality*: Sites with better habitat (e.g., abundant prey and perches; a tendency toward less snow accumulation due to exposure to strong prevailing winds) are probably more significant; and,
- *Historical use of area*: Significant sites may have been used for several years and/or at least 60% of winters.

Evaluation criteria outlined in the Draft SWH Ecoregion Criteria Schedules state winter raptor feeding and roosting habitat must be used by one or more Short-eared Owls or two or more Rough-legged Hawks, Red-tailed Hawks, Northern Harriers and/or American Kestrels and 10 or more individuals for a minimum of 20 days per season. The evaluation of candidate significant winter raptor feeding and roosting habitat is provided in Section 4.2.4.1.

Reptile Hibernacula

Evaluation criteria and guidance provided in Appendix Q (Table Q-1) of the SWHTG (OMNR, 2000) and Schedule 2 (Table 1.1) of the Draft SWH Ecoregion Criteria Schedules (OMNR, 2009) were applied in the evaluation of significance of candidate significant reptile hibernacula. Habitat descriptions provided in Index #4 of the SWH Decision Support System (OMNR, 2000) was considered in the evaluation.

Evaluation criteria outlined in Appendix Q of the SWHTG include:

- *Relative importance of the site*: Significant sites are generally the only known sites in the planning area; significant sites may be one of only a few in the area;
- *Presence of species of conservation concern*: Most significant sites support two or more species of concern; significant sites may support one species;
- *Species diversity and abundance*: Sites with the greatest number of species are more significant. Sites with the highest number of individuals are more significant;
- *Habitat quality*: Sites with better habitat are probably more significant;
- *Location of site*: Sites found in areas with good movement corridors are more significant; and,
- *Level of disturbance*: Least disturbed sites are more significant.

Evaluation criteria outlined in the Draft SWH Ecoregion Criteria Schedules further states that snake hibernacula used by five or more individuals or two or more species of snakes, or congregations of five or more individuals or two or more species of snakes near potential hibernacula (e.g., foundation or rocky slope) on sunny warm days in spring (Apr/May) and fall (Sept/Oct) should be considered significant. If there are Special Concern species present, the site is considered significant. The evaluation of candidate significant reptile hibernacula is provided in Section 4.2.4.1.

Bat Maternity Colony Roosts

Evaluation criteria and guidance provided in *Bats and Bat Habitats: Guidelines for Wind Power Projects* (OMNR, 2011b), Appendix Q (Table Q-1) of the SWHTG (OMNR, 2000) and Schedule 2 (Table 1.1) of the Draft SWH Ecoregion Criteria Schedules (OMNR, 2009) were applied in the evaluation of significance of candidate significant bat maternal colony roosts.

Evaluation criteria outlined in the *Bats and Bat Habitats: Guidelines for Wind Power Projects* included (in order of importance):

- *Snag/cavity tree height*: Tallest snag/cavity tree and largest diameter at breast height are most significant;
- *Exhibits cavities or crevices*: Exhibits cavities or crevices most often originating as cracks, scars, knot holes or woodpecker cavities;
- *Snag/cavity tree size*: Large dbh snag/cavity trees are more significant than smaller trees;
- *Density*: More significant when within the highest density of snags/cavity trees (e.g., clusters of snags);
- *Presence of loose bark*: Snag/cavity trees with loose and/or peeling are important at roosting areas for bats;
- *Height of cavity or crevice*: Cavity or crevice is high in snag/ cavity tree (>10 m);
- *Tree species composition*: Tree species that provide good cavity habitat (e.g., white pine, maple, aspen, ash, oak);

- *Snag/cavity tree exposure*: Canopy is more open (to determine canopy cover, determine the percentage of the ground covered by a vertical projection of the outermost perimeter of the natural spread of the foliage of trees); and,
- *Decay stage*: Exhibits early stages of decay (decay class 1-3; refer to Watt and Caceres, 1999).

The SWHTG outlines bat maternal colony roosts should be considered significant if sites contain at least 30 big brown bats, 100 little brown bats, 10 eastern pipistrelles, 10 silver-haired bats, 10 long-eared bats, 10 small-footed bats; however, the *Bats and Bat Habitats: Guidelines for Wind Power Projects* states that if a maternity roost is found, the entire ELC stand is considered significant bat maternity colony roost habitat. Subsequently, any evidence of maternal colony roosting is considered significant. The evaluation of candidate significant bat maternal colony roost habitat is provided in Section 4.2.4.1.

4.1.4.2 Specialized Habitats for Wildlife

Amphibian Woodland Breeding Habitat

Evaluation criteria and guidelines provided in Appendix Q (Table Q-2) of the SWHTG and Index #40 of the SWH Decision Support System (OMNR, 2000), and Schedule 2 (Table 1.1) of the Draft SWH Ecoregion Criteria Schedules (OMNR, 2009) were applied in the evaluation of significance of candidate significant amphibian woodland breeding habitat.

Evaluation criteria outlined in Appendix Q of the SWHTG include:

- *Provision of significant wildlife habitat*: Woodlands providing several significant wildlife habitats (e.g., forest interior habitat, raptor nesting, abundant tree cavities and down woody debris) are most significant;
- *Degree of permanence*: Woodlands with permanent ponds or those containing water in most years until at least mid July are most significant;
- *Species diversity of pond*: Ponds supporting high species diversity are more significant;
- *Presence of rare species*: Ponds supporting rare amphibian species are more significant than ponds supporting only common species;
- *Size and number of ponds*: In general, woodlands with larger and/or several ponds are more significant;
- *Diversity of submergent and emergent vegetation*: Ponds with a good diversity of emergent and submergent aquatic vegetation are most significant;
- *Presence of shrubs, logs at edge of pond*: Presence of shrubs and logs increase significance of pond for some amphibian species because of increased structure for calling, foraging, and escape and concealment from predators;
- *Adjacent forest habitat*: More significant areas will have closed canopy forest providing shaded, moist understory and abundance of down woody debris for cover habitat. Breeding ponds with shortest distance to forest habitat are more significant because of reduced risk to moving amphibians and are more likely to be used;
- *Water quality*: Prefer unpolluted waters; and,

- *Level of disturbance*: Woodlands with little or no disturbance (e.g., forest management, roads between breeding pond and forest habitat) are more significant.

Information from site investigations were used to evaluate the candidate habitat in relation to the evaluation criteria provided above and the essential components of woodland breeding habitat as described in the SWH Decision Support System (OMNR, 2000), including:

- Permanent or temporary shallow water with no fish;
- Emergent or submergent vegetation, woody shrubs, logs and/or other shoreline structures; and,
- A closed canopy surrounding woodland with an abundance of downed woody debris.

Evaluation criteria outlined in the Draft SWH Ecoregion Criteria Schedules further states the presence of breeding population of one or more of woodland breeding amphibians with at least 20 individuals (adults, juveniles, eggs/larval masses) should be considered significant amphibian woodland breeding habitat. The evaluation of candidate significant amphibian woodland breeding habitat is provided in Section 4.2.4.2.

4.1.4.3 Habitats of Species of Conservation Concern

ESA Special Concern and Provincially Rare – Other Species

As identified in the Site Investigation Report (see Section 3.2.4.3), one category of candidate significant habitat of species of conservation concern (*ESA Special Concern* Species) was identified during site investigations within the 120 m Zone of Investigation. These candidate significant natural features include habitat for snapping turtles.

Evaluation criteria and guidelines provided in Appendix Q (Table Q-3) of the SWHTG (OMNR, 2000) were applied in the evaluation of significance of candidate significant habitats of species of conservation concern. Evaluation criteria outlined in the SWHTG include:

- *Degree of rarity of species found at site*: Habitats for species ranked S1 and S2 should be considered more significant than habitats for species ranked S3. Habitats with species ranked as *Special Concern* by the OMNR should also be considered significant;
- *Documented significant decline in a species and/or its critical habitat*: Habitat for species experiencing the greatest declines is most significant. The habitat for declining species that has the lowest representation in the planning area is more significant. Habitats that provide the best opportunity for the long-term sustainability are most significant;
- *Species whose range is solely or primarily found in Ontario*: Species and their habitats are significant even if well represented in the planning area, due to high provincial responsibility for their protection. Habitats that provide the best opportunities for the long-term sustainability of the species are most significant;
- *Condition of existing habitat at site*: Sites that provide habitat that best meets the survival requirements of the target species and that also include a natural buffer zone

are most significant. Undisturbed or least-disturbed habitats (e.g., no/few deleterious impacts from roads, human activities) are significant. Highly diverse sites that support one or more species of conservation concern are most significant;

- *Size of species population at site*: Habitat supporting large populations of a several species of conservation concern is most significant. Habitat supporting large populations of a single species is significant;
- *Size and location of habitat*: Large sites supporting large populations of several species of conservation concern are most significant. Sites large enough to ensure long-term support and viability of species of conservation concern are significant. Sites with large areas of suitable habitat that are also connected to other potentially suitable habitat and/or natural areas are most significant;
- *Potential for long-term protection of the habitat*: Habitats that provide the best opportunity for long-term protection are usually more significant than similar habitats with little opportunity for protection. Habitats of species currently experiencing severe population declines in Ontario due to habitat loss are most significant. Habitats of species currently experiencing significant population declines are significant;
- *Representation of species/habitat within the municipality*: Poorly represented habitats for species of conservation concern are significant. Habitats that could be lost or severely degraded and cannot be replaced by similar habitats are highly significant; and,
- *Evidence of use of the habitat*: Sites with documented traditional use by species are most significant.

The evaluation of candidate significant habitat of special of conservation concern is provided in Section 4.2.4.3.

4.1.4.4 Animal Movement Corridors

For the purpose of identifying candidate significant amphibian corridors, corridors were assessed as linkages between significant breeding habitats and summer habitats. Corridor habitats were not considered to occur within features (e.g., within Feature 48), but were only considered in areas where amphibians may potentially leave breeding areas (and the feature) in search of summer habitats. Active agricultural fields were not considered 'safe' movement corridors; therefore, only areas providing safe movements such as vegetated watercourses and hedgerows that link significant woodland and wetland breeding habitats with other woodlands and/or wetlands were considered in the determination of candidate significant amphibian corridors. Watercourses and hedgerows that do not link woodlands and/or wetlands (i.e., end in an agricultural field or continue without entering a woodland and/or wetland feature) were not considered candidate significant amphibian corridors.

Evaluation criteria provided in Appendix Q (Table Q-4) of the SWHTG (OMNR, 2000) was used in the determination of significance candidate amphibian corridor habitat. Evaluation criteria included:

- *Importance of areas to be linked by corridor*: Corridors linking the significant natural areas are most significant. Corridors that provide access to and from the most critical habitats within a species/ home range are significant;
- *Importance of corridor to survival of target species*: Corridors linking most significant or critical identified amphibian habitats are most significant;
- *Dimensions of corridor*: Wider corridors are usually more significant than narrow ones as they generally provide more food and habitat for more species and better protection from predation and disturbance. Most significant woodland corridors should be at least 200 m wide. Shorter corridors are usually more significant than longer ones as they minimize the time animals spend in the corridor and the mortality risks to moving animals;
- *Continuity of corridor*: Continuous corridors consisting of native vegetation, unbroken by roads, or other gaps such as fields, water bodies, residential areas are most significant. Gaps should be <20 m;
- *Habitat and habitat structure of corridor*: Corridors with several layers of vegetation (e.g., mature tall trees, understory trees, shrubs, herbaceous ground cover) are generally more significant than corridors with few vegetation layers. Corridors with variety of ground cover (living low vegetation, down woody debris, stumps, rock piles) are usually more significant than corridors consisting of sparsely covered ground;
- *Species found in corridor or presumed to be using corridor*: Corridors containing high overall species diversity or rare species are more significant than corridors with less species diversity. Corridors used for movement by many species are usually more significant than corridors;
- *Risk of mortality for species using corridor*: Corridors providing safest passage for wildlife moving across the landscape are most significant. Best corridors will have the lowest risk of mortality associated with them;
- *Opportunity for protection*: Corridors with the best opportunity for protection are significant; and,
- *Provision of other related values*: Numerous and/or large corridors that could effectively increase the overall area of the existing system of protected natural areas in the planning area are significant. Corridors that may permit the future expansion of wildlife populations into an area are significant.

Based on consultation with the OMNR, a physical site investigation conducted for the purpose of identifying candidate significant amphibian corridors within 120 m of the Project Location is required for access road components of the Project. Therefore, to assess candidate significant amphibian corridors, both significant amphibian woodland/wetland habitats and generalized candidate significant amphibian woodland/wetland habitats were examined to determine if amphibian corridors were present within 120 m of an access road. All features with potential amphibian corridor habitat within 120 m of Project components other than an access road are considered generalized candidate significant amphibian woodland breeding habitat. An individual description and evaluation of significance of generalized candidate significant wildlife habitat is not required, as per Appendix D of the NHAG (OMNR, 2011a); instead, these features are to be treated as existing and significant and progress directly to the EIS Report (Section 5).

The evaluation of candidate significant amphibian corridors is provided in Section 4.2.4.4.

4.1.5 Areas of Natural and Scientific Interest (ANSI)

As outlined in the NHAG, provincially and regionally significant ANSI's are determined by OMNR using the Identification and Confirmation Procedure for ANSI's, and therefore, REA applicants are not required to evaluate known ANSI's any further (NHAG, OMNR, 2011a). The provincially significant Lothian-Lake Warren Shorelines ANSI progressed to the EIS Report (Section 5). As outlined in the NHAG, regionally significant ANSI features (Lucknow River ANSI) do not require the preparation of an EIS Report.

4.2 Evaluation of Significance

4.2.1 Woodlands

The 61 candidate significant woodlands that occur within 120 m of the Project Location were evaluated using the significance criteria recommended in the NHAG (OMNR, 2011a), as described in Section 4.1.1.

A summary of the criteria satisfied by each woodland within 120 m of the Project Location based on the site investigations (vegetation and wildlife surveys) and GIS analysis of the landscape is provided in Table 4.3 (Appendix B) and is meant to be read in conjunction with the information provided in Table 3.3 (Appendix B). Significant woodlands within 120 m of the Project location are shown on Figures 8.1 to 8.29 (Appendix A). Based on the evaluation criteria, 42 of the 61 woodlands were considered significant woodlands and progressed to the EIS Report (Section 5).

4.2.2 Wetlands

The OMNR is responsible for determining the significance of wetlands using methods outlined in the Ontario Wetland Evaluation System (OWES) (OMNR, 2002a). Evaluated wetlands are determined to be provincially or locally significant. Locally significant wetlands are those that have been evaluated, but did not receive a sufficient score to be considered provincially significant. Unevaluated or 'other' wetlands are those yet to be evaluated by the OMNR. For the purposes of the wetland evaluation, wetlands previously identified and confirmed by OMNR as provincially significant or locally significant are considered to meet the requirements for a determination of significance. Unless site investigations provided support to challenge these assessments, the designation as assigned by OMNR is used.

The boundaries of the Saratoga Swamp PSW complex, as evaluated by the OMNR, do not extend within 120 m of the Project Location. In addition, the two locally significant wetlands (Colbourne 52A and Colbourne 52D) identified in the General Project Area are outside 120 m of the Project Location and were not included in the EIS Report.

During the site investigations, portions of deciduous, mixed forest and thicket swamp ecosites, as well as meadow and shallow water marshes were identified within 34 features (52 total

wetlands; see Table 4.4, Appendix B). As per the draft NHAG (OMNR, 2010), these wetlands were considered significant and progressed to the EIS Report (Section 5). The unevaluated wetlands were evaluated following the *Wetland Characteristics and Ecological Functions Assessment for Renewable Energy Projects - Appendix C* of the draft NHAG (OMNR, 2011a) and are presented in Table 4.4 (Appendix B). No ranking or rating of these wetland features (as either provincially significant or not significant) was calculated, as according to the OMNR OWES Manual (OMNR, 2002a), habitat evaluations must be scored by OMNR. The significant wetlands are illustrated on Figures 8.1 to 8.29 (Appendix A).

4.2.3 Valleylands

The eight candidate significant valleylands that occur either in, and/or within 120 m of, the Project Location were evaluated using the significance criteria recommended in the NHAG (OMNR, 2011a), as described in Section 4.1.3.

The evaluation criteria satisfied by each candidate significant valleyland identified as occurring in, and within 120 m of, the Project Location based on the site investigations and GIS analysis of the landscape is provided in Table 4.5 (Appendix B) and is meant to be read in conjunction with the information provided in Table 3.3 (Appendix B). Significant valleylands in, and within 120 m of, the Project Location are shown on Figures 8.1 to 8.29 (Appendix A). Based on the evaluation criteria, four of the eight valleylands were considered significant valleylands and progressed to the EIS Report (Section 5). The significant valleylands include Valleylands 1, 2, 5 and 7.

4.2.4 Wildlife Habitat

The following sections provide an evaluation of the candidate significant wildlife habitat features within 120 m of the Project Location based on the criteria described in Section 4.1.4. The evaluation criteria satisfied by each candidate significant wildlife habitat feature, as determined through site investigations, is provided in Tables 4.6 to 4.12 (Appendix B) and is designed to be read in conjunction with the information provided in Table 3.3 (Appendix B). Significant wildlife habitats within 120 m of the Project Location are shown on Figures 8.1 to 8.29 (Appendix A).

4.2.4.1 Seasonal Concentration Areas

Colonial Bird Nesting Habitat

As identified in the Site Investigation Report (Section 3.2.4.1), one candidate significant colonial bird nesting habitat feature (associated with Feature 63) was identified within 120 m of the Project Location. The candidate significant colonial nesting habitat was evaluated using the significance criteria outlined in Section 4.1.4.1. The evaluation of the candidate significant colonial nesting habitat is provided in Table 4.6 (Appendix B) and is designed to be read in conjunction with the information provided in Table 3.3 (Appendix B).

The determination of significant wildlife habitat is also based on habitat use of the natural feature. Although habitat use within the natural feature was documented during site

investigations (see Table 4.2 – Point Count 29; Appendix B), confirmation of the number of nests could not be accurately ascertained from site investigations as access to the property was not possible (alternate site investigations were employed). The Draft SWH Ecoregion Criteria Schedule (Schedule 2; OMNR, 2009) outlines that five or more active nests must be present to be considered significant wildlife habitat. For the purposes of the evaluation of significance, a conservative approach was employed and the natural feature was considered to be significant wildlife habitat; however, pre-construction surveys are required to confirm the number of nests within the natural feature (if possible). Pre-construction monitoring protocols are described in the EIS Report (Section 5). The significant colonial bird nesting habitat for herons is shown on Figure 8.25 (Appendix A).

Waterfowl Nesting Habitat

As identified in the Site Investigation Report (Section 3.2.4.1), five candidate significant waterfowl nesting habitat features (associated with Features 17, 18, 44, 49 and 51) were identified within 120 m of the Project Location. The candidate significant colonial nesting habitats were evaluated using the significance criteria outlined in Section 4.1.4.1. The evaluation of candidate significant waterfowl nesting habitat is provided in Table 4.7 (Appendix B) and is designed to be read in conjunction with the information provided in Table 3.3 (Appendix B).

The determination of significant wildlife habitat is also based on habitat use of the natural feature. Site investigations revealed the potential for waterfowl nesting species is mainly limited to Wood Ducks (this species nests within large cavity trees in deciduous swamp ecosites), although no large diameter trees (>40 cm dbh) with large cavities suitable for Wood Duck nesting were observed in the natural features. The deciduous swamp ecosites are dominated by emergent deciduous and forest wetland species, which are uncharacteristic of vegetation types preferred by the non-cavity nesting dabbling waterfowl species (typically occur in marsh and swamp habitats with sub-merged aquatic vegetation, abundant sedge cover and/or abundant emergent vegetation). The meadow marsh ecosite (MAM2) associated with Feature 49 was the only natural feature capable of supporting any of the listed non-cavity nesting waterfowl species.

The Draft SWH Ecoregion Criteria Schedule (Schedule 2; OMNR, 2009) states that waterfowl nesting habitat must have three or more nesting pairs for listed species except Mallard or 10 or more nesting pairs for listed species including Mallard to be considered significant wildlife habitat. Based on the size of wetlands and the quality of habitat (lack of suitable nesting sites and cover vegetation), the probability of any of these natural features supporting the required number of nesting pairs is low to none. As such, the candidate significant waterfowl nesting habitat associated with Feature 44 was the only habitat evaluated as significant wildlife habitat. Pre-construction surveys are required to confirm the habitat use (nesting) within this natural feature, where possible based on land access permission. Significance criteria outlined in the Draft SWH Ecoregion Criteria Schedule would be considered in the post-construction evaluation. Pre-construction monitoring protocols are described in the EIS Report (Section 5). The significant waterfowl nesting habitat is shown on Figure 8.20 (Appendix A).

Winter Raptor Feeding and Roosting Habitat

As identified in the Site Investigation Report (Section 3.2.4.1), two candidate significant winter raptor feeding and roosting habitat (associated with Features 13, 14, 16 and 59) were identified within 120 m of the Project Location. The candidate significant winter raptor feeding and roosting habitats were evaluated using the significance criteria outlined in Section 4.1.4.1. The evaluation of candidate significant winter raptor feeding and roosting habitats is provided in Table 4.8 (Appendix B) and is designed to be read in conjunction with the information provided in Table 3.3 (Appendix B).

The determination of significant wildlife habitat is also based on habitat use of the natural feature. The Draft SWH Ecoregion Criteria Schedule (Schedule 2; OMNR, 2009) states that winter raptor feeding and roosting habitat must be used by one or more Short-eared Owls or two or more Rough-legged Hawks, Red-tailed Hawks, Northern Harriers and/or American Kestrels and 10 or more individuals for a minimum of 20 days per season. Based on the large size of the features and the good habitat quality, there is a high probability of these two natural features supporting the required number of raptors during the winter months. As such, the candidate significant winter raptor feeding and roosting habitat associated with Features 13, 14, 16 and 59 were evaluated as significant wildlife habitat. Pre-construction surveys are required to confirm the habitat use within these natural features, where possible based on land access permission. Significance criteria outlined in the Draft SWH Ecoregion Criteria Schedule would be considered in the post-construction evaluation. Pre-construction monitoring protocols are described in the EIS Report (Section 5). The significant winter raptor feeding and roosting habitat is shown on Figures 8.6 and 8.25 (Appendix A).

Bat Maternal Colony Roost Habitat

As identified in the Site Investigation Report (Section 3.2.4.1), eight candidate significant bat maternal colony roost features (associated with Features 5, 13, 28, 32, 33, 36, 39 and 48) were identified within 120 m of the Project Location. The candidate significant bat maternal colony roost habitats were evaluated using the significance criteria outlined in Section 4.1.4.1. The evaluation of candidate significant bat maternal colony roost habitat is provided in Table 4.9 (Appendix B) and is designed to be read in conjunction with the information provided in Table 3.3 (Appendix B).

The determination of significant wildlife habitat is also based on habitat use of the natural feature. Habitat use within the natural features was not documented during site investigations; however, the identification of candidate significant bat maternal colony roost habitat was not conducted during the optimal time period for identifying habitat use (June). Therefore, for the purposes of the evaluation of significance, a conservative approach was applied and all candidate significant bat maternal colony roost habitats were considered to be significant wildlife habitat. Pre-construction surveys are required to confirm the habitat use by bats within the natural features. Pre-construction monitoring surveys would apply the significance criteria outlined in the *Bats and Bat Habitats: Guidelines for Wind Power Projects*, which states that if a

maternity roost is found, the entire ELC stand is considered significant bat maternity colony roost habitat. Subsequently, any woodland with evidence of maternal colony roosting is considered significant wildlife habitat. Pre-construction monitoring protocols are described in the EIS Report (Section 5). The significant bat maternal colony roost habitats are shown on Figures 8.1 to 8.29 (Appendix A).

Turtle Over-wintering Habitat

As identified in the Site Investigation Report (Section 3.2.4.1), three candidate significant turtle over-wintering habitat features (associated with Valleylands 2, 5 and 7) were identified within 120 m of the Project Location. Based on consultation with the OMNR, these three features are to be considered significant. The significant turtle over-wintering habitats are shown on Figure 8.1 to 8.29 (Appendix A). Potential impacts of the Project on these features are expected to occur during construction, operation and decommissioning; however, habitat use studies to confirm significance are not necessary to implement appropriate mitigation. Potential impacts of the Project and mitigation measures are provided in the EIS report (Section 5).

4.2.4.2 Specialized Habitat for Wildlife

Amphibian Woodland Breeding Ponds

As identified in the Site Investigation Report (Section 3.2.4.1), 12 candidate significant amphibian woodland breeding habitat features (associated with Features 3, 11, 13, 28, 32, 33, 37, 44, 47, 48, 57 and 66) were identified within 120 m of the Project Location. Based on consultation with the OMNR, Features 12, 24, 35, 36 and 39, and additional areas of Features 13, 33 and 37 were also considered candidate significant amphibian woodland breeding habitat. The candidate significant amphibian woodland breeding habitats were evaluated using the significance criteria outlined in Section 4.1.4.2. The evaluation of candidate significant amphibian woodland breeding habitat is provided in Table 4.10 (Appendix B) and is designed to be read in conjunction with the information provided in Table 3.3 (Appendix B). As Features 12, 24, 35, 36 and 39 were determined to be significant amphibian woodland breeding habitat by the OMNR, these features are not included in Table 4.10.

The determination of significant wildlife habitat is based on habitat use of the natural feature. Habitat use within these natural features was, for the most part, not documented during site investigations. Nonetheless, many candidate significant amphibian woodland breeding habitats can be evaluated for significance based on a qualitative assessment of the habitat. The Draft SWH Ecoregion Criteria Schedule (Schedule 2; OMNR, 2009) states that the presence of breeding population of one or more of woodland breeding amphibians with at least 20 individuals (adults, juveniles, eggs/larval masses) should be considered significant amphibian woodland breeding habitat. Largely based on the degree of permanence, size, and the presence of shrubs and downed woody debris, many candidate significant amphibian woodland breeding habitats were evaluated as not significant (see Table 4.10, Appendix B) due to the negligible probability of the natural features supporting one or more of the woodland breeding amphibians and at least 20 individuals. For the remainder of the natural features meeting the evaluation criteria for significant amphibian woodland breeding habitat, a

conservative approach was applied and these natural features were considered significant wildlife habitat. However, based on consultation with the OMNR, significant amphibian woodland breeding habitat associated with Features 3, 11, 28, 32, 47, 48 and 66 do not require the application of habitat use studies to confirm significance and are to be treated as significant in the EIS Report (Section 5) due to potential construction and decommissioning impacts to these habitats.

Based on consultation with the OMNR, pre-construction surveys are required at Features 12, 13, 24, 33, 35, 36, 37 and 39 to confirm habitat use by amphibians. The habitat use surveys would apply the significance criteria outlined in the Draft SWH Ecoregion Criteria Schedule (OMNR, 2009). In addition, significance criteria outlined in the Draft SWH Ecoregion Criteria Schedule would be considered in the post-construction evaluation. Pre-construction monitoring protocols are described in the EIS Report (Section 5). The significant amphibian woodland breeding habitats are shown on Figures 8.1 to 8.29 (Appendix A).

Turtle Nesting Habitat

As identified in the Site Investigation Report (Section 3.2.4.1), three candidate significant turtle nesting habitat features (associated with Valleylands 2, 5 and 7) were identified within 120 m of the Project Location. Based on consultation with the OMNR, these three features are to be considered significant. The significant turtle nesting habitats are shown on Figure 8.1 to 8.29 (Appendix A). Potential impacts of the Project on these features are expected to occur during construction, operation and decommissioning; however, habitat use studies to confirm significance are not necessary to implement appropriate mitigation. Potential impacts of the Project and mitigation measures are provided in the EIS Report (Section 5).

4.2.4.3 Species of Conservation Concern

As identified in the Site Investigation Report (Section 3.2.4.1), two candidate significant habitats of species of conservation concern (snapping turtles; associated with Features 28 and 49) were identified within 120 m of the Project Location. The candidate significant habitats of species of conservation concern were evaluated using the significance criteria outlined in Section 4.1.4.2. The evaluation of candidate significant habitats of species of conservation concern is provided in Table 4.11 (Appendix B) and is designed to be read in conjunction with the information provided in Table 3.3 (Appendix B).

Relative to candidate significant snapping turtle habitat, habitat use within the natural features was not documented during site investigations; however, the identification of snapping turtle over-wintering habitat was not conducted during the optimal time period for identifying habitat use (September – October). Therefore, for the purpose of the evaluation of significance, a conservative approach was applied and these natural features were considered significant wildlife habitat. Based on consultation with the OMNR, potential impacts of the Project on over-wintering habitat for snapping turtles may occur during construction, operation and decommissioning; however, habitat use studies to confirm significance are not necessary to implement appropriate mitigation. Potential impacts of the Project and mitigation measures are

provided in the EIS Report (Section 5). The significant snapping turtle habitats are shown on Figures 8.4 and 8.19 (Appendix A).

4.2.4.4 Animal Movement Corridors

Based on the evaluation of significance of amphibian woodland and wetlands features (see Section 4.2.4.2), six areas have been identified as candidate significant amphibian corridors within 120 m of an access road. Based on consultation with the OMNR, three additional areas were identified as candidate significant amphibian corridors. Candidate significant amphibian corridors are illustrated on Figures 3.1 to 3.29 (Appendix A). The candidate significant amphibian corridors were evaluated using the significance criteria outlined in Section 4.1.4.4. The evaluation of candidate significant amphibian corridors is provided in Table 4.12 (Appendix B).

The determination of significant wildlife habitat is also based on habitat use of the natural feature. Nonetheless, many candidate significant amphibian corridor habitats can be evaluated for significance based on a qualitative assessment of the habitat. Based on the evaluation criteria outlined in Section 4.1.4.4, six amphibian corridors were evaluated as significant wildlife habitat (Amphibian Corridor 3, 5, 6, 7, 8 and 9). For amphibian corridors satisfying the evaluation criteria, pre-construction surveys are required to confirm the habitat use by amphibians within the natural features. Studies must be conducted at the time of year when species are expected to be migrating or entering breeding sites. Neither the SWHTG nor the Draft SWH Ecoregion Criteria Schedules outline habitat use studies and thresholds for confirming significant amphibian corridors based on habitat use; therefore, thresholds for amphibian use determined in consultation with the OMNR would be considered significant. Pre-construction monitoring protocols are described in the EIS Report (Section 5). The significant amphibian corridors are shown on Figure 8.1 to 8.29 (Appendix A).

Multiple areas within 120 m of the Project components other than an access road were identified as generalized candidate significant wildlife habitat. The generalized candidate significant amphibian corridors are associated with a hedgerow between Features 14 and 16, a watercourse between Features 18 and 19, a watercourse between Features 23 and 24, and a watercourse through Feature 9.

4.2.4.5 Summary of Significant Wildlife Habitat

Significant wildlife habitat is present within 120 m of the Project Location and was identified and designated based on:

- Seasonal concentration areas (colonial bird nesting habitat, waterfowl nesting habitat, bat maternal colony roost habitat, turtle over-wintering habitat);
- Specialized habitats (amphibian woodland breeding habitat, turtle nesting habitat);
- Habitat of species of conservation concern (*ESA Special Concern* species – other species); and,
- Animal movement corridors (amphibian corridors).

These features are shown on Figures 8.1 to 8.29 (Appendix A). Features containing significant wildlife habitat are summarized in Table 4.13 (Appendix B).

4.2.5 Areas of Natural and Scientific Interest (ANSI)

Provincially significant ANSI's are determined by OMNR using the Identification and Confirmation Procedure for ANSI's, and therefore, REA applicants are not required to evaluate known ANSI's any further (NHAG, OMNR, 2011a). These features progressed to the EIS Report (Section 5).

4.3 Summary

Based on the results of the evaluation of significance, the following significant natural features have been identified in, or within 120 m of, the Project Location:

- Significant Woodlands;
- Significant Wetlands;
- Significant Valleylands;
- Significant Wildlife Habitats;
- Regionally Significant Life Science ANSI; and,
- Provincially Significant Earth Science ANSI.

Each of these significant natural features progressed to the EIS Report (see Section 5). A summary of significant natural features in provided in Table 4.13 (Appendix B).

4.4 Qualifications

AMEC personnel responsible for conducting the evaluation of significance include:

- Jeff Balsdon, M.Sc. (Terrestrial Ecologist);
- Matt Evans, Ph.D. (Senior Ecologist); and,
- Said Mohamed, B.Sc. (Wetland Ecologist).

Curricula vitae are provided in Appendix H.

5.0 ENVIRONMENTAL IMPACT STUDY REPORT

Section 38 of O.Reg. 359/09 states that an EIS Report must be conducted for all significant natural heritage features, provincial parks, or conservation areas that are located in or within 120 m of Project Location (50 m for a Provincially Significant Earth Science ANSI). The purpose of this EIS is to identify and assess any potential negative environmental effects to significant natural features during the construction, operation, and decommissioning phases of the Project. This EIS also provides effective mitigation measures to eliminate or minimize potential negative environmental effects. Detailed mitigation measures and post-construction monitoring plans are also provided in this section. The Environmental Effects Monitoring Plan (EEMP) is provided in Appendix I and is discussed below in relevant sections.

The primary mitigation measure employed to reduce impacts to natural features and functions was avoidance; micro-siting decisions made during the development of the Project layout considered minimizing impacts to, and encroachment on, natural features. The Project is sited predominately within actively cultivated agricultural land. Modifications to the site plan were made to avoid placing the Project in features identified as significant through the site investigation and evaluation of significance for this Project.

The overall goal of this EIS Report is to eliminate or minimize Project related residual impacts to all significant natural heritage features in, or within 120 m of, the Project Location. Given that the proposed Project Location is largely confined to existing agricultural croplands and, where possible, Project components have been sited outside of specified REA setbacks, direct effects to natural features will be minimal. Aside from the Project Location being sited directly within the Lothian-Lake Warren Shorelines Earth Science ANSI, six significant valleylands and six amphibian corridors, no other Project components are located within a significant natural feature; however, several significant natural features are located within the 120 m Zone of Investigation. This section presents the results of the environmental effects analysis for the significant natural features and presents proposed mitigation measures to avoid, minimize or eliminate Project-related environmental effects.

A conservative approach has been used when proposing mitigation measures in order to avoid, minimize or eliminate, to the extent practical, potential negative Project effects on significant natural features. The NHAG (OMNR, 2011a), and the SWHTG (OMNR, 2000) were used in the evaluation of significance for natural features and in the assessment of potential negative effects from this Project. A summary of potential environmental effects and proposed mitigation measures for each natural feature, as described in the subsections below, is provided in Table 5.1 (Appendix B).

Provincial SAR listed as *Endangered* or *Threatened* that are protected under Ontario's *Endangered Species Act*, 2007 (*ESA*) are considered separately from the Natural Heritage Assessment, and are addressed under a separate cover as part of the APRD.

5.1 Overview of Project

As outlined in Section 1.1, this report assesses 141 potential turbine sites and associated padmount transformers, four potential met tower locations, collector and data lines, junction boxes, utility vaults, a 138 kV step-up transformer station, a substation, access roads with several alternate alignments, crane paths, culverts, and temporary construction and laydown areas. The location of the Project components in relation to significant natural features is shown on Figures 8.1 to 8.29 (Appendix A).

The construction phase of the Project is expected to last 18-24 months. The construction of turbines and ancillary facilities will take place in agricultural lands and will involve no destruction or fragmentation of natural habitats. All construction activities will occur within the 'buildable area'. The foundations for the turbines are made of poured in place reinforced concrete, and are approximately 19-21 m in diameter and 3 m deep.

Each wind turbine will require a padmount transformer with associated foundation (approximately 2.4 m x 2.4 m x 1.5 m), located on the ground adjacent to the tower. The padmount transformer is required to transform the electricity created in the nacelle to a standard operating power line voltage (i.e. 690 V to 34.5 kV).

A temporary construction and storage area at each turbine location (approximately 160 m x 160 m) will be used for temporary storage of the turbine components, staging, parking, and foundation spoil pile. The temporary construction area has been reduced in size on a site-specific basis to exclude natural features as part of the proposed mitigation. The general construction pad for the crane will be approximately 100 m x 60 m and will be located within the temporary construction area beside the location of the turbine. Generally, the process for construction pad installation will involve stripping and stockpiling of surface material (topsoil separate from subsoil) and applying an approximately 0.5 m deep gravel or stone base of granular type gravel. Alternatively, if appropriate, the area will be compacted and temporary crane mats made of timber will be used under each of the crane stabilizer arms. The construction pad or mat area will be removed at the end of the construction phase and restored to pre-existing conditions as soon as possible once the assembly of the turbines is complete.

Permanent gravel access roads, approximately 5 m wide will be constructed to each turbine, the transformer station and the substation/switchyard, with some temporary local widening up to 8 m on bends for crane access and at passing bays. Temporary construction work areas along the length of the access roads are 10 m wide and have been reduced in size on a site-specific basis to exclude natural features. The width of the access road and temporary construction area combined is 15 m. Most access roads are sited in active agricultural fields with few crossing hedgerows. Where access roads cross hedgerows, crossings have been located in areas that minimize vegetation removal by crossing at gaps in the hedgerow wherever possible. Some tree removal may be required at some hedgerow crossings. As appropriate, and in consultation with the relevant parties (government, conservation authority, adjacent landowner), K2 Wind would replace trees removed with tree species native to the ecoregion in an alternate location either on the affected property or elsewhere within the General Project Area.

Where possible, access roads have been planned to parallel property boundaries to reduce the interaction with drainage systems, farm operations and agricultural lands. Road construction for each turbine will be completed over the course of several days. The gravel access roads will be used periodically during operation for ongoing turbine maintenance. The roads will be constructed by removing (excavating) and stockpiling topsoil, then building the roadbed using local granular material. The design will allow drainage of rainwater using lateral drains where appropriate and ditches with culverts. Approximately 71 km of new permanent access roads are required for this Project.

During construction, the movement of cranes between turbine sites will take place primarily along access roads and municipal roads but in some cases crane paths have been proposed to allow movement of cranes between turbines. Crane paths are temporary paths that will be sited entirely within agricultural fields. Heavy-lift crawlers and mobile cranes will be used to assemble the turbines. In some places the cranes will be broken down and transported along access roads and municipal roads to other turbine locations for re-assembly. There are instances where cranes will travel along the most direct path between two turbines to increase efficiency and minimize potential impact to municipal roads. All proposed crane paths have been routed on private lands where landowners have agreements with the Proponent. Crane paths not located on access roads will be approximately 10 m wide, and will be relatively level and rolled as required; these crane paths will be short term in duration and rehabilitated to pre-construction conditions at the end of the construction phase.

From the padmount transformer at the base of each turbine, underground 34.5 kV collector lines will carry the electricity to the road allowance and have been sited to follow the turbine access roads in all cases to reduce the Project footprint. Data lines will follow the same corridor.

The collector lines, transmission line, and data lines (referred to as the collector system) will be placed underground within the road allowance and above ground on wood poles over major watercourse crossings or in areas where below grade construction is not possible due to obstacles (see Figure 8.1 to 8.29, Appendix A). Where underground collector lines are proposed, the preferred method of installation is trenching. At watercourse crossings, preferred crossing methods include open cut or high pressure directional drilling (HPDD). For overhead crossings, the preferred method of installation is to follow existing pole line corridors. Installation methods for the collector system will be influenced by site-specific conditions encountered during construction. The potential impacts associated with each method of installation are described in Section 5.2. Mitigation measures for each crossing method, as outlined in the Fisheries and Oceans Canada (DFO) Operational Statements (see Appendix J), are provided in Section 5.3.

At each end of the cable run will be a junction box or a utility vault to allow for cable splicing and access. During the excavation for underground cabling, an excavation will be made for the utility vaults typically approximately 2.5 m x 2.0 m x 1.0 m. The construction will typically consist of engineered fill/onsite crushed materials to form a base slab on which the junction box will be positioned. The junction box is partially buried with a hinged lid sitting above grade to allow for

maintenance access. The above ground portion of a typical junction box is approximately 1.5 m x 0.6 m x 0.6 m. The utility vaults will be approximately 5-6 m long x 2 m wide x 3.5 m deep. Where there are existing distribution lines, current infrastructure may be upgraded as required.

The collector system will carry the electricity to the transformer station or the substation. To reduce the number of circuits entering the substation, approximately one half of the 34.5 kV lines will be routed to the transformer station where there will be a step-up to a 138 kV. All circuits (138 kV and 34.5 kV) will then feed into the substation. The voltage will be increased at the substation for connection into the adjacent Hydro-One transmission line via the switchyard. The substation/switchyard will consist of a K2 Wind substation where the 34.5 kV and 138 kV collector circuits will terminate and the incoming power will be converted to 500 kV and a Hydro-One switching station, immediately adjacent to the substation, which will connect the 500 kV into the adjacent 500 kV Hydro-One transmission lines.

The substation/switchyard will be approximately 18.5 ha. Excavation of the yard will be required for the construction of concrete foundations and installation the electrical grounding grid and gravel. The substation structures will electrically connect the incoming 34.5 kV and 138 kV lines and the outgoing 500 kV conductors in the Hydro-One interconnection station.

An operation and maintenance building and protection control building will be located on the substation site. The operations building (approximately 32 m x 16 m) will house operational control equipment and spare parts, as well as maintenance and operator facilities. This facility will provide warehouse and workshop spaces, administrative office, kitchen, two restrooms, telecommunications areas, and associated parking.

The substation/switchyard site will also be used for the construction management offices and laydown for the entire Project. An area of approximately 160 m X 160 m will be clearly marked and temporary facilities such as trailers, power, and portable toilets will be installed. The laydown area will be used for the storage of supplies and equipment such as electrical cabling, capacitor banks, statcom units, cable bus, buswork, steel structures, outdoor breakers, as well as resources and general construction materials such as gravel, wood and steel. Major equipment such as turbine components (towers, nacelles and rotors) will not be stored at the laydown area as these will be delivered directly to the turbine sites. The construction management offices and laydown area will be used for the duration of the construction contract. Following construction, the temporary facilities will be removed and the site rehabilitated.

Up to four permanent met towers may be required for the Project and will be installed for use during the operation phase of the Project. The met towers will be a steel lattice climbable tower approximately 100 m high. Access for installation of the met towers is required. No permanent road will be constructed for the met towers; the truck used to deliver the met towers and installation equipment will travel the access routes that are delineated. Power and data cabling for the towers will be trenched in from the nearest collector line within the buildable areas delineated for the access routes.

Operation of the turbines will involve periodic use of the access roads for maintenance servicing of the turbines, underground collector line and above ground poles and collector lines. Once the wind facility is operational, existing agricultural land use practices will be re-established around the turbines.

Components of the Project are proposed to be constructed within significant wildlife habitat and an earth science ANSI and within 120 m of significant woodlands, significant wetlands, significant valleylands, significant wildlife habitat and a life science ANSI. Construction and installation of a renewable energy facility may be permitted in, or within 120 m of, these natural features (50 m in the case of the earth science ANSI), but are subject to the completion of an EIS (O.Reg. 359/09, s. (38(1)). No components of the Project are located within a significant southern wetland, coastal wetland or PSW.

In accordance with O.Reg. 359/09, (s.38(2)(a)), the following sections provide a detailed description of the potential negative environmental effects of the Project, identify appropriate mitigation measures and describe how the environmental effects monitoring plan and construction plan will address any negative environmental effects. Distances for any component within 120 m of a significant natural feature are provided. The impact assessment was conducted on a feature basis, rather than a turbine-by-turbine basis, so that potential impacts to significant natural features arising from multiple project components could be considered together. Significant natural features are discussed in context of each 'feature', as described in Section 3 and 4 of this report. Many of 'features' contain multiple significant natural features. Where a feature is considered to have multiple significant natural features, the impacts and mitigation as they relate to each natural feature are discussed.

5.2 Potential Impacts of the Project

The potential impacts associated with the proposed construction of the K2 Wind Power Project are identified and assessed in this section of the EIS, with appropriate recommended mitigation measures. A summary of the potential environmental effects of construction on significant natural features, as well as proposed mitigation measures and net residual effects are provided in Section 5.4 and summarized in Table 5.1 (Appendix B).

5.2.1 Significant Woodlands

A total of 42 significant woodlands have been identified within 120 m of the Project Location (Woodlands 3, 5, 5c, 6, 7, 8, 9, 12, 13, 14, 16, 17, 18, 19, 20, 23, 24, 27, 28, 32, 33, 35, 36, 37, 39, 42, 43, 44, 47, 48, 49, 51, 53, 54, 55, 57, 59, 63, 64, 66, 67 and 68; see Table 4.3, Appendix B and Figures 8.1 to 8.29, Appendix A). The turbine and infrastructure layout has been developed to minimize disturbance to the significant woodlands and efforts were made to incorporate the existing road network and farming lanes to the greatest extent possible. In some cases, the shape and size of the temporary turbine construction footprints (160 m x 160 m) has been altered such that no portion of the woodland falls within the turbine construction footprints. As no Project components are located within the boundaries of any significant

woodland, no habitat loss or creation of new edge (fragmentation) is expected and direct negative environmental effects to these features are not predicted.

Some construction activities (access road and collector system installation, and temporary crane paths) have been proposed within 120 m of a number of woodland features; however, no construction is proposed within any woodland feature. Potential impacts from access road and collector system installation, as well as temporary crane paths, during construction include soil migration associated with excavation, soil compaction from heavy equipment, potential changes in hydrological low/drainage and root zone damage. Excavation of soils for the purpose of underground collector system installation will occur at the minimum distance of 5 m from the woodland boundary (drip line). Trenching, which is required to install the underground collector system, has the potential to injure roots that might extend from trees located along the edge of the woodland boundary. The trench will generally be a shallow (1 m deep) depression, therefore minimizing the risk of root damage.

Overhead lines are currently proposed within the municipal road allowance at watercourse crossings adjacent to Features 16, 37 and 68 (see Figures 8.1 to 8.29, Appendix A). The preference is to minimize the extent of overhead lines as much as possible based on consultation with ACW Township and local residents. For overhead line construction, the Proponent intends to utilize the existing pole line corridor wherever possible. Existing poles would need to be replaced with taller poles to allow for the addition of new lines. Existing poles are located adjacent to Features 16 and 37 (except at the Kerry's Line crossing). There are no existing poles adjacent to Feature 68 so new poles would be required. All poles would be sited within the municipal road allowance.

Potential impacts from overhead line construction using new or replaced poles include potential to injure roots that might extend from trees directly adjacent to the municipal road allowance, erosion and sedimentation related to excavation, increased noise and dust associated with construction activity and wildlife disturbance. During operation, occasional tree pruning as part of the above ground collector system maintenance program may be required. General mitigation measures would be employed to avoid impacts to nearby features and applicable DFO Operational Statements will be followed at all crossing locations to mitigate any potential impacts (see Section 5.3 and Appendix J).

All other collector line installations adjacent to significant features would be installed underground using standard open trenching methods with either open cut or HPDD methods at watercourse crossings (see Figures 8.1 to 8.29, Appendix B). In some cases, there may be sufficient depth between the top of the road bed and the existing culvert to allow for lines to be buried directly in the roadbed. This crossing method will be discussed with ACW Township in areas where it is deemed feasible. Burying lines within the road bed will avoid potential impacts to adjacent features as excavation will occur in the travelled portion of the road.

Potential effects from standard trenching methods include short-term, localized dust generation, soil erosion and sedimentation, root zone damage to edge trees and disturbance to wildlife. Potential effects from open cut crossings include those identified for open trenching as well as

short-term increases of sedimentation downstream resulting from disturbance of the stream bed. Potential effects from HPDD include those identified for open trenching (although they are confined to the excavations for the entry and exit points of the lines which will be located outside of any natural features) as well as potential frac-out of drilling mud into aquatic habitat. General mitigation measures would be employed to avoid impacts to nearby features and applicable DFO Operational Statements, including the emergency frac-out response and contingency plan for HPDD, will be followed at all crossing locations to mitigate any potential impacts (Section 5.3 and Appendix J).

During the construction and decommissioning, some pruning of trees may be necessary. The locations where pruning will be required will be determined during the construction and decommissioning phases.

Although the intent is to avoid tree removal in significant woodland, tree removal may be necessary within the road allowances that overlap with significant woodlands for health and safety or electrical safety reasons. In the event that tree removal is required, it will be completed in consultation with the MVCA and a certified arborist. As appropriate, and in consultation with the relevant parties (government, conservation authority, adjacent landowner), K2 Wind will replace trees removed with tree species native to the ecoregion in an alternate location. The preferred option is to plant replacement trees at a suitable location on the landowner's property. If a suitable location is not available on the landowner's property, a suitable offsite location within the General Project Area will be identified through consultation with MVCA and/or ACW Township.

Overall, the potential effects of the construction and decommissioning of the turbines, substation/switchyard, access roads, met towers, and temporary construction pads and crane paths within 120 m of significant woodlands include short-term, localized dust generation, soil erosion and sedimentation, root zone damage to edge trees (soil compaction) and disturbance to woodland wildlife. The impacts resulting are expected to be short term, temporary in duration and can be mitigated through the use of general mitigation measures and best management practices (see Section 5.3). During construction, there will be increased traffic and the potential for accidental spills.

No potential negative effects to significant woodlands are expected from the installation of collector lines/data cables along road allowances. Construction and decommissioning activities will be short-term, localized, and will remain confined to areas already cleared for road allowances. During the operations phase, some periodic maintenance activities will occur, but these will have no impact on nearby significant woodlands. Maintenance of collector lines may include some pruning of trees, where necessary.

During operation, potential negative effects include accidental chemical and/or fuel spills and contamination of nearby woodlands from materials such as lubricating oils and other fluids associated with turbine maintenance. Improper waste disposal (fluids, containers, cleaning materials) could also have a negative impact on significant woodlands. The dust and

disturbance to woodland vegetation as a result of maintenance vehicle traffic is expected to be negligible due to the infrequency of these activities.

5.2.2 Significant Wetlands

A total of 52 significant wetlands have been identified within 120 m of the Project Location (Wetlands 5a, 5b, 5c, 6a, 6b, 7, 9a, 9b, 9c, 12a, 12b, 12c, 14, 15, 17, 18, 19a, 23, 24, 25, 28a, 28b, 29, 30, 34a, 34b, 35, 36, 37a, 37b, 37c, 37d, 37e, 37f, 37g, 39, 44a, 44b, 46, 47a, 47b, 47c, 47d, 48, 49, 51, 57, 59, 61, 63, 65 and 69; see Table 4.4, Appendix B and Figures 8.1 to 8.29, Appendix A)). The turbine and infrastructure layout has been developed to minimize disturbance to the significant wetlands and efforts were made to incorporate the existing road network and farming lanes to the greatest extent possible. In some cases, the shape and size of the temporary turbine construction footprints (160 m x 160 m) has been altered such that no portion of the wetland falls within the temporary turbine construction footprint. As no Project components are located within the boundaries of any significant wetland, no loss of wetland habitat or function is expected and direct negative environmental effects to these features are not predicted.

Some construction activities (access road with collector system installation, and temporary crane paths) have been proposed within 120 m of a number of significant wetland features, therefore a higher level of mitigation will be required. Potential impacts from access road and collector system installation, as well as temporary crane paths, during construction include soil migration associated with excavation, soil compaction from heavy equipment, potential changes in hydrological low/drainage and root zone damage. For construction on private lands, no construction is proposed within 5 m of any significant wetland feature. Should any disturbance occur to vegetation within 5 m of a wetland due to construction, the disturbed area will be seeded with species native to the ecoregion to establish the 5 m buffer. Where possible, and as appropriate, access roads will be constructed at or near existing grade to maintain surface flow contributions to the significant wetland. Temporary and permanent access and infrastructure roads will be constructed such that they mimic pre-construction surface flow regimes. Excavation of soils for the purpose of underground collector system installations along access roads will occur at the minimum distance of 5 m from the significant wetland. During the construction and decommissioning, some pruning of trees may be necessary. The locations where pruning will be required will be determined during the construction and decommissioning phases.

Overhead lines are currently proposed within the municipal road allowance at watercourse crossings adjacent to Wetland 37e, 37f and 37g (see Figures 8.18 and 8.19, Appendix A). The preference is to minimize the extent of overhead lines as much as possible based on consultation with ACW Township and local residents. For overhead line construction, the Proponent intends to utilize the existing pole line corridor wherever possible. Existing poles would need to be replaced with taller poles to allow for the addition of new lines. Existing poles are located at the crossing between Wetland 37f and 37g (at Division Line crossing), but there are no existing poles at the crossing between Wetland 37e and 37f (at Kerry's Creek crossing). All poles would be sited within the municipal road allowance.

Potential impacts from overhead line construction using new and replaced poles include potential to injure roots that might extend from trees directly adjacent to the municipal road allowance, erosion and sedimentation related to excavation, increased noise and dust associated with construction activity and wildlife disturbance. During operation, occasional tree pruning as part of the above ground collector system maintenance program may be required. General mitigation measures would be employed to avoid impacts to nearby features and applicable DFO Operational Statements will be followed at all crossing locations to mitigate any potential impacts (see Section 5.3 and Appendix J).

All other collector line installations adjacent to significant features will be installed underground using standard open trenching methods with either open cut or HPDD methods at watercourse crossings (Figures 8.1 to 8.29, Appendix A). In some cases there may be sufficient depth between the top of the road bed and the existing culvert to allow for lines to be buried directly in the roadbed. This crossing method will be discussed with ACW Township in areas where it is deemed feasible. Burying lines within the roadbed will avoid potential impacts to adjacent features as excavation will occur in the traveled portion of the road.

Potential effects from standard trenching methods include short-term, localized dust generation, soil erosion and sedimentation, root zone damage to edge trees and disturbance to wildlife. Potential effects from open cut crossings include those identified for open trenching as well as short-term increases of sedimentation downstream resulting from disturbance of the stream bed. Potential effects from HPDD include those identified for open trenching (although they are confined to the excavations for the entry and exit points of the lines which will be located outside of any natural features) as well as potential frac-out of drilling mud into aquatic habitat. General mitigation measures would be employed to avoid impacts to nearby features and applicable DFO Operational Statements, including the emergency frac-out response and contingency plan for HPDD, will be followed at all crossing locations to mitigate any potential impacts (see Section 5.3 and Appendix J).

Overall, the potential effects of the construction and decommissioning of the turbines, substation/switchyard, access roads, met towers, and temporary turbine construction areas and crane paths within 120 m of significant wetlands include short-term, localized dust generation, soil erosion and sedimentation, root zone damage to edge trees (soil compaction), changes to wetland hydrology either by increasing or decreasing surficial runoff and disturbance to wetland wildlife. The type of construction activities proposed will have little or minimal impact to pervious areas and precludes the potential of effects associated with changes in groundwater influence (i.e., water table changes). Given the shallow nature of the works no appreciable changes to the groundwater or surface water flows are anticipated. The impacts are expected to be short term, temporary in duration and can be mitigated through the use of general mitigation measures (see Section 5.3). During construction, there will be increased traffic and the potential for accidental spills.

No potential negative effects to significant wetlands are expected from the installation of collector lines/data cables along road allowances. Trenches will generally be a shallow (1 m

deep) depression and will be placed at least 5 m from the wetland boundary. The intent of the design will be to place the collector system on the opposite side of the road allowance where possible. In the event that subsurface conditions do not allow for placement of the collector system on the opposite side of the road from the wetland, the collector system will be placed as close to the road as safe and allowable by the Township or County to create as much buffer from the wetland as available. Given the shallow nature of the works no appreciable changes to the groundwater or surface water flows are anticipated. Construction and decommissioning activities will be short-term, localized, and will remain confined to areas already cleared for road allowances. During the operations phase, some periodic maintenance activities may occur and may result in potential erosion and sediment run-off into nearby significant wetlands. Maintenance of collector lines may include some pruning of trees, where necessary.

During operation, potential negative effects will include accidental chemical and/or fuel spills and contamination of nearby wetlands from materials such as lubricating oils and other fluids associated with turbine maintenance. Improper waste disposal (fluids, containers, cleaning materials) could also have a negative impact on significant wetlands. The dust and disturbance to wetland vegetation as a result of maintenance vehicle traffic is expected to be negligible due to the infrequency of these activities.

5.2.3 Significant Valleylands

A total of four (4) significant valleylands have been identified in, and within 120 m of, the Project Location (Valleylands 1, 2, 5 and 7; see Table 4.5, Appendix B and Figures 8.1 to 8.29, Appendix A). The turbine and infrastructure layout has been developed to minimize disturbance to the significant valleylands and efforts were made to incorporate the current road network and farming lanes to the greatest extent possible. In some cases, the shape and size of the temporary turbine construction footprints (160 m x 160 m) has been altered such that no portion of a valleyland falls within the turbine construction footprints. The only components of the Project Location located within significant valleylands are collector lines/data cables. The collector system has been designed to utilize existing above ground hydro pole line paths in areas that span significant valleylands to minimize disturbance. For health and safety reasons and depending upon the current state of the existing poles, it may be necessary to move the pole line to the other side of the municipal road allowance. The overhead collector system will generally use wood poles within the municipal road allowance. For sections of the municipal road allowance requiring new poles, poles will be set into holes augured to a depth of approximately 2 to 3 m. Where there are existing distribution lines within the municipal road allowances, K2 Wind will work to develop shared pole user agreements and will upgrade the existing infrastructure. In these areas, existing poles may be replaced with larger wood poles and the power lines re-strung. All activities associated with the installation of collector lines/data cables for the Project will occur within existing municipal road allowances. The majority of work will be completed from vehicles parked in the road allowance, including the use of vehicle mounted drilling equipment.

As such, no loss of valleyland habitat or function is expected and direct negative environmental effects to these features are not predicted.

Some construction activities (access road and collector system installation, and temporary crane paths) have been proposed within 120 m of valleyland features. Only collector system construction is proposed within municipal road allowances within any valleyland feature and no excavation for the purpose of access roads and temporary crane paths is proposed within 30 m of any valleyland feature, except for culvert installation where required for surface water flow. Excavation of soils for the purpose of underground collector system installation will occur at the minimum distance of 5 m from the valleyland to reduce the potential for erosion.

Overhead lines are currently proposed within the municipal road allowances at watercourse crossings adjacent to Valleylands 2, 5 and 7 (six crossings total; see Figures 8.1 to 8.29, Appendix A). The preference is to minimize the extent of overhead lines as much as possible based on consultation with ACW Township and local residents. For overhead line construction, the Proponent intends to utilize the existing pole line corridor wherever possible. Existing poles would need to be replaced with taller poles to allow for the addition of new lines. Existing poles are located adjacent to Valleyland 2 and Valleyland 5 (except at the Kerry's Line crossing). There are no existing poles adjacent Valleyland 5 (at Kerry's Line) and Valleyland 7 so new poles would be required. All poles would be sited within the municipal road allowance.

Potential impacts from overhead line construction using new and replaced poles include potential to injure roots that might extend from trees directly adjacent to the municipal road allowance, erosion and sedimentation related to excavation, increased noise and dust associated with construction activity and wildlife disturbance. During operation, occasional tree pruning as part of the above ground collector system maintenance program may be required. General mitigation measures would be employed to avoid impacts to nearby features and applicable DFO Operational Statements will be followed at all crossing locations to mitigate any potential impacts (see Section 5.3 and Appendix J).

All other collector line installations adjacent to significant features would be installed underground using standard open trenching methods with either open cut or HPDD methods at all watercourse crossings (see Figures 8.1 to 8.29, Appendix A). In some cases there may be sufficient depth between the top of the road bed and the existing culvert to allow for lines to be buried directly in the roadbed. This crossing method will be discussed with ACW Township in areas where it is deemed feasible. Burying lines within the roadbed will avoid potential impacts to adjacent features as excavation will occur in the traveled portion of the road.

Potential effects from standard trenching methods include short-term, localized dust generation, soil erosion and sedimentation, root zone damage to edge trees and disturbance to wildlife. Potential effects from open cut crossings include those identified for open trenching as well as short-term increases of sedimentation downstream resulting from disturbance of the stream bed. Potential effects from HPDD include those identified for open trenching (although they are confined to the excavations for the entry and exit points of the lines which will be located outside of any natural features) as well as potential frac-out of drilling mud into aquatic habitat. General mitigation measures would be employed to avoid impacts to nearby features and applicable DFO Operational Statements, including the emergency frac-out response and contingency plan

for HPDD, will be followed at all crossing locations to mitigate any potential impacts (see Section 5.3 and Appendix J).

During the construction and decommissioning, some pruning of trees may be necessary. The locations where pruning will be required will be determined during the construction and decommissioning phases. In some cases, tree removal may be necessary within the road allowance for health and safety or electrical safety reason. Tree removal required will be completed consultation with the MVCA and a certified arborist. As appropriate, and in consultation with the relevant parties (government, conservation authority, adjacent landowner) K2 Wind will replace trees removed with appropriate species in an alternate location.

Potential indirect effects of construction activities to significant valleylands can be geological and/or ecological and may include sedimentation within the watercourses, a reduction in bank stability due to erosion, dust pollution and disruption to the connectivity and wildlife corridor functions associated with valleyland. Indirect impacts resulting from construction activities are expected to be short term, temporary in duration and can be mitigated through the use of standard site control measures. During construction, there will be increased traffic and the potential for accidental spills.

No potential negative effects to significant valleylands are expected from the installation of collector lines/data cables along road allowances. Construction and decommissioning activities will be short-term, localized, and will remain confined to areas already cleared for road allowances. During the operations phase, some periodic maintenance activities will occur, but these will have no impact on nearby significant valleylands.

During operation, potential negative effects include accidental chemical and/or fuel spills and contamination of nearby valleylands from materials such as lubricating oils and other fluids associated with turbine maintenance. Improper waste disposal (fluids, containers, cleaning materials) could also have a negative impact on significant valleylands.

5.2.4 Significant Wildlife Habitat

As identified in the Evaluation of Significant Report (Section 4.0), significant wildlife habitat has not been identified within the Project Location. The Project Location will largely be limited to actively cultivated lands; therefore, negative impacts on significant wildlife habitat are generally expected to be minimal. Nonetheless, significant wildlife habitat was identified within 120 m of the Project Location and the potential exists for some negative effects to these natural features.

Significant wildlife habitat within 120 m of the Project Location include colonial bird nesting habitat, waterfowl nesting habitat, turtle over-wintering habitat, bat maternal colony roost habitat, rare vegetation communities, interior forest breeding bird habitat, amphibian woodland breeding habitat, amphibian wetland breeding habitat, terrestrial crayfish habitat, habitat of species of conservation concern and amphibian corridors.

As no significant wildlife habitat is located within the Project Location, there will be no direct loss of habitat or function. Potential indirect effects may arise during or after construction. General effects of the Project on significant wildlife habitats are discussed below.

5.2.4.1 Significant Colonial Bird Nesting Habitat – Herons

All components of the Project are sited outside these features; therefore, no loss of habitat for herons is anticipated for the Project. Potential negative effects on colonial bird nesting habitat for herons due to Project construction and decommissioning activities may occur indirectly from disturbance (affect use of adjacent habitats). Short-term disturbance from construction and decommissioning activity, such as increased traffic, noise, or dust, may result in avoidance of habitats by herons if construction disrupts critical life-cycle activities such as mating or nesting (NWCC, 2002). Increased human activities on-site may occur during all phases of the Project (e.g., site preparation, turbine assembly, maintenance activities) resulting in disturbance to herons. If not managed appropriately, development on adjacent land can have significant impacts on habitat if there are alterations to surface water availability or surface water flow. Potential short term changes to surface water hydrology and drainage to/from the natural feature is a potential risk from construction activities. Higher water levels may kill nest trees that are currently in shallow water or at the water's edge and reduced water levels may make the nests susceptible to predators such as raccoons. In addition, heronries are often abandoned if water levels decline significantly.

During operation, direct mortality of herons in a potential risk from collisions with turbines. Collision risk is partly a function of the rate of exposure of birds to the turbine blade sweep and types of behaviour that occurs within this range. Great Blue Herons nest between early May and late July and continuously fly to and from their nesting colonies when making foraging trips (Vennesland and Butler, 2011). During operation, this species could be at risk of colliding with turbines during their daily foraging excursions. Avoidance behaviour of herons may also occur due to the operation of turbines. Avoidance behaviour may include shifts in ingress or egress behaviours and complete avoidance of the habitat once the Project is operational.

5.2.4.2 Significant Waterfowl Nesting Habitat

Potential negative effects on waterfowl nesting sites due to Project construction and operation activities may occur indirectly from disturbance (affect use of adjacent habitats). Short-term disturbance from construction activity, such as increased traffic, noise, or dust, may result in avoidance of habitats by waterfowl if construction disrupts critical life-cycle activities such as mating or nesting (NWCC, 2002). Increased human activities on-site may occur during all phases of the Project (e.g., site preparation, turbine assembly, maintenance activities) resulting in disturbance to waterfowl. Potential short term changes to surface water hydrology and drainage to/from the natural feature may result from construction activities. Higher water levels flood ground nesting sites that are currently in shallow water or at the water's edge. Water levels may also decline if development inhibits groundwater recharge, or if surface water is diverted away from the wetland. Reduced water levels make the nests susceptible to predators

such as raccoons and waterfowl may abandon historical nest sites if water levels decline significantly.

During operation, direct mortality of waterfowl is a potential risk from collisions with turbines. Collision risk is partly a function of the rate of exposure of birds to the turbine blade sweep and types of behaviour that occurs within this range. Waterfowl nesting occurs between early April and June with adults and ducklings leaving nesting sites as early as August. During operation, this species could be at risk of colliding with turbines during their daily foraging excursions. Avoidance behaviour of waterfowl may also occur due to the operation of turbines. Avoidance behaviour may include shifts in ingress or egress behaviours and complete avoidance of the habitat once the Project is operational.

5.2.4.3 Significant Winter Raptor Feeding and Roosting Habitat

Potential negative effects on winter raptor feeding and roosting habitat due to Project construction and decommissioning activities may occur indirectly from disturbance (affect use of adjacent habitats). Short-term disturbance from construction activity, such as increased traffic, noise, or dust, may result in avoidance of habitats by raptors if construction disrupts critical life-cycle activities such as mating or nesting (NWCC, 2002). Increased human activities on-site may occur during all phases of the Project (e.g., site preparation, turbine assembly, maintenance activities) resulting in disturbance to raptors; however, the level of disturbance to wildlife will be comparable to current levels of disturbance from surrounding agricultural activities and wildlife has likely adapted to periodic human activity.

During operation, direct mortality of raptors is a potential risk from collisions with turbines. Collision risk is partly a function of the rate of exposure of birds to the turbine blade sweep and types of behaviour that occurs within this range. Wintering raptors will be exposed to turbines during foraging activities and general movements through the General Project Area; however, most studies indicate that direct mortality at wind facilities is low, especially when compared to other anthropogenic structures (Kingsley and Whittam, 2007; National Academy of Sciences, 2007). Avoidance behaviour of raptors may also occur due to the operation of turbines. Avoidance behaviour may include shifts in foraging and/or roosting locations and complete avoidance of the habitat once the Project is operational.

5.2.4.4 Significant Turtle Over-Wintering Habitat

The potential negative effects to significant turtle over-wintering habitat during Project construction and decommissioning activities include short-term sensory disturbance to species using these areas, localized dust generation, soil erosion, sedimentation and chemical or fuel spills, and may occur indirectly from disturbance (affect use of adjacent habitats).

Short-term disturbance from construction activity, such as increased traffic and noise may also result in avoidance of habitats by over-wintering turtles if construction disrupts critical life-cycle activities. Increased human activities on-site may occur during all phases of the Project

(e.g., site preparation, turbine assembly, maintenance activities) resulting in disturbance to painted turtles.

Development on adjacent land can have significant negative impacts on painted turtle over-wintering habitat if groundwater or surface water flow to the habitat is altered. Painted turtles typically over-winter in water deep enough to avoid freezing and desiccation; however, reduced water levels could result in mortalities if the entire water column freezes or anoxic (low dissolved oxygen) conditions become extreme.

During construction and operation of the turbines, the access roads will experience some traffic, which will vary in intensity; however, impacts to painted turtles are not expected given their dependence on aquatic habitats. Avoidance behaviour of painted turtles due to Project operations is not predicted.

Project related impacts to over-wintering snapping turtle habitat are described in below in Section 5.2.4.11.

5.2.4.5 Significant Bat Maternal Colony Roost Habitat

All components of the Project are sited outside these features; therefore, no loss of habitat for bat maternal roost colonies is anticipated for the Project. The potential negative effects to habitat during Project construction and decommissioning activities may occur indirectly from disturbance (affect use of adjacent habitats) or directly through mortality (bat collisions with turbines). Short-term disturbance from construction activity, such as increased traffic, noise, or dust, may result in avoidance of habitats by bats if construction disrupts critical life-cycle activities such as mating (NWCC, 2002). Increased human activities on-site may occur during all phases of the Project (e.g., site preparation, turbine assembly, maintenance activities) resulting in disturbance to bats; however, the level of disturbance to wildlife will be comparable to current levels of disturbance from surrounding agricultural activities and therefore, wildlife has likely adapted to periodic human activity.

During operation, direct mortality of bats is a potential risk from collisions with turbines. Collision risk is partly a function of the rate of exposure of bats to the turbine blade sweep and types of behaviour that occurs within this range. High levels of bat activity have been documented in forested ridge habitats, forest canopy openings, and along the shores of large waterbodies. These areas may offer attractive migratory and feeding habitat for some species of bats, which may lead to increased bat activity and mortality risk (OMNR, 2011). Barotrauma (internal haemorrhaging) caused by rapid air pressure reduction near moving turbine blades has also been found to be a source of bat mortality (OMNR, 2011). Avoidance behaviour of bats may also occur due to the operation of turbines. Avoidance behaviour may include shifts in ingress or egress behaviours and complete avoidance of the habitat once the Project is operational.

5.2.4.6 Significant Rare Vegetation Community

No Project components are located within the boundaries of the rare vegetation community (buttonbush swamp), and therefore, no habitat loss or creation of new edge (fragmentation) is expected and negative environmental effects to these features will be low to none. Overall, the potential effects of the construction and decommissioning of the turbines within 120 m of the rare vegetation community include short-term, localized dust generation, soil erosion and sedimentation. Potential negative effects during Project operation include chemical and/or fuel spills and contamination.

Potential short-term changes to surface water hydrology and drainage to/from the natural feature may result from construction activities. Impacts to habitat use of the rare vegetation community by amphibians are addressed in Section 5.2.4.8 below.

5.2.4.7 Significant Interior Forest Breeding Bird Habitat

Overall, potential negative effects due to Project construction activities may occur indirectly from disturbance (affect use of adjacent habitats). Short-term disturbance from construction and use of the access road, such as increased traffic, noise, or dust, may result in avoidance of habitats if construction disrupts critical life-cycle activities such as mating or nesting (NWCC, 2002). High noise levels (75 to 90 dB) have been found to reduce pairing success of area-sensitive species (Ovenbird); however, Reijnen *et al*. (1996) suggest that noise levels that are below 47 dB(A) will not have significant effects on breeding birds. The level of disturbance to forest interior birds will be comparable to current levels of disturbance from surrounding agriculture activity. As such, forest interior birds have likely adapted to periodic human activity.

As all forest interior habitats are identified as generalized candidate significant wildlife habitat (and considered existing and significant), operational impacts are not predicted.

5.2.4.8 Significant Amphibian Woodland Breeding Habitat

All components of the Project are sited outside these features; therefore, no loss of habitat for amphibians is anticipated for the Project. The potential negative effects to habitat during Project construction and decommissioning activities include short-term sensory disturbance to species using these areas, localized dust generation, soil erosion, sedimentation and chemical or fuel spills, and may occur indirectly from disturbance (affect use of adjacent habitats).

Short-term disturbance from construction activity, such as increased traffic and noise may also result in avoidance behaviour of habitats by amphibians if construction disrupts critical life-cycle activities such as mating (NWCC, 2002). Effects of turbine noise on amphibian populations are relatively unknown and not-well understood; however, individual reproductive success has been directly related to calling effort in frogs (Sun and Narins, 2004). Noise can interfere with calling rates, which could in turn impact fitness and noise may not allow breeding frogs to properly hear and move toward breeding populations (Sun and Narins, 2004). Masking of amphibian calls may be significant immediately underneath the turbine, but the effects rapidly decline with distance from the turbine.

Increased human activities on-site may occur during all phases of the Project (e.g., site preparation, turbine assembly, maintenance activities) resulting in disturbance.

Development on adjacent land can have significant impacts on breeding pond functions if it alters ground or surface water flow. Woodland ponds which dry up before larvae transform as a result of disruptions to hydrological function become unsuitable sites for reproduction. In addition, tree cutting in the vicinity of the pond or development in terrestrial habitats used as summer range can affect amphibian habitat by changing the moisture regime of the woodland. The release of contaminants (i.e., road salt, sediments, accidental spills) in surface runoff may affect breeding ponds due to the sensitivity that amphibians have to aquatic toxicants.

During construction of the turbines, the access roads will experience some traffic, which will vary in intensity as the construction phase progresses. Therefore, amphibians are at an increased risk from vehicle collisions in spring, particularly on cool rainy nights as they move towards warmer road surface. Given the short-term and temporary (i.e., one breeding season or less) nature of the increased traffic activity, the restriction of construction activities primarily to daytime hours and the design of access roads (unpaved, gravel roads), the risk of increased mortality during construction is considered low. During operation of the Project, access roads will experience very little traffic on a daily basis and both mortality and barrier effects are expected to be negligible.

During operation, direct mortality of amphibians may result due to vehicles using the access roads for turbine maintenance activities. Given the short-term and temporary nature of the maintenance activity, access roads will experience very little traffic on a daily basis and both mortality and barrier effects are expected to be negligible and can be mitigated through the use of standard site control measures. Potential changes in drainage to and from amphibian woodland breeding habitats may result in avoidance behaviour due to unsuitable conditions. Avoidance behaviour of amphibian woodland breeding habitats due to operational use (e.g., maintenance) of the access roads is not predicted.

5.2.4.9 Significant Amphibian Wetland Breeding Habitat

All components of the Project are sited outside these features; therefore, no loss of habitat for amphibians is anticipated for the Project. The potential negative effects to habitat during Project construction and decommissioning activities include short-term sensory disturbance to species using these areas, localized dust generation, soil erosion, sedimentation and chemical or fuel spills, and may occur indirectly from disturbance (affect use of adjacent habitats).

Short-term disturbance from construction activity, such as increased traffic and noise may also result in avoidance behaviour of habitats by amphibians if construction disrupts critical life-cycle activities such as mating (NWCC, 2002). Increased human activities on-site may occur during all phases of the Project (e.g., site preparation, turbine assembly, maintenance activities) resulting in disturbance.

During construction of the turbines, the access roads will experience some traffic, which will vary in intensity as the construction phase progresses. Therefore, amphibians are at an increased risk from vehicle collisions in spring, particularly on cool rainy nights as they move towards warmer road surface. Given the short-term and temporary (i.e., one breeding season or less) nature of the increased traffic activity, the restriction of construction activities primarily to daytime hours and the design of access roads (unpaved, gravel roads), the risk of increased mortality during construction is considered low. During operation of the Project, access roads will experience very little traffic on a daily basis and both mortality and barrier effects are expected to be negligible.

During operation, direct mortality of amphibians is a potential risk due to vehicles using the access roads for turbine maintenance activities. Given the short-term and temporary nature of the maintenance activity, access roads will experience very little traffic on a daily basis and both mortality and barrier effects are expected to be negligible and can be mitigated through the use of standard site control measures. Avoidance behaviour of amphibian woodland breeding habitats due to operational use (e.g., maintenance) of the access roads is not predicted.

5.2.4.10 Significant Turtle Nesting Habitat

The potential negative effects to significant turtle nesting habitat during Project construction and decommissioning activities include short-term sensory disturbance to species using these areas, localized dust generation, soil erosion, sedimentation and chemical or fuel spills, and may occur indirectly from disturbance (affect use of adjacent habitats).

Short-term disturbance from construction activity, such as increased traffic and noise may also result in avoidance of habitats by nesting turtles if construction disrupts critical life-cycle activities. Increased human activities on-site may occur during all phases of the Project (e.g., site preparation, turbine assembly, maintenance activities) resulting in disturbance to painted turtles.

During construction and operation of the turbines, the access roads will experience some traffic, which will vary in intensity; however, as no turtle nesting habitat will be directly affected by the Project activities, impacts to nesting turtles are not expected. Avoidance behaviour of turtle nesting habitats due to Project operations is not predicted.

5.2.4.11 Significant Terrestrial Crayfish Habitat

All components of the Project are sited outside these features; therefore, no loss of habitat for terrestrial crayfish is anticipated for the Project. The potential negative effects to habitat during Project construction and decommissioning activities include short-term sensory disturbance to species using these areas, localized dust generation, soil erosion, sedimentation and chemical or fuel spills, and may occur indirectly from disturbance (affect use of adjacent habitats).

Short-term disturbance from construction activity, such as increased traffic and noise may also result in avoidance of habitats by terrestrial crayfish. Increased human activities on-site may

occur during all phases of the Project (e.g., site preparation, turbine assembly, maintenance activities) resulting in disturbance. Development on adjacent land can have significant impacts on terrestrial crayfish habitat and functions if it alters ground or surface water flow.

During construction of the turbines, the access roads will experience some traffic, which will vary in intensity as the construction phase progresses; however, given that terrestrial crayfish require moist habitats, it is unlikely for them to be present on access roads and therefore, the risk of increased mortality during construction is considered low.

As all terrestrial crayfish habitats are identified as generalized candidate significant wildlife habitat (and considered existing and significant), operational impacts are not predicted.

5.2.4.12 Significant Habitat of Species of Conservation Concern

Several categories of significant habitats of species of conservation concern have been identified within 120 m of the Project Location, including habitats for PIF bird species, snapping turtle, plant species, bat species and terrestrial crayfish. Impacts to the habitat of bat and crayfish species of conservation concern are addressed in Section 5.2.4.5 and 5.2.4.10, respectively.

Overall, potential negative effects due to Project construction activities on PIF bird species (Wood Thrush, Eastern Wood-Pewee, Rose-breasted Grosbeak, Northern Flicker and Baltimore Oriole) may occur indirectly from disturbance (affect use of adjacent habitats). Short-term disturbance from construction activity, such as increased traffic, noise, or dust, may result in avoidance of habitats on the edge of woodland and wetland if construction disrupts critical life-cycle activities such as mating or nesting (NWCC, 2002). Increased human activities on-site may occur during all phases of the construction (e.g., site preparation, turbine assembly, maintenance activities) resulting in disturbance; however, the level of disturbance to wildlife will be minimal and somewhat comparable to current levels of disturbance from surrounding agricultural activities. As the habitat for these species was identified as generalized candidate significant wildlife habitat (and considered existing and significant), operational impacts are not predicted.

The potential negative effects to snapping turtle habitat during Project construction and decommissioning activities include short-term sensory disturbance to species using these areas, localized dust generation, soil erosion, sedimentation and chemical or fuel spills, and may occur indirectly from disturbance (affect use of adjacent habitats). Short-term disturbance from construction activity, such as increased traffic and noise may also result in avoidance of habitats by snapping turtles if construction disrupts critical life-cycle activities such as overwintering. Increased human activities on-site may occur during all phases of the Project (e.g., site preparation, turbine assembly, maintenance activities) resulting in disturbance to turtles; however, snapping turtle are well adapted to human activities and likely undisturbed by construction activities occurring within agricultural fields. Development on adjacent land can have significant impacts on snapping turtle habitat if it alters ground or surface water flow. During construction and operation of the turbines, the access roads will experience some traffic,

which will vary in intensity depending of the phase of the Project. Therefore, snapping turtles are at an increased risk from vehicle collisions. Operation effects of the turbines and avoidance behaviour of habitat during Project operation are not predicted.

Overall, the potential effects of the construction and decommissioning of the turbines on habitat of plant species of conservation concern are limited to short-term, localized dust generation, soil erosion and sedimentation. As the habitat for these species was identified as generalized candidate significant wildlife habitat (and considered existing and significant), operational impacts are not predicted.

5.2.4.13 Significant Amphibian Corridor

Potential negative effects due to Project construction on significant amphibian corridors may occur indirectly from disturbance (affect use of adjacent habitats) or directly through mortality (vehicle mortality) or loss of corridor function. Short-term disturbance from construction activity, such as increased traffic, noise, or dust, may result in avoidance of habitat if construction activities within the corridor disrupt movement corridors. Amphibians are at an increased risk from vehicle collisions in spring, particularly on cool rainy nights as they move towards warmer road surface; however, the level of disturbance to wildlife will be comparable to current levels of disturbance from road activities. Potential impacts to significant amphibian corridor habitat such as disturbance or species mortality may occur due to collector system installation within municipal road allowances.

Sensory disturbance of amphibians using the corridors may occur during the all phases of the Project as a result of increased on-site human activities (e.g., site preparation, turbine assembly, access road use); however, a certain level of sensory disturbance to wildlife resources in the General Project Area already exists from ongoing agricultural, rural, and domestic activities. Above-grade access road designs may act as barriers to amphibian corridor habitats resulting in avoidance behaviour. Avoidance behaviour of amphibian corridor habitats due to operational use (e.g., maintenance) of the access roads is not predicted.

5.2.5 Significant ANSI

One provincially significant Earth Science ANSI is located within the Project area. The Lothian-Lake Warren Shorelines Earth Science ANSI is a large underground ANSI located along the northern Project boundary. Eight turbines (Turbines 335, 337, 339, 340, 341, 342, 343 and 344) are located within the natural feature. In addition, multiple access roads, crane paths and collector lines/data cables are located within the natural feature. Based on consultation with the OMNR, two turbines (340 and 341) and the associated access road have been identified as having a potential impact on the Earth Science ANSI. Impacts to the Earth Science ANSI are related to the sand bar features associated with the ANSI. Two prominent offshore sand bars lie immediately below the shorebluff trending almost directly east-west, slightly acute to the trend of the shore.

The two turbines identified above are located within the vicinity of the offshore sand bars. The base of the foundation for Turbine 340 is located approximately 20 m northwest from the high point of the southern sand bar and the base of the foundation for Turbine 341 is located approximately 80 m north from the high point of the southern sand bar (see Figure 6.1 and 6.2, Appendix A).

For the purpose of turbine construction, top soil would be removed and stockpiled for reuse on site separately from subsoil. Excavations would be completed for each foundation over approximately 2-3 days. The foundation for each turbine would be comprised of a reinforced concrete base approximately 19 m across, lying up to 3 m below ground. The foundation pedestal would be approximately 5.3 m in diameter and sit approximately 0.3 m above grade. An alternate foundation design that may be required at either turbine site based on the geotechnical conditions. This could include a larger approximately 21 m diameter foundation. Alternatively, a caisson style foundation could be used, which would have a reduced diameter but would require deeper footings.

If not managed properly, potential impacts to the offshore sand bars from construction and decommissioning activities include degradation and erosion of soils, loss of landscape form and potential changes to hydrological drainage patterns. No operational impacts to the Earth Science ANSI are predicted.

5.3 General Mitigation Measures and Best Management Practices

The primary mitigation measure employed to reduce impacts to natural features and their functions was avoidance. Modifications to the layout, including temporary laydown and construction areas, were made to avoid placing the Project in features identified as significant through the evaluation of significance for this Project. Micro-siting decisions made during the final development of the Project layout considered minimizing impacts to significant natural features. The Project is sited predominately within actively cultivated agricultural land.

The following mitigation measures and best management practices are intended to minimize or mitigate potential adverse impacts on adjacent significant natural features and will be implemented, where required and reasonable, during the construction and operation of various turbines, access roads, temporary turbine construction areas and collector system.

5.3.1 Air Quality/Noise - Exhaust and Dust Emissions

Construction activities rely on the use of a wide range of mobile equipment. The engine exhaust from these vehicles represents a source of emissions from the construction site. Traffic delays also result in increased emissions from vehicles traveling slowly through construction zones. To reduce emissions from equipment and vehicles, several mitigation measures will be employed:

- Multi-passenger vehicles shall be utilized to the extent practical;
- Company and construction personnel shall avoid idling of vehicles when not necessary for construction activities;

- Equipment and vehicles shall be turned off when not in use unless required for construction activities and/or effective operation;
- Equipment and vehicles shall be maintained in good working order with functioning mufflers and emission control systems as available;
- All vehicles shall be fitted with catalytic converters as required;
- All activities shall be conducted in accordance with "Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities" (Environment Canada, 2005) to further minimize adverse air quality impacts due to project implementation;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) to control during construction and decommissioning activities;
- As appropriate, records of vehicle maintenance shall be retained and made available for periodic review by the Construction Contractor; and,
- All vehicles identified through the monitoring program that fail to meet the minimum emission standards will be repaired immediately or replaced as soon as practicable.

A Construction Traffic Management Plan will be developed by the Construction Contractor and will include protocols for the management of traffic and for the delivery of materials to the site.

Air quality effects will be primarily due to particulate matter (dust emissions) from overburden disturbances during excavation and backfill, soil exposure and stockpiling, and placement of gravel on access roads. During dry conditions, excessive dust may be generated from the work sites and access roads. The mitigation includes best management practices which are common to the construction industry. The following procedures will be implemented to ensure the potential impacts from excessive dust are minimized:

- Apply dust suppressants such as water mist, or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields);
- Maintain adequate control of dust at sites that are in close proximity to residences;
- Enforce low speed limits for trucks on site as appropriate;
- Re-vegetate exposed soils as soon as possible;
- As appropriate, protect stockpiles of friable material with a barrier or windscreen in the event of dry conditions and/or excessive dust;
- Consult with local road authorities prior to application of dust suppressants on public access roads; and,
- Ensure dust generation is monitored and controlled in areas of sensitive land use.

5.3.2 Fuel and Chemical Materials

In terms of accidental spills or releases to the environment, undesirable materials on-site are limited to fuel, lubricating oils, and other fluids associated with turbine construction. The potential exists for spills during any construction activity. The most probable type of spill will be from refuelling of major construction equipment that cannot readily leave the site, such as cranes or earth movers. By implementing proper handling of fuels and lubricants during construction, the likelihood of accidental events that result in adverse effects to the environment will be prevented or greatly reduced. The following procedures will be implemented to prevent spills and protect natural features:

- Construction equipment will be stored in an area not subject to water erosion and secured in using silt fencing to contain dust/silt that may be contaminated due to incidental leakage;
- All trucks or other road vehicles shall be refuelled and maintained off site, where practicable;
- Refuelling and maintenance of vehicles will not be allowed within 30 m of a natural feature – woodland, waterway, wetland, or drainage systems;
- Regular inspections of hydraulic and fuel systems on machinery shall be done, and leaks shall be repaired immediately upon detection or the equipment removed from site;
- Ensure proper storage of materials in storage containers;
- Spill kits containing absorbent materials shall be kept on hand; and,
- Implement best management practices and develop an emergency spill response plan.

In terms of accidental spills or releases to the environment, standard containment facilities and emergency response materials will be maintained on-site as required. Refuelling, equipment maintenance, and other potentially contaminating activities will occur in designated areas, and as appropriate spills will be reported immediately to the MOE Spills Action Centre.

5.3.3 Vegetation Removal

Based on the approach taken to site Project components outside of significant natural features, impacts to existing natural vegetation communities have been avoided. The majority of lands impacted by the Project consist of agricultural fields. While there will be no clearing, there are circumstances where pruning or removal of small parts of hedgerow vegetation is proposed. The extent of this will be relatively minor and related to the construction of the access lanes or installation of collector lines/data cables. As appropriate, and in consultation with the relevant parties (government, conservation authority, adjacent landowner), K2 Wind will replace trees removed with tree species native to the ecoregion in an alternate location.

For all areas where vegetation removal or trimming is required, the following mitigation measures shall be implemented:

- Prior to construction, the limits of vegetation clearing within the agricultural fields will be staked and flagged in the field. The Construction Contractor will ensure that no

construction disturbance occurs beyond the staked limits. Regular monitoring of the clearing will be employed to ensure minimal disturbance. Should monitoring reveal that clearing occurred beyond defined limits, mitigation measures will be taken that will include rehabilitation of the disturbed area to pre-disturbance conditions at the direction of a qualified ecologist;

- To the extent practical, vegetation clearing will be completed prior to or after the breeding season for migratory birds (May 1st to July 31st). Should vegetation clearing be required during the breeding bird season, prior to construction, surveys will be undertaken to identify the presence/absence of nesting birds. If a nest is located, a designated buffer will be marked off as to ensure no construction activity will be allowed while the nest is active. The radius of the buffer width may range from 5 m to 60 m depending on the species. Buffer widths will be based on the species sensitivity and on buffer width recommendations approved by Environment Canada;
- Tree pruning will be minimized to the greatest extent possible. To the extent practical, pruning will be avoided during leaf fall, typically between September and November. Prior to construction, the limits of tree pruning will be marked in the field. The Construction Contractor will ensure that no construction disturbance occurs beyond the marked limits;
- The boundaries of all wetlands, woodlands and valleylands within 30 m of the proposed construction area will be staked and flagged in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid significant wetlands, woodlands, valleylands and wildlife habitats and to assist with the proper field installation of erosion and sediment controls measures;
- All disturbed areas of the construction site will be re-vegetated as soon as practicable. Excavated soil will be re-used on site as feasible. The excavated soil removed for installation of infrastructure will be stockpiled and re-used on-site as feasible. If not feasible, the soil will be disposed of at an MOE-approved off-site facility to be determined by the Construction Contractor. Temporary laydown areas will be returned to pre-construction conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production. The areas cleared for construction but not being returned to agricultural production after completion of construction (i.e., buffer areas), will be reseeded with species native to Ecoregion 6E or the local area;
- Although the intent is to avoid tree removal in significant features, tree removal may be necessary within the road allowances that overlap with significant features for health and safety or electrical safety reasons. In the event that tree removal is required, it will be completed in consultation with the MVCA and a certified arborist. As appropriate, and in consultation with the relevant parties (government, conservation authority, adjacent landowner), K2 Wind will replace trees removed with tree species native to the ecoregion in an alternate location. The preferred option is to plant replacement trees at a suitable location within the property of the affected landowner. If a suitable location is not available on the affected landowner's property, a suitable offsite location within the General Project Area will be identified through consultation with MVCA and/or ACW Township; and,

- Areas where vegetation is removed and soils excavated for the purpose of collector system installation within municipal road allowances will be re-seeded following construction as soon as practical with vegetation native to ecoregion 6E.

5.3.4 Sediment and Erosion Control

In order to minimize erosion potential and the introduction of sediment into the natural features during grading and construction activities, a number of erosion and sediment control measures will be implemented. Erosion susceptibility within the 'buildable areas' is relatively low due to the generally flat topography of most agricultural fields; however, some areas may be more susceptible than other areas. All erosion and sediment controls will be installed prior to construction to minimize potential impacts and will be maintained during and following construction, until soils in the construction area are stabilized with vegetation, to ensure their effectiveness at protecting adjacent natural features. Silt barriers will be removed after this has been achieved.

The proximity and sensitivity of adjacent natural features increases the risk of erosion and sedimentation within a construction area. As such, all natural features identified within 30 m of any proposed construction area are at higher risk of erosion from grading and topsoil removal and sediment transfer. Erosion and sedimentation control measures will be installed to minimize erosion impacts adjacent to natural features, as appropriate.

Generically, erosion and sediment control measures will include the application of structures such as:

- Runoff Controls – diversion berms, cross trenches, chutes, check dams, interceptor swales;
- Erosion Control – diversion ditch and dispersion aprons, gravel sheeting, mulch, erosion control blankets; and,
- Sediment Control – sediment fence, straw bale barriers, filter berms, sediment traps, settling ponds.

The following points and definitions comprise the basic principles of erosion and sediment control. These measures are to be implemented, as appropriate, where there is a risk of surficial erosion and loss of soil:

- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Areas where soil or subsoil has been exposed shall be stabilized by:
- Grading exposed areas to a slope which minimizes the potential for erosion;
- Applying appropriate erosion and sediment control measures;
- Seeding, mulching or covering with erosion control matting where deemed appropriate by the Site Engineer;

- Sediment and erosion control structures will be installed prior to site disturbance and meet the quality standards outlined in the construction or manufacturers specifications. These measures shall only be removed when the disturbed area is stabilized;
- Direct discharges from any de-watering to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the woodland unless required to maintain hydrological flow (based on detailed design);
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas; and,
- Where possible, the fields surrounding the construction areas will be re-vegetated following the completion of the construction activities.

Specific mitigation measures to be applied will be as follows:

- Minimize disturbance of existing vegetation outside ditching and grassed slopes where grading is required;
- Where there is a risk of soil migration into a nearby watercourse, excavated soils will be stockpiled, stabilized and silt-fencing will be installed as appropriate to prevent erosion and sediment run-off;
- As appropriate, use of in-line erosion control measures such as erosion blanket, rip rap, straw bale, rock flow checks and vegetated buffers, thereby mitigating high flow velocities and excessive erosion/sedimentation. Erosion control measures will be inspected regularly to ensure proper function, particularly during heavy rainfall events;
- Silt barriers (e.g., fencing) will be erected along wetland, woodland, valleyland and wildlife habitat boundaries located within 30 m of construction work areas (access roads, laydown areas) to minimize potential sediment transport to the natural features. These barriers will be regularly monitored and properly maintained during and following construction until soils in the construction area (i.e., side slopes of access roads, realigned grassed swales) are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which they will be removed;
- Top of bank barriers (e.g., silt fencing) will to be put in place for any construction activity that is in proximity to watercourses. Silt fencing will be inspected regularly to ensure proper function, particularly during and following heavy rainfall events. Any evidence of stream bank erosion will be stabilized and restored to their pre-construction condition as soon as possible;
- Where culverts are proposed within 30 m of a significant natural feature, enhanced sediment and erosion control measures (i.e., straw bales, double rows of sediment fencing, check dams) will be installed as added protection to filter runoff and further minimize potential sedimentation within the downstream features (wetland, woodland). This added protection is proposed to reduce environmental risk;
- The exposure of un-vegetated and exposed soils will be minimized to the greatest extent possible;
- Minimize vehicle traffic on exposed soils and stabilize high traffic areas with a clean gravel surface layer or other suitable cover material;
- Steep slopes will be left undisturbed to the greatest extent possible;

- Maximize length of overland flow through to points where stormwater leaves the site;
- Complete an erosion assessment on all new and existing ditches to determine the need for additional erosion protection;
- Any stockpiled materials will be stored and stabilized away from watercourses;
- Sediment and erosion control measures will be left in place until all disturbed areas have been stabilized; and,
- All disturbed areas at the construction site will be re-vegetated as soon as practical. Excavated soil will be re-used on site as feasible. If not feasible, the soil will be disposed of at an MOE approved off-site facility. Temporary laydown areas will be returned to pre-construction conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production. The areas cleared for construction but not being returned to agricultural production after completion of construction (i.e., buffer areas), will be reseeded with species native to Ecoregion 6E or the local area.

Sediment and erosion protection measures will be regularly maintained and inspected to confirm continued effectiveness. Even with properly installed erosion and sedimentation control measures, extreme runoff events could result in collapse of silt fencing, slope or trench failures and other problems which could lead to siltation of watercourses. If siltation to a watercourse occurs, activities shall cease immediately until sedimentation control measures have been repaired.

5.3.5 Dewatering

Depending on the presence of water within the construction areas, it may be necessary to dewater the excavated areas for the turbine foundations due to interception of groundwater seams and surface water entering the excavations. Site soil conditions consist predominantly of glacial till with occasional sand seams. Further geotechnical studies will be conducted to determine whether dewatering activities will be needed. Should dewatering be required, the following measures will be implemented, as required and necessary:

- Areas to be used for dewatering will be clearly marked with flagging and/or snow fencing prior to work commencing, and silt fencing will be included to retain sediments so they do not enter any natural feature;
- Water pumped during dewatering activities shall not be discharged directly to a watercourse or wetland and will be directed away from natural features; the water will be discharged to a settling pond, filter bag, or vegetated buffer strip of adequate size, to filter out suspended sediment;
- Before dewatering, any oil (free product) on the water will be completely removed or contained in the excavation through the use of sorbent booms; keeping the pump intake hose submerged and directing the discharge to a filter bag or hay bale structure;
- A nonwoven fabric filter bag will be used on the end of the discharge hose (or temporarily stored in appropriate-sized settlement ponds). Any filter will be monitored to ensure their efficiency; and,

- After the dewatering work area is no longer required, any remaining disturbed soils will be returned to pre-disturbance conditions as soon as feasible.

5.3.6 Area of Natural and Scientific Interest (Earth Science ANSI)

Construction related impacts to the Earth Science ANSI are limited to the areas of the two offshore sand bars. To minimize impacts to the Earth Science feature and preserve the form and function of the feature, the following mitigation measures will be implemented:

- The limit of the 'buildable areas' for Turbines 335, 339, 340 and 341 and their associated infrastructure (roads, collector lines/data cables, and temporary crane paths and construction pads) will be staked and flagged prior to construction to assist with the demarcation of the construction area, to ensure construction activities minimize disturbance to the ANSI and to assist with the proper field installation of erosion and sediment controls measures;
- Access roads will be constructed at grade for Turbines 340 and 341 and within the offshore sand bar areas to maintain the visual aesthetics of the ANSI;
- Excavation of soils for the purpose of turbine and underground collector system installation will be filled as quickly as practicable to grade to prevent soil erosion and sedimentation issues. Excess soil will be re-used on site as feasible and applicable to ensure the form and function of the offshore sand bars are maintained post-construction;
- Where there is a risk of soil migration into a nearby watercourse, excavated soils will be stockpiled, stabilized and silt-fencing will be installed as appropriate to prevent erosion and sediment run-off;
- Power and data cable trenches within the offshore sand bar tranches will be bedded with sand and backfilled with native soils or appropriate fill material, and if appropriate, clay plugs will be installed every 30 m to ensure that potential groundwater entering the trench is not drawn along the sand/filled conduit and hydrological conveyance is maintained;
- Photographs will be taken prior to construction activities to document the shape of the sand bar areas. Upon competition of construction, the photographs will be used as a guide to assist in re-shaping the areas disturbed by temporary construction;
- After turbines have been assembled, the temporary turbine construction area will be restored to pre-existing conditions and the offshore sand bars will be re-shaped to resemble the pre-construction form and function as soon as practical. The pre-existing conditions at each turbine site are agricultural and thus, will be converted back into agricultural production; and,
- For Project decommissioning, topsoil will be replaced at grade for all access roads, buildable areas, crane paths and turbine locations. The underground collector system may remain undisturbed upon Project completion.

In addition to the mitigation measures, OMNR staff will be taking vertical samples of the sub-surface layers prior to construction where Project components are located. The information will be preserved and added to the ANSI record.

5.3.7 Wildlife Mitigation

The potential negative effects to wildlife during Project construction activities include short-term sensory disturbance to species using these areas, localized dust generation, soil erosion, sedimentation and chemical or fuel spills, and may occur indirectly from disturbance (affect use of adjacent habitats) or directly through mortality. Mitigation measures to be implemented for dust, chemical or fuel spills and erosion/sedimentation have been addressed in Sections 5.3.1, 5.3.2, and 5.3.4, respectively.

The Project will not result in the removal of significant wildlife habitat, fragmentation, or disturbance. The collector system within municipal road allowance, however, does cross each significant valleyland. Proposed collector system crossings will occur along municipal road allowance at Boundary Creek (Valleyland 1) and Nine Mile River (Valleyland 2) on Lanesville Line, at Kerry's Creek (Valleyland 5) on Kingsbridge Line, Kerry's Line and Division Line, and at Eighteen Mile Creek (Valleyland 7) on 18 Mile Line. The overhead collector system will use wood poles within the municipal road allowance. For sections of the municipal road allowance requiring new poles, poles will be set into holes augured to a depth of approximately 2 to 3 m. Where there are existing distribution lines within the municipal road allowances, K2 Wind will work to develop shared pole user agreements and will upgrade the existing infrastructure as necessary. In these areas, existing poles will be replaced with larger wood poles and the power lines re-strung. Where re-stringing of poles creates a health and safety concern, new poles may be required on the alternate side of the road allowance. All activities associated with the installation of collector system for the Project will occur within existing municipal road allowances. The majority of work will be completed from vehicles parked in the road allowance, including the use of vehicle mounted drilling equipment.

Some culverts will double as equalization culverts, allowing flows to be conveyed beneath the access road, and as wildlife movement corridors, allowing wildlife to move under the road.

During construction of the turbines, the access roads will experience some traffic, which will vary in intensity as the construction phase progresses. Amphibians and turtles are at an increased risk from vehicle collisions in spring, particularly on cool rainy nights as they move towards warmer road surface and when nesting. During operation, there is a potential risk of direct mortality of birds and bats from collisions with turbines.

Specific wildlife mitigation measures include the following:

- Where the separation distance between significant wildlife areas and the Project site perimeter is 30 m or less, the significant wildlife areas will be well demarcated with fencing such that all construction activities and personnel are excluded from these areas to minimize any disturbance to existing vegetation around the Project site perimeter (excluding potential tree pruning requirements);
- To the extent practical, vegetation clearing will be completed prior to or after the breeding season for migratory birds (May 1st to July 31st). Should vegetation clearing be required during the breeding bird season, prior to construction, surveys will be

undertaken to identify the presence/absence of nesting birds. If a nest is located, a designated buffer will be marked off to ensure no construction activity will be allowed while the nest is active. The radius of the buffer widths vary and will be determined in consultation with Environment Canada and the OMNR;

- Should construction activities occur within 30 m of the woodland or wetland edge during breeding bird season (May 1st to July 31st), surveys will be undertaken prior to construction to identify the presence/absence of nesting birds up to 50 m within of the woodland or wetland. 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 widths vary and will be determined in consultation with Environment Canada and the OMNR;
- As practical, adjust timing of construction and decommissioning activities to minimize impacts to wildlife;
- After turbines have been assembled, the temporary turbine construction area will be restored to pre-existing conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production;
- Additional mitigation for colonial nesting sites includes implementing a 1,000 m buffer around the colony during all construction and decommissioning activities conducted during the breeding season. No construction or decommissioning activities shall be permitted within the buffer for the duration of the heron breeding season (early May to early August). Mitigation measures such as temporary operational adjustments to any of the turbines during the breeding season may be required if significant avoidance behaviour of Great Blue Herons is documented during post-construction monitoring (see Section 5.4.47 for further details);
- To avoid impacts to wetland hydrology and maintain existing overland flows and continuous surface water conveyance to wetlands, crossings of water bodies and grassed waterways (drainage swales) will entail the installation of permanent and temporary culverts as to provide continued conveyance function. The culverts will be appropriately sized in consultation with the MVCA and/or DFO. All installation activities would conform to Ontario Provincial Standard Specification (OPSS) 421 – Construction Specification for Pipe Culvert Installation in Open Cut. Site specific refinement to the location of individual culverts may occur during detailed design to ensure proper placement and maintain conveyance flows, prevent pooling and maintain hydrology;
- To prevent wildlife (i.e., turtles) from entering turbine excavation areas during construction and decommissioning activities, the edge of excavation areas will be fenced off where excavations are left overnight. Fencing of excavation sites will occur where turbines are located with 120 m of significant turtle nesting habitat (see Section 5.4 for feature-specific mitigation measures);
- Any wildlife found within the 'buildable areas' during construction and decommissioning activities will be safely relocated, as appropriate, in consultation with a qualified biologist to the nearest appropriate habitat. Construction will not continue until the species has been relocated or the species has left the area on its own accord;

- Turtle nests should not be touched as it can damage eggs; OMNR will be contacted if turtle nests are identified in the construction area. Turtles should not be picked up by their tail, as it can fracture their spine;
- During construction/decommissioning and operation, vehicle traffic shall primarily be restricted to daytime hours. Speed limit signage will be erected and shall be restricted to 30 km/h or less, where appropriate;
- Best management practices such as silt fencing, as described in Section 5.3.4, will be employed to minimize negative impacts on wildlife habitats and species that use them. Silt fencing will occur where buildable area is located within 30 m of significant wildlife habitat (see Section 5.4 for feature-specific mitigation measure);
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Implement a minimum three-year post-construction monitoring plan on natural features where avoidance behaviour of significant wildlife habitat has been identified as a potential effect of operations; and,
- Implement post-construction monitoring for disturbance and mortality; where applicable.

Specific mitigation measures relative to each significant wildlife habitat feature are discussed further in Section 5.4.

5.3.8 Mitigation for Collector System Installation Options

The Proponent is proposing several alternative methods for installing both the overhead and underground components of the collector system. The locations of proposed overhead and underground lines are provided in Figure 8.1 to 8.29 (Appendix A). The majority of the collector system will be installed underground using standard trenching methods which are mitigated using the general mitigation measures outlined in this section. At watercourse and valleyland crossings there are several alternative installation methods that may be used including open cut, overhead lines on existing or new poles, or HPDD. Preferred methods for crossings related to each feature are outlined in Section 5.4, but any of these methods may be used at a given crossing depending on site specific conditions at the time of construction.

General mitigation measures outlined in the previous subsections as well as mitigation measures outlined in DFO Operational Statements will be followed for open cut, HPDD, and overhead line crossings at watercourses (DFO OS 2011, Appendix J). The DFO Operational Statement for HPDD includes an emergency frac-out response and contingency plan that will be followed at all HPDD crossings. The plan includes the following elements:

- Keep all material and equipment needed to contain and clean up drilling mud releases on site and readily accessible in the event of a frac-out;
- Implement the frac-out response plan that includes measures to stop work, contain the drilling mud and prevent its further migration into the watercourse and notify all applicable authorities, including the closest DFO office in the area (see Ontario DFO

office list). Prioritize clean-up activities relative to the risk of potential harm and dispose of the drilling mud in a manner that prevents re-entry into the watercourse;

- Ensure clean up measures do not result in greater damage to the banks and watercourse than from leaving the drilling mud in place;
- Implement the contingency crossing plan including measures to either re-drill at a more appropriate location or to isolate the watercourse to complete the crossing at the current location. See Isolated or Dry Open-cut Stream Crossings Operational Statement for carrying out an isolated trenched crossing;
- Stabilize any waste materials removed from the work site to prevent them from entering the watercourse. This could include covering spoil piles with biodegradable mats or tarps or planting them with preferably native grass or shrubs;
- Vegetate any disturbed areas by planting and seeding with native trees, shrubs or grasses and cover such areas with mulch to prevent erosion and to help seeds germinate. If there is insufficient time remaining in the growing season, the site should be stabilized (e.g., cover exposed areas with erosion control blankets to keep the soil in place and prevent erosion) and vegetated the following spring; and,
- Maintain effective sediment and erosion control measures until re-vegetation of disturbed areas is achieved.

5.4 Significant Natural Features

The following subsections provide an assessment of the potential environmental impacts and mitigation measures to be implemented through the planning, construction, operation and decommissioning of the Project on a feature by feature basis. Potential impacts are similar during construction and decommissioning so mitigation measures applied during the construction phase will also be applied during the decommissioning phase of the Project. A summary of mitigation measures for significant features within 120 m of proposed turbines, access roads, collector system, transformer station, substation/switchyard, met towers and/or temporary turbine construction areas and crane paths is provided in Table 5.1 (Appendix B).

5.4.1 Feature 3

Feature 3 is comprised of a significant woodland, significant amphibian woodland breeding habitat and significant habitat of species of conservation concern (PIF bird species). The significant woodland is 10.6 ha with no interior habitat and is composed primarily of sugar maple and white ash as co-dominants among the canopy species. The understory consists of white ash, with chokecherry and serviceberry as co-dominants. The significant amphibian woodland breeding habitat is located approximately 30 m from the southwestern edge of the significant woodland. The habitat of species of conservation concern (PIF bird species) within this feature is considered generalized candidate significant wildlife habitat and is assumed to be existing and significant.

5.4.1.1 Adjacent Project Components

Feature 3 falls within 120 m of Turbine 201 and its associated access road, collector lines/data cables, and temporary turbine construction area and crane path. The minimum distance from Project components to each significant natural feature within Feature 3 is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the significant woodland. There are no watercourse crossings associated with this feature.

Project Component	Approx. Distance to Significant Woodland (m)	Approx. Distance to Significant Amphibian Woodland Breeding Habitat (m)
		3d
T-201 Base	101	--
T-201 Blade Tip	61	--
Access Road (T-201)	5	44
Temp. Construction Area (T-201)	10	84

*The distance from the natural features to the temporary crane path and the collector system (under the access road) are assumed to correspond with the distance to the access road.

5.4.1.2 Pre-construction Monitoring (Habitat Use Study)

Based on consultation with the OMNR, potential impacts of the Project on significant amphibian woodland breeding habitat may occur during construction and decommissioning. As such, habitat use studies to confirm significance are not necessary to implement appropriate mitigation. General mitigation measures will be applied and are discussed in 5.4.1.4. As per the NHAG (OMNR, 2011a), the natural feature identified as generalized candidate significant habitat of species of conservation concern is considered existing and significant and does not require the application of a habitat use study to confirm significance.

5.4.1.3 Potential Effects

The potential effects of the Project on significant woodlands and significant wildlife habitats (amphibian woodland breeding habitat and habitat of species of conservation concern) are described in Sections 5.2.1 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.1.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland and significant wildlife habitat associated with Feature 3. General mitigation measures and best management

practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 3. The specific mitigation strategy to protect the significant woodland and significant wildlife habitats will include the following:

- Prior to construction the outer limits of the construction area will be staked and marked to ensure that contractors remain within the temporary construction areas;
- Silt barrier will be erected along the boundary of the significant woodland (and thus the wildlife habitat) within 30 m of the Project Location. Silt barriers will be erected in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant woodland and to assist with the proper field installation of erosion and sediment controls measures;
- The silt-fencing barriers will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which they will be removed;
- During construction, a buffer will be established from the stem line to the drip line where the significant woodland is immediately adjacent to a permanent access road. The purpose of the buffer is to minimize root zone damage and compaction. Silt fencing will be established at the edge of the drip line to prevent sedimentation and erosion of soils into the significant woodland. The buffer area will not be disturbed during construction and will be seeded with species native to the ecoregion upon completion of construction, if necessary;
- Restore temporary turbine construction areas to pre-existing conditions as soon as practical after turbines have been assembled. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Tree pruning will be minimized to the greatest extent possible. To the extent practical, pruning will be avoided during leaf fall, typically between September and November. Prior to construction, the limits of tree pruning will be marked in the field. Tree pruning will be supervised by a qualified arborist. The Construction Contractor will ensure that no construction disturbance occurs beyond the marked limits;
- To prevent damage to the root zone, excavation of soils for the purpose of underground collector system installation on private lands will occur at the minimum distance of 5 m away from the drip line of the significant woodland. Cable trenches within 30 m of the significant woodland will be filled immediately to prevent soil erosion and sedimentation issues;
- Direct discharges from any de-watering to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the woodland unless required to maintain hydrological flow (based on detailed design);

- Limiting traffic during construction and follow-up activities to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, requiring contractors to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintaining vehicles, machinery and equipment in good repair, and equipping them with emission controls, as applicable, and operating them within regulatory requirements;
- As necessary, suppressing releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Establishing detailed protocols for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, covering or otherwise containing loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, the net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of 'natural features' within Feature 3 are predicted to be low.

5.4.2 Feature 5

Feature 5 is comprised of a significant woodland, significant wetlands, significant bat maternal colony roost habitat, amphibian woodland breeding habitat and significant habitat of species of conservation concern (PIF bird species). The significant woodland is 33.7 ha in size and is a mixture of upland and wetland ecosites. The amphibian woodland breeding habitat and habitat of species of conservation concern (PIF bird species) within this feature are considered generalized candidate significant wildlife habitat and are assumed to be existing and significant.

5.4.2.1 Adjacent Project Components

Feature 5 falls within 120 m of Turbines 204 and 206, temporary turbine construction areas and crane paths, collector lines/data cables and the associated access road. The minimum distance from Project components to each significant natural feature within Feature 5 is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the significant woodland. There is one watercourse crossing

upstream of Feature 5 along Lucknow Line (see Figure 8.3, Appendix A). The preferred method of crossing would be open cut.

Project Component	Approx. Distance to Significant Woodland (m)	Approx. Distance to Significant Wetlands (m)		Approx. Distance to Significant Bat Maternal Colony Roost Habitat (m)
		5a	5b	
T-204 Base	82	82	--	82
T-204 Blade Tip	32	32	86	32
T-206 Base	115	--	--	115
T-206 Blade Tip	65	--	97	65
Access Road (T-204, T-205, T-206)	102	--	108	102
Temp. Construction Area (T-204)	5	5	17	5
Temp. Construction Area (T-205)	114	--	--	114
Temp. Construction Area (T-206)	23	--	55	23

*The distance from the natural features to the temporary crane path and the collector system (under the access road) are assumed to correspond with the distance to the access road.

5.4.2.2 Pre-construction Monitoring (Habitat Use Study)

Pre-construction monitoring will be conducted within the significant bat maternal colony roost habitat to confirm habitat use by bats. Candidate roost trees (snags/cavity trees) will be monitored for evidence of maternity colonies through exit surveys following the protocols outlined in OMNR's *Bat and Bat Habitats: Guidelines for Wind Power Projects* (OMNR, 2011b). To ensure accuracy of the surveys, pre-construction monitoring methodologies will be reviewed by the OMNR prior to the commencement of field surveys.

A total of 30 snags/cavity trees will be surveyed throughout the feature, as per the OMNR's guidelines for features ≥30 ha. The best candidate trees for the exit surveys will be determined based on the criteria outlined in Section 4.1.4.1 (Bat Maternal Colony Roost Habitat). Exit surveys will be conducted during the month of June. Surveyors will choose a location with a clear view of the cavity opening or crevice (multiple surveyors may be required if multiple openings are present in one snag). The cavity opening or crevice will be monitored for any evidence of bats beginning 30 minutes before dusk until 60 minutes after dusk for evidence of bats. Modern broadband bat detectors (automated systems in conjunction with computer software analysis packages or manual devices) with condenser microphones may be used in conjunction with visual surveys to determine species using roost habitats. Each candidate roost tree will only be monitored once prior to construction. If any two bats are observed or detected, it will serve as confirmation that a maternity roost is present.

There are two possible outcome scenarios which could result from the pre-construction monitoring, including; 1) there is no evidence of habitat use in the candidate roost trees, or 2) habitat use by at least two bats is confirmed in at least one candidate roost tree.

If pre-construction monitoring confirms habitat use by at least two bats in any one candidate bat maternal colony roost trees, then the entire ELC stand (woodland) will be considered significant wildlife habitat and mitigation measures will be applied to manage potential impacts. The results of all pre-construction monitoring will be shared with the OMNR/MOE to confirm significance and modify mitigation measures, where necessary. Potential effects, proposed mitigation and post-construction monitoring to be implemented in this scenario are discussed below.

As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant wildlife habitat (in this case, amphibian woodland breeding habitat and habitat of species of conservation concern) are to be considered existing and significant and do not require the application of habitat use studies to confirm significance.

5.4.2.3 Potential Effects

The potential effects of the Project on significant woodlands, significant wetlands and significant wildlife habitats (amphibian woodland breeding habitat and habitat of species of conservation concern) are described in Sections 5.2.1, 5.2.2 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1, 5.2.2 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.2.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland and significant wildlife habitat associated with Feature 5. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 5. The specific mitigation strategy to protect the significant woodland, significant wetlands and significant wildlife habitats will include the following:

- Prior to construction the outer limits of the temporary construction area will be staked and marked to ensure that contractors remain within the temporary construction areas. A minimum distance of 5 m will be established and a silt barrier constructed between the significant wetland and temporary construction area;
- Silt barrier will be erected along the boundaries of the significant woodland and wetland (and thus the wildlife habitat) within 30 m of the Project Location in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant woodland and to assist with the proper field installation of erosion and sediment controls measures;
- All silt-fencing barriers will be regularly monitored and properly maintained during and following construction until soils in the construction area are stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- After turbines have been assembled, turbine construction areas will be restored to pre-existing conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production;

- Discharges from any de-watering shall be directed to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the woodland unless required to maintain hydrological flow (based on detailed design);
- To avoid impacts to wetland hydrology and maintain existing overland flows and continuous surface water conveyance to Wetland 5b, two culverts have been proposed beneath the permanent access roads to convey runoff following storm events. The two culverts will be placed under the access road between Turbines 204 and 206 (see Figure 8.3, Appendix A). The culverts will be appropriately sized in consultation with the Maitland Valley Conservation Authority and where required, permits will be sought from the Conservation Authority and/or the Department of Fisheries and Oceans. All installation activities will conform to Ontario Provincial Standard Specification 421 (OPSS) – Construction Specification for Pipe Culvert Installation in Open Cut. Site specific refinement to the location of individual culverts may occur during detailed design to ensure proper placement and maintain conveyance flows, prevent pooling and maintain hydrology;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppressing releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, the net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of ‘natural features’ within Feature 5 are predicted to be low.

5.4.2.5 Post-Construction Monitoring

As avoidance behaviour of turbines is identified as a potential operational effect, a minimum three-year post-construction bat monitoring plan will be implemented if the habitat is identified as significant wildlife habitat. The objective of the monitoring will be to determine if Project operations have an effect on bat behaviour and habitat use. The same protocols which are implemented during pre-construction surveys will be applied post-construction. Significant bat maternal colony roost habitats will be monitored for evidence of maternity colonies through exit surveys following the protocols outlined in OMNR's *Bat and Bat Habitats: Guidelines for Wind Power Projects* (OMNR, 2011b). All snags/cavity trees identified during pre-construction surveys, regardless of evidence of habitat use, will be surveyed during post-construction monitoring.

Species diversity and density will be compared between pre-construction and post-construction conditions. If bat maternal colony trees are located within the ELC stand but not within 120 m of the Project Location, these sites will be used as 'control' sites to document potential changes in species diversity and density compared to potential 'impacted' sites (within 120 m of the Project Location). This approach allows for a Before-After-Control-Impact design. Consistency in the survey methods will allow for defensible comparisons of the post-construction disturbance effects. Post-construction data will be statistically compared to pre-construction data. This will allow yearly comparisons of potential post-construction effects while statistically controlling for external factors such as weather, disease and depredation.

The OMNR, along with the proponent and other relevant agencies, will collectively review the results of the post-construction monitoring to determine if a negative environmental effect is occurring, and whether such an effect is attributable to the wind turbines and not external factors. These discussions will determine if and when contingency measures shall be undertaken. The best available science and information will be considered when determining appropriate mitigation and will be determined in consultation with MOE and OMNR based on post-construction monitoring results.

5.4.3 Feature 5c

Feature 5c is comprised of a significant woodland, significant wetland and significant habitat of species of conservation concern (PIF bird species). The significant woodland is 5.0 ha in size and is comprised of deciduous forest comprising mostly sugar maple and white ash. The feature slightly slopes towards a watercourse. The habitat of species of conservation concern (PIF bird species) within this feature is considered generalized candidate significant wildlife habitat and is assumed to be existing and significant. There is one watercourse crossing upstream of Feature 5c along Lucknow Line (see Figure 8.3, Appendix A). The preferred method of crossing would be open cut.

5.4.3.1 Adjacent Project Components

Feature 5c falls within 120 m of the 'buildable area' associated with Turbine 202. The minimum distance from Project components to each significant natural feature within Feature 5c is

provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the significant woodland.

Project Component	Approx. Distance to Significant Woodland (m)	Approx. Distance to Significant Wetland (m)
Temp. Construction Area (T-202)	110	110

5.4.3.2 Pre-construction Monitoring (Habitat Use Study)

As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant habitat of species of conservation concern is considered existing and significant and does not require the application of a habitat use study to confirm significance.

5.4.3.3 Potential Effects

The potential effects of the Project on significant woodlands, significant wetlands and significant wildlife habitats (habitat of species of conservation concern) are described in Sections 5.2.1 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.3.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland and significant wildlife habitat associated with Feature 5c. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 5c. The specific mitigation strategy to protect the significant woodland and significant wildlife habitat will include the following:

- Prior to construction the outer limits of the construction area will be staked and marked to ensure that contractors remain within the temporary construction areas;
- After turbines have been assembled, temporary construction pads will be restored to pre-existing conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production;
- Direct discharges from any de-watering to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the woodland unless required to maintain hydrological flow (based on detailed design);
- Limiting traffic during construction and follow-up activities to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected

and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;

- When appropriate, requiring contractors to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintaining vehicles, machinery and equipment in good repair, and equipping them with emission controls, as applicable, and operating them within regulatory requirements;
- As necessary, suppressing releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Establishing detailed protocols for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared; and,
- As appropriate, covering or otherwise containing loose materials that have potential to release airborne particulates during their transport, installation or removal.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, no net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of 'natural features' within Feature 5c are predicted.

5.4.4 Feature 6

Feature 6 is comprised of a significant woodland, significant wetlands, significant amphibian woodland breeding habitat and significant habitat of species of conservation concern. The significant woodland is a mixture of ecosites and is associated with a watercourse. The coniferous woodland is consistent with a white cedar dominated ecosite. This ecosite slopes towards the watercourse. A farmyard/zoo is located adjacent to the ecosite and within the flood plain of the watercourse. The upland ecosite is dominated by sugar maple and white ash, with American beech and black cherry associated. The significant wetlands are mixed swamp ecosite surrounding a watercourse and deciduous swamp. The amphibian woodland breeding habitat and habitat of species of conservation concern (PIF bird species) within this feature are considered generalized candidate significant wildlife habitat and are assumed to be existing and significant.

5.4.4.1 Adjacent Project Components

Feature 6 falls within 120 m of a collector system within the municipal road allowance. Where the collector lines cross watercourses adjacent to this feature, the collector line will be installed above ground on new poles or below ground through either open cut or HPDD methods. The minimum distance from Project components to each significant natural feature within Feature 6 is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the Feature based on landscape and topography. For the purpose of

identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the significant woodland. There are five watercourse crossings upstream of Feature 6 (two on River Mill Line and three on Hawkins Road; see Figure 8.5, Appendix A). The preferred methods of crossing would be open cut.

Project Component	Approx. Distance to Significant Woodland (m)	Approx. Distance to Significant Wetland (m)	
		6a	6b
Collector System (within road allowance)	2	12	78

5.4.4.2 Pre-construction Monitoring (Habitat Use Study)

As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant wildlife habitat (in this case, amphibian woodland breeding habitat and habitat of species of conservation concern) are to be considered existing and significant and do not require the application of habitat use studies to confirm significance.

5.4.4.3 Potential Effects

The potential effects of the Project on significant woodlands, significant wetlands and significant wildlife habitats (amphibian woodland breeding habitat and habitat of species of conservation concern) are described in Sections 5.2.1, 5.2.2 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1, 5.2.2 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.4.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland, significant wetland and significant wildlife habitat associated with Feature 6. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 6. The specific mitigation strategy to protect the significant woodland, significant wetland and significant wildlife habitats will include the following:

- Prior to construction, the boundary of the significant woodland and wetland (and thus the wildlife habitat) within 30 m of the Project Location will be staked and flagged, and a silt barrier will be constructed in consultation with a qualified ecologist to ensure construction activities avoid the significant feature and to assist with the proper field installation of erosion and sediment controls measures;
- The silt-fencing barriers will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;

- Collector lines/data cables are proposed on the east side of River Mill Line (opposite the side of the significant woodland/wetland) within the municipal road allowance. The trench will generally be a shallow (1 m deep) depression and will be placed at least 5 m from the wetland boundary. The intent of the design will be to place the collector system on the opposite side of the road allowance where possible. Where the collector lines cross watercourses associated with this feature, general mitigation measures as well as mitigation measures outlined in DFO Operational Statements, including emergency frac-out response and contingency planning for HPDD, would be followed at these locations (Appendix J);
- Issues may arise in the detailed design or construction that requires the line be constructed on the wetland side. In the event that subsurface conditions do not allow for placement of the collector system on the opposite side of the road from the wetland, the collector system will be placed as close to the road as allowable and safe by the Township or County to create as much buffer from the wetland as available. Given the shallow nature of the works, no appreciable changes to the groundwater or surface water flows are anticipated. Cable trenches will be filled immediately after installation is complete to prevent soil erosion and sedimentation issues;
- Areas where vegetation is removed and soils excavated for the purpose of collector system installation within municipal road allowances will be re-seeded following construction as soon as practical with vegetation native to the ecoregion;
- Power cable trenches within the municipal road allowance will be bedded with sand and backfilled with native soils or appropriate fill material, with clay plugs every 30 m to ensure that potential groundwater entering the trenches is not drawn along the sand-filled conduit and hydrological conveyance to the wetland, if any, is maintained;
- Should the construction of underground collector lines not be feasible within the municipal road allowance on the edge of the wetland, collector lines will be installed above ground on wooden poles. The collector line will exit the ground at least 30 m from the wetland;
- Tree pruning will be minimized to the greatest extent possible. To the extent practical, pruning will be avoided during leaf fall, typically between September and November. Prior to construction, the limits of tree pruning will be marked in the field. Tree pruning will be supervised by a qualified arborist. The Construction Contractor will ensure that no construction disturbance occurs beyond the marked limits;
- In some cases, tree removal may be necessary within the road allowance for health and safety or electrical safety reason. Tree removal required will be completed consultation with the MVCA and a certified arborist. As appropriate, and in consultation with the relevant parties (government, conservation authority, adjacent landowner) K2 Wind will replace trees removed with appropriate species in an alternate location;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;

- As necessary, suppressing releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, no net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of 'natural features' within Feature 6 are predicted.

5.4.5 Feature 7

Feature 7 is 11.3 ha and comprised of a significant woodland, significant wetland, significant amphibian woodland breeding habitat and significant habitat of species of conservation concern. The significant woodland and wetland features are dominated by red ash and Freeman maple. The edge of the significant woodland/wetland slopes toward the watercourse. The amphibian woodland breeding habitat and habitat of species of conservation concern (PIF bird species) within this feature are considered generalized candidate significant wildlife habitat and are assumed to be existing and significant.

5.4.5.1 Adjacent Project Components

Feature 7 falls within 120 m of a collector system within the municipal road allowance. The minimum distance from Project components to each significant natural feature within Feature 7 is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the significant woodland. There is one watercourse crossing downstream of Feature 7 on Hawkins Road (see Figure 8.5, Appendix A). The preferred method of crossing would be open cut.

Project Component	Approx. Distance to Significant Woodland (m)	Approx. Distance to Significant Wetland (m)
Collector System (within road allowance)	16	16

5.4.5.2 Pre-construction Monitoring (Habitat Use Study)

As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant wildlife habitat (in this case, amphibian woodland breeding habitat and habitat of species of conservation concern) are to be considered existing and significant and do not require the application of habitat use studies to confirm significance.

5.4.5.3 Potential Effects

The potential effects of the Project on significant woodlands, significant wetlands and significant wildlife habitats (amphibian woodland breeding habitat and habitat of species of conservation concern) are described in Sections 5.2.1, 5.2.2 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1, 5.2.2 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.5.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland, significant wetland and significant wildlife habitat associated with Feature 7. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 7. The specific mitigation strategy to protect the significant woodland, significant wetland and significant wildlife habitats will include the following:

- Prior to construction, the boundary of the significant woodland and significant wetland (and thus the wildlife habitat) within 30 m of the proposed construction area will be staked and flagged, and a silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant feature and to assist with the proper field installation of erosion and sediment controls measures;
- The silt-fencing barriers will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- Collector lines/data cables are proposed on the south side of Hawkins Road (opposite the side of the significant woodland/wetland) within the municipal road allowance. The trench will generally be a shallow (1 m deep) depression and will be placed at least 5 m from the wetland boundary. Issues may arise during detailed design or construction that do not allow for construction of the collector system on the south side of Hawkins Road. In that event, the collector system will be buried in the road bed or gravel shoulder on the north side of Hawkins Road. Burying lines within the road bed will avoid potential impacts to the wetland feature as excavation will occur in the travelled portion of the road. This method will be discussed with ACW Township in areas where it is deemed feasible. Given the shallow nature of the works, no appreciable changes to the

groundwater or surface water flows are anticipated. Cable trenches will be filled immediately after installation is complete to prevent soil erosion and sedimentation issues;

- Areas where vegetation is removed and soils excavated for the purpose of collector system installation within municipal road allowances will be re-seeded following construction as soon as practical with vegetation native to the ecoregion;
- Power cable trenches within the municipal road allowance will be bedded with sand and backfilled with native soils or appropriate fill material, with clay plugs every 30 m to ensure that potential groundwater entering the trenches is not drawn along the sand/fill conduit and hydrological conveyance to the wetland, if any, is maintained;
- Should the construction of underground collector lines not be feasible within the municipal road allowance on the edge of the feature, collector lines will be installed above ground on wooden poles;
- Tree pruning will be minimized to the greatest extent possible. To the extent practical, pruning will be avoided during leaf fall, typically between September and November. Prior to construction, the limits of tree pruning will be marked in the field. Tree pruning will be supervised by a qualified arborist. The Construction Contractor will ensure that no construction disturbance occurs beyond the marked limits;
- In some cases, tree removal may be necessary within the road allowance for health and safety or electrical safety reason. Tree removal required will be completed consultation with the MVCA and a certified arborist. As appropriate, and in consultation with the relevant parties (government, conservation authority, adjacent landowner) K2 Wind will replace trees removed with appropriate species in an alternate location;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppressing releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, no net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of ‘natural features’ within Feature 7 are predicted.

5.4.6 Feature 8

Feature 8 is comprised of a significant woodland, significant interior forest breeding bird habitat and significant habitat of species of conservation concern (PIF bird species). The significant woodland is 238.1 ha in size and is a complex of conifer plantations, deciduous swamp, and mixed forest ecosites providing forest interior habitat. This feature is a 238.1 ha complex of conifer plantations, deciduous swamp, and mixed forest ecosites providing forest interior habitat. Feature 8 contains two wetlands (non-provincially significant) and supports significant wildlife habitat for forest interior breeding birds and species of conservation concern. The wetland is situated outside of the 120 m O.Reg. 359/09 setback from the Project Location. Three watercourses are present within the woodland. The interior forest breeding bird habitat and habitat of species of conservation concern (PIF bird species) within this feature are considered generalized candidate significant wildlife habitat and are assumed to be existing and significant.

5.4.6.1 Adjacent Project Components

Feature 8 falls within 120 m of the access road, temporary construction area (laydown area), collector lines/data cables for Turbine 207, and the collector system. The distance from the access road to each significant natural feature within Feature 8 is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the significant woodland. There is one watercourse crossing upstream of Feature 8 on Lucknow Line (see Figures 8.2 and 8.3, Appendix A). The preferred method of crossing would be open cut.

Project Component	Approx. Distance to Significant Woodland (m)
Access Road (T-207)	20
Temp. Construction Area (laydown)	20
Collector System (within road allowance)	20

*The distance from natural features to the collector lines/data cables under the access road are assumed to correspond with the distance to the access road.

5.4.6.2 Pre-construction Monitoring (Habitat Use Study)

As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant wildlife habitat (in this case, interior forest breeding bird habitat and habitat of species of conservation concern) are to be considered existing and significant and do not require the application of habitat use studies to confirm significance.

5.4.6.3 Potential Effects

The potential effects of the Project on significant woodlands and significant wildlife habitats (interior forest breeding bird habitat and habitat of species of conservation concern) are described in Sections 5.2.1 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.6.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland and significant wildlife habitat associated with Feature 8. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 8. The specific mitigation strategy to protect the significant woodland and significant wildlife habitats will include the following:

- Prior to construction, the boundary of the significant woodland (and thus the wildlife habitat) within 30 m of the proposed construction area will be staked and flagged, and silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant feature and to assist with the proper field installation of erosion and sediment control measures;
- The silt-fencing barriers will be regularly monitored and properly maintained during and following construction until soils in the construction area are stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,

- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, no net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of 'natural features' within Feature 8 are predicted.

5.4.7 Feature 9

Feature 9 is a large complex of woodland (mixed and deciduous), wetland, and cultural ecosites. The feature is identified as containing significant woodland, significant wetlands, significant valleylands, significant interior forest breeding bird habitat, significant amphibian woodland breeding habitat, significant habitat of species of conservation concern (PIF bird species) and significant amphibian corridor habitats. Feature 9 crosses two roads (Lanesville Line and Cransford Line); however, these roads do not divide the significant woodland feature. The interior forest breeding bird habitat, amphibian woodland breeding habitat, habitat of species of conservation concern (PIF bird species) and amphibian corridor habitat within this feature are considered generalized candidate significant wildlife habitat and are assumed to be existing and significant.

5.4.7.1 Adjacent Project Components

Feature 9 falls within 120 m of Turbine 210, the temporary turbine construction area, crane path, access road and collector line/data cable. The minimum distance from Project components to each significant natural feature within Feature 9 is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the significant woodland. There are two watercourse crossings associated with Feature 9; one within the road allowance directly adjacent to the feature and one upstream on Lanesville Line (see Figures 8.4, 8.5 and 8.6, Appendix A). The preferred method of crossing would be open cut.

Project Component	Approx. Distance to Significant Woodland (m)	Approx. Distance to Significant Wetlands (m)			Approx. Distance to Significant Valleyland 1 (m)
		9a	9b	9c	
T-210 Base	73	--	--	--	73
T-210 Blade Tip	23	109	--	--	23
Access Road (T-210)	7	104	--	--	7
Temp. Construction Area (T-210)	1	28	--	93	1
Collector System (within road allowance)	2	5	15	--	0

*The distance from the natural features to the temporary crane path and the collector system (under the access road) are assumed to correspond with the distance to the access road.

5.4.7.2 Pre-construction Monitoring (Habitat Use Study)

As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant wildlife habitat (in this case, interior forest breeding bird habitat, amphibian woodland breeding habitat, habitat of species of conservation concern (PIF bird species) and amphibian corridor habitats) are to be considered existing and significant and do not require the application of habitat use studies to confirm significance.

5.4.7.3 Potential Effects

The potential effects of the Project on significant woodlands, significant wetlands, significant valleylands and significant wildlife habitats (interior forest breeding bird habitat, amphibian woodland breeding habitat, habitat of species of conservation concern (PIF bird species) and amphibian corridor habitat) are described in Sections 5.2.1, 5.2.2, 5.2.3 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1, 5.2.2, 5.2.3 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.7.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland, significant wetland and significant wildlife habitat, and directly within the significant valleyland associated with Feature 9. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 9. The specific mitigation strategy to protect the significant woodland, significant wetland, significant wildlife habitats and significant valleyland will include the following:

- Prior to construction, the outer limits of the temporary construction area will be staked and marked to ensure that contractors remain within the temporary construction areas;
- Prior to construction, the boundary of the significant woodland and significant valleyland (and thus the significant wildlife habitat) within 30 m of the proposed access road and temporary construction area for Turbine 210 will be staked and flagged, and a silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant feature and to assist with the proper field installation of erosion and sediment controls measures;
- During construction, a buffer will be established from the stem line to the drip line where the significant woodland is immediately adjacent to a permanent access road. The purpose of the buffer is to minimize root zone damage and compaction. Silt fencing will be established at the edge of the drip line to prevent sedimentation and erosion of soils into the significant woodland. The buffer area will not be disturbed during construction and will be seeded with species native to the ecoregion upon completion of construction, if necessary;

- Prior to construction, the boundary of the significant woodland and wetland (and thus the wildlife habitat) within 30 m of the collector system (within the road allowance) will be staked and flagged, and a silt barrier will be constructed in consultation with a qualified ecologist to ensure construction activities avoid the significant feature and to assist with the proper field installation of erosion and sediment controls measures;
- Within the valleyland, the collector system will be buried within the road bed to avoid potential impacts to the adjacent woodland and wetland features as excavation will occur in the travelled portion of the road. The feasibility of this method will be discussed with ACW Township. If the proposed method is not feasible, the collector system will move to above ground lines approximately 30 m from the valleyland to reduce the overall impact to the valleyland that would occur if large bore pits were required for directional drilling. The overhead collector lines will be installed on above ground poles. Silt fencing will be installed prior to construction along the boundary of the municipal road allowance, in areas were poles are required, to inhibit sediment flow;
- The silt-fencing barriers will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- After turbines have been assembled, the temporary turbine construction area will be restored to pre-existing conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production;
- To prevent damage to the root zone, excavation of soils for the purpose of underground collector system installation on private lands will occur at the minimum distance of 5 m away from the drip line of the significant woodland. Cable trenches within 30 m of the significant woodland will be filled immediately to prevent soil erosion and sedimentation issues;
- Tree pruning will be minimized to the greatest extent possible. To the extent practical, pruning will be avoided during leaf fall, typically between September and November. Prior to construction, the limits of tree pruning will be marked in the field. Tree pruning will be supervised by a qualified arborist. The Construction Contractor will ensure that no construction disturbance occurs beyond the marked limits;
- In some cases, tree removal may be necessary within the road allowance for health and safety or electrical safety reason. Tree removal required will be completed consultation with the MVCA and a certified arborist. As appropriate, and in consultation with the relevant parties (government, conservation authority, adjacent landowner) K2 Wind will replace trees removed with appropriate species in an alternate location;
- Discharges from any de-watering shall be directed to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the woodland unless required to maintain hydrological flow (based on detailed design);
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);

- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, no net residual effects of the construction, operation and decommissioning of the proposed Project in, and within 120 m of, Feature 9 are predicted.

5.4.8 Feature 10

Feature 10 is a small deciduous woodland and has not been identified as significant; however, significant amphibian woodland breeding habitat and significant habitat of species of conservation concern (PIF bird species) has been identified within Feature 10. The amphibian woodland breeding habitat and habitat of species of conservation concern (PIF bird species) within this feature are considered generalized candidate significant wildlife habitat and are assumed to be existing and significant.

5.4.8.1 Adjacent Project Components

Feature 10 falls within 120 m of the collector system within the municipal road allowance. The distance of Project components to the generalized candidate significant wildlife habitats (amphibian woodland breeding habitat and habitat of species of conservation concern) are not provided as these habitats are only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the woodland. There are no watercourse crossings associated with this feature.

5.4.8.2 Pre-construction Monitoring (Habitat Use Study)

As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant wildlife habitat (in this case, amphibian woodland breeding habitat and habitat of species of conservation concern) are to be considered existing and significant and do not require the application of habitat use studies to confirm significance.

5.4.8.3 Potential Effects

The potential effects of the Project on significant amphibian woodland breeding habitats and habitats for species of conservation concern (PIF bird species) are described in Section 5.2.4. No specific effects beyond those described in Section 5.2.4 are expected on this significant natural feature. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.8.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant wildlife habitat associated with Feature 10. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 10. The specific mitigation strategy to protect the significant wildlife habitats will include the following:

- Prior to construction the outer limits of the construction area will be staked and marked to ensure that contractors remain within the temporary construction areas;
- The boundaries of the wildlife habitat (in this case the woodland) within 30 m of the proposed construction area will be staked and flagged, and silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant wildlife habitat and to assist with the proper field installation of erosion and sediment controls measures;
- The silt-fencing barriers will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- For collector system installation a trench will generally be a shallow (1 m deep) depression and will be placed at least 5 m from the wildlife habitat boundary. The intent of the design will be to place the collector system on the opposite side of the road allowance where possible. Issues may arise in the detailed design or construction that requires the line be constructed on the wetland side. In the event that subsurface condition do not allow for placement of the collector system on the opposite side of the road, the collector system will be placed on the feature side as close to the road as safe and allowable by the Township or County to create as much buffer from the habitat as available;

- Should the construction of underground collector lines not be feasible within the municipal road allowance on the edge of the feature, collector lines will be installed above ground on wooden pole;
- Tree pruning will be minimized to the greatest extent possible. To the extent practical, pruning will be avoided during leaf fall, typically between September and November. Prior to construction, the limits of tree pruning will be marked in the field. Tree pruning will be supervised by a qualified arborist. The Construction Contractor will ensure that no construction disturbance occurs beyond the marked limits;
- In some cases, tree removal may be necessary within the road allowance for health and safety or electrical safety reason. Tree removal required will be completed consultation with the MVCA and a certified arborist. As appropriate, and in consultation with the relevant parties (government, conservation authority, adjacent landowner) K2 Wind will replace trees removed with appropriate species in an alternate location;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, no net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of ‘natural features’ within Feature 10 are predicted.

5.4.9 Feature 11

Feature 11 is a small deciduous woodland and has not been identified as significant; however, significant amphibian woodland breeding habitat and significant habitat of species of conservation concern (PIF bird species) has been identified within Feature 11. The habitat of species of conservation concern (PIF bird species) within this feature is considered generalized candidate significant wildlife habitat and is assumed to be existing and significant.

5.4.9.1 Adjacent Project Components

Feature 11 falls within 120 m of Turbine 211, the temporary turbine construction area, the access road and the collector lines/data cables. The distance of Project components to the generalized candidate significant habitat of species of conservation concern is not provided as these habitats are only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the woodland. There are no watercourse crossings associated with this feature.

Project Component	Approx. Distance to Significant Amphibian Woodland Breeding Habitat (m)
Access Road (T-211)	102
Temp. Construction Area (T-211)	82

*The distance from natural features to the collector lines/data cables under the access road are assumed to correspond with the distance to the access road.

5.4.9.2 Pre-construction Monitoring (Habitat Use Study)

Based on consultation with the OMNR, potential impacts of the Project on significant amphibian woodland breeding habitat may occur during construction and decommissioning As such, habitat use studies to confirm significance are not necessary to implement appropriate mitigation. General mitigation measures will be applied and are discussed in 5.4.9.4. As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant habitat of species of conservation concern is considered existing and significant and does not require the application of a habitat use study to confirm significance.

5.4.9.3 Potential Effects

The potential effects of the Project on significant habitats for species of conservation concern (PIF bird species) are described in Section 5.2.4. No specific effects beyond those described in Section 5.2.4 are expected on this significant natural feature. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.9.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant wildlife habitat associated with Feature 11. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 11. The specific mitigation strategy to protect the significant wildlife habitat will include the following:

- Prior to construction the outer limits of the construction area will be staked and marked to ensure that contractors remain within the temporary construction areas;

- The boundary of the woodland (and thus the wildlife habitat) within 30 m of the temporary turbine construction area, access road and collector system for Turbine 211 will be staked and flagged, and silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the woodland and to assist with the proper field installation of erosion and sediment controls measures;
- The silt fencing will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- After turbines have been assembled, the temporary turbine construction area will be restored to pre-existing conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Discharges from any de-watering shall be directed to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the woodland unless required to maintain hydrological flow (based on detailed design);
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, no net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of ‘natural features’ within Feature 11 are predicted.

5.4.10 Feature 12

Feature 12 is comprised of a significant woodland, significant wetland, significant turtle overwintering habitat, significant amphibian wetland breeding habitat and significant habitat of species of conservation concern (PIF bird species and snapping turtles). The turtle over-wintering habitat, amphibian wetland habitat and habitat of species of conservation concern (PIF bird species) within this feature are considered generalized candidate significant wildlife habitat and are assumed to be existing and significant.

5.4.10.1 Adjacent Project Components

Feature 12 is situated within 120 m of Turbines 208 and 209, their associated access road, temporary crane path and turbine construction area, and collector lines/data cables. The minimum distance from Project components to each significant natural feature within Feature 12 is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the significant woodland. There are three watercourse crossings associated with Feature 12; two within the road allowance on River Mill Line directly adjacent to the feature and one downstream on Hawkins Road (see Figure 8.5, Appendix A). The preferred method of crossing would be open cut.

Project Component	Approx. Distance to Significant Woodland (m)	Approx. Distance to Significant Wetland (m)			Approx. Distance to Significant Amphibian Woodland Breeding Habitat (m)	Approx. Distance to Significant Amphibian Corridor 7 (m)
		12a	12b	12c		
T-208 Base	88	--	--	--	88	--
T-208 Blade Tip	38	--	--	--	38	--
T-209 Base	--	--	--	--	--	--
T-209 Blade Tip	78	--	--	--	78	--
Access Road (T-208, T-209)	9	--	--	--	9	0
Temp. Construction Area (T-208)	17	--	--	66	17	--
Temp. Construction Area (T-209)	63	--	--	--	63	63
Collector System (within road allowance)	2	10	18	5	5	0

*The distance from the natural features to the temporary crane path and the collector system (under the access road) are assumed to correspond with the distance to the access road.

5.4.10.2 Pre-construction Monitoring (Habitat Use Study)

Pre-construction monitoring will be conducted within the significant amphibian woodland breeding habitat to confirm habitat use by amphibians. Monitoring will be partially based on OMNR's Wildlife Monitoring Programs and Inventory Techniques for Ontario (Konze and

McLaren, 1997) and partially based on consultation with the OMNR. To ensure accuracy of the surveys, pre-construction monitoring methodologies will be reviewed by the OMNR prior to the commencement of field surveys.

Four site visits will be conducted within the amphibian breeding season. The first survey will be conducted in late March/early April to identify vernal pools and any evidence of salamander egg masses. Vernal pools will be assessed for the presence of key habitat characteristics critical for amphibian breeding (e.g., presence of shrubs and downed woody debris, and absence of predatory fish). The remainder of the surveys will be conducted within the recommended timing windows for Central Ontario (Survey 1: April 15 - 30; Survey 2: May 15 - 30; and Survey 3: June 15 - 30). Each site visit will consist of both visual and auditory observations of the vernal pools indentified during the first site survey. Prior to dusk, the surveyor will look for visual evidence of amphibian breeding including adult frogs, tadpoles or egg masses. An observer, sitting or standing quietly, can often see and identify frogs resting on vegetation, logs, etc. in ponds during the day. Downed wood or other objects under which amphibians may be hiding shall be moved (and then replaced) during a visual encounter search (Konze and McLaren, 1997).

After dusk, the surveyor will conduct auditory surveys in the form of amphibian breeding call counts. These surveys start at least one-half hour after sunset and finish before midnight. Efforts must be made to conduct the surveys under appropriate weather conditions. Ideal calling conditions consist of winds less than level three on the Beaufort scale and warm, damp nights with light rain or fog. Counts shall not be conducted if the wind is strong enough to raise dust or move small branches. As a guide, minimum night-time air temperatures shall be at least 8°C for the first survey, 13°C for the second and 21°C for the third. Surveys may be conducted at lower temperatures if there is strong calling activity. During amphibian breeding call counts, the surveyor will stand at each pond for 3-minutes. All calling activity will be ranked using one of the following three abundance code categories;

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

A final visual survey will also be conducted after dusk. At night, observers wearing headlamps can detect the presence of anurans by eyeshine. The reflection from the eyes of frogs and toads makes them visible in dense vegetation and at long distances (Konze and McLaren, 1997). An amphibian woodland breeding pond will be considered significant wildlife habitat if the presence of a breeding population of one or more of the species listed in the Draft SWH Ecoregion Criteria Schedules (Schedule 2; OMNR, 2009) with at least 20 individuals is confirmed during pre-construction monitoring. Listed species include: eastern newt, blue-spotted salamander, spotted salamander, gray treefrog, spring peeper, chorus frog and/or wood frog.

Movement surveys will be conducted in June at the Amphibian Corridor 7 (between Features 12 and 13). The surveys will consist of erecting a barrier (silt fence) in the location of the proposed access road in the significant amphibian corridor habitat prior to the juvenile emergence season. To the greatest extent possible, the barrier will be located where amphibians are most likely to be ingressing or egressing the feature (i.e., near vernal pools). The length of the barrier will be 40 m in length. The barrier will be surveyed every day for one week in June to document amphibians using the corridor and once again in July/August, if necessary (based on consultation with the OMNR). The barrier will be left standing for the full week and will be monitored at dawn, mid-day and dusk to prevent desiccation of amphibians. Any amphibian identified along the edge of the barrier will be moved to the closest woodland/wetland feature to prevent desiccation of amphibians. The surveys will consist of walking the extent of the barrier (on both sides) to identify amphibians. The extent of the proposed access road between Features 12 and 13 will also be walked to survey visually for amphibian movement. Should amphibian mortality be detected due to the presence of the semi-permanent barrier, the barrier will be set up before dusk each day of the survey, checked at dawn for amphibians and then laid down flat or removed for the day.

There are three possible outcome scenarios which could result from the pre-construction monitoring, including 1) a breeding population of at least 20 individual amphibians is not confirmed to be using the woodland or corridor habitats, 2) a breeding population of at least 20 individual amphibians is confirmed to be using the woodland habitats, but not the corridor habitat, or 3) a breeding population of at least 20 individual amphibians is confirmed to be using the woodland and corridor habitats.

If there is an insufficient amphibian breeding population present at the site based on criteria provided in the Draft SWH Ecoregion Criteria Schedules, no further monitoring will be required. If pre-construction monitoring does identify a breeding population of at least 20 individual amphibians is documented in the woodland or corridor habitats, then the features will be considered significant amphibian woodland breeding habitat and /or amphibian corridor habitat and mitigation measures will be applied to manage potential impacts. The results of all pre-construction monitoring will be shared with the OMNR/MOE to confirm significance and modify mitigation measures, where necessary. Potential effects to significant amphibian woodland breeding habitat, proposed mitigation and post-construction monitoring to be implemented in this scenario are discussed below.

As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant wildlife habitat (in this case, turtle overwintering habitat, amphibian wetland breeding habitat and habitat of species of conservation concern) are to be considered existing and significant and do not require the application of habitat use studies to confirm significance.

5.4.10.3 Potential Effects

The potential effects of the Project on significant woodlands, significant wetlands, significant turtle overwintering habitats, significant amphibian woodland breeding habitats and significant habitats for species of conservation concern are described in Sections 5.2.1, 5.2.2 and 5.2.4,

respectively. No specific effects beyond those described in Section 5.2.4 are expected on this significant natural feature. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.10.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland, significant wetland and significant wildlife habitat associated with Feature 12. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 12. The specific mitigation strategy to protect the significant woodland, significant wetland and significant wildlife habitats will include the following:

- Prior to construction the outer limits of the construction area will be staked and marked to ensure that contractors remain within the temporary construction areas;
- Prior to construction, the boundary of the significant features (and thus the wildlife habitat) within 30 m of the turbine temporary construction area and access road for Turbines 208 and 209 will be staked and flagged, and a silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant feature and to assist with the proper field installation of erosion and sediment controls measures;.
- During construction, a buffer will be established from the stem line to the drip line where the significant woodland is immediately adjacent to a permanent access road. The purpose of the buffer is to minimize root zone damage and compaction. Silt fencing will be established at the edge of the drip line to prevent sedimentation and erosion of soils into the significant woodland. The buffer area will not be disturbed during construction and will be seeded with species native to the ecoregion upon completion of construction, if necessary;
- Prior to construction, the boundary of the significant woodland and wetland (and thus the wildlife habitat) within 30 m of the collector system (within the road allowance) will be staked and flagged, and a silt barrier will be constructed in consultation with a qualified ecologist to ensure construction activities avoid the significant feature and to assist with the proper field installation of erosion and sediment controls measures;
- Adjacent to Wetland 12a, the collector system will be buried within the road bed on the south side of Hawkins Road to avoid potential impacts to the adjacent wetland features as excavation will occur in the travelled portion of the road. The feasibility of this method will be discussed with ACW Township. If the proposed method is not feasible, the collector system will move to above ground lines on the south side of Hawkins Road (approximately 30 m from the wetland) to avoid impacts to the wetland that would occur if large bore pits were required for directional drilling. The overhead collector lines will be installed on above ground poles. Silt fencing will be installed prior to construction along the boundary of the municipal road allowance, in areas were poles are required, to inhibit sediment flow;

- The preferred design is to excavate soils for the purpose of underground collector system installation in the municipal road allowance 5 m away from the Wetland 12b and 12c boundary. Issues may arise in the detailed design or construction that requires the line be constructed closer than 5 m. In the event that subsurface condition do not allow for placement of the collector system 5 m away, the collector system will be placed as close to the road as safe and allowable by the Township or County to create as much buffer from the Feature. Given the shallow nature of the works, no appreciable changes to the groundwater or surface water flows are anticipated. Cable trenches will be filled immediately after installation is complete to prevent soil erosion and sedimentation issues;
- The silt-fencing barriers will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- To prevent damage to the root zone, excavation of soils for the purpose of underground collector system installation on private lands will occur at the minimum distance of 5 m away from the drip line of the significant woodland. Cable trenches within 30 m of the significant woodland will be filled immediately to prevent soil erosion and sedimentation issues;
- Power cable trenches within 30 m of the wetland will be bedded with sand and backfilled with native soils or appropriate fill material, with clay plugs every 30 m to ensure that potential groundwater entering the trenches is not drawn along the sand-filled conduit and hydrological conveyance to the wetland is maintained;
- Should the amphibian corridor between Features 12 and 13 be identified as significant, a wildlife friendly culvert will be constructed under the access road to allow safe movement of amphibians between features;
- After turbines have been assembled, the temporary turbine construction area will be restored to pre-existing conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production;
- Tree pruning will be minimized to the greatest extent possible. To the extent practical, pruning will be avoided during leaf fall, typically between September and November. Prior to construction, the limits of tree pruning will be marked in the field. Tree pruning will be supervised by a qualified arborist. The Construction Contractor will ensure that no construction disturbance occurs beyond the marked limits;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Discharges from any de-watering shall be directed to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the woodland unless required to maintain hydrological flow (based on detailed design);
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected

and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;

- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, no net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of 'natural features' within Feature 12 are predicted.

5.4.10.5 Post-Construction Monitoring

As avoidance behaviour of access roads is identified as a potential operational effect on amphibians, a minimum three-year post-construction amphibians monitoring plan will be implemented if the amphibian corridor habitat is identified as significant wildlife habitat. The objective of the monitoring will be to determine if Project operations have an effect on amphibian behaviour and habitat use of the corridor and adjacent amphibian woodland breeding habitat. The same protocols which are implemented during pre-construction surveys will be applied post-construction.

Since there are only five potential amphibian corridor habitats identified within the General Project Area (associated with Features 12, 13, 24, 33, 35, 36, 37 and 39), comparisons cannot be made between potentially "impacted" sites (within 120 m of the Project Location) and "control" sites (not within 120 m of the Project Location). Comparisons can only be made between pre-construction and post-construction survey results. While this type of comparison is not ideal, post-construction data can be statistically compared to pre-construction data. However, without the use of control sites, data suggesting avoidance behaviour of amphibian corridor habitats should be taken with caution as confounding factors such as weather, disease and/or predators may influence the analysis. Should pre-construction surveys suggest the presence of other amphibian corridor habitat in the area but not within 120 m of the Project Location, the Proponent will make efforts to use these areas as 'control' sites to allow for a Before-After-Control-Impact study design.

The OMNR, along with the proponent and other relevant agencies, will collectively review the results of the post-construction monitoring to determine if a negative environmental effect is occurring, and whether such an effect is attributable to the access road and not external factors. These discussions will determine if and when contingency measures shall be undertaken. The best available science and information will be considered when determining appropriate mitigation and will be determined in consultation with MOE and OMNR based on post-construction monitoring results.

5.4.11 Feature 13

Feature 13 is a 314.7 ha feature associated with the Lucknow River ANSI and Nine Mile River. Within 120 m of the Project Location, the feature is comprised of a significant woodland, significant valleyland, significant bat maternal colony roost habitat, significant raptor winter feeding and roosting habitat, significant turtle over-wintering habitat, significant turtle nesting habitat, significant interior forest breeding bird habitat, significant amphibian woodland breeding habitat and significant habitat of species of conservation concern (PIF bird species, and *Special Concern* and low S-ranking plant species). The significant raptor winter feeding and roosting habitat also spans across Features 14 and 16 and as such, is addressed in Section 5.4.14. The turtle over-wintering habitat and turtle nesting habitat also span across Feature 16 and as such, are addressed in Section 5.4.14. The mixed forest ecosite is co-dominated by eastern hemlock trembling aspen, basswood, white birch, and white cedar. The deciduous forest south of the watercourse is dominated by sugar maple, while the deciduous forest north of the watercourse is dominated by white ash. The interior forest breeding bird habitat and habitat of species of conservation concern (PIF bird species, and *Special Concern* and low S-ranking plant species) within this feature are considered generalized candidate significant wildlife habitat and are assumed to be existing and significant.

5.4.11.1 Adjacent Project Components

Feature 13 falls within 120 m of Turbines 209, 213, and 218, access roads, collector lines/data cables and temporary crane paths and turbine construction areas. The minimum distance from Project components to each significant natural feature within Feature 13 is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the significant woodland. There is one watercourse crossings upstream of Feature 13 on Dungannon Road (see Figure 8.7 and 8.9, Appendix A). The preferred method of crossing would be open cut.

Project Component	Approx. Distance to Significant Woodland (m)	Approx. Distance to Significant Valleyland 2 (m)	Approx. Distance to Significant Bat Maternal Colony Roost Habitat (m)	Approx. Distance to Significant Amphibian Woodland Breeding Habitat (m)
T-209 Blade Tip	94	--	94	94
T-213 Blade Tip	73	--	73	73
T-218 Blade Tip	104	--	104	104
Access Road (T-208, T-209)	30	--	30	30
Access Road (T-213)	76	--	76	76
Access Road (T-218)	105	--	105	105
Temp. Construction Area (T-208)	120	--	120	120
Temp. Construction Area (T-209)	30	--	30	30
Temp. Construction Area (T-213)	28	--	28	28
Temp. Construction Area (T-218)	38	108	38	38

*The distance from the natural features to the temporary crane path and the collector system (under the access road) are assumed to correspond with the distance to the access road.

5.4.11.2 Pre-construction Monitoring (Habitat Use Study)

Pre-construction monitoring will be conducted within the significant amphibian woodland breeding habitat to confirm habitat use by amphibians. Monitoring will be partially based on OMNR's Wildlife Monitoring Programs and Inventory Techniques for Ontario (Konze and McLaren, 1997) and partially based on consultation with the OMNR. To ensure accuracy of the surveys, pre-construction monitoring methodologies will be reviewed by the OMNR prior to the commencement of field surveys.

Four site visits will be conducted within the amphibian breeding season. The first survey will be conducted in late March/early April to identify vernal pools and any evidence of salamander egg masses. Vernal pools will be assessed for the presence of key habitat characteristics critical for amphibian breeding (e.g., presence of shrubs and downed woody debris, and absence of predatory fish). The remainder of the surveys will be conducted within the recommended timing windows for Central Ontario (Survey 1: April 15 - 30; Survey 2: May 15 - 30; and Survey 3: June 15 - 30). Each site visit will consist of both visual and auditory observations of the vernal pools indentified during the first site survey. Prior to dusk, the surveyor will look for visual evidence of amphibian breeding including adult frogs, tadpoles or egg masses. An observer, sitting or standing quietly, can often see and identify frogs resting on vegetation, logs, etc. in ponds during the day. Downed wood or other objects under which amphibians may be hiding shall be moved (and then replaced) during a visual encounter search (Konze and McLaren, 1997).

After dusk, the surveyor will conduct auditory surveys in the form of amphibian breeding call counts. These surveys start at least one-half hour after sunset and finish before midnight. Efforts must be made to conduct the surveys under appropriate weather conditions. Ideal calling conditions consist of winds less than level three on the Beaufort scale and warm, damp

nights with light rain or fog. Counts shall not be conducted if the wind is strong enough to raise dust or move small branches. As a guide, minimum night-time air temperatures shall be at least 8°C for the first survey, 13°C for the second and 21°C for the third. Surveys may be conducted at lower temperatures if there is strong calling activity. During amphibian breeding call counts, the surveyor will stand at each pond for 3-minutes. All calling activity will be ranked using one of the following three abundance code categories;

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

A final visual survey will also be conducted after dusk. At night, observers wearing headlamps can detect the presence of anurans by eyeshine. The reflection from the eyes of frogs and toads makes them visible in dense vegetation and at long distances (Konze and McLaren, 1997). An amphibian woodland breeding pond will be considered significant wildlife habitat if the presence of a breeding population of one or more of the species listed in the Draft SWH Ecoregion Criteria Schedules (Schedule 2; OMNR, 2009) with at least 20 individuals is confirmed during pre-construction monitoring. Listed species include: eastern newt, blue-spotted salamander, spotted salamander, gray treefrog, spring peeper, chorus frog and/or wood frog.

Movement surveys will be conducted in June at the Amphibian Corridor 7 (between Features 12 and 13). The surveys will consist of erecting a barrier (silt fence) in the location of the proposed access road in the significant amphibian corridor habitat prior to the juvenile emergence season. To the greatest extent possible, the barrier will be located where amphibians are most likely to be ingressing or egressing the feature (i.e., near vernal pools). The length of the barrier will be 40 m in length. The barrier will be surveyed every day for one week in June to document amphibians using the corridor and once again in July/August, if necessary (based on consultation with the OMNR). The barrier will be left standing for the full week and will be monitored at dawn, mid-day and dusk to prevent desiccation of amphibians. Any amphibian identified along the edge of the barrier will be moved to the closest woodland/wetland feature to prevent desiccation of amphibians. The surveys will consist of walking the extent of the barrier (on both sides) to identify amphibians. The extent of the proposed access road between Features 12 and 13 will also be walked to survey visually for amphibian movement. Should amphibian mortality be detected due to the presence of the semi-permanent barrier, the barrier will be set up before dusk each day of the survey, checked at dawn for amphibians and then laid down flat or removed for the day.

There are three possible outcome scenarios which could result from the pre-construction monitoring, including 1) a breeding population of at least 20 individual amphibians is not confirmed to be using the woodland or corridor habitats, 2) a breeding population of at least 20 individual amphibians is confirmed to be using the woodland habitats, but not the corridor habitat, or 3) a breeding population of at least 20 individual amphibians is confirmed to be using the woodland and corridor habitats.

If there is an insufficient amphibian breeding population present at the site based on criteria provided in the Draft SWH Ecoregion Criteria Schedules, no further monitoring will be required. If pre-construction monitoring does identify a breeding population of at least 20 individual amphibians is documented in the woodland or corridor habitats, then the features will be considered significant amphibian woodland breeding habitat and /or amphibian corridor habitat and mitigation measures will be applied to manage potential impacts. The results of all pre-construction monitoring will be shared with the OMNR/MOE to confirm significance and modify mitigation measures, where necessary. Potential effects to significant amphibian woodland breeding habitat, proposed mitigation and post-construction monitoring to be implemented in this scenario are discussed below.

Pre-construction monitoring will be conducted within the significant bat maternal colony roost habitat to confirm habitat use by bats. Candidate roost trees (snags/cavity trees) will be monitored for evidence of maternity colonies through exit surveys following the protocols outlined in OMNR's *Bat and Bat Habitats: Guidelines for Wind Power Projects* (OMNR, 2011b). To ensure accuracy of the surveys, pre-construction monitoring methodologies will be reviewed by the OMNR prior to the commencement of field surveys.

A total of 30 snags/cavity trees will be surveyed throughout the feature, as per the OMNR's guidelines for features ≥30 ha. The best candidate trees for the exit surveys will be determined based on the criteria outlined in Section 4.1.4.1 (Bat Maternal Colony Roost Habitat). Exit surveys will be conducted during the month of June. Surveyors will choose a location with a clear view of the cavity opening or crevice (multiple surveyors may be required if multiple openings are present in one snag). The cavity opening or crevice will be monitored for any evidence of bats beginning 30 minutes before dusk until 60 minutes after dusk for evidence of bats. Modern broadband bat detectors (automated systems in conjunction with computer software analysis packages or manual devices) with condenser microphones may be used in conjunction with visual surveys to determine species using roost habitats. Each candidate roost tree will only be monitored once prior to construction. If any two bats are observed or detected, it will serve as confirmation that a maternity roost is present.

There are two possible outcome scenarios which could result from the pre-construction monitoring, including; 1) there is no evidence of habitat use in the candidate roost trees, or 2) habitat use by at least two bats is confirmed in at least one candidate roost tree.

If pre-construction monitoring confirms habitat use by at least two bats in any one candidate bat maternal colony roost trees, then the entire ELC stand (woodland) will be considered significant wildlife habitat and mitigation measures will be applied to manage potential impacts. The results of all pre-construction monitoring will be shared with the OMNR/MOE to confirm significance and modify mitigation measures, where necessary. Potential effects, proposed mitigation and post-construction monitoring to be implemented in this scenario are discussed below.

As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant wildlife habitat (in this case, interior forest breeding bird habitat and habitat of species

of conservation concern) are to be considered existing and significant and do not require the application of habitat use studies to confirm significance.

5.4.11.3 Potential Effects

The potential effects of the Project on significant woodlands, significant valleylands and significant wildlife habitats (bat maternal colony roost habitat, interior forest breeding bird habitat, amphibian woodland breeding habitat and habitat of species of conservation concern) are described in Sections 5.2.1, 5.2.3 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1, 5.2.3 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.11.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland, significant valleyland and significant wildlife habitat associated with Feature 13. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 13. The specific mitigation strategy to protect the significant woodland, significant valleyland and significant wildlife habitats will include the following:

- Prior to construction the outer limits of the construction area will be staked and marked to ensure that contractors remain within the temporary construction areas;
- The boundaries of the significant woodland (and thus the wildlife habitat and valleyland) within 30 m of the proposed access road for Turbines 209 and 213 will be staked and flagged, and silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant woodland and to assist with the proper field installation of erosion and sediment controls measures;
- The silt-fencing barriers will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- To prevent damage to the root zone, excavation of soils for the purpose of underground collector system installation on private lands will occur at the minimum distance of 5 m away from the drip line of the significant woodland. Cable trenches within 30 m of the significant woodland will be filled immediately to prevent soil erosion and sedimentation issues;
- After turbines have been assembled, temporary construction areas for turbines will be restored to pre-existing conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production;

- Should the amphibian corridor between Features 12 and 13 be identified as significant, a wildlife friendly culvert will be constructed under the access road to allow safe movement of amphibians between features;
- Tree pruning will be minimized to the greatest extent possible. To the extent practical, pruning will be avoided during leaf fall, typically between September and November. Prior to construction, the limits of tree pruning will be marked in the field. Tree pruning will be supervised by a qualified arborist. The Construction Contractor will ensure that no construction disturbance occurs beyond the marked limits;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Discharges from any de-watering shall be directed to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the woodland unless required to maintain hydrological flow (based on detailed design);
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, the net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of ‘natural features’ within Feature 13 are predicted to be low.

5.4.11.5 Post-Construction Monitoring

As avoidance behaviour of access roads is identified as a potential operational effect on amphibians, a minimum three-year post-construction amphibians monitoring plan will be implemented if the amphibian corridor habitat is identified as significant wildlife habitat. The

objective of the monitoring will be to determine if Project operations have an effect on amphibian behaviour and habitat use of the corridor and adjacent amphibian woodland breeding habitat. The same protocols which are implemented during pre-construction surveys will be applied post-construction.

Since there are only five potential amphibian corridor habitats identified within the General Project Area (associated with Features 12, 13, 24, 33, 35, 36, 37 and 39), comparisons cannot be made between potentially "impacted" sites (within 120 m of the Project Location) and "control" sites (not within 120 m of the Project Location). Comparisons can only be made between pre-construction and post-construction survey results. While this type of comparison is not ideal, post-construction data can be statistically compared to pre-construction data. However, without the use of control sites, data suggesting avoidance behaviour of amphibian corridor habitats should be taken with caution as confounding factors such as weather, disease and/or predators may influence the analysis. Should pre-construction surveys suggest the presence of other amphibian corridor habitat in the area but not within 120 m of the Project Location, the Proponent will make efforts to use these areas as 'control' sites to allow for a Before-After-Control-Impact study design.

As avoidance behaviour of turbines is identified as a potential operational effect, a minimum three-year post-construction bat monitoring plan will be implemented if the habitat is identified as significant wildlife habitat. The objective of the monitoring will be to determine if Project operations have an effect on bat behaviour and habitat use. The same protocols which are implemented during pre-construction surveys will be applied post-construction. Significant bat maternal colony roost habitats will be monitored for evidence of maternity colonies through exit surveys following the protocols outlined in OMNR's *Bat and Bat Habitats: Guidelines for Wind Power Projects* (OMNR, 2011b). All snags/cavity trees identified during pre-construction surveys, regardless of evidence of habitat use, will be surveyed during post-construction monitoring.

Species diversity and density will be compared between pre-construction and post-construction conditions. If bat maternal colony trees are located within the ELC stand but not within 120 m of the Project Location, these sites will be used as 'control' sites to document potential changes in species diversity and density compared to potential 'impacted' sites (within 120 m of the Project Location). This approach allows for a Before-After-Control-Impact design. Consistency in the survey methods will allow for defensible comparisons of the post-construction disturbance effects. Post-construction data will be statistically compared to pre-construction data. This will allow yearly comparisons of potential post-construction effects while statistically controlling for external factors such as weather, disease and depredation.

The OMNR, along with the proponent and other relevant agencies, will collectively review the results of the post-construction monitoring to determine if a negative environmental effect is occurring, and whether such an effect is attributable to the wind turbines and not external factors. These discussions will determine if and when contingency measures shall be undertaken. The best available science and information will be considered when determining

appropriate mitigation and will be determined in consultation with MOE and OMNR based on post-construction monitoring results.

5.4.12 Feature 14

Feature 14 is a small and isolated mixed forest with little interior forest habitat. The feature is young and regenerating, resulting in a lack of large canopy trees and a somewhat open canopy. This natural feature has been identified as a significant woodland based on woodland size (19.7 ha) and contained a significant wetland. Significant amphibian woodland breeding habitat, significant raptor winter feeding and roosting habitat and significant habitat of species of conservation concern are associated with Feature 14. The significant raptor winter feeding and roosting habitat also spans across Features 13 and 16 and as such, is addressed in Section 5.4.14. Significant amphibian corridor habitat also connects Feature 14 and Feature 16. The amphibian woodland breeding habitat, habitat of species of conservation concern (PIF bird species) and amphibian corridor habitat within this feature are considered generalized candidate significant wildlife habitat and are assumed to be existing and significant.

5.4.12.1 Adjacent Project Components

Feature 14 is situated within 120 m of the collector lines/data cables in municipal road allowances, the access road to Turbines 353 and 211, and the temporary turbine construction area for Turbine 219. The minimum distance from Project components to each significant natural feature within Feature 14 is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the significant woodland. There are no watercourse crossings associated with this feature.

Project Component	Approx. Distance to Significant Woodland (m)	Approx. Distance to Significant Wetland (m)
Access Road (T-353)	54	--
Access Road (T-211)	98	--
Temp. Construction Area (T-219)	90	--
Collector System (with road allowance)	2	10

*The distance from natural features to the collector lines/data cables under the access road are assumed to correspond with the distance to the access road.

5.4.12.2 Pre-construction Monitoring (Habitat Use Study)

As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant wildlife habitat (in this case, amphibian woodland breeding habitat and habitat of species of conservation concern) are to be considered existing and significant and do not require the application of habitat use studies to confirm significance.

5.4.12.3 Potential Effects

The potential effects of the Project on significant woodlands, significant wetlands and significant wildlife habitats (amphibian woodland breeding habitat, habitat of species of conservation concern and amphibian corridor habitat) are described in Sections 5.2.1, 5.2.2 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1, 5.2.2 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.12.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland and significant wildlife habitat associated with Feature 14. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 14. The specific mitigation strategy to protect the significant woodland and significant wildlife habitats will include the following:

- Prior to construction the outer limits of the construction area will be staked and marked to ensure that contractors remain within the temporary construction areas;
- The boundaries of the significant woodland (and thus the significant wetland and wildlife habitat) within 30 m of the proposed temporary construction areas will be staked and flagged, and silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant woodland and to assist with the proper field installation of erosion and sediment controls measures. The silt-fencing barriers will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- The preferred design is to excavate soils for the purpose of underground collector system installation in the municipal road allowance 5 m away from the significant woodland and wetland boundary. Issues may arise in the detailed design or construction that requires the line be constructed closer than 5 m. In the event that subsurface condition do not allow for placement of the collector system 5 m away, the collector system will be placed as close to the road as safe and allowable by the Township or County to create as much buffer from the Feature. Given the shallow nature of the works no appreciable changes to the groundwater or surface water flows are anticipated. Cable trenches will be filled immediately after installation is complete to prevent soil erosion and sedimentation issues;
- Power cable trenches within the municipal road allowance will be bedded with sand and backfilled with native soils or appropriate fill material, with clay plugs every 30 m to ensure that potential groundwater entering the trenches is not drawn along the sand-filled conduit and hydrological conveyance to the wetland, if any, is maintained;
- Should the construction of underground collector lines not be feasible within the municipal road allowance on the edge of the feature, collector lines will be installed above ground on wooden poles;

- After turbines have been assembled, the temporary turbine construction area will be restored to pre-existing conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Discharges from any de-watering shall be directed to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the woodland unless required to maintain hydrological flow (based on detailed design);
- Tree pruning will be minimized to the greatest extent possible. To the extent practical, pruning will be avoided during leaf fall, typically between September and November. Prior to construction, the limits of tree pruning will be marked in the field. Tree pruning will be supervised by a qualified arborist. The Construction Contractor will ensure that no construction disturbance occurs beyond the marked limits;
- In some cases, tree removal may be necessary within the road allowance for health and safety or electrical safety reason. Tree removal required will be completed consultation with the MVCA and a certified arborist. As appropriate, and in consultation with the relevant parties (government, conservation authority, adjacent landowner) K2 Wind will replace trees removed with appropriate species in an alternate location;
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, no net residual effects of the construction, operation and

decommissioning of the proposed Project within 120 m of 'natural features' within Feature 14 are predicted.

5.4.13 Feature 15

Feature 15 is a small (0.2 ha) Mineral Thicket Swamp ecosite co-dominated by willow, red-osier dogwood and silky dogwood. Goldenrods, asters, sedges and grasses dominate the herbaceous layer. This feature is sparsely surrounded by trembling aspen on the periphery and is further surrounded by agriculture. The wetland is isolated and has no inflow or outflow. No significant wildlife habitat features are associated with Feature 15.

5.4.13.1 Adjacent Project Components

Feature 15 falls within 120 m of Turbine 353, an access road and a construction pad. The minimum distance from Project components to the significant natural feature is provided in the table below. There are no watercourse crossings associated with this feature.

Project Component	Approx. Distance to Significant Wetland (m)
T-353 Base	79
T-353 Blade Tip	29
Access Road (T-353)	77
Temp. Construction Area (T-353)	6

*The distance from natural features to the collector lines/data cables under the access road are assumed to correspond with the distance to the access road.

5.4.13.2 Potential Effects

The potential effects of the Project on significant wetlands are described in Sections 5.2.2. No specific effects beyond those described in Sections 5.2.2 are expected on this significant natural feature.

5.4.13.3 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant wetland associated with Feature 15. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 15. The specific mitigation strategy to protect the significant wetland will include the following:

- Prior to construction the outer limits of the temporary construction area will be staked and marked to ensure that contractors remain within the temporary construction areas. A minimum distance of 5 m will be established and a silt barrier constructed between the wetland and temporary construction area;
- Silt barrier will be erected along the boundaries of the wetland within 30 m of the proposed temporary turbine construction areas for Turbine 353 in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction

area, to ensure construction activities avoid the significant woodland and to assist with the proper field installation of erosion and sediment controls measures;

- The silt-fencing barriers will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- After turbines have been assembled, the temporary turbine construction area will be restored to pre-existing conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Discharges from any de-watering shall be directed to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the woodland unless required to maintain hydrological flow (based on detailed design);
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, no net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of ‘natural features’ within Feature 15 are predicted.

5.4.14 Feature 16

Feature 16 consists of a mixture of cultural, deciduous, and coniferous forest ecosites. This feature is large (191.4 ha) with considerable forest interior habitat, and is associated with the Nine Mile River valleyland (Valleyland 2). Feature 16 has been identified as comprising a significant woodland, significant valleyland, significant winter raptor feeding and roosting habitat, significant turtle over-wintering habitat, significant turtle nesting habitat, significant interior forest breeding bird habitat, significant habitat of species of conservation concern (PIF bird species, and *Special Concern* and low S-ranking plant species) and significant amphibian corridor habitats. The interior forest breeding bird habitat, habitat of species of conservation concern and amphibian corridor habitat within this feature are considered generalized candidate significant wildlife habitat and are assumed to be existing and significant.

5.4.14.1 Adjacent Project Components

Feature 16 falls within 120 m of the blade tip of Turbine 219, temporary turbine construction areas, access roads and collector lines/data cables for Turbines 219, 224 and T-229, and the collector system. The minimum distance from Project components to each significant natural feature within Feature 16 is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the significant woodland. There are four watercourse crossings associated with Feature 16, two within the road allowance directly adjacent to the feature and two upstream on Lanesville Line and Dungannon Road (see Figures 8.6 and 8.8, Appendix A). The preferred method of crossing would be overhead on shared poles through the valleyland and open cut in other locations.

Project Component	Approx. Distance to Significant Woodland (m)	Approx. Distance to Significant Valleyland 2 (m)	Approx. Distance to Significant Winter Raptor Feeding and Roosting Habitat (m)	Approx. Distance to Significant Turtle Over-Wintering Habitat (m)	Approx. Distance to Significant Turtle Nesting Habitat (m)
T-219 Blade Tip	--	--	99	--	--
T-209 Blade Tip	--	--	94	--	--
T-213 Blade Tip	--	--	73	--	--
T-218 Blade Tip	--	--	104	--	--
Access Road (T-213)	--	--	76	--	--
Access Road (T-218)	--	--	105	--	--
Access Road (T-209,T-209)	--	--	30	--	--
Access Road (T-353)	--	--	54	--	--
Access Road (T-219)	--	--	99	--	--
Access Road (T-224, T-229)	15	45	--	45	45
Temp. Construction Area (T-219)	--	--	70	--	--

Project Component	Approx. Distance to Significant Woodland (m)	Approx. Distance to Significant Valleyland 2 (m)	Approx. Distance to Significant Winter Raptor Feeding and Roosting Habitat (m)	Approx. Distance to Significant Turtle Over-Wintering Habitat (m)	Approx. Distance to Significant Turtle Nesting Habitat (m)
Temp. Construction Area (T-208)	--	--	120	--	--
Temp. Construction Area (T-209)	--	--	30	--	--
Temp. Construction Area (T-213)	--	--	28	--	--
Temp. Construction Area (T-218)	--	--	38	--	--
Collector System (within road allowance)	2	0	10	2	2

*The distance from the natural features to the temporary crane path and the collector system (under the access road) are assumed to correspond with the distance to the access road.

5.4.14.2 Pre-construction Monitoring (Habitat Use Study)

Pre-construction monitoring will be conducted within the significant raptor winter feeding and roosting habitat to confirm habitat use by raptors. Preliminary habitat use surveys will consist of three surveys conducted 7-10 days apart during the month of December to document habitat use by raptors. Based on the results of the first three surveys and in consultation with the OMNR, further surveys may be required. Should the OMNR request further surveys based on the results of the preliminary raptor surveys, additional raptor surveys will be conducted 7-10 days apart through January and February to document habitat use.

Surveys will be conducted using the 'standardized area searches' protocols outlined in the *Birds and Bird Habitats: Guidelines for Wind Power Project*s (OMNR, 2011c). The standardized area searches will consist of a fixed width transects, in which all raptors within a fixed distance (edge of the natural feature) of transects will be recorded. Transects will be continuous, traversed on foot and focus on the woodland edges and the 100 m of the surrounding open habitat, where possible based on land access permission on non-participating properties. To ensure accuracy of the surveys, pre-construction monitoring methodologies and transect locations will be reviewed by the OMNR prior to the commencement of field surveys. Visual surveys for raptors will be conducted using binoculars with a minimum 10x magnification.

Surveys will be undertaken during daylight hours, between late morning and the afternoon. Data recorded will include:

- The level of effort for each visit (date, start time, finish time, hours of searching, weather conditions during the survey and the distance/area covered);
- A complete list and abundance of species detected on each visit/each day (including non-raptor species);
- A basic description of the habitats covered; and,
- A GPS track log or shape file representing the area searched.

As the start of the raptor wintering season is variable and based on weather conditions, the OMNR will be consulted to determine the appropriate time to commence the surveys. Surveys shall occur in calm weather conditions without precipitation or winds greater than 3-4 on the Beaufort scale.

In addition to diversity and density studies, behavioural surveys will be conducted concurrently with standardized area searched. The behavioural studies will determine how raptors are using the area and whether they are flying through areas that will be swept by blades after the turbines are built or are using habitats that will be directly affected by the construction and/or operation process. Beyond the data collection described above, data recorded will include: summary statistics on how often and how many birds flew through potential turbine locations, the estimated height of flight to determine whether the raptors are flying within, above or below the proposed blade sweep area and how often the raptors used area that would be disturbed by construction.

There are two possible outcome scenarios which could result from the pre-construction monitoring, including; 1) habitat use is insufficient to determine the raptor winter feeding and roosting habitat as significant, or 2) habitat use confirms the presence of two or more of the species listed in the Draft SWH Ecoregion Criteria Schedules (Schedule 2; OMNR, 2009) and 10 or more individuals for a minimum of 20 days per season.

If there is insufficient habitat use at the site for it to be determined as significant wildlife habitat based on criteria provided in the Draft SWH Ecoregion Criteria Schedules (Schedule 2; OMNR, 2009), no further monitoring will be required. If pre-construction monitoring does identify habitat use by two or more of the species listed in the Draft SWH Ecoregion Criteria Schedules (Schedule 2; OMNR, 2009) and 10 or more individuals for a minimum of 20 days per season, then the site is determined to be significant wildlife habitat and mitigation measures will be needed to manage potential impacts. Potential effects, proposed mitigation and follow-up monitoring to be implemented in this scenario are discussed below.

Based on consultation with the OMNR, potential impacts of the Project on turtle over-wintering habitat and turtle nesting habitat may occur during construction, operation and decommissioning; however, habitat use studies to confirm significance are not necessary to implement appropriate mitigation. As such, general mitigation measures will be applied and are discussed in 5.4.14.4. As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant wildlife habitat (in this case, interior forest breeding bird habitat, habitat of species of conservation concern and amphibian corridor habitats) are to be considered existing and significant and do not require the application of habitat use studies to confirm significance.

5.4.14.3 Potential Effects

The potential effects of the Project on significant woodlands, significant valleylands and significant wildlife habitats (winter raptor feeding and roosting habitat, interior forest breeding bird habitat, habitat of species of conservation concern (PIF bird species, and *Special Concern*

and low S-ranking plant species) and amphibian corridor habitat) are described in Sections 5.2.1, 5.2.3 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1, 5.2.3 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.14.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland, significant wildlife habitat and directly within the significant valleyland associated with Feature 16. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 16. The specific mitigation strategy to protect the significant woodland, significant wildlife habitats and significant valleyland will include the following:

- Prior to construction the outer limits of the construction area will be staked and marked to ensure that contractors remain within the temporary construction areas;
- The boundaries of the significant woodland and valleyland (and thus the wildlife habitat) within 30 m of the proposed construction area will be staked and flagged, and silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant woodland and to assist with the proper field installation of erosion and sediment controls measures;
- The silt-fencing barriers will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- Where the Project Location is located within 120 m of significant turtle nesting habitat, turbine excavations, access road construction and collector line installation will be conducted outside the turtle nesting season (late May to mid-July). Should construction be required during this period, the edge of excavation areas will be fenced off (with silt fencing) where excavations are left overnight to prevent turtles from entering turbine excavation areas and attempting to nest;
- After turbines have been assembled, temporary turbine construction areas will be restored to pre-existing conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production;
- To prevent damage to the root zone, excavation of soils for the purpose of underground collector system installation on private lands will occur at the minimum distance of 5 m away from the drip line of the significant woodland and valleyland. Cable trenches within 30 m of the significant woodland and valleyland will be filled immediately to prevent soil erosion and sedimentation issues;
- Discharges from any de-watering shall be directed to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the

woodland or valleyland unless required to maintain hydrological flow (based on detailed design);

- Excavation of soils for the purpose of underground collector system installation within the municipal road allowance will be filled immediately to prevent soil erosion and sedimentation issues;
- In areas where the collector system crosses the valleylands within the municipal road allowance, the collector system will move to above ground lines approximately 30 m from the valleyland, to reduce the overall impact to the valleyland that will occur if large bore pits were required for directional drilling. Silt fencing will be installed prior to construction along the boundary of the municipal road allowance, in areas were poles are required, to inhibit sediment flow. The silt-fencing barriers will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- Should the construction of underground collector lines not be feasible within the municipal road allowance on the edge of the feature, collector lines will be installed above ground on wooden poles;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Tree pruning will be minimized to the greatest extent possible. To the extent practical, pruning will be avoided during leaf fall, typically between September and November. Prior to construction, the limits of tree pruning will be marked in the field. Tree pruning will be supervised by a qualified arborist. The Construction Contractor will ensure that no construction disturbance occurs beyond the marked limits;
- In some cases, tree removal may be necessary within the road allowance for health and safety or electrical safety reason. Tree removal required will be completed consultation with the MVCA and a certified arborist. As appropriate, and in consultation with the relevant parties (government, conservation authority, adjacent landowner) K2 Wind will replace trees removed with appropriate species in an alternate location. Discharges from any de-watering shall be directed to settling sumps, or overland to vegetated areas where appropriate, and shall not be released directly into the woodland;
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;

- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of 'natural features' within Feature 16 are predicted to be low.

5.4.14.5 Post-Construction Monitoring

As avoidance behaviour of turbines is identified as a potential operational effect on winter raptors, a minimum three-year post-construction raptor winter monitoring plan to assess habitat disturbance to raptor winter feeding and roosting habitat will be implemented if the habitat is identified as significant wildlife habitat. The objective of the monitoring will be to determine if Project operations have an effect on raptor behaviour and habitat use. The same survey protocols which are implemented during pre-construction surveys will be used.

Since there are only two potential winter raptor feeding and roosting habitats identified within the General Project Area (associated with Features 13, 14, 16 and 59), comparisons cannot be made between potentially "impacted" sites (within 120 m of the Project Location) and "control" sites (not within 120 m of the Project Location). Comparisons can only be made between pre-construction and post-construction survey results. While this type of comparison is not ideal, post-construction data can be statistically compared to pre-construction data. However, without the use of control sites, data suggesting avoidance behaviour of wintering raptor should be taken with caution as confounding factors such as weather, disease and/or predators may influence the analysis. Should pre-construction surveys suggest the presence of other winter raptor feeding and roosting habitat in the area but not within 120 m of the Project Location, the Proponent will make efforts to use these sites as 'control' sites to allow for a Before-After-Control-Impact study design.

The OMNR, along with the proponent and other relevant agencies, will collectively review the results of the post-construction monitoring to determine if a negative environmental effect is occurring, and whether such an effect is attributable to the wind turbines and not external factors. These discussions will determine if and when contingency measures shall be undertaken. The best available science and information will be considered when determining appropriate mitigation and will be determined in consultation with MOE and OMNR based on post-construction monitoring results.

5.4.15 Feature 17

Feature 17 is comprised of a significant woodland, significant wetland, significant amphibian woodland breeding habitat and significant habitat of species of conservation concern (PIF bird species). The amphibian woodland breeding habitat and habitat of species of conservation concern (PIF bird species) within this feature are considered generalized candidate significant wildlife habitat and are assumed to be existing and significant.

5.4.15.1 Adjacent Project Components

Feature 17 falls within 120 m of three turbines (T-223, T-225 and T-226), access roads, crane paths, collector lines/data cables and temporary turbine construction areas. The minimum distance from Project components to each significant natural feature within Feature 17 is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the significant woodland. There is one watercourse crossing downstream of Feature 17 on Tower Line (see Figure 8.9, Appendix A). The preferred method of crossing would be open cut.

Project Component	Approx. Distance to Significant Woodland (m)	Approx. Distance to Significant Wetland (m)
T-223 Base	92	92
T-223 Blade Tip	42	42
T-225 Blade Tip	120	--
T-226 Blade Tip	107	--
Access Road (T-221, T-223)	100	100
Access Road (T-225, T-226, T-227, T-228)	86	--
Temp. Construction Area (T-223)	13	13
Temp. Construction Area (T-225)	93	--
Temp. Construction Area (T-226)	83	--

*The distance from the natural features to the temporary crane path and the collector system (under the access road) are assumed to correspond with the distance to the access road.

5.4.15.2 Pre-construction Monitoring (Habitat Use Study)

As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant wildlife habitat (in this case, amphibian woodland breeding habitat and habitat of species of conservation concern) are to be considered existing and significant and do not require the application of habitat use studies to confirm significance.

5.4.15.3 Potential Effects

The potential effects of the Project on significant woodlands, significant wetlands and significant wildlife habitats (amphibian woodland breeding habitat and habitat of species of conservation concern) are described in Sections 5.2.1 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.15.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland and significant wildlife habitat associated with Feature 17. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 17. The specific mitigation strategy to protect the significant woodland and significant wildlife habitats will include:

- Prior to construction, the outer limits of the temporary construction area will be staked and marked to ensure that contractors remain within the temporary construction areas. A minimum distance of 5 m will be established and a silt barrier constructed between the wetland and temporary construction area;
- Prior to construction, the boundary of the significant woodland, wetland and valleyland (and thus the wildlife habitat) within 30 m of the proposed temporary construction area for Turbine 223 will be staked and flagged, and a silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant feature and to assist with the proper field installation of erosion and sediment controls measures;
- The silt-fencing barriers will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- After turbines have been assembled, the temporary turbine construction area will be restored to pre-existing conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Discharges from any de-watering shall be directed to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the woodland or wetland unless required to maintain hydrological flow (based on detailed design);
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;

- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, no net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of 'natural features' within Feature 17 are predicted.

5.4.16 Feature 18

Feature 18 is comprised of a significant woodland, significant wetland, significant interior forest breeding bird habitat, significant amphibian woodland breeding habitat, significant habitat of species of conservation concern (PIF bird species) and significant amphibian corridor habitat. The significant woodland is comprised of upland sugar maple dominated ecosites and mixed swamp ecosites. The mixed swamp ecosite is dominated by white cedar with the understory dominated by serviceberry and the herbaceous ground layer dominated by sensitive fern, poison ivy, and goldenrod. The wetland is isolated and has no inflow or outflow. The interior forest breeding bird habitat, amphibian woodland breeding habitat, habitat of species of conservation concern (PIF bird species) and amphibian corridor habitat within this feature are considered generalized candidate significant wildlife habitat and are assumed to be existing and significant.

5.4.16.1 Adjacent Project Components

Feature 18 falls within the 120 m of Turbine 231 and the associated access road, crane path, temporary turbine construction area and collector line/data cables. The minimum distance from Project components to each significant natural feature within Feature 18 is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within

the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the significant woodland. There are two watercourse crossings associated with Feature 18; one downstream on Tower Line and one upstream on Belgrave Road (see **Figures 8.11 and 8.13, Appendix A**). The preferred method of crossing would be open cut.

Project Component	Approx. Distance to Significant Woodland (m)	Approx. Distance to Significant Wetland (m)
T-231 Base	89	89
T-231 Blade Tip	39	39
Access Road (T-231)	117	117
Temp. Construction Area (T-231)	6	6

*The distance from the natural features to the temporary crane path and the collector system (under the access road) are assumed to correspond with the distance to the access road.

5.4.16.2 Pre-construction Monitoring (Habitat Use Study)

As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant wildlife habitat (in this case, interior forest breeding bird habitat, amphibian woodland breeding habitat, habitat of species of conservation concern and amphibian corridor habitat) are to be considered existing and significant and do not require the application of habitat use studies to confirm significance.

5.4.16.3 Potential Effects

The potential effects of the Project on significant woodlands, significant wetlands and significant wildlife habitats (interior forest breeding bird habitat, amphibian woodland breeding habitat, habitat of species of conservation concern and amphibian corridor habitat) are described in Sections 5.2.1, 5.2.2 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1, 5.2.2 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.16.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland, significant wetland and significant wildlife habitat associated with Feature 18. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 18. The specific mitigation strategy to protect the significant woodland, significant wetland and significant wildlife habitats will include the following:

- Prior to construction, the outer limits of the temporary construction area will be staked and marked to ensure that contractors remain within the temporary construction areas.

A minimum distance of 5 m will be established and a silt barrier constructed between the wetland and temporary construction area;

- The boundaries of the significant woodland and wetland (and thus the wildlife habitat) within 30 m of the proposed temporary construction area for Turbines 231 will be staked and flagged, and silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant woodland and to assist with the proper field installation of erosion and sediment controls measures;
- The silt-fencing barriers will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- After turbines have been assembled, the temporary turbine construction area will be restored to pre-existing conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Discharges from any de-watering shall be directed to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the woodland or wetland unless required to maintain hydrological flow (based on detailed design);
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, no net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of 'natural features' within Feature 18 are predicted.

5.4.17 Feature 19

Feature 19 is comprised of a significant woodland, significant habitat of species of conservation concern and significant amphibian corridor habitat. The significant woodland is comprised of sugar maple dominated deciduous woodland. Some cultural thicket dominated by hawthorns and grasses are present within the feature. The feature is associated with a watercourse. The habitat of species of conservation concern (PIF bird species) and amphibian corridor habitat within this feature are considered generalized candidate significant wildlife habitat and are assumed to be existing and significant.

5.4.17.1 Adjacent Project Components

Feature 19 falls within 120 m of Turbine 233 and the associated access road, collector system, temporary crane path and temporary turbine construction area, as well as the temporary turbine construction areas for Turbines 236 and 239. The minimum distance from Project components to each significant natural feature within Feature 19 is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the significant woodland. There are four watercourse crossings associated with Feature 19; one downstream on Lanesville Line and three upstream on Tower Line and Belgrave Road (see Figure 8.13, Appendix A). The preferred method of crossing would be open cut.

Project Component	Approx. Distance to Significant Woodland (m)
T-233 Base	88
T-233 Blade Tip	38
Access Road (T-233)	110
Crane Path	25
Temp. Construction Area (T-233)	16
Temp. Construction Area (T-236)	96
Temp. Construction Area (T-239)	107

*The distance from the natural features to the temporary crane path and the collector system (under the access road) are assumed to correspond with the distance to the access road.

5.4.17.2 Pre-construction Monitoring (Habitat Use Study)

As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant wildlife habitat (in this case, habitat of species of conservation concern and

amphibian corridor habitat) are to be considered existing and significant and do not require the application of habitat use studies to confirm significance.

5.4.17.3 Potential Effects

The potential effects of the Project on significant woodlands and significant wildlife habitats (habitat of species of conservation concern and amphibian corridor habitat) are described in Sections 5.2.1 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.17.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland and significant wildlife habitat associated with Feature 19. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 19. The specific mitigation strategy to protect the significant woodland and significant wildlife habitats will include the following:

- Prior to construction the outer limits of the construction area will be staked and marked to ensure that contractors remain within the temporary construction areas;
- The boundaries of the significant woodland (and thus the wildlife habitat) within 30 m of the temporary turbine construction area, access roads, and collector lines/data cables for Turbine 233, 236, and 239, as well as the collector system will be staked and flagged, and silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant woodland and to assist with the proper field installation of erosion and sediment controls measures;
- The silt-fencing barriers will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- After turbines have been assembled, the temporary turbine construction area will be restored to pre-existing conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Discharges from any de-watering shall be directed to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the woodland unless required to maintain hydrological flow (based on detailed design);
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;

- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, no net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of 'natural features' within Feature 19 are predicted.

5.4.18 Feature 19a

Feature 19a is a small (0.2 ha) gray dogwood dominated thicket swamp wetland, with willow and red-osier-dogwood associates. Mature black willows dominate the periphery. Open water is present (~60%) with patchy shrubs throughout. Duckweed dominated the herbaceous layer, with broad-leaved cattails present on the fringe of the wetland. The wetland is isolated with no inflow or outflow. No significant wildlife habitat features are associated with Feature 19a.

5.4.18.1 Adjacent Project Components

Feature 19a falls within 120 m of a collector lines/data cables within a municipal road allowance. The minimum distance from Project components to the significant wetland is provided in the table below. There are no watercourse crossings associated with this feature.

Project Component	Approx. Distance to Significant Wetland (m)
Collector System (within road allowance)	5

5.4.18.2 Potential Effects

The potential effects of the Project on significant wetlands are described in Sections 5.2.2. No specific effects beyond those described in Sections 5.2.2 are expected on this significant natural feature.

5.4.18.3 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant wetland associated with Feature 19a. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 19a. The specific mitigation strategy to protect the significant wetland will include the following:

- The boundaries of the wetland within 30 m of the proposed construction area will be staked and flagged, and silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant woodland and to assist with the proper field installation of erosion and sediment controls measures;
- The silt-fencing barriers will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- The preference is for collector lines/data cables to be installed on the east side of Tower Line (opposite the side of the wetland) within the municipal road allowance. Issues may arise in the detailed design or construction that requires the line be constructed on the wetland side. In the event that subsurface condition do not allow for placement of the collector system on the opposite side of the road from the wetland, the collector system will be placed as close to the road as safe and allowable by the Township or County to create as much buffer from the wetland as available. Excavation of soils for the purpose of underground collector system installation will occur at the minimum distance of 5 m from the wetland. Given the shallow nature of the works, no appreciable changes to the groundwater or surface water flows are anticipated. Cable trenches will be filled immediately after installation is complete to prevent soil erosion and sedimentation issues;
- Power cable trenches within the municipal road allowance will be bedded with sand and backfilled with native soils or other appropriate fill material, with clay plugs every 30 m to ensure that potential groundwater entering the trenches is not drawn along the sand/fill conduit and conveyance to the wetland, if any, is maintained;
- Should the construction of underground collector lines not be feasible within the municipal road allowance on the edge of the feature, collector lines will be installed above ground on wooden poles;
- Tree pruning will be minimized to the greatest extent possible. To the extent practical, pruning will be avoided during leaf fall, typically between September and November. Prior to construction, the limits of tree pruning will be marked in the field. Tree pruning

will be supervised by a qualified arborist. The Construction Contractor will ensure that no construction disturbance occurs beyond the marked limits;

- In some cases, tree removal may be necessary within the road allowance for health and safety or electrical safety reason. Tree removal required will be completed consultation with the MVCA and a certified arborist. As appropriate, and in consultation with the relevant parties (government, conservation authority, adjacent landowner) K2 Wind will replace trees removed with appropriate species in an alternate location;
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, no net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of ‘natural features’ within Feature 19a are predicted.

5.4.19 Feature 20

Feature 20 is identified as comprising a significant woodland, significant amphibian woodland breeding habitat and significant habitat of species of conservation concern (PIF bird species). The woodland is 21.4 ha and is comprised of coniferous plantation and deciduous forest ecosites. The coniferous plantation is composed of red pine, with white ash and Freeman maple as associates. The deciduous forest canopy is dominated by white ash and sugar maple. The amphibian woodland breeding habitat and habitat of species of conservation concern (PIF bird species) within this feature are considered generalized candidate significant wildlife habitat and are assumed to be existing and significant.

5.4.19.1 Adjacent Project Components

Feature 20 falls within 120 m of Turbine 237 and the associated access road, collector lines/data cables and temporary turbine construction area and crane path, and the access road to Turbine 233. The minimum distance from Project components to each significant natural

feature within Feature 20 is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the significant woodland. There are no watercourse crossings associated with this feature.

Project Component	Approx. Distance to Significant Woodland (m)
T-237 Base	99
T-237 Blade Tip	49
Access Road (T-237)	8
Access Road (T-233)	15
Temp. Construction Area (T-237)	11

*The distance from the natural features to the temporary crane path and the collector system (under the access road) are assumed to correspond with the distance to the access road.

5.4.19.2 Pre-construction Monitoring (Habitat Use Study)

As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant wildlife habitat (in this case, amphibian woodland breeding habitat and habitat of species of conservation concern) are to be considered existing and significant and do not require the application of habitat use studies to confirm significance.

5.4.19.3 Potential Effects

The potential effects of the Project on significant woodlands and significant wildlife habitats (amphibian woodland breeding habitat and habitat of species of conservation concern) are described in Sections 5.2.1 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.19.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland and significant wildlife habitat associated with Feature 20. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 20. The specific mitigation strategy to protect the significant woodland and significant wildlife habitats will include the following:

- Prior to construction the outer limits of the construction area will be staked and marked to ensure that contractors remain within the temporary construction areas;
- The boundaries of the significant woodland (and thus the wildlife habitat) within 30 m of the proposed access road for Turbines 237 will be staked and flagged, and silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist

with the demarcation of the construction area, to ensure construction activities avoid the significant woodland and to assist with the proper field installation of erosion and sediment controls measures;

- During construction, a buffer will be established from the stem line to the drip line where the significant woodland is immediately adjacent to a permanent access road to Turbine 237. The purpose of the buffer is to minimize root zone damage and compaction. Silt fencing will be established at the edge of the drip line to prevent sedimentation and erosion of soils into the significant woodland. The buffer area will not be disturbed during construction and will be seeded with species native to the ecoregion upon completion of construction, if necessary;
- The silt-fencing barriers will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- Excavation of soils for the purpose of underground collector system installation on leased lands will occur at the minimum distance of 5 m from the significant woodland under the outer most edge of the access road (away from the feature) and within the 'buildable area'. Cable trenches within 30 m of the significant woodland will be filled immediately to prevent soil erosion and sedimentation issues;
- The intent of the design will be to place the collector system on the opposite side of the road allowance from the Feature where possible. In the event that subsurface condition do not allow for placement of the collector system on the opposite side of the road, the collector system will be placed as close to the road as safe and allowable by the Township or County to create as much buffer from the significant woodland as available. Given the shallow nature of the works no appreciable changes to the groundwater or surface water flows are anticipated. Excavation of soils for the purpose of underground collector system installation within the municipal road allowance will be filled immediately to prevent soil erosion and sedimentation issues;
- Should the construction of underground collector lines not be feasible within the municipal road allowance on the edge of the feature, collector lines will be installed above ground on wooden poles;
- Tree pruning will be minimized to the greatest extent possible. To the extent practical, pruning will be avoided during leaf fall, typically between September and November. Prior to construction, the limits of tree pruning will be marked in the field. Tree pruning will be supervised by a qualified arborist. The Construction Contractor will ensure that no construction disturbance occurs beyond the marked limits;
- In some cases, tree removal may be necessary within the road allowance for health and safety or electrical safety reason. Tree removal required will be completed consultation with the MVCA and a certified arborist. As appropriate, and in consultation with the relevant parties (government, conservation authority, adjacent landowner) K2 Wind will replace trees removed with appropriate species in an alternate location;
- After turbines have been assembled, the temporary turbine construction area will be restored to pre-existing conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production;

- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Discharges from any de-watering shall be directed to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the woodland unless required to maintain hydrological flow (based on detailed design);
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) to control during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, no net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of ‘natural features’ within Feature 20 are predicted.

5.4.20 Feature 23

Feature 23 is 9.6 ha and comprised of a significant woodland, significant wetland, significant amphibian woodland breeding habitat, significant habitat of species of conservation concern and significant amphibian corridor habitat. The wetland is a long and narrow mixed swamp ecosite associated with a watercourse. The wetland is dominated by red ash, with American elm and red maple as co-dominants. The significant woodland comprises the wetland area, a small coniferous forest dominated by white cedar with some white ash and a cultural woodland dominated by white ash. The feature is associated with a watercourse. The amphibian woodland breeding habitat, habitat of species of conservation concern (PIF bird species) and amphibian corridor habitat within this feature are considered generalized candidate significant wildlife habitat and are assumed to be existing and significant.

5.4.20.1 Adjacent Project Components

Feature 23 falls within 120 m of a collector system within a municipal road allowance and the transformer station. The minimum distance from Project components to the significant woodland and wetland within Feature 23 is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the significant woodland. There are three watercourse crossings associated with Feature 23; one downstream on Belgrave Road, one upstream on Tower Line and one directly adjacent to the feature within the municipal road allowance (see Figures 8.13 and 8.16, Appendix A). The preferred method of crossing would be open cut.

Project Component	Approx. Distance to Significant Woodland (m)	Approx. Distance to Significant Wetland (m)
Transformer Station	35	--
Collector System (within road allowance)	5	11

5.4.20.2 Pre-construction Monitoring (Habitat Use Study)

As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant wildlife habitat (in this case, amphibian woodland breeding habitat, habitat of species of conservation concern and amphibian corridor habitat) are to be considered existing and significant and do not require the application of habitat use studies to confirm significance.

5.4.20.3 Potential Effects

The potential effects of the Project on significant woodlands, significant wetlands and significant wildlife habitats (amphibian woodland breeding habitat, habitat of species of conservation concern and amphibian corridor habitats) are described in Sections 5.2.1, 5.2.2 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1, 5.2.2 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.20.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland, significant wetland and significant wildlife habitat associated with Feature 23. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 23. The specific mitigation strategy to protect the significant woodland, significant wetland and significant wildlife habitats will include the following:

- The boundaries of the significant woodland and wetland (and thus the wildlife habitat) within 30 m of the proposed construction area will be staked and flagged, and silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant woodland and to assist with the proper field installation of erosion and sediment controls measures;
- The silt-fencing barriers will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- The preference is to install collector lines/data cables on the west side of Lanesville Line (opposite the side of the wetland) within the municipal road allowance. Issues may arise in the detailed design or construction that requires the line be constructed on the wetland side. In the event that subsurface condition do not allow for placement of the collector system on the opposite side of the road from the wetland, the collector system will be placed as close to the road as safe and allowable by the Township or County to create as much buffer from the wetland as available. Given the shallow nature of the works no appreciable changes to the groundwater or surface water flows are anticipated. Excavation of soils for the purpose of underground collector system installation will occur at the minimum distance of 5 m from the wetland. Cable trenches will be filled immediately after installation is complete to prevent soil erosion and sedimentation issues;
- Power cable trenches within the municipal road allowance will be bedded with sand and backfilled with native soils or appropriate fill material, with clay plugs every 30 m to ensure that potential groundwater entering the trenches is not drawn along the sand-filled conduit and hydrological conveyance to the wetland, if any, is maintained;
- Should the construction of underground collector lines not be feasible within the municipal road allowance on the edge of the feature, collector lines will be installed above ground on wooden poles;
- Tree pruning will be minimized to the greatest extent possible. To the extent practical, pruning will be avoided during leaf fall, typically between September and November. Prior to construction, the limits of tree pruning will be marked in the field. Tree pruning will be supervised by a qualified arborist. The Construction Contractor will ensure that no construction disturbance occurs beyond the marked limits;
- In some cases, tree removal may be necessary within the road allowance for health and safety or electrical safety reason. Tree removal required will be completed consultation with the MVCA and a certified arborist. As appropriate, and in consultation with the relevant parties (government, conservation authority, adjacent landowner) K2 Wind will replace trees removed with appropriate species in an alternate location;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;

- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, no net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of 'natural features' within Feature 23 are predicted.

5.4.21 Feature 24

Feature 24 is composed of a significant woodland, significant wetland, significant amphibian woodland breeding habitat and significant amphibian corridor habitat. The significant woodland feature is 4.5 ha and is composed of willow species and some white ash in the canopy and sub-canopy and hawthorn and apple. The feature is associated with a watercourse.

5.4.21.1 Adjacent Project Components

Feature 24 is within 120 m of Turbines 251 and 254, an access road, collector system and temporary crane path and turbine construction area. The minimum distance from Project components to the significant woodland within Feature 24 is provided in the table below. There are two watercourse crossings associated with Feature 24; one downstream on Division Line and one upstream on Belgrave Road (see Figure 8.16, Appendix A). The preferred method of crossing would be open cut.

Project Component	Approx. Distance to Significant Woodland (m)	Approx. Distance to Significant Wetland (m)	Approx. Distance to Significant Amphibian Woodland Breeding Habitat (m)	Approx. Distance to Significant Amphibian Corridor Habitat 2 (m)
T-251 Base	111	119	119	120
T-251 Blade Tip	61	69	69	70
T-254 Blade Tip	--	--	110	111
Access Road (T-251)	90	--	5	0
Temp. Construction Area (T-251)	30	35	5	5
Temp. Construction Area (T-254)	--	--	62	70

*The distance from the natural features to the temporary crane path and the collector system (under the access road) are assumed to correspond with the distance to the access road.

5.4.21.2 Pre-construction Monitoring (Habitat Use Study)

Pre-construction monitoring will be conducted within the significant amphibian woodland breeding habitat to confirm habitat use by amphibians. Monitoring will be partially based on OMNR's Wildlife Monitoring Programs and Inventory Techniques for Ontario (Konze and McLaren, 1997) and partially based on consultation with the OMNR. To ensure accuracy of the surveys, pre-construction monitoring methodologies will be reviewed by the OMNR prior to the commencement of field surveys.

Four site visits will be conducted within the amphibian breeding season. The first survey will be conducted in late March/early April to identify vernal pools and any evidence of salamander egg masses. Vernal pools will be assessed for the presence of key habitat characteristics critical for amphibian breeding (e.g., presence of shrubs and downed woody debris, and absence of predatory fish). The remainder of the surveys will be conducted within the recommended timing windows for Central Ontario (Survey 1: April 15 - 30; Survey 2: May 15 - 30; and Survey 3: June 15 - 30). Each site visit will consist of both visual and auditory observations of the vernal pools indentified during the first site survey. Prior to dusk, the surveyor will look for visual evidence of amphibian breeding including adult frogs, tadpoles or egg masses. An observer, sitting or standing quietly, can often see and identify frogs resting on vegetation, logs, etc. in ponds during the day. Downed wood or other objects under which amphibians may be hiding shall be moved (and then replaced) during a visual encounter search (Konze and McLaren, 1997).

After dusk, the surveyor will conduct auditory surveys in the form of amphibian breeding call counts. These surveys start at least one-half hour after sunset and finish before midnight. Efforts must be made to conduct the surveys under appropriate weather conditions. Ideal calling conditions consist of winds less than level three on the Beaufort scale and warm, damp nights with light rain or fog. Counts shall not be conducted if the wind is strong enough to raise dust or move small branches. As a guide, minimum night-time air temperatures shall be at least 8°C for the first survey, 13°C for the second and 21°C for the third. Surveys may be conducted

at lower temperatures if there is strong calling activity. During amphibian breeding call counts, the surveyor will stand at each pond for 3-minutes. All calling activity will be ranked using one of the following three abundance code categories;

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

A final visual survey will also be conducted after dusk. At night, observers wearing headlamps can detect the presence of anurans by eyeshine. The reflection from the eyes of frogs and toads makes them visible in dense vegetation and at long distances (Konze and McLaren, 1997). An amphibian woodland breeding pond will be considered significant wildlife habitat if the presence of a breeding population of one or more of the species listed in the Draft SWH Ecoregion Criteria Schedules (Schedule 2; OMNR, 2009) with at least 20 individuals is confirmed during pre-construction monitoring. Listed species include: eastern newt, blue-spotted salamander, spotted salamander, gray treefrog, spring peeper, chorus frog and/or wood frog.

Movement surveys will be conducted in June at Amphibian Corridor 2 (across Feature 24). The surveys will consist of erecting a barrier (silt fence) in the location of the proposed access road in the significant amphibian corridor habitat prior to the juvenile emergence season. To the greatest extent possible, the barrier will be located where amphibians are most likely to be ingressing or egressing the feature (i.e., near vernal pools). The length of the barrier will be 20 m in length. The barrier will be surveyed every day for one week in June to document amphibians using the corridor and once again in July/August, if necessary (based on consultation with the OMNR). The barrier will be left standing for the full week and will be monitored at dawn, mid-day and dusk to prevent desiccation of amphibians. Any amphibian identified along the edge of the barrier will be moved to the closest woodland/wetland feature to prevent desiccation of amphibians. The surveys will consist of walking the extent of the barrier (on both sides) to identify amphibians. The extent of the proposed access road will also be walked to survey visually for amphibian movement. Should amphibian mortality be detected due to the presence of the semi-permanent barrier, the barrier will be set up before dusk each day of the survey, checked at dawn for amphibians and then laid down flat or removed for the day.

There are three possible outcome scenarios which could result from the pre-construction monitoring, including 1) a breeding population of at least 20 individual amphibians is not confirmed to be using the woodland or corridor habitats, 2) a breeding population of at least 20 individual amphibians is confirmed to be using the woodland habitats, but not the corridor habitat, or 3) a breeding population of at least 20 individual amphibians is confirmed to be using the woodland and corridor habitats.

If there is an insufficient amphibian breeding population present at the site based on criteria provided in the Draft SWH Ecoregion Criteria Schedules, no further monitoring will be required.

If pre-construction monitoring does identify a breeding population of at least 20 individual amphibians is documented in the woodland or corridor habitats, then the features will be considered significant amphibian woodland breeding habitat and /or amphibian corridor habitat and mitigation measures will be applied to manage potential impacts. The results of all pre-construction monitoring will be shared with the OMNR/MOE to confirm significance and modify mitigation measures, where necessary. Potential effects to significant amphibian woodland breeding habitat, proposed mitigation and post-construction monitoring to be implemented in this scenario are discussed below.

5.4.21.3 Potential Effects

The potential effects of the Project on significant woodlands, significant wetlands and significant wildlife habitats (amphibian woodland breeding habitat and amphibian corridor habitat) are described in Sections 5.2.1, 5.2.2 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1, 5.2.2 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.21.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland and significant wildlife habitat associated with Feature 24. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 24. The specific mitigation strategy to protect the significant woodland and significant wildlife habitats will include the following:

- Prior to construction the outer limits of the construction area will be staked and marked to ensure that contractors remain within the temporary construction areas;
- The boundaries of the significant woodland and wetland (and thus the wildlife habitat) within 30 m of the proposed access road for Turbine 251 will be staked and flagged, and silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant woodland and to assist with the proper field installation of erosion and sediment controls measures;
- The silt-fencing barriers will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- The existing watercourse culvert shall be maintained or replaced underneath the access road to allow safe movement of amphibians across the feature;
- After turbines have been assembled, the temporary turbine construction area will be restored to pre-existing conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production;

- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Discharges from any de-watering shall be directed to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the woodland unless required to maintain hydrological flow (based on detailed design);
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, no net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of ‘natural features’ within Feature 24 are predicted.

5.4.21.5 Post-Construction Monitoring

As avoidance behaviour of access roads is identified as a potential operational effect on amphibians, a minimum three-year post-construction amphibians monitoring plan will be implemented if the amphibian corridor habitat is identified as significant wildlife habitat. The objective of the monitoring will be to determine if Project operations have an effect on amphibian behaviour and habitat use of the corridor and adjacent amphibian woodland breeding habitat. The same protocols which are implemented during pre-construction surveys will be applied post-construction.

Since there are only five potential amphibian corridor habitats identified within the General Project Area (associated with Features 12, 13, 24, 33, 35, 36, 37 and 39), comparisons cannot be made between potentially “impacted” sites (within 120 m of the Project Location) and

"control" sites (not within 120 m of the Project Location). Comparisons can only be made between pre-construction and post-construction survey results. While this type of comparison is not ideal, post-construction data can be statistically compared to pre-construction data. However, without the use of control sites, data suggesting avoidance behaviour of amphibian corridor habitats should be taken with caution as confounding factors such as weather, disease and/or predators may influence the analysis. Should pre-construction surveys suggest the presence of other amphibian corridor habitat in the area but not within 120 m of the Project Location, the Proponent will make efforts to use these areas as 'control' sites to allow for a Before-After-Control-Impact study design.

The OMNR, along with the proponent and other relevant agencies, will collectively review the results of the post-construction monitoring to determine if a negative environmental effect is occurring, and whether such an effect is attributable to the wind turbines and not external factors. These discussions will determine if and when contingency measures shall be undertaken. The best available science and information will be considered when determining appropriate mitigation and will be determined in consultation with MOE and OMNR based on post-construction monitoring results.

5.4.22 Feature 25

Feature 25 is 1.9 ha and is comprised of a significant wetland, significant amphibian woodland breeding habitat and significant habitat of species of conservation concern (PIF bird species). The wetland feature is co-dominated by red ash and silver maple, with basswood as an associate. The sub-canopy and understory are sparse with vegetation. Grasses adapted to hydrophytic conditions dominate the southern section of the feature, while open water dominated the northern section. The amphibian woodland breeding habitat and habitat of species of conservation concern (PIF bird species) within this feature are considered generalized candidate significant wildlife habitat and are assumed to be existing and significant. There is one watercourse crossings downstream of Feature 25 on Belgrave Road (see Figure 8.14, Appendix A). The preferred method of crossing would be open cut.

5.4.22.1 Adjacent Project Components

Feature 25 falls within 120 m of a collector system within a municipal road allowance. The minimum distance from Project components to the significant wetland is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the wetland.

Project Component	Approx. Distance to Significant Wetland (m)
Collector System (within road allowance)	66

5.4.22.2 Pre-construction Monitoring (Habitat Use Study)

As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant wildlife habitat (in this case, amphibian woodland breeding habitat and habitat of species of conservation concern) are to be considered existing and significant and do not require the application of habitat use studies to confirm significance.

5.4.22.3 Potential Effects

The potential effects of the Project on significant wetlands and significant wildlife habitats (amphibian woodland breeding habitat and habitat of species of conservation concern) are described in Sections 5.2.2 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.2 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.22.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant wetland and significant wildlife habitat associated with Feature 25. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 25. The specific mitigation strategy to protect the significant wetland and wildlife habitats will include the following:

- Prior to construction the outer limits of the construction area will be staked and marked to ensure that contractors remain within the temporary construction areas;
- The temporary construction area is proposed 66 m from the wetland. As such, the boundary of the wetland will not be staked and flagged with silt fencing;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- All activities shall be conducted in accordance with "Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities" (2005) to further minimize adverse air quality impacts due to project implementation; and,
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, no net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of 'natural features' within Feature 25 are predicted.

5.4.23 Feature 27

Feature 27 is comprised of a significant woodland and significant habitat of species of conservation concern (PIF bird species). The significant woodland feature is a deciduous forest ecosite consistent with sugar maple dominated deciduous forest, with white ash and basswood associates. The habitat of species of conservation concern (PIF bird species) within this feature is considered generalized candidate significant wildlife habitat and is assumed to be existing and significant.

5.4.23.1 Adjacent Project Components

Feature 27 falls within 120 m of the collector system within a municipal road allowance. The minimum distance from Project components to the significant woodland is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the significant woodland. There are no watercourse crossings associated with this feature.

Project Component	Approx. Distance to Significant Woodland (m)
Collector System (within road allowance)	5

5.4.23.2 Pre-construction Monitoring (Habitat Use Study)

As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant habitat of species of conservation concern is considered existing and significant and does not require the application of a habitat use study to confirm significance.

5.4.23.3 Potential Effects

The potential effects of the Project on significant woodlands and significant wildlife habitats (habitat of species of conservation concern) are described in Sections 5.2.1 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.23.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland and significant wildlife habitat associated with Feature 27. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 27. The specific mitigation strategy to protect the significant wetland and significant wildlife habitat will include the following:

- Prior to construction the outer limits of the construction area will be staked and marked to ensure that contractors remain within the temporary construction areas;
- The boundaries of the significant woodland (and thus the wildlife habitat) within 30 m of the proposed construction area will be staked and flagged, and silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant woodland and to assist with the proper field installation of erosion and sediment controls measures;
- The silt-fencing barriers will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- The preferred design is to place collector lines/data cables on the west side of Tower Line (opposite the side of the significant woodland) within the municipal road allowance. Excavation of soils for the purpose of underground collector lines/data cables installation will occur at the minimum distance of 5 m from the significant woodland. Issues may arise in the detailed design or construction that requires the line be constructed on the woodland side. In the event that subsurface condition do not allow for placement of the collector system on the opposite side of the road from the woodland, the collector system will be placed as close to the road as safe and allowable by the Township or County to create as much buffer from the woodland as available. Cable trenches will be filled immediately after installation is complete to prevent soil erosion and sedimentation issues;
- Should the construction of underground collector lines not be feasible within the municipal road allowance on the edge of the feature, collector lines will be installed above ground on wooden poles;
- Tree pruning will be minimized to the greatest extent possible. To the extent practical, pruning will be avoided during leaf fall, typically between September and November. Prior to construction, the limits of tree pruning will be marked in the field. Tree pruning will be supervised by a qualified arborist. The Construction Contractor will ensure that no construction disturbance occurs beyond the marked limits;
- In some cases, tree removal may be necessary within the road allowance for health and safety or electrical safety reason. Tree removal required will be completed consultation with the MVCA and a certified arborist. As appropriate, and in consultation with the relevant parties (government, conservation authority, adjacent landowner) K2 Wind will replace trees removed with appropriate species in an alternate location;

- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- All activities shall be conducted in accordance with "Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities" (2005) to further minimize adverse air quality impacts due to project implementation;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, no net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of 'natural features' within Feature 27 are predicted.

5.4.24 Feature 28

Feature 28 is comprised of a significant woodland, two significant wetlands, significant bat maternal colony roost habitat, two significant amphibian woodland breeding habitats, significant terrestrial crayfish habitat and significant habitat of species of conservation concern (PIF bird species and snapping turtle). The significant woodland feature is dominated by sugar maple and white ash and contains a Freeman maple deciduous swamp. A small reed-canary grass meadow marsh is located at the southwestern tip of the feature. The habitat of species of conservation concern (PIF bird species) and terrestrial crayfish habitat within this feature are considered generalized candidate significant wildlife habitat and are assumed to be existing and significant.

5.4.24.1 Adjacent Project Components

Feature 28 falls within 120 m of Turbines 247, 248 and 249, access roads, collector lines/data cables and temporary crane paths and turbine construction areas. The minimum distance from Project components to the significant natural features are provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant habitat of species of conservation concern (PIF bird species) can be considered the edge of the significant woodland

and the distance to the generalized candidate significant terrestrial crayfish habitat can be considered the edge of the meadow marsh wetland. There are no watercourse crossings associated with this feature.

Project Component	Approx. Distance to Significant Woodland (m)	Approx. Distance to Significant Wetland (m)		Approx. Distance to Significant Bat Maternal Colony Roost Habitat (m)	Approx. Distance to Significant Amphibian Woodland Breeding Habitat (m)		Approx. Distance to Significant Habitat of Species of Conservation Concern (Snapping Turtle) (m)
		28a	28b		28a	28b	
T-246 Base	119	--	--	119	--	--	--
T-246 Blade Tip	69	--	--	69	--	--	--
T-247 Base	120	--	--	120	--	--	--
T-247 Blade Tip	70	--	--	70	--	--	--
T-249 Base	96	85	--	96	--	85	--
T-249 Blade Tip	46	35	--	46	73	35	--
T-253 Blade Tip	114	--	--	114	--	--	--
Access Road (T-247, T-249)	5	23	5	5	--	116	12
Temp. Construction Area (T-246)	41	--	--	41	--	--	--
Temp. Construction Area (T-247)	6	--	--	6	--	--	--
Temp. Construction Area (T-248)	88	--	103	88	--	--	--
Temp. Construction Area (T-249)	5	8	--	5	32	96	96
Temp. Construction Area (T-253)	84	--	--	84	--	--	--

*The distance from the natural features to the temporary crane path and the collector system (under the access road) are assumed to correspond with the distance to the access road.

5.4.24.2 Pre-construction Monitoring (Habitat Use Study)

Pre-construction monitoring will be conducted within the significant bat maternal colony roost habitat to confirm habitat use by bats. Candidate roost trees (snags/cavity trees) will be monitored for evidence of maternity colonies through exit surveys following the protocols outlined in OMNR's *Bat and Bat Habitats: Guidelines for Wind Power Projects* (OMNR, 2011b). To ensure accuracy of the surveys, pre-construction monitoring methodologies will be reviewed by the OMNR prior to the commencement of field surveys.

A total of 30 snags/cavity trees will be surveyed throughout the feature, as per the OMNR's guidelines for features ≥30 ha. The best candidate trees for the exit surveys will be determined based on the criteria outlined in Section 4.1.4.1 (Bat Maternal Colony Roost Habitat). Exit surveys will be conducted during the month of June. Surveyors will choose a location with a clear view of the cavity opening or crevice (multiple surveyors may be required if multiple openings are present in one snag). The cavity opening or crevice will be monitored for any evidence of bats beginning 30 minutes before dusk until 60 minutes after dusk for evidence of bats. Modern broadband bat detectors (automated systems in conjunction with computer software analysis packages or

manual devices) with condenser microphones may be used in conjunction with visual surveys to determine species using roost habitats. Each candidate roost tree will only be monitored once prior to construction. If any two bats are observed or detected, it will serve as confirmation that a maternity roost is present.

There are two possible outcome scenarios which could result from the pre-construction monitoring, including; 1) there is no evidence of habitat use in the candidate roost trees, or 2) habitat use by at least two bats is confirmed in at least one candidate roost tree.

If pre-construction monitoring confirms habitat use by at least two bats in any one candidate bat maternal colony roost trees, then the entire ELC stand (woodland) will be considered significant wildlife habitat and mitigation measures will be applied to manage potential impacts. The results of all pre-construction monitoring will be shared with the OMNR/MOE to confirm significance and modify mitigation measures, where necessary. Potential effects, proposed mitigation and post-construction monitoring to be implemented in this scenario are discussed below.

Based on consultation with the OMNR, potential impacts of the Project on significant amphibian woodland breeding habitat and snapping turtle habitat may occur during construction and decommissioning. As such, habitat use studies to confirm significance are not necessary to implement appropriate mitigation. General mitigation measures will be applied and are discussed in 5.4.24.4. As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant wildlife habitat (in this case, habitat of species of conservation concern (PIF bird species) and terrestrial crayfish habitat) are to be considered existing and significant and do not require the application of habitat use studies to confirm significance.

5.4.24.3 Potential Effects

The potential effects of the Project on significant woodlands, significant wetlands and significant wildlife habitats (bat maternal colony roost habitat, amphibian woodland breeding habitat, terrestrial crayfish habitat, habitat of species of conservation concern) are described in Sections 5.2.1, 5.2.2 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1, 5.2.2 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.24.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland, significant wetlands and significant wildlife habitats associated with Feature 28. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 28. The specific mitigation strategy to protect the significant woodland, significant wetlands and significant wildlife habitats will include the following:

- Prior to construction, the outer limits of the temporary construction area will be staked and marked to ensure that contractors remain within the temporary construction areas. A minimum distance of 5 m will be established and a silt barrier constructed between the wetland and temporary construction area;
- Prior to construction, the boundary of the significant woodland and wetland (and thus the wildlife habitat) within 30 m of the proposed temporary construction area and access road for Turbines 247 and 249 will be staked and flagged, and a silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant feature and to assist with the proper field installation of erosion and sediment controls measures;
- During construction, a 5 m buffer will be established between the drip line of the significant wetlands/woodland and the permanent access road to minimize root zone damage, compaction and hydrological changes to the feature. Silt fencing will be established at the edge of the buffer to prevent sedimentation and erosion of soils into the significant wetlands/woodland. The buffer area will not be disturbed during construction and will be seeded with species native to the ecoregion upon completion of construction, if necessary;
- The silt-fencing barriers will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- Excavated soils from Turbine 245, 248 and 249 will be stockpiled, stabilized and surrounded by silt-fencing to prevent snapping turtle nesting;
- Where the Project Location is located within 120 m of the turtle habitat, turbine excavations, access road construction and collector line installation will be conducted outside the turtle nesting season (late May to mid-July). Should construction be required during this period, the edge of excavation areas will be fenced off (with silt fencing) where excavations are left overnight to prevent turtles from entering turbine excavation areas and attempting to nest;
- After turbines have been assembled, the temporary turbine construction area will be restored to pre-existing conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production;
- Portions of the permanent access roads within 30 m of the wetland will be constructed at or near existing grade to maintain surface flow contributions to the wetland;
- Excavation of soils for the purpose of underground collector lines/data cables installation will occur at the minimum distance of 5 m from the wetland under the outer most edge of the access road (away from the feature) and within the ‘buildable area’. Cable trenches within 30 m of the wetland will be filled immediately to prevent soil erosion and sedimentation issues;
- Power cable trenches within 30 m of the wetlands will be bedded with sand and backfilled with native soils or appropriate fill material, with clay plugs every 30 m to ensure that

potential groundwater entering the trenches is not drawn along the sand/fill conduit and hydrological conveyance to the wetland, if any, is maintained;

- To avoid impacts to wetland hydrology and maintain existing overland flows and continuous surface water conveyance to Wetland 28b and from Woodland 28, culverts have been proposed beneath the permanent access roads to convey runoff following storm events. The culverts will be placed under the access roads between Turbines 245 and 248, between Turbines 243 and 245 and between Turbines 247 and 249 (see Figure 8.14, Appendix A). The culverts will be appropriately sized in consultation with the Maitland Valley Conservation Authority and where required, permits will be sought from the Conservation Authority and/or the Department of Fisheries and Oceans. All installation activities will conform to Ontario Provincial Standard Specification 421 (OPSS) – Construction Specification for Pipe Culvert Installation in Open Cut. Site specific refinement to the location of individual culverts may occur during detailed design to ensure proper placement and maintain conveyance flows, prevent pooling and maintain hydrology;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Discharges from any de-watering shall be directed to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the woodland or wetland unless required to maintain hydrological flow (based on detailed design);
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, the net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of 'natural features' within Feature 28 are predicted to be low.

5.4.24.5 Post-Construction Monitoring

As avoidance behaviour of turbines is identified as a potential operational effect, a minimum three-year post-construction bat monitoring plan will be implemented if the habitat is identified as significant wildlife habitat. The objective of the monitoring will be to determine if Project operations have an effect on bat behaviour and habitat use. The same protocols which are implemented during pre-construction surveys will be applied post-construction. Significant bat maternal colony roost habitats will be monitored for evidence of maternity colonies through exit surveys following the protocols outlined in OMNR's *Bat and Bat Habitats: Guidelines for Wind Power Projects* (OMNR, 2011b). All snags/cavity trees identified during pre-construction surveys, regardless of evidence of habitat use, will be surveyed during post-construction monitoring.

Species diversity and density will be compared between pre-construction and post-construction conditions. If bat maternal colony trees are located within the ELC stand but not within 120 m of the Project Location, these sites will be used as 'control' sites to document potential changes in species diversity and density compared to potential 'impacted' sites (within 120 m of the Project Location). This approach allows for a Before-After-Control-Impact design. Consistency in the survey methods will allow for defensible comparisons of the post-construction disturbance effects. Post-construction data will be statistically compared to pre-construction data. This will allow yearly comparisons of potential post-construction effects while statistically controlling for external factors such as weather, disease and depredation.

The OMNR, along with the proponent and other relevant agencies, will collectively review the results of the post-construction monitoring to determine if a negative environmental effect is occurring, and whether such an effect is attributable to the wind turbines and not external factors. These discussions will determine if and when contingency measures shall be undertaken. The best available science and information will be considered when determining appropriate mitigation and will be determined in consultation with MOE and OMNR based on post-construction monitoring results.

5.4.25 Feature 29

Feature 29 is a small wetland dominated by grasses, shrubs and trees, is surrounded by agriculture and is associated with a watercourse. No significant wildlife habitat features are associated with Feature 29.

5.4.25.1 Adjacent Project Components

Feature 29 falls within 120 m of the access road and associated collector line/data cables for Turbine 253. The minimum distance from Project components to the significant natural feature

is provided in the table below. There is one watercourse crossing associated with Feature 29 along the access road to T253 (see Figure 8.17, Appendix A). A culvert would be installed to construct the access road with collector lines installed beneath the culvert.

Project Component	Approx. Distance to Significant Wetland (m)
Access Road (T-353)	5
Collector System (within road allowance)	40

*The distance from natural features to the collector lines/data cables under the access road are assumed to correspond with the distance to the access road.

5.4.25.2 Potential Effects

The potential effects of the Project on significant wetlands are described in Sections 5.2.2. No specific effects beyond those described in Sections 5.2.2 are expected on this significant natural feature.

5.4.25.3 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant wetland associated with Feature 29. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 29. The specific mitigation strategy to protect the significant wetland will include the following:

- Prior to construction the outer limits of the access road will be staked and marked to ensure that contractors remain within the temporary construction areas;
- During construction, a 5 m buffer will be established from the drip line where the significant wetland is immediately adjacent to a permanent access road to minimize hydrological changes to the feature. Silt fencing will be established at the edge of the buffer to prevent sedimentation and erosion of soils into the significant wetland. The buffer area will not be disturbed during construction and will be seeded with species native to the ecoregion upon completion of construction, if necessary;
- The silt-fencing barriers will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- Power cable trenches within 30 m of the wetland would be bedded with sand and backfilled with native soils or appropriate fill material, with clay plugs every 30 m to ensure that potential groundwater entering the trenches is not drawn along the sand-filled conduit and hydrological conveyance to the wetland is maintained;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);

- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, no net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of 'natural features' within Feature 29 are predicted.

5.4.26 Feature 30

Feature 30 is comprised of a significant wetland and significant amphibian woodland breeding habitat. The wetland is consistent with red ash dominated ecosites with some red maple, white birch and trembling aspen content. The amphibian woodland breeding habitat is considered generalized candidate significant wildlife habitat and is assumed to be existing and significant. The wetland feature is 1.5 ha.

5.4.26.1 Adjacent Project Components

Feature 30 falls within 120 m of the collector system within a municipal road allowance. The minimum distance from Project components to the significant wetland is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the woodland. There are no watercourse crossings associated with this feature.

Project Component	Approx. Distance to Significant Wetland (m)
Collector System (within road allowance)	5

5.4.26.2 Pre-construction Monitoring (Habitat Use Study)

As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant amphibian woodland breeding habitat is considered existing and significant and does not require the application of a habitat use study to confirm significance.

5.4.26.3 Potential Effects

The potential effects of the Project on significant wetlands and significant wildlife habitats (amphibian woodland breeding habitat) are described in Sections 5.2.2 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.2 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.26.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant wetland and significant wildlife habitats associated with Feature 30. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 30. The specific mitigation strategy to protect the significant wetland and significant wildlife habitat will include the following:

- Prior to construction, the outer limits of the temporary construction area will be staked and marked to ensure that contractors remain within the temporary construction areas;
- The boundaries of the wetland (and thus the wildlife habitat) within 30 m of the proposed construction area will be staked and flagged, and silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant wetland and to assist with the proper field installation of erosion and sediment controls measures;
- The silt-fencing barriers will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- The preferred placement of the collector lines/data cables will be installed on the west side of Lanesville Line (opposite the side of the wetland) within the municipal road allowance. Excavation of soils for the purpose of underground collector lines/data cables installation within the municipal road allowance will occur at the minimum distance of 5 m from the wetland. Issues may arise in the detailed design or construction that requires the line be constructed on the wetland side. In the event that subsurface condition do not allow for placement of the collector system on the opposite side of the road from the

wetland, the collector system will be placed as close to the road as safe and allowable by the Township or County to create as much buffer from the wetland as available. Given the shallow nature of the works, no appreciable changes to the groundwater or surface water flows are anticipated. Cable trenches will be filled immediately after installation is complete to prevent soil erosion and sedimentation issues. Cable trenches will be filled immediately after installation is complete to prevent soil erosion and sedimentation issues;

- Power cable trenches within the municipal road allowance will be bedded with sand and backfilled with native soils or appropriate fill material, with clay plugs every 30 m to ensure that potential groundwater entering the trenches is not drawn along the sand/fill conduit and hydrological conveyance to the wetland, if any, is maintained;
- Should the construction of underground collector lines not be feasible within the municipal road allowance on the edge of the feature, collector lines will be installed above ground on wooden poles;
- Tree pruning will be minimized to the greatest extent possible. To the extent practical, pruning will be avoided during leaf fall, typically between September and November. Prior to construction, the limits of tree pruning will be marked in the field. Tree pruning will be supervised by a qualified arborist. The Construction Contractor will ensure that no construction disturbance occurs beyond the marked limits;
- In some cases, tree removal may be necessary within the road allowance for health and safety or electrical safety reason. Tree removal required will be completed consultation with the MVCA and a certified arborist. As appropriate, and in consultation with the relevant parties (government, conservation authority, adjacent landowner) K2 Wind will replace trees removed with appropriate species in an alternate location;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, no net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of ‘natural features’ within Feature 30 are predicted.

5.4.27 Feature 32

Feature 32 is comprised of a significant woodland, significant bat maternal colony roost habitat, significant amphibian woodland breeding habitat and significant habitat of species of conservation concern (PIF bird species). The significant woodland feature is 8.8 ha and is dominated by sugar maple in the canopy and sub-canopy, with white ash and black cherry as co-dominants; white elm, basswood and black ash are less common. The habitat of species of conservation concern (PIF bird species) within this feature is considered generalized candidate significant wildlife habitat and is assumed to be existing and significant.

5.4.27.1 Adjacent Project Components

Feature 32 falls within 120 m of Turbines 256 and 259, an access road, collector lines/data cables and temporary crane paths, turbine construction areas and laydown areas. The minimum distance from Project components to the significant natural features are provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant habitat of species of conservation concern (PIF bird species) can be considered the edge of the significant woodland. There are no watercourse crossings associated with this feature.

Project Component	Approx. Distance to Significant Woodland (m)	Approx. Distance to Significant Bat Maternal Colony Roost Habitat (m)	Approx. Distance to Significant Amphibian Woodland Breeding Habitat (m)
			32a
T-256 Blade Tip	118	118	--
T-259 Blade Tip	109	109	--
Access Road (T-256, T-259)	11	11	106
Temp. Construction Area (T-256)	86	86	--
Temp. Construction Area (T-259)	53	53	--
Temp. Construction Area (laydown)	5	5	--

*The distance from the natural features to the temporary crane path and the collector system (under the access road) are assumed to correspond with the distance to the access road.

5.4.27.2 Pre-construction Monitoring (Habitat Use Study)

Pre-construction monitoring will be conducted within the significant bat maternal colony roost habitat to confirm habitat use by bats. Candidate roost trees (snags/cavity trees) will be monitored for evidence of maternity colonies through exit surveys following the protocols outlined in OMNR's *Bat and Bat Habitats: Guidelines for Wind Power Projects* (OMNR, 2011b). To ensure accuracy of the surveys, pre-construction monitoring methodologies will be reviewed by the OMNR prior to the commencement of field surveys.

A total of 10 snags/cavity trees will be surveyed throughout the feature, as per the OMNR's guidelines for features ≤10 ha. The best candidate trees for the exit surveys will be determined based on the criteria outlined in Section 4.1.4.1 (Bat Maternal Colony Roost Habitat). Exit surveys will be conducted during the month of June. Surveyors will choose a location with a clear view of the cavity opening or crevice (multiple surveyors may be required if multiple openings are present in one snag). The cavity opening or crevice will be monitored for any evidence of bats beginning 30 minutes before dusk until 60 minutes after dusk for evidence of bats. Modern broadband bat detectors (automated systems in conjunction with computer software analysis packages or manual devices) with condenser microphones may be used in conjunction with visual surveys to determine species using roost habitats. Each candidate roost tree will only be monitored once prior to construction. If any two bats are observed or detected, it will serve as confirmation that a maternity roost is present.

There are two possible outcome scenarios which could result from the pre-construction monitoring, including; 1) there is no evidence of habitat use in the candidate roost trees, or 2) habitat use by at least two bats is confirmed in at least one candidate roost tree.

If pre-construction monitoring confirms habitat use by at least two bats in any one candidate bat maternal colony roost trees, then the entire ELC stand (woodland) will be considered significant wildlife habitat and mitigation measures will be applied to manage potential impacts. The results of all pre-construction monitoring will be shared with the OMNR/MOE to confirm significance and modify mitigation measures, where necessary. Potential effects, proposed mitigation and post-construction monitoring to be implemented in this scenario are discussed below.

Based on consultation with the OMNR, potential impacts of the Project on significant amphibian woodland breeding habitat may occur during construction and decommissioning. As such, habitat use studies to confirm significance are not necessary to implement appropriate mitigation. General mitigation measures will be applied and are discussed in 5.4.27.4. As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant habitat of species of conservation concern is considered existing and significant and does not require the application of a habitat use study to confirm significance.

5.4.27.3 Potential Effects

The potential effects of the Project on significant woodlands, and significant wildlife habitats (bat maternal colony roost habitat, amphibian woodland breeding habitat, habitat of species of conservation concern) are described in Sections 5.2.1 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.27.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland and significant wildlife habitats associated with Feature 32. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 32. The specific mitigation strategy to protect the significant woodland and significant wildlife habitats will include the following:

- Prior to construction, the outer limits of the temporary construction area will be staked and marked to ensure that contractors remain within the temporary construction areas;
- The boundaries of the significant woodland (and thus the wildlife habitat) within 30 m of the proposed access road for Turbines 256 and 259 will be staked and flagged, and silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant woodland and to assist with the proper field installation of erosion and sediment controls measures;
- The silt-fencing barriers will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- An existing farm road is located adjacent to the significant woodland. The exiting road will be upgraded for the installation of the access road. The existing buffer between the farm road and the significant woodland will be maintained;
- To prevent damage to the root zone, excavation of soils for the purpose of underground collector system installation on private lands will occur at the minimum distance of 5 m away from the drip line of the significant woodland. Cable trenches within 30 m of the significant woodland will be filled immediately to prevent soil erosion and sedimentation issues;
- Excavation of soils for the purpose of collector lines/data cables installation within the municipal road allowance will be filled immediately to prevent soil erosion and sedimentation issues;
- Tree pruning will be minimized to the greatest extent possible. To the extent practical, pruning will be avoided during leaf fall, typically between September and November. Prior to construction, the limits of tree pruning will be marked in the field. Tree pruning will be supervised by a qualified arborist. The Construction Contractor will ensure that no construction disturbance occurs beyond the marked limits;
- In some cases, tree removal may be necessary within the road allowance for health and safety or electrical safety reason. Tree removal required will be completed consultation with the MVCA and a certified arborist. As appropriate, and in consultation with the relevant parties (government, conservation authority, adjacent landowner) K2 Wind will replace trees removed with appropriate species in an alternate location;
- After turbines have been assembled, the temporary turbine construction area will be restored to pre-existing conditions as soon as practical. The pre-existing conditions at

each turbine site are primarily agricultural and thus will be converted back into agricultural production;

- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Discharges from any de-watering shall be directed to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the woodland unless required to maintain hydrological flow (based on detailed design);
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, the net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of 'natural features' within Feature 32 are predicted to be low.

5.4.27.5 Post-Construction Monitoring

As avoidance behaviour of turbines is identified as a potential operational effect, a minimum three-year post-construction bat monitoring plan will be implemented if the habitat is identified as significant wildlife habitat. The objective of the monitoring will be to determine if Project operations have an effect on bat behaviour and habitat use. The same protocols which are implemented during pre-construction surveys will be applied post-construction. Significant bat maternal colony roost habitats will be monitored for evidence of maternity colonies through exit surveys following the protocols outlined in OMNR's *Bat and Bat Habitats: Guidelines for Wind Power Projects* (OMNR, 2011b). All snags/cavity trees identified during pre-construction

surveys, regardless of evidence of habitat use, will be surveyed during post-construction monitoring.

Species diversity and density will be compared between pre-construction and post-construction conditions. If bat maternal colony trees are located within the ELC stand but not within 120 m of the Project Location, these sites will be used as 'control' sites to document potential changes in species diversity and density compared to potential 'impacted' sites (within 120 m of the Project Location). This approach allows for a Before-After-Control-Impact design. Consistency in the survey methods will allow for defensible comparisons of the post-construction disturbance effects. Post-construction data will be statistically compared to pre-construction data. This will allow yearly comparisons of potential post-construction effects while statistically controlling for external factors such as weather, disease and depredation.

The OMNR, along with the proponent and other relevant agencies, will collectively review the results of the post-construction monitoring to determine if a negative environmental effect is occurring, and whether such an effect is attributable to the wind turbines and not external factors. These discussions will determine if and when contingency measures shall be undertaken. The best available science and information will be considered when determining appropriate mitigation and will be determined in consultation with MOE and OMNR based on post-construction monitoring results.

5.4.28 Feature 33

Feature 33 has been identified as containing a significant woodland, significant bat maternal colony roost habitat, significant amphibian woodland breeding habitat, significant terrestrial crayfish habitat, significant habitat of species of conservation concern (PIF bird species) and significant amphibian corridor habitat (connected to Feature 35). The significant woodland is dominated by white ash, with sugar maple, basswood and eastern hemlock associates. The habitat of species of conservation concern (PIF bird species) and terrestrial crayfish habitat are considered generalized candidate significant wildlife habitat and are assumed to be existing and significant.

5.4.28.1 Adjacent Project Components

Feature 33 falls within 120 m of Turbines 257, 260, and 265, and access roads, collector lines/data cables and temporary crane paths and turbine construction areas for Turbines 257, 260, 265 and 266. The minimum distance from Project components to each significant natural feature within Feature 33 is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the significant woodland. There are two watercourse crossings upstream of Feature 33 on Kerry's Line (see Figure 8.15, Appendix A). The preferred method of crossing would be open cut.

Project Component	Approx. Distance to Significant Woodland (m)	Approx. Distance to Significant Bat Maternal Colony Roost Habitat (m)	Approx. Distance to Significant Amphibian Woodland Breeding Habitat (m)	Approx. Distance to Significant Amphibian Corridor 3 (m)
T-257 Blade Tip	73	73	73	--
T-260 Base	86	86	86	--
T-260 Blade Tip	36	36	36	--
T-265 Blade Tip	105	105	105	--
Access Road (T-260)	118	118	118	0
Access Road (T-265, T-266)	12	12	12	--
Temp. Construction Area (T-257)	43	43	--	--
Temp. Construction Area (T-260)	5	5	26	110
Temp. Construction Area (T-285)	30	30	--	--
Temp. Construction Area (T-266)	100	100	--	--
Temp. Construction Area (T-265)	--	--	--	74

*The distance from the natural features to the temporary crane path and the collector system (under the access road) are assumed to correspond with the distance to the access road.

5.4.28.2 Pre-construction Monitoring (Habitat Use Study)

Pre-construction monitoring will be conducted within the significant amphibian woodland breeding habitat to confirm habitat use by amphibians. Monitoring will be partially based on OMNR's Wildlife Monitoring Programs and Inventory Techniques for Ontario (Konze and McLaren, 1997) and partially based on consultation with the OMNR. To ensure accuracy of the surveys, pre-construction monitoring methodologies will be reviewed by the OMNR prior to the commencement of field surveys.

Four site visits will be conducted within the amphibian breeding season. The first survey will be conducted in late March/early April to identify vernal pools and any evidence of salamander egg masses. Vernal pools will be assessed for the presence of key habitat characteristics critical for amphibian breeding (e.g., presence of shrubs and downed woody debris, and absence of predatory fish). The remainder of the surveys will be conducted within the recommended timing windows for Central Ontario (Survey 1: April 15 - 30; Survey 2: May 15 - 30; and Survey 3: June 15 - 30). Each site visit will consist of both visual and auditory observations of the vernal pools indentified during the first site survey. Prior to dusk, the surveyor will look for visual evidence of amphibian breeding including adult frogs, tadpoles or egg masses. An observer, sitting or standing quietly, can often see and identify frogs resting on vegetation, logs, etc. in ponds during the day. Downed wood or other objects under which amphibians may be hiding shall be moved (and then replaced) during a visual encounter search (Konze and McLaren, 1997).

After dusk, the surveyor will conduct auditory surveys in the form of amphibian breeding call counts. These surveys start at least one-half hour after sunset and finish before midnight. Efforts must be made to conduct the surveys under appropriate weather conditions. Ideal calling conditions consist of winds less than level three on the Beaufort scale and warm, damp nights with light rain or fog. Counts shall not be conducted if the wind is strong enough to raise dust or move small branches. As a guide, minimum night-time air temperatures shall be at least 8°C for the first survey, 13°C for the second and 21°C for the third. Surveys may be conducted at lower temperatures if there is strong calling activity. During amphibian breeding call counts, the surveyor will stand at each pond for 3-minutes. All calling activity will be ranked using one of the following three abundance code categories;

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

A final visual survey will also be conducted after dusk. At night, observers wearing headlamps can detect the presence of anurans by eyeshine. The reflection from the eyes of frogs and toads makes them visible in dense vegetation and at long distances (Konze and McLaren, 1997). An amphibian woodland breeding pond will be considered significant wildlife habitat if the presence of a breeding population of one or more of the species listed in the Draft SWH Ecoregion Criteria Schedules (Schedule 2; OMNR, 2009) with at least 20 individuals is confirmed during pre-construction monitoring. Listed species include: eastern newt, blue-spotted salamander, spotted salamander, gray treefrog, spring peeper, chorus frog and/or wood frog.

Movement surveys will be conducted in June at the Amphibian Corridor 3 (between Features 33 and 35). The surveys will consist of erecting a barrier (silt fence) in the location of the proposed access road in the significant amphibian corridor habitat prior to the juvenile emergence season. To the greatest extent possible, the barrier will be located where amphibians are most likely to be ingressing or egressing the feature (i.e., near vernal pools). The length of the barrier will be 60 m in length. The barrier will be surveyed every day for one week in June to document amphibians using the corridor and once again in July/August, if necessary (based on consultation with the OMNR). The barrier will be left standing for the full week and will be monitored at dawn, mid-day and dusk to prevent desiccation of amphibians. Any amphibian identified along the edge of the barrier will be moved to the closest woodland/wetland feature to prevent desiccation of amphibians. The surveys will consist of walking the extent of the barrier (on both sides) to identify amphibians. The extent of the proposed access road between Features 33 and 35 will also be walked to survey visually for amphibian movement. Should amphibian mortality be detected due to the presence of the semi-permanent barrier, the barrier will be set up before dusk each day of the survey, checked at dawn for amphibians and then laid down flat or removed for the day.

There are three possible outcome scenarios which could result from the pre-construction monitoring, including 1) a breeding population of at least 20 individual amphibians is not

confirmed to be using the woodland or corridor habitats, 2) a breeding population of at least 20 individual amphibians is confirmed to be using the woodland habitats, but not the corridor habitat, or 3) a breeding population of at least 20 individual amphibians is confirmed to be using the woodland and corridor habitats.

If there is an insufficient amphibian breeding population present at the site based on criteria provided in the Draft SWH Ecoregion Criteria Schedules, no further monitoring will be required. If pre-construction monitoring does identify a breeding population of at least 20 individual amphibians is documented in the woodland or corridor habitats, then the features will be considered significant amphibian woodland breeding habitat and /or amphibian corridor habitat and mitigation measures will be applied to manage potential impacts. The results of all pre-construction monitoring will be shared with the OMNR/MOE to confirm significance and modify mitigation measures, where necessary. Potential effects to significant amphibian woodland breeding habitat, proposed mitigation and post-construction monitoring to be implemented in this scenario are discussed below.

Pre-construction monitoring will be conducted within the significant bat maternal colony roost habitat to confirm habitat use by bats. Candidate roost trees (snags/cavity trees) will be monitored for evidence of maternity colonies through exit surveys following the protocols outlined in OMNR's *Bat and Bat Habitats: Guidelines for Wind Power Projects* (OMNR, 2011b). To ensure accuracy of the surveys, pre-construction monitoring methodologies will be reviewed by the OMNR prior to the commencement of field surveys.

A total of 20 snags/cavity trees will be surveyed throughout the feature, as per the OMNR's requirement for 10 snags/cavity trees plus one snag/cavity tree per hectare above the 10 ha size threshold (the feature is 19.9 ha). The best candidate trees for the exit surveys will be determined based on the criteria outlined in Section 4.1.4.1 (Bat Maternal Colony Roost Habitat). Exit surveys will be conducted during the month of June. Surveyors will choose a location with a clear view of the cavity opening or crevice (multiple surveyors may be required if multiple openings are present in one snag). The cavity opening or crevice will be monitored for any evidence of bats beginning 30 minutes before dusk until 60 minutes after dusk for evidence of bats. Modern broadband bat detectors (automated systems in conjunction with computer software analysis packages or manual devices) with condenser microphones may be used in conjunction with visual surveys to determine species using roost habitats. Each candidate roost tree will only be monitored once prior to construction. If any two bats are observed or detected, it will serve as confirmation that a maternity roost is present.

There are two possible outcome scenarios which could result from the pre-construction monitoring, including; 1) there is no evidence of habitat use in the candidate roost trees, or 2) habitat use by at least two bats is confirmed in at least one candidate roost tree.

If pre-construction monitoring confirms habitat use by at least two bats in any one candidate bat maternal colony roost trees, then the entire ELC stand (woodland) will be considered significant wildlife habitat and mitigation measures will be applied to manage potential impacts. The results of all pre-construction monitoring will be shared with the OMNR/MOE to confirm significance and

modify mitigation measures, where necessary. Potential effects, proposed mitigation and post-construction monitoring to be implemented in this scenario are discussed below.

As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant wildlife habitat (in this case, terrestrial crayfish habitat and habitat of species of conservation concern) are to be considered existing and significant and do not require the application of habitat use studies to confirm significance.

5.4.28.3 Potential Effects

The potential effects of the Project on significant woodlands and significant wildlife habitats (bat maternal colony roost habitat, amphibian woodland breeding habitat, terrestrial crayfish habitat, habitat of species of conservation concern and amphibian corridor habitat) are described in Sections 5.2.1, 5.2.3 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1, 5.2.3 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.28.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland and significant wildlife habitat associated with Feature 33. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 33. The specific mitigation strategy to protect the significant woodland and significant wildlife habitats will include the following:

- Prior to construction the outer limits of the construction area will be staked and marked to ensure that contractors remain within the temporary construction areas. A minimum distance of 5 m will be established and a silt barrier constructed between the woodland and temporary construction area;
- The boundaries of the significant woodland (and thus the wildlife habitat) within 30 m of the proposed temporary construction areas for Turbines 257, 260, 265 and 266 will be staked and flagged, and silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant woodland and to assist with the proper field installation of erosion and sediment controls measures;
- During construction, a buffer will be established from the stem line to the drip line where the significant woodland is immediately adjacent to a permanent access road. The purpose of the buffer is to minimize root zone damage and compaction. Silt fencing will be established at the edge of the drip line to prevent sedimentation and erosion of soils into the significant woodland. The buffer area will not be disturbed during construction and will be seeded with species native to the ecoregion upon completion of construction, if necessary;

- The silt fencing will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- Should the amphibian corridor between Features 33 and 35 be identified as significant, a wildlife friendly culvert will be constructed under the access road to allow safe movement of amphibians between features;
- After turbines have been assembled, the temporary turbine construction area will be restored to pre-existing conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Discharges from any de-watering shall be directed to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the woodland unless required to maintain hydrological flow (based on detailed design);
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, the net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of ‘natural features’ within Feature 33 are predicted to be low.

5.4.28.5 Post-Construction Monitoring

As avoidance behaviour of access roads is identified as a potential operational effect on amphibians, a minimum three-year post-construction amphibians monitoring plan will be implemented if the amphibian corridor habitat is identified as significant wildlife habitat. The objective of the monitoring will be to determine if Project operations have an effect on amphibian behaviour and habitat use of the corridor and adjacent amphibian woodland breeding habitat. The same protocols which are implemented during pre-construction surveys will be applied post-construction.

Since there are only five potential amphibian corridor habitats identified within the General Project Area (associated with Features 12, 13, 24, 33, 35, 36, 37 and 39), comparisons cannot be made between potentially "impacted" sites (within 120 m of the Project Location) and "control" sites (not within 120 m of the Project Location). Comparisons can only be made between pre-construction and post-construction survey results. While this type of comparison is not ideal, post-construction data can be statistically compared to pre-construction data. However, without the use of control sites, data suggesting avoidance behaviour of amphibian corridor habitats should be taken with caution as confounding factors such as weather, disease and/or predators may influence the analysis. Should pre-construction surveys suggest the presence of other amphibian corridor habitat in the area but not within 120 m of the Project Location, the Proponent will make efforts to use these areas as 'control' sites to allow for a Before-After-Control-Impact study design.

As avoidance behaviour of turbines is identified as a potential operational effect, a minimum three-year post-construction bat monitoring plan will be implemented if the habitat is identified as significant wildlife habitat. The objective of the monitoring will be to determine if Project operations have an effect on bat behaviour and habitat use. The same protocols which are implemented during pre-construction surveys will be applied post-construction. Significant bat maternal colony roost habitats will be monitored for evidence of maternity colonies through exit surveys following the protocols outlined in OMNR's *Bat and Bat Habitats: Guidelines for Wind Power Projects* (OMNR, 2011b). All snags/cavity trees identified during pre-construction surveys, regardless of evidence of habitat use, will be surveyed during post-construction monitoring.

Species diversity and density will be compared between pre-construction and post-construction conditions. If bat maternal colony trees are located within the ELC stand but not within 120 m of the Project Location, these sites will be used as 'control' sites to document potential changes in species diversity and density compared to potential 'impacted' sites (within 120 m of the Project Location). This approach allows for a Before-After-Control-Impact design. Consistency in the survey methods will allow for defensible comparisons of the post-construction disturbance effects. Post-construction data will be statistically compared to pre-construction data. This will allow yearly comparisons of potential post-construction effects while statistically controlling for external factors such as weather, disease and depredation.

The OMNR, along with the proponent and other relevant agencies, will collectively review the results of the post-construction monitoring to determine if a negative environmental effect is occurring, and whether such an effect is attributable to the wind turbines and not external factors. These discussions will determine if and when contingency measures shall be undertaken. The best available science and information will be considered when determining appropriate mitigation and will be determined in consultation with MOE and OMNR based on post-construction monitoring results.

5.4.29 Feature 34

Feature 34 has two small wetland dominated by grasses and shrubs and has been classified as a cultural thicket. The feature is surrounded by agriculture and is associated with a watercourse. No significant wildlife habitat features are associated with Feature 34.

5.4.29.1 Adjacent Project Components

Feature 34 falls within 120 m of the collector system within the municipal road allowance. The minimum distance from Project components to the significant natural feature is provided in the table below. There are two watercourse crossings associated with Feature 34; one upstream on Glen's Hill Road and one downstream on Kerry's Line (see Figure 8.12, Appendix A). The preferred method of crossing would be open cut.

Project Component	Approx. Distance to Significant Wetland 34a (m)	Approx. Distance to Significant Wetland 34b (m)
Collector System (within road allowance)	5	54

*The distance from natural features to the collector lines/data cables under the access road are assumed to correspond with the distance to the access road.

5.4.29.2 Potential Effects

The potential effects of the Project on significant wetlands are described in Sections 5.2.2. No specific effects beyond those described in Sections 5.2.2 are expected on this significant natural feature.

5.4.29.3 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant wetland associated with Feature 34. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 34. The specific mitigation strategy to protect the significant wetland will include the following:

- Prior to construction, the boundary of the significant wetland within 30 m of the proposed construction area will be staked and flagged, and a silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation

of the construction area, to ensure construction activities avoid the significant feature and to assist with the proper field installation of erosion and sediment controls measures;

- The silt-fencing barriers will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- The preferred design is to excavate soils for the purpose of underground collector system installation in the municipal road allowance 5 m away from the wetland boundary. Issues may arise in the detailed design or construction that requires the line be constructed closer than 5 m. In the event that subsurface condition do not allow for placement of the collector system 5 m away, the collector system will be placed as close to the road as safe and allowable by the Township or County to create as much buffer from the Feature. Given the shallow nature of the works no appreciable changes to the groundwater or surface water flows are anticipated. Cable trenches will be filled immediately after installation is complete to prevent soil erosion and sedimentation issues;
- Power cable trenches within the municipal road allowance will be bedded with sand and backfilled with native soils or appropriate fill material, with clay plugs every 30 m to ensure that potential groundwater entering the trenches is not drawn along the sand-filled conduit and hydrological conveyance to the wetland, if any, is maintained;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, no net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of ‘natural features’ within Feature 29 are predicted.

5.4.30 Feature 35

Feature 35 is composed of a significant woodland, significant wetland, significant amphibian woodland breeding habitat and significant habitat of species of conservation concern. The significant woodland/wetland is comprised of a mosaic of white spruce, white pine, red ash, Freeman Maple with large amounts of red-osier dogwood throughout the understory. Much of the wetland area is open with scattered red ash, red-osier dogwood and wetland grasses. The habitat of species of conservation concern (PIF bird species) is considered generalized candidate significant wildlife habitat and is assumed to be existing and significant.

5.4.30.1 Adjacent Project Components

Feature 35 falls within 120 m of the access road to Turbines 260 and 265, the associated collector lines/data cables and the collector system within the municipal road allowance. The minimum distance from Project components to the significant woodland and wetland is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the significant woodland or wetland. There is one watercourse crossing upstream of Feature 35 on Kerry's Line (see Figure 8.15, Appendix A). The preferred method of crossing would be open cut.

Project Component	Approx. Distance to Significant Woodland (m)	Approx. Distance to Significant Wetland (m)	Approx. Distance to Significant Amphibian Woodland Breeding Habitat (m)
Access Road (T-260, T-265)	67	31	67
Collector System (within road allowance)	5	5	5

*The distance from natural features to the collector lines/data cables under the access road are assumed to correspond with the distance to the access road.

5.4.30.2 Pre-construction Monitoring (Habitat Use Study)

Pre-construction monitoring will be conducted within the significant amphibian woodland breeding habitat to confirm habitat use by amphibians. Monitoring will be partially based on OMNR's Wildlife Monitoring Programs and Inventory Techniques for Ontario (Konze and McLaren, 1997) and partially based on consultation with the OMNR. To ensure accuracy of the surveys, pre-construction monitoring methodologies will be reviewed by the OMNR prior to the commencement of field surveys.

Four site visits will be conducted within the amphibian breeding season. The first survey will be conducted in late March/early April to identify vernal pools and any evidence of salamander egg masses. Vernal pools will be assessed for the presence of key habitat characteristics critical for

amphibian breeding (e.g., presence of shrubs and downed woody debris, and absence of predatory fish). The remainder of the surveys will be conducted within the recommended timing windows for Central Ontario (Survey 1: April 15 - 30; Survey 2: May 15 - 30; and Survey 3: June 15 - 30). Each site visit will consist of both visual and auditory observations of the vernal pools indentified during the first site survey. Prior to dusk, the surveyor will look for visual evidence of amphibian breeding including adult frogs, tadpoles or egg masses. An observer, sitting or standing quietly, can often see and identify frogs resting on vegetation, logs, etc. in ponds during the day. Downed wood or other objects under which amphibians may be hiding shall be moved (and then replaced) during a visual encounter search (Konze and McLaren, 1997).

After dusk, the surveyor will conduct auditory surveys in the form of amphibian breeding call counts. These surveys start at least one-half hour after sunset and finish before midnight. Efforts must be made to conduct the surveys under appropriate weather conditions. Ideal calling conditions consist of winds less than level three on the Beaufort scale and warm, damp nights with light rain or fog. Counts shall not be conducted if the wind is strong enough to raise dust or move small branches. As a guide, minimum night-time air temperatures shall be at least 8°C for the first survey, 13°C for the second and 21°C for the third. Surveys may be conducted at lower temperatures if there is strong calling activity. During amphibian breeding call counts, the surveyor will stand at each pond for 3-minutes. All calling activity will be ranked using one of the following three abundance code categories;

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

A final visual survey will also be conducted after dusk. At night, observers wearing headlamps can detect the presence of anurans by eyeshine. The reflection from the eyes of frogs and toads makes them visible in dense vegetation and at long distances (Konze and McLaren, 1997). An amphibian woodland breeding pond will be considered significant wildlife habitat if the presence of a breeding population of one or more of the species listed in the Draft SWH Ecoregion Criteria Schedules (Schedule 2; OMNR, 2009) with at least 20 individuals is confirmed during pre-construction monitoring. Listed species include: eastern newt, blue-spotted salamander, spotted salamander, gray treefrog, spring peeper, chorus frog and/or wood frog.

Movement surveys will be conducted in June at the Amphibian Corridor 3 (between Features 33 and 35). The surveys will consist of erecting a barrier (silt fence) in the location of the proposed access road in the significant amphibian corridor habitat prior to the juvenile emergence season. To the greatest extent possible, the barrier will be located where amphibians are most likely to be ingressing or egressing the feature (i.e., near vernal pools). The length of the barrier will be 60 m in length. The barrier will be surveyed every day for one week in June to document amphibians using the corridor and once again in July/August, if necessary (based on consultation with the OMNR). The barrier will be left standing for the full week and will be

monitored at dawn, mid-day and dusk to prevent desiccation of amphibians. Any amphibian identified along the edge of the barrier will be moved to the closest woodland/wetland feature to prevent desiccation of amphibians. The surveys will consist of walking the extent of the barrier (on both sides) to identify amphibians. The extent of the proposed access road between Features 33 and 35 will also be walked to survey visually for amphibian movement. Should amphibian mortality be detected due to the presence of the semi-permanent barrier, the barrier will be set up before dusk each day of the survey, checked at dawn for amphibians and then laid down flat or removed for the day.

There are three possible outcome scenarios which could result from the pre-construction monitoring, including 1) a breeding population of at least 20 individual amphibians is not confirmed to be using the woodland or corridor habitats, 2) a breeding population of at least 20 individual amphibians is confirmed to be using the woodland habitats, but not the corridor habitat, or 3) a breeding population of at least 20 individual amphibians is confirmed to be using the woodland and corridor habitats.

If there is an insufficient amphibian breeding population present at the site based on criteria provided in the Draft SWH Ecoregion Criteria Schedules, no further monitoring will be required. If pre-construction monitoring does identify a breeding population of at least 20 individual amphibians is documented in the woodland or corridor habitats, then the features will be considered significant amphibian woodland breeding habitat and /or amphibian corridor habitat and mitigation measures will be applied to manage potential impacts. The results of all pre-construction monitoring will be shared with the OMNR/MOE to confirm significance and modify mitigation measures, where necessary. Potential effects to significant amphibian woodland breeding habitat, proposed mitigation and post-construction monitoring to be implemented in this scenario are discussed below.

As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant wildlife habitat (in this case, interior forest breeding bird habitat and habitat of species of conservation concern (PIF bird species)) are to be considered existing and significant and do not require the application of habitat use studies to confirm significance.

5.4.30.3 Potential Effects

The potential effects of the Project on significant woodlands, significant wetlands and significant wildlife habitats (amphibian woodland breeding habitat and habitat of species of conservation concern) are described in Sections 5.2.1 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.30.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland, significant wetland and significant wildlife habitat associated with Feature 35. General mitigation measures and

best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 35. The specific mitigation strategy to protect the significant woodland, significant wetland and significant wildlife habitats will include the following:

- Prior to construction, the boundary of the significant wildlife habitat within 30 m of the proposed access road for Turbines 260 and 265 will be staked and flagged, and a silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant feature and to assist with the proper field installation of erosion and sediment controls measures;
- The silt fencing will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- The preferred design is to excavate soils for the purpose of underground collector system installation 5 m away from the wetland boundary within the municipal road allowance. Issues may arise in the detailed design or construction that may not make this possible. In the event that subsurface condition do not allow for placement of the collector system 5 m away from the wetland, the collector system will be placed as close to the road as safe and allowable by the Township or County to create as much buffer from the wetland. Cable trenches within 30 m of the wetland will be filled immediately to prevent soil erosion and sedimentation issues;
- Power cable trenches within 30 m of the wetlands will be bedded with sand and backfilled with native soils or appropriate fill material, with clay plugs every 30 m to ensure that potential groundwater entering the trenches is not drawn along the sand/fill conduit and hydrological conveyance to the wetland, if any, is maintained;
- Should the construction of underground collector lines not be feasible within the municipal road allowance on the edge of the feature, collector lines will be installed above ground on wooden poles;
- Tree pruning will be minimized to the greatest extent possible. To the extent practical, pruning will be avoided during leaf fall, typically between September and November. Prior to construction, the limits of tree pruning will be marked in the field. Tree pruning will be supervised by a qualified arborist. The Construction Contractor will ensure that no construction disturbance occurs beyond the marked limits;
- In some cases, tree removal may be necessary within the road allowance for health and safety or electrical safety reason. Tree removal required will be completed consultation with the MVCA and a certified arborist. As appropriate, and in consultation with the relevant parties (government, conservation authority, adjacent landowner) K2 Wind will replace trees removed with appropriate species in an alternate location;
- To avoid impacts to wetland hydrology and maintain existing overland flows and continuous surface water conveyance from Wetland 35, culvert placement has been proposed beneath the permanent access roads to convey runoff following storm events. The culvert will be placed under the access road to Turbines 260, 265 and 266 (see Figure 8.15, Appendix A). The culvert will be appropriately sized in consultation with the Maitland Valley Conservation Authority and where required, permits will be sought from

the Conservation Authority and/or the Department of Fisheries and Oceans. All installation activities will conform to Ontario Provincial Standard Specification 421 (OPSS) – Construction Specification for Pipe Culvert Installation in Open Cut. Site specific refinement to the location of individual culverts may occur during detailed design to ensure proper placement and maintain conveyance flows, prevent pooling and maintain hydrology;

- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Discharges from any de-watering shall be directed to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the woodland or wetland unless required to maintain hydrological flow (based on detailed design);
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, no net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of ‘natural features’ within Feature 35 are predicted.

5.4.30.5 Post-Construction Monitoring

As avoidance behaviour of access roads is identified as a potential operational effect on amphibians, a minimum three-year post-construction amphibians monitoring plan will be implemented if the amphibian corridor habitat is identified as significant wildlife habitat. The objective of the monitoring will be to determine if Project operations have an effect on amphibian

behaviour and habitat use of the corridor and adjacent amphibian woodland breeding habitat. The same protocols which are implemented during pre-construction surveys will be applied post-construction.

Since there are only five potential amphibian corridor habitats identified within the General Project Area (associated with Features 12, 13, 24, 33, 35, 36, 37 and 39), comparisons cannot be made between potentially "impacted" sites (within 120 m of the Project Location) and "control" sites (not within 120 m of the Project Location). Comparisons can only be made between pre-construction and post-construction survey results. While this type of comparison is not ideal, post-construction data can be statistically compared to pre-construction data. However, without the use of control sites, data suggesting avoidance behaviour of amphibian corridor habitats should be taken with caution as confounding factors such as weather, disease and/or predators may influence the analysis. Should pre-construction surveys suggest the presence of other amphibian corridor habitat in the area but not within 120 m of the Project Location, the Proponent will make efforts to use these areas as 'control' sites to allow for a Before-After-Control-Impact study design.

The OMNR, along with the proponent and other relevant agencies, will collectively review the results of the post-construction monitoring to determine if a negative environmental effect is occurring, and whether such an effect is attributable to the wind turbines and not external factors. These discussions will determine if and when contingency measures shall be undertaken. The best available science and information will be considered when determining appropriate mitigation and will be determined in consultation with MOE and OMNR based on post-construction monitoring results.

5.4.31 Feature 36

Feature 36 is comprised of a significant woodland, significant wetlands, significant bat maternal colony roost habitat, significant amphibian woodland breeding habitats, amphibian corridor habitat and significant habitat of species of conservation concern (PIF bird species). The significant woodland/wetland feature is dominated by red ash and white cedar, with trembling aspen associates in the canopy and sub-canopy. The understory is dominated by red-osier dogwood and willows. Open water is permanently present, as well as some ephemeral vernal pools. The habitat of species of conservation concern (PIF bird species) within this feature is considered generalized candidate significant wildlife habitat and is assumed to be existing and significant.

5.4.31.1 Adjacent Project Components

Feature 36 falls within 120 m of Turbine 273 and the associated access roads, collector lines/data cables and temporary turbine construction area, and within 120 m of the access road to Turbine 280. The minimum distance from Project components to the significant natural features are provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the Feature based on landscape and topography. For the

purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat (amphibian woodland breeding habitat and habitat of species of conservation concern) can be considered the edge of the significant woodland/wetland. There are no watercourse crossings associated with this feature.

Project Component	Approx. Distance to Significant Woodland (m)	Approx. Distance to Significant Wetland (m)	Approx. Distance to Significant Bat Maternal Colony Roost Habitat (m)	Approx. Distance to Significant Amphibian Woodland Breeding Habitat (m)	Approx. Distance to Significant Amphibian Corridor Habitat 8 (m)
T-273 Base	120	120	120	120	--
T-273 Blade Tip	70	70	70	70	--
Temp. Construction Area (T-273)	9	9	9	9	--
Access Road (T-280)	--	--	--	--	0

5.4.31.2 Pre-construction Monitoring (Habitat Use Study)

Pre-construction monitoring will be conducted within the significant amphibian woodland breeding habitat to confirm habitat use by amphibians. Monitoring will be partially based on OMNR's Wildlife Monitoring Programs and Inventory Techniques for Ontario (Konze and McLaren, 1997) and partially based on consultation with the OMNR. To ensure accuracy of the surveys, pre-construction monitoring methodologies will be reviewed by the OMNR prior to the commencement of field surveys.

Four site visits will be conducted within the amphibian breeding season. The first survey will be conducted in late March/early April to identify vernal pools and any evidence of salamander egg masses. Vernal pools will be assessed for the presence of key habitat characteristics critical for amphibian breeding (e.g., presence of shrubs and downed woody debris, and absence of predatory fish). The remainder of the surveys will be conducted within the recommended timing windows for Central Ontario (Survey 1: April 15 - 30; Survey 2: May 15 - 30; and Survey 3: June 15 - 30). Each site visit will consist of both visual and auditory observations of the vernal pools indentified during the first site survey. Prior to dusk, the surveyor will look for visual evidence of amphibian breeding including adult frogs, tadpoles or egg masses. An observer, sitting or standing quietly, can often see and identify frogs resting on vegetation, logs, etc. in ponds during the day. Downed wood or other objects under which amphibians may be hiding shall be moved (and then replaced) during a visual encounter search (Konze and McLaren, 1997).

After dusk, the surveyor will conduct auditory surveys in the form of amphibian breeding call counts. These surveys start at least one-half hour after sunset and finish before midnight. Efforts must be made to conduct the surveys under appropriate weather conditions. Ideal calling conditions consist of winds less than level three on the Beaufort scale and warm, damp nights with light rain or fog. Counts shall not be conducted if the wind is strong enough to raise dust or move small branches. As a guide, minimum night-time air temperatures shall be at least

8°C for the first survey, 13°C for the second and 21°C for the third. Surveys may be conducted at lower temperatures if there is strong calling activity. During amphibian breeding call counts, the surveyor will stand at each pond for 3-minutes. All calling activity will be ranked using one of the following three abundance code categories;

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

A final visual survey will also be conducted after dusk. At night, observers wearing headlamps can detect the presence of anurans by eyeshine. The reflection from the eyes of frogs and toads makes them visible in dense vegetation and at long distances (Konze and McLaren, 1997). An amphibian woodland breeding pond will be considered significant wildlife habitat if the presence of a breeding population of one or more of the species listed in the Draft SWH Ecoregion Criteria Schedules (Schedule 2; OMNR, 2009) with at least 20 individuals is confirmed during pre-construction monitoring. Listed species include: eastern newt, blue-spotted salamander, spotted salamander, gray treefrog, spring peeper, chorus frog and/or wood frog.

Movement surveys will be conducted in June at the Amphibian Corridor 8 (between Features 36 and 37). The surveys will consist of erecting a barrier (silt fence) in the location of the proposed access road in the significant amphibian corridor habitat prior to the juvenile emergence season. To the greatest extent possible, the barrier will be located where amphibians are most likely to be ingressing or egressing the feature (i.e., near vernal pools). The length of the barrier will be 60 m in length. The barrier will be surveyed every day for one week in June to document amphibians using the corridor and once again in July/August, if necessary (based on consultation with the OMNR). The barrier will be left standing for the full week and will be monitored at dawn, mid-day and dusk to prevent desiccation of amphibians. Any amphibian identified along the edge of the barrier will be moved to the closest woodland/wetland feature to prevent desiccation of amphibians. The surveys will consist of walking the extent of the barrier (on both sides) to identify amphibians. The extent of the proposed access road between Features 36 and 37 will also be walked to survey visually for amphibian movement. Should amphibian mortality be detected due to the presence of the semi-permanent barrier, the barrier will be set up before dusk each day of the survey, checked at dawn for amphibians and then laid down flat or removed for the day.

There are three possible outcome scenarios which could result from the pre-construction monitoring, including 1) a breeding population of at least 20 individual amphibians is not confirmed to be using the woodland or corridor habitats, 2) a breeding population of at least 20 individual amphibians is confirmed to be using the woodland habitats, but not the corridor habitat, or 3) a breeding population of at least 20 individual amphibians is confirmed to be using the woodland and corridor habitats.

If there is an insufficient amphibian breeding population present at the site based on criteria provided in the Draft SWH Ecoregion Criteria Schedules, no further monitoring will be required. If pre-construction monitoring does identify a breeding population of at least 20 individual amphibians is documented in the woodland or corridor habitats, then the features will be considered significant amphibian woodland breeding habitat and /or amphibian corridor habitat and mitigation measures will be applied to manage potential impacts. The results of all pre-construction monitoring will be shared with the OMNR/MOE to confirm significance and modify mitigation measures, where necessary. Potential effects to significant amphibian woodland breeding habitat, proposed mitigation and post-construction monitoring to be implemented in this scenario are discussed below.

Pre-construction monitoring will be conducted within the significant bat maternal colony roost habitat to confirm habitat use by bats. Candidate roost trees (snags/cavity trees) will be monitored for evidence of maternity colonies through exit surveys following the protocols outlined in OMNR's *Bat and Bat Habitats: Guidelines for Wind Power Projects* (OMNR, 2011b). To ensure accuracy of the surveys, pre-construction monitoring methodologies will be reviewed by the OMNR prior to the commencement of field surveys.

A total of 10 snags/cavity trees will be surveyed throughout the feature, as per the OMNR's guidelines for features ≤10 ha. The best candidate trees for the exit surveys will be determined based on the criteria outlined in Section 4.1.4.1 (Bat Maternal Colony Roost Habitat). Exit surveys will be conducted during the month of June. Surveyors will choose a location with a clear view of the cavity opening or crevice (multiple surveyors may be required if multiple openings are present in one snag). The cavity opening or crevice will be monitored for any evidence of bats beginning 30 minutes before dusk until 60 minutes after dusk for evidence of bats. Modern broadband bat detectors (automated systems in conjunction with computer software analysis packages or manual devices) with condenser microphones may be used in conjunction with visual surveys to determine species using roost habitats. Each candidate roost tree will only be monitored once prior to construction. If any two bats are observed or detected, it will serve as confirmation that a maternity roost is present.

There are two possible outcome scenarios which could result from the pre-construction monitoring, including; 1) there is no evidence of habitat use in the candidate roost trees, or 2) habitat use by at least two bats is confirmed in at least one candidate roost tree.

If pre-construction monitoring confirms habitat use by at least two bats in any one candidate bat maternal colony roost trees, then the entire ELC stand (woodland) will be considered significant wildlife habitat and mitigation measures will be applied to manage potential impacts. The results of all pre-construction monitoring will be shared with the OMNR/MOE to confirm significance and modify mitigation measures, where necessary. Potential effects, proposed mitigation and post-construction monitoring to be implemented in this scenario are discussed below.

As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant habitat of species of conservation concern is considered existing and significant and does not require the application of habitat use studies to confirm significance.

5.4.31.3 Potential Effects

The potential effects of the Project on significant woodlands, significant wetlands and significant wildlife habitats (bat maternal colony roost habitat, amphibian woodland breeding habitat and habitat of species of conservation concern) are described in Sections 5.2.1, 5.2.2 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1, 5.2.2 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.31.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland, significant wetlands and significant wildlife habitats associated with Feature 36. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 36. The specific mitigation strategy to protect the significant woodland, significant wetlands and significant wildlife habitats will include the following:

- Prior to construction, the outer limits of the temporary construction area will be staked and marked to ensure that contractors remain within the temporary construction areas. A minimum distance of 5 m will be established and a silt barrier constructed between the wetland and temporary construction area;
- Prior to construction, the boundary of the wetland (and thus the wildlife habitat) within 30 m of the temporary construction area for Turbines 273 will be staked and flagged, and a silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant feature and to assist with the proper field installation of erosion and sediment controls measures;
- Should the amphibian corridor between Features 36 and 37 be identified as significant, a wildlife friendly culvert will be constructed under the access road to allow safe movement of amphibians between features;
- The silt fencing will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- After turbines have been assembled, the temporary turbine construction area will be restored to pre-existing conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Discharges from any de-watering shall be directed to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the

woodland or wetland unless required to maintain hydrological flow (based on detailed design);

- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, the net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of 'natural features' within Feature 36 are predicted to be low.

5.4.31.5 Post-Construction Monitoring

As avoidance behaviour of access roads is identified as a potential operational effect on amphibians, a minimum three-year post-construction amphibians monitoring plan will be implemented if the amphibian corridor habitat is identified as significant wildlife habitat. The objective of the monitoring will be to determine if Project operations have an effect on amphibian behaviour and habitat use of the corridor and adjacent amphibian woodland breeding habitat. The same protocols which are implemented during pre-construction surveys will be applied post-construction.

Since there are only five potential amphibian corridor habitats identified within the General Project Area (associated with Features 12, 13, 24, 33, 35, 36, 37 and 39), comparisons cannot be made between potentially "impacted" sites (within 120 m of the Project Location) and "control" sites (not within 120 m of the Project Location). Comparisons can only be made between pre-construction and post-construction survey results. While this type of comparison is not ideal, post-construction data can be statistically compared to pre-construction data. However, without the use of control sites, data suggesting avoidance behaviour of amphibian

corridor habitats should be taken with caution as confounding factors such as weather, disease and/or predators may influence the analysis. Should pre-construction surveys suggest the presence of other amphibian corridor habitat in the area but not within 120 m of the Project Location, the Proponent will make efforts to use these areas as 'control' sites to allow for a Before-After-Control-Impact study design.

As avoidance behaviour of turbines is identified as a potential operational effect, a minimum three-year post-construction bat monitoring plan will be implemented if the habitat is identified as significant wildlife habitat. The objective of the monitoring will be to determine if Project operations have an effect on bat behaviour and habitat use. The same protocols which are implemented during pre-construction surveys will be applied post-construction. Significant bat maternal colony roost habitats will be monitored for evidence of maternity colonies through exit surveys following the protocols outlined in OMNR's *Bat and Bat Habitats: Guidelines for Wind Power Projects* (OMNR, 2011b). All snags/cavity trees identified during pre-construction surveys, regardless of evidence of habitat use, will be surveyed during post-construction monitoring.

Species diversity and density will be compared between pre-construction and post-construction conditions. If bat maternal colony trees are located within the ELC stand but not within 120 m of the Project Location, these sites will be used as 'control' sites to document potential changes in species diversity and density compared to potential 'impacted' sites (within 120 m of the Project Location). This approach allows for a Before-After-Control-Impact design. Consistency in the survey methods will allow for defensible comparisons of the post-construction disturbance effects. Post-construction data will be statistically compared to pre-construction data. This will allow yearly comparisons of potential post-construction effects while statistically controlling for external factors such as weather, disease and depredation.

The OMNR, along with the proponent and other relevant agencies, will collectively review the results of the post-construction monitoring to determine if a negative environmental effect is occurring, and whether such an effect is attributable to the wind turbines and not external factors. These discussions will determine if and when contingency measures shall be undertaken. The best available science and information will be considered when determining appropriate mitigation and will be determined in consultation with MOE and OMNR based on post-construction monitoring results.

5.4.32 Feature 37

Feature 37 has been identified as containing a significant woodland, seven significant wetlands, significant valleyland, significant turtle over-wintering habitat, significant turtle nesting habitat, significant amphibian woodland breeding habitats, significant habitat of species of conservation concern (PIF bird species) and significant amphibian corridor habitat. The significant woodland is a mixture of mixed forest composed of white cedar, sugar maple, white ash and basswood, lowland forests with white cedar, red maple, red ash and basswood (wetland feature), deciduous forests dominated by white ash and white pine cultural plantation. The habitat of

species of conservation concern (PIF bird species) is considered generalized candidate significant wildlife habitat and is assumed to be existing and significant.

5.4.32.1 Adjacent Project Components

Feature 37 falls within 120 m of Turbines 280 and 295, as well as access roads, collector lines/data cables, and temporary crane paths and construction areas (turbines and met tower) for several other turbines. The minimum distance from Project components to each significant natural feature within Feature 37 is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the significant woodland or valleyland. There are six watercourse crossings associated with Feature 37, four within the road allowance directly adjacent to the feature and two upstream on Lanesville Line (see Figures 8.18 and 8.19, Appendix A). The preferred method of crossing would be overhead on shared poles or HPDD through the valleyland and open cut in other locations.

Project Component	Approx. Distance to Significant Woodland (m)	Approx. Distance to Significant Wetland (m)							Approx. Distance to Significant Valleyland 5 (m)
		37a	37b	37c	37d	37e	37f	37g	
T-280 Blade Tip	71	--	--	81	95	--	--	--	71
T-295 Blade Tip	87	--	--	--	--	--	--	--	91
T-299 Blade Tip	--	--	--	--	--	--	--	--	--
Access Road (T-273, T-280)	5	--	--	97	5	15	62	--	5
Access Road (T-295, T-296, T-299)	18	--	69	--	--	--	--	--	18
Temp. Construction Area (T-280)	5	--	--	20	48	--	--	--	5
Temp. Construction Area (T-295)	44	--	--	--	--	--	--	--	48
Temp. Construction Area (T-299)	--	--	--	--	--	--	--	--	--
Temp. Construction Area (Met Tower Option 2)	30	100	--	--	--	--	--	--	35
Collector System	2	--	5	5	5	5	5	5	0

*The distance from the natural features to the temporary crane path and the collector system (under the access road) are assumed to correspond with the distance to the access road.

Project Component	Approx. Distance to Significant Amphibian Woodland Breeding Habitat (m)	Approx. Distance to Significant Turtle Over-Wintering Habitat (m)	Approx. Distance to Significant Turtle Nesting Habitat (m)	Approx. Distance to Significant Amphibian Corridor (m)		
				5	6	9
T-280 Blade Tip	--	71	71	--	--	--
T-295 Blade Tip	--	91	91	--	--	--
T-299 Blade Tip	--	--	--	--	--	98
Access Road (T-273, T-280)	5	5	5	119	--	--
Access Road (T-295, T-296, T-299)	18	18	18	--	118	0
Temp. Construction Area (T-280)	5	5	5	--	--	--
Temp. Construction Area (T-295)	44	48	48	--	--	--
Temp. Construction Area (T-299)	--	--	--	--	--	28
Temp. Construction Area (Met Tower Option 2)	30	35	35	--	--	--
Collector System	2	0	0	0	0	--

*The distance from the natural features to the temporary crane path and the collector system (under the access road) are assumed to correspond with the distance to the access road.

5.4.32.2 Pre-construction Monitoring (Habitat Use Study)

Pre-construction monitoring will be conducted within the significant amphibian woodland breeding habitat to confirm habitat use by amphibians. Monitoring will be partially based on OMNR's Wildlife Monitoring Programs and Inventory Techniques for Ontario (Konze and McLaren, 1997) and partially based on consultation with the OMNR. To ensure accuracy of the surveys, pre-construction monitoring methodologies will be reviewed by the OMNR prior to the commencement of field surveys.

Four site visits will be conducted within the amphibian breeding season. The first survey will be conducted in late March/early April to identify vernal pools and any evidence of salamander egg masses. Vernal pools will be assessed for the presence of key habitat characteristics critical for amphibian breeding (e.g., presence of shrubs and downed woody debris, and absence of predatory fish). The remainder of the surveys will be conducted within the recommended timing windows for Central Ontario (Survey 1: April 15 - 30; Survey 2: May 15 - 30; and Survey 3: June 15 - 30). Each site visit will consist of both visual and auditory observations of the vernal pools indentified during the first site survey. Prior to dusk, the surveyor will look for visual evidence of amphibian breeding including adult frogs, tadpoles or egg masses. An observer, sitting or standing quietly, can often see and identify frogs resting on vegetation, logs, etc. in ponds during the day. Downed wood or other objects under which amphibians may be hiding shall be moved (and then replaced) during a visual encounter search (Konze and McLaren, 1997).

After dusk, the surveyor will conduct auditory surveys in the form of amphibian breeding call counts. These surveys start at least one-half hour after sunset and finish before midnight.

Efforts must be made to conduct the surveys under appropriate weather conditions. Ideal calling conditions consist of winds less than level three on the Beaufort scale and warm, damp nights with light rain or fog. Counts shall not be conducted if the wind is strong enough to raise dust or move small branches. As a guide, minimum night-time air temperatures shall be at least 8°C for the first survey, 13°C for the second and 21°C for the third. Surveys may be conducted at lower temperatures if there is strong calling activity. During amphibian breeding call counts, the surveyor will stand at each pond for 3-minutes. All calling activity will be ranked using one of the following three abundance code categories;

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

A final visual survey will also be conducted after dusk. At night, observers wearing headlamps can detect the presence of anurans by eyeshine. The reflection from the eyes of frogs and toads makes them visible in dense vegetation and at long distances (Konze and McLaren, 1997). An amphibian woodland breeding pond will be considered significant wildlife habitat if the presence of a breeding population of one or more of the species listed in the Draft SWH Ecoregion Criteria Schedules (Schedule 2; OMNR, 2009) with at least 20 individuals is confirmed during pre-construction monitoring. Listed species include: eastern newt, blue-spotted salamander, spotted salamander, gray treefrog, spring peeper, chorus frog and/or wood frog.

Movement surveys will be conducted in June at the Amphibian Corridor 8 (between Features 36 and 37) and Amphibian Corridor 9 (between Features 37 and 39). The surveys will consist of erecting barriers (silt fence) in the location of the proposed access roads in the significant amphibian corridor habitats prior to the juvenile emergence season. To the greatest extent possible, the barriers will be located where amphibians are most likely to be ingressing or egressing the feature (i.e., near vernal pools). The length of the barriers will be 60 m in length. The barriers will be surveyed every day for one week in June to document amphibians using the corridor and once again in July/August, if necessary (based on consultation with the OMNR). The barriers will be left standing for the full week and will be monitored at dawn, mid-day and dusk to prevent desiccation of amphibians. Any amphibian identified along the edge of the barrier will be moved to the closest woodland/wetland feature to prevent desiccation of amphibians. The surveys will consist of walking the extent of the barriers (on both sides) to identify amphibians. The extent of the proposed access roads between Features 36 and 37 and Features 37 and 39 will also be walked to survey visually for amphibian movement. Should amphibian mortality be detected due to the presence of the semi-permanent barriers, the barriers will be set up before dusk each day of the survey, checked at dawn for amphibians and then laid down flat or removed for the day.

There are three possible outcome scenarios which could result from the pre-construction monitoring, including 1) a breeding population of at least 20 individual amphibians is not confirmed to be using the woodland or corridor habitats, 2) a breeding population of at least 20

individual amphibians is confirmed to be using the woodland habitats, but not the corridor habitat, or 3) a breeding population of at least 20 individual amphibians is confirmed to be using the woodland and corridor habitats.

If there is an insufficient amphibian breeding population present at the site based on criteria provided in the Draft SWH Ecoregion Criteria Schedules, no further monitoring will be required. If pre-construction monitoring does identify a breeding population of at least 20 individual amphibians is documented in the woodland or corridor habitats, then the features will be considered significant amphibian woodland breeding habitat and /or amphibian corridor habitat and mitigation measures will be applied to manage potential impacts. The results of all pre-construction monitoring will be shared with the OMNR/MOE to confirm significance and modify mitigation measures, where necessary. Potential effects to significant amphibian woodland breeding habitat, proposed mitigation and post-construction monitoring to be implemented in this scenario are discussed below.

Based on consultation with the OMNR, potential impacts of the Project on turtle over-wintering habitat and turtle nesting habitat may occur during construction, operation and decommissioning; however, habitat use studies to confirm significance are not necessary to implement appropriate mitigation. As such, general mitigation measures will be applied and are discussed in 5.4.32.4. As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant habitat of species of conservation concern is considered existing and significant and does not require the application of a habitat use study to confirm significance.

5.4.32.3 Potential Effects

The potential effects of the Project on significant woodlands, significant wetlands, significant valleylands and significant wildlife habitats (bat maternal colony roost habitat, amphibian woodland breeding habitat, habitat of species of conservation concern and amphibian corridor habitat) are described in Sections 5.2.1, 5.2.3 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1, 5.2.3 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.32.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland, significant valleyland and significant wildlife habitat associated with Feature 37. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 37. The specific mitigation strategy to protect the significant woodland, significant valleyland and significant wildlife habitats will include the following:

- Prior to construction, the outer limits of the temporary construction area will be staked and marked to ensure that contractors remain within the temporary construction areas.

A minimum distance of 5 m will be established and a silt barrier constructed between the wetland and temporary construction areas;

- Prior to construction, the boundary of the significant wetland, significant woodland and significant valleyland (and thus the significant wildlife habitat) within 30 m of the temporary construction areas for Turbine 273, 280, 295, 296, and 299 will be staked and flagged, and a silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant feature and to assist with the proper field installation of erosion and sediment controls measures;
- During construction, a 5 m buffer will be established between the drip line of the significant wetland (Wetland 37d)/woodland and the permanent access road to minimize root zone damage and hydrological changes to the feature. Silt fencing will be established at the edge of the buffer to prevent sedimentation and erosion of soils into the significant wetland/woodland. The buffer area will not be disturbed during construction and will be seeded with species native to the ecoregion upon completion of construction, if necessary;
- The silt fencing will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- Where the Project Location is located within 120 m of significant turtle nesting habitat, turbine excavations, access road construction and collector line installation will be conducted outside the turtle nesting season (late May to mid-July). Should construction be required during this period, the edge of excavation areas will be fenced off (with silt fencing) where excavations are left overnight to prevent turtles from entering turbine excavation areas and attempting to nest;
- Where the collector system crosses the valleylands within the municipal road allowance at Kerry's Line and Division Line, the collector system will move to above ground lines approximately 30 m from the valleyland, to reduce the overall impact to the valleyland that will occur if large bore pits were required for directional drilling. To mitigate impacts to Wetland 37e, the above ground poles will be constructed on the east side of Kerry's Line within the municipal road allowance. Silt fencing will be installed prior to construction along the boundary of the municipal road allowance, in areas were poles are required, to inhibit sediment flow. The silt-fencing barriers will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- Within the valleyland at Kingsbridge Line, the collector system will be buried within the road bed to avoid potential impacts to the adjacent woodland and wetland features as excavation will occur in the travelled portion of the road. The feasibility of this method will be discussed with ACW Township. If the proposed method is not feasible, the collector system will move to above ground lines approximately 30 m from the valleyland to reduce the overall impact to the valleyland that would occur if large bore pits were required for directional drilling. The overhead collector lines will be installed on above ground poles. Silt fencing will be installed prior to construction along the boundary of the municipal road allowance, in areas were poles are required, to inhibit sediment flow;

- To prevent damage to the root zone, excavation of soils for the purpose of underground collector system installation on private lands will occur at the minimum distance of 5 m away from the drip line of the significant woodland, wetland and valleyland. Cable trenches within 30 m of the significant woodland, wetland and valleyland will be filled immediately to prevent soil erosion and sedimentation issues;
- Power cable trenches within 30 m of the wetlands will be bedded with sand and backfilled with native soils or appropriate fill material, with clay plugs every 30 m to ensure that potential groundwater entering the trenches is not drawn along the sand/fill conduit and hydrological conveyance to the wetland, if any, is maintained;
- Excavated soils from Turbines 280 and 295 will be stockpiled, stabilized and surrounded by silt-fencing to prevent turtle nesting;
- Where the Project Location is located within 120 m of significant turtle nesting habitat, turbine excavations, access road construction and collector line installation will be conducted outside the turtle nesting season (late May to mid-July). Should construction be required during this period, the edge of excavation areas will be fenced off (with silt fencing) where excavations are left overnight to prevent turtles from entering turbine excavation areas and attempting to nest;
- Should the amphibian corridor between Features 36 and 37 and Features 37 and 39 be identified as significant, a wildlife friendly culvert will be constructed under the access road to allow safe movement of amphibians between features;
- After turbines have been assembled, the temporary turbine construction area will be restored to pre-existing conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production;
- Portions of the permanent access roads within 30 m of the wetland will be constructed at or near existing grade to maintain surface flow contributions to the wetland;
- Tree pruning will be minimized to the greatest extent possible. To the extent practical, pruning will be avoided during leaf fall, typically between September and November. Prior to construction, the limits of tree pruning will be marked in the field. Tree pruning will be supervised by a qualified arborist. The Construction Contractor will ensure that no construction disturbance occurs beyond the marked limits;
- In some cases, tree removal may be necessary within the road allowance for health and safety or electrical safety reason. Tree removal required will be completed consultation with the MVCA and a certified arborist. As appropriate, and in consultation with the relevant parties (government, conservation authority, adjacent landowner) K2 Wind will replace trees removed with appropriate species in an alternate location;
- Where culverts are proposed within 30 m of a significant natural feature, enhanced sediment and erosion control measure (i.e., straw bales, double rows of sediment fencing, check dams) will be installed as added protection to filter runoff and further minimize potential sedimentation within the downstream features (wetland, woodland). This added protection is proposed to reduce environmental risk;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);

- Discharges from any de-watering shall be directed to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the woodland, wetland or valleyland unless required to maintain hydrological flow (based on detailed design);
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) to control during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, the net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of 'natural features' within Feature 37 are predicted to be low.

5.4.32.5 Post-Construction Monitoring

As avoidance behaviour of access roads is identified as a potential operational effect on amphibians, a minimum three-year post-construction amphibians monitoring plan will be implemented if the amphibian corridor habitat is identified as significant wildlife habitat. The objective of the monitoring will be to determine if Project operations have an effect on amphibian behaviour and habitat use of the corridor and adjacent amphibian woodland breeding habitat. The same protocols which are implemented during pre-construction surveys will be applied post-construction.

Since there are only five potential amphibian corridor habitats identified within the General Project Area (associated with Features 12, 13, 24, 33, 35, 36, 37 and 39), comparisons cannot be made between potentially "impacted" sites (within 120 m of the Project Location) and "control" sites (not within 120 m of the Project Location). Comparisons can only be made between pre-construction and post-construction survey results. While this type of comparison is

not ideal, post-construction data can be statistically compared to pre-construction data. However, without the use of control sites, data suggesting avoidance behaviour of amphibian corridor habitats should be taken with caution as confounding factors such as weather, disease and/or predators may influence the analysis. Should pre-construction surveys suggest the presence of other amphibian corridor habitat in the area but not within 120 m of the Project Location, the Proponent will make efforts to use these areas as 'control' sites to allow for a Before-After-Control-Impact study design.

The OMNR, along with the proponent and other relevant agencies, will collectively review the results of the post-construction monitoring to determine if a negative environmental effect is occurring, and whether such an effect is attributable to the wind turbines and not external factors. These discussions will determine if and when contingency measures shall be undertaken. The best available science and information will be considered when determining appropriate mitigation and will be determined in consultation with MOE and OMNR based on post-construction monitoring results.

5.4.33 Feature 39

Feature 39 is comprised of a significant woodland, significant bat maternal colony roost habitat, significant amphibian woodland breeding habitats and significant habitat of species of conservation concern (PIF bird species). The significant woodland feature is 19.0 ha and is composed of a mixture of deciduous ecosites dominated by sugar maple, with white ash, American elm and black cherry associates in the canopy and sub-canopy, and balsam poplar with white ash as an associate. The habitat of species of conservation concern (PIF bird species) within this feature is considered generalized candidate significant wildlife habitat and is assumed to be existing and significant.

5.4.33.1 Adjacent Project Components

Feature 39 falls within 120 m of Turbines 299 and 309, access roads, collector lines/data cables, and temporary turbine construction areas and crane paths. The minimum distance from Project components to the significant natural features are provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat (amphibian woodland breeding habitat and habitat of species of conservation concern) can be considered the edge of the significant woodland. There are no watercourse crossings associated with this feature.

Project Component	Approx. Distance to Significant Woodland (m)	Approx. Distance to Significant Wetland (m)	Approx. Distance to Significant Bat Maternal Colony Roost Habitat (m)	Approx. Distance to Significant Amphibian Woodland Breeding Habitat (m)
T-299 Base	102	--	102	102
T-299 Blade Tip	52	104	52	52
T-309 Base	90	110	90	90
T-309 Blade Tip	40	60	40	40
Access Road (T-299)	110	--	110	110
Access Road (T-309)	98	115	98	98
Temp. Construction Area (T-299)	5	49	5	5
Temp. Construction Area (T-309)	5	5	5	5

*The distance from the natural features to the temporary crane path and the collector system (under the access road) are assumed to correspond with the distance to the access road.

5.4.33.2 Pre-construction Monitoring (Habitat Use Study)

Pre-construction monitoring will be conducted within the significant amphibian woodland breeding habitat to confirm habitat use by amphibians. Monitoring will be partially based on OMNR's Wildlife Monitoring Programs and Inventory Techniques for Ontario (Konze and McLaren, 1997) and partially based on consultation with the OMNR. To ensure accuracy of the surveys, pre-construction monitoring methodologies will be reviewed by the OMNR prior to the commencement of field surveys.

Four site visits will be conducted within the amphibian breeding season. The first survey will be conducted in late March/early April to identify vernal pools and any evidence of salamander egg masses. Vernal pools will be assessed for the presence of key habitat characteristics critical for amphibian breeding (e.g., presence of shrubs and downed woody debris, and absence of predatory fish). The remainder of the surveys will be conducted within the recommended timing windows for Central Ontario (Survey 1: April 15 - 30; Survey 2: May 15 - 30; and Survey 3: June 15 - 30). Each site visit will consist of both visual and auditory observations of the vernal pools indentified during the first site survey. Prior to dusk, the surveyor will look for visual evidence of amphibian breeding including adult frogs, tadpoles or egg masses. An observer, sitting or standing quietly, can often see and identify frogs resting on vegetation, logs, etc. in ponds during the day. Downed wood or other objects under which amphibians may be hiding shall be moved (and then replaced) during a visual encounter search (Konze and McLaren, 1997).

After dusk, the surveyor will conduct auditory surveys in the form of amphibian breeding call counts. These surveys start at least one-half hour after sunset and finish before midnight. Efforts must be made to conduct the surveys under appropriate weather conditions. Ideal calling conditions consist of winds less than level three on the Beaufort scale and warm, damp nights with light rain or fog. Counts shall not be conducted if the wind is strong enough to raise

dust or move small branches. As a guide, minimum night-time air temperatures shall be at least 8°C for the first survey, 13°C for the second and 21°C for the third. Surveys may be conducted at lower temperatures if there is strong calling activity. During amphibian breeding call counts, the surveyor will stand at each pond for 3-minutes. All calling activity will be ranked using one of the following three abundance code categories;

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

A final visual survey will also be conducted after dusk. At night, observers wearing headlamps can detect the presence of anurans by eyeshine. The reflection from the eyes of frogs and toads makes them visible in dense vegetation and at long distances (Konze and McLaren, 1997). An amphibian woodland breeding pond will be considered significant wildlife habitat if the presence of a breeding population of one or more of the species listed in the Draft SWH Ecoregion Criteria Schedules (Schedule 2; OMNR, 2009) with at least 20 individuals is confirmed during pre-construction monitoring. Listed species include: eastern newt, blue-spotted salamander, spotted salamander, gray treefrog, spring peeper, chorus frog and/or wood frog.

Movement surveys will be conducted in June at the Amphibian Corridor 9 (between Features 37 and 39). The surveys will consist of erecting a barrier (silt fence) in the location of the proposed access road in the significant amphibian corridor habitat prior to the juvenile emergence season. To the greatest extent possible, the barrier will be located where amphibians are most likely to be ingressing or egressing the feature (i.e., near vernal pools). The length of the barrier will be 40 m in length. The barrier will be surveyed every day for one week in June to document amphibians using the corridor and once again in July/August, if necessary (based on consultation with the OMNR). The barrier will be left standing for the full week and will be monitored at dawn, mid-day and dusk to prevent desiccation of amphibians. Any amphibian identified along the edge of the barrier will be moved to the closest woodland/wetland feature to prevent desiccation of amphibians. The surveys will consist of walking the extent of the barrier (on both sides) to identify amphibians. The extent of the proposed access road between Features 37 and 39 will also be walked to survey visually for amphibian movement. Should amphibian mortality be detected due to the presence of the semi-permanent barrier, the barrier will be set up before dusk each day of the survey, checked at dawn for amphibians and then laid down flat or removed for the day.

There are three possible outcome scenarios which could result from the pre-construction monitoring, including 1) a breeding population of at least 20 individual amphibians is not confirmed to be using the woodland or corridor habitats, 2) a breeding population of at least 20 individual amphibians is confirmed to be using the woodland habitats, but not the corridor habitat, or 3) a breeding population of at least 20 individual amphibians is confirmed to be using the woodland and corridor habitats.

If there is an insufficient amphibian breeding population present at the site based on criteria provided in the Draft SWH Ecoregion Criteria Schedules, no further monitoring will be required. If pre-construction monitoring does identify a breeding population of at least 20 individual amphibians is documented in the woodland or corridor habitats, then the features will be considered significant amphibian woodland breeding habitat and /or amphibian corridor habitat and mitigation measures will be applied to manage potential impacts. The results of all pre-construction monitoring will be shared with the OMNR/MOE to confirm significance and modify mitigation measures, where necessary. Potential effects to significant amphibian woodland breeding habitat, proposed mitigation and post-construction monitoring to be implemented in this scenario are discussed below.

Pre-construction monitoring will be conducted within the significant bat maternal colony roost habitat to confirm habitat use by bats. Candidate roost trees (snags/cavity trees) will be monitored for evidence of maternity colonies through exit surveys following the protocols outlined in OMNR's *Bat and Bat Habitats: Guidelines for Wind Power Projects* (OMNR, 2011b). To ensure accuracy of the surveys, pre-construction monitoring methodologies will be reviewed by the OMNR prior to the commencement of field surveys.

A total of 19 snags/cavity trees will be surveyed throughout the feature, as per the OMNR's requirement for 10 snags/cavity trees plus one snag/cavity tree per hectare above the 10 ha size threshold (the feature is 19.0 ha) The best candidate trees for the exit surveys will be determined based on the criteria outlined in Section 4.1.4.1 (Bat Maternal Colony Roost Habitat). Exit surveys will be conducted during the month of June. Surveyors will choose a location with a clear view of the cavity opening or crevice (multiple surveyors may be required if multiple openings are present in one snag). The cavity opening or crevice will be monitored for any evidence of bats beginning 30 minutes before dusk until 60 minutes after dusk for evidence of bats. Modern broadband bat detectors (automated systems in conjunction with computer software analysis packages or manual devices) with condenser microphones may be used in conjunction with visual surveys to determine species using roost habitats. Each candidate roost tree will only be monitored once prior to construction. If any two bats are observed or detected, it will serve as confirmation that a maternity roost is present.

There are two possible outcome scenarios which could result from the pre-construction monitoring, including; 1) there is no evidence of habitat use in the candidate roost trees, or 2) habitat use by at least two bats is confirmed in at least one candidate roost tree.

If pre-construction monitoring confirms habitat use by at least two bats in any one candidate bat maternal colony roost trees, then the entire ELC stand (woodland) will be considered significant wildlife habitat and mitigation measures will be applied to manage potential impacts. The results of all pre-construction monitoring will be shared with the OMNR/MOE to confirm significance and modify mitigation measures, where necessary. Potential effects, proposed mitigation and post-construction monitoring to be implemented in this scenario are discussed below.

As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant habitat of species of conservation concern is considered existing and significant and does not require the application of habitat use studies to confirm significance.

5.4.33.3 Potential Effects

The potential effects of the Project on significant woodlands, significant wetlands and significant wildlife habitats (bat maternal colony roost habitat, amphibian woodland breeding habitat and habitat of species of conservation concern) are described in Sections 5.2.1, 5.2.2 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1, 5.2.2 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.33.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland, significant wetland and significant wildlife habitats associated with Feature 39. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 39. The specific mitigation strategy to protect the significant woodland, significant wetland and significant wildlife habitats will include the following:

- Prior to construction, the outer limits of the construction area will be staked and marked to ensure that contractors remain within the temporary construction areas. A minimum distance of 5 m will be established and a silt barrier constructed between the wetland and temporary construction areas;
- The boundaries of the significant woodland and wetland (and thus the wildlife habitat) within 30 m of the proposed temporary construction areas for Turbines 299 and 309 will be staked and flagged, and silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant woodland and to assist with the proper field installation of erosion and sediment controls measures;
- The silt fencing will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- Should the amphibian corridor between Features 37 and 39 be identified as significant, a wildlife friendly culvert will be constructed under the access road to allow safe movement of amphibians between features;
- After turbines have been assembled, the temporary turbine construction area will be restored to pre-existing conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production;

- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Discharges from any de-watering shall be directed to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the woodland unless required to maintain hydrological flow (based on detailed design);
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, the net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of 'natural features' within Feature 39 are predicted to be low.

5.4.33.5 Post-Construction Monitoring

As avoidance behaviour of access roads is identified as a potential operational effect on amphibians, a minimum three-year post-construction amphibians monitoring plan will be implemented if the amphibian corridor habitat is identified as significant wildlife habitat. The objective of the monitoring will be to determine if Project operations have an effect on amphibian behaviour and habitat use of the corridor and adjacent amphibian woodland breeding habitat. The same protocols which are implemented during pre-construction surveys will be applied post-construction.

Since there are only five potential amphibian corridor habitats identified within the General Project Area (associated with Features 12, 13, 24, 33, 35, 36, 37 and 39), comparisons cannot be made between potentially "impacted" sites (within 120 m of the Project Location) and

"control" sites (not within 120 m of the Project Location). Comparisons can only be made between pre-construction and post-construction survey results. While this type of comparison is not ideal, post-construction data can be statistically compared to pre-construction data. However, without the use of control sites, data suggesting avoidance behaviour of amphibian corridor habitats should be taken with caution as confounding factors such as weather, disease and/or predators may influence the analysis. Should pre-construction surveys suggest the presence of other amphibian corridor habitat in the area but not within 120 m of the Project Location, the Proponent will make efforts to use these areas as 'control' sites to allow for a Before-After-Control-Impact study design.

As avoidance behaviour of turbines is identified as a potential operational effect, a minimum three-year post-construction bat monitoring plan will be implemented if the habitat is identified as significant wildlife habitat. The objective of the monitoring will be to determine if Project operations have an effect on bat behaviour and habitat use. The same protocols which are implemented during pre-construction surveys will be applied post-construction. Significant bat maternal colony roost habitats will be monitored for evidence of maternity colonies through exit surveys following the protocols outlined in OMNR's *Bat and Bat Habitats: Guidelines for Wind Power Projects* (OMNR, 2011b). All snags/cavity trees identified during pre-construction surveys, regardless of evidence of habitat use, will be surveyed during post-construction monitoring.

Species diversity and density will be compared between pre-construction and post-construction conditions. If bat maternal colony trees are located within the ELC stand but not within 120 m of the Project Location, these sites will be used as 'control' sites to document potential changes in species diversity and density compared to potential 'impacted' sites (within 120 m of the Project Location). This approach allows for a Before-After-Control-Impact design. Consistency in the survey methods will allow for defensible comparisons of the post-construction disturbance effects. Post-construction data will be statistically compared to pre-construction data. This will allow yearly comparisons of potential post-construction effects while statistically controlling for external factors such as weather, disease and depredation.

The OMNR, along with the proponent and other relevant agencies, will collectively review the results of the post-construction monitoring to determine if a negative environmental effect is occurring, and whether such an effect is attributable to the wind turbines and not external factors. These discussions will determine if and when contingency measures shall be undertaken. The best available science and information will be considered when determining appropriate mitigation and will be determined in consultation with MOE and OMNR based on post-construction monitoring results.

5.4.34 Feature 42

Feature 42 is comprised of a significant woodland, significant interior forest breeding bird habitat and significant habitat of species of conservation concern (PIF bird species). The significant woodland feature is 145.5 ha and is consistent with cultural woodland, cultural plantation (white pine), upland deciduous woods and deciduous swamp. The interior forest breeding bird habitat

and habitat of species of conservation concern (PIF bird species) within this feature is considered generalized candidate significant wildlife habitat and is assumed to be existing and significant.

5.4.34.1 Adjacent Project Components

Feature 42 falls within 120 m of the temporary construction area for Turbine 243 and the collector system within the municipal road allowance. The minimum distance from Project components to the significant woodland is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats were only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the significant woodland. There is one watercourse crossing downstream of Feature 42 on Halls Hill Line (see Figure 8.14, Appendix A). The preferred method of crossing would be open cut.

Project Component	Approx. Distance to Significant Woodland (m)
Temp. Construction Area (T-243)	114
Collector System (within road allowance)	26

5.4.34.2 Pre-construction Monitoring (Habitat Use Study)

As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant wildlife habitat (in this case, interior forest breeding bird habitat and habitat of species of conservation concern) are to be considered existing and significant and do not require the application of habitat use studies to confirm significance.

5.4.34.3 Potential Effects

The potential effects of the Project on significant woodlands and significant wildlife habitats (interior forest breeding bird habitat and habitat of species of conservation concern) are described in Sections 5.2.1 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.34.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland and significant wildlife habitat associated with Feature 42. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 42. The specific mitigation strategy to protect the significant woodland will include the following:

- Prior to construction the outer limits of the construction area will be staked and marked to ensure that contractors remain within the temporary construction areas;
- The boundaries of the significant woodland (and thus the wildlife habitat) within 30 m of the proposed temporary construction area will be staked and flagged, and silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant woodland and to assist with the proper field installation of erosion and sediment controls measures;
- The silt fencing will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- The preferred design is to excavate soils for the purpose of underground collector system installation in the municipal road allowance at a minimum 5 m away from the significant woodland boundary. Issues may arise in the detailed design or construction that requires the line be constructed closer than 5 m. In the event that subsurface condition do not allow for placement of the collector system 5 m away, the collector system will be placed as close to the road as safe and allowable by the Township or County to create as much buffer from the significant woodland. Cable trenches will be filled immediately after installation is complete to prevent soil erosion and sedimentation issues;
- Should the construction of underground collector lines not be feasible within the municipal road allowance on the edge of the feature, collector lines will be installed above ground on wooden poles;
- Tree pruning will be minimized to the greatest extent possible. To the extent practical, pruning will be avoided during leaf fall, typically between September and November. Prior to construction, the limits of tree pruning will be marked in the field. Tree pruning will be supervised by a qualified arborist. The Construction Contractor will ensure that no construction disturbance occurs beyond the marked limits;
- In some cases, tree removal may be necessary within the road allowance for health and safety or electrical safety reason. Tree removal required will be completed consultation with the MVCA and a certified arborist. As appropriate, and in consultation with the relevant parties (government, conservation authority, adjacent landowner) K2 Wind will replace trees removed with appropriate species in an alternate location;
- Where culverts upgrades are proposed within 30 m of the significant woodland, enhanced sediment and erosion control measure (i.e., straw bales, double rows of sediment fencing, check dams) will be installed as added protection to filter runoff and further minimize potential sedimentation within the downstream significant woodland;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;

- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, no net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of 'natural features' within Feature 42 are predicted.

5.4.35 Feature 43

Feature 43 is comprised of a significant woodland and significant amphibian corridor habitat. The significant woodland feature is 7.6 ha and is consistent with cultural woodland dominated by basswood and hawthorns, with some apple. The significant amphibian corridor habitat within this feature is considered generalized candidate significant wildlife habitat and is assumed to be existing and significant.

5.4.35.1 Adjacent Project Components

Feature 43 falls within 120 m of a collector system within a municipal road allowance. The minimum distance from Project components to the significant woodland is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats were only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the significant woodland. There are three watercourse crossings downstream of Feature 43 on Halls Hill Line (see Figure 8.17, Appendix A). The preferred method of crossing would be open cut.

Project Component	Approx. Distance to Significant Woodland (m)
Collector System (within road allowance)	5

5.4.35.2 Pre-construction Monitoring (Habitat Use Study)

As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant wildlife habitat (in this case, amphibian corridor habitat) are to be considered existing and significant and do not require the application of habitat use studies to confirm significance.

5.4.35.3 Potential Effects

The potential effects of the Project on significant woodlands and significant wildlife habitats (amphibian corridor habitat) are described in Sections 5.2.1 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.35.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland and significant wildlife habitat associated with Feature 43. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 43. The specific mitigation strategy to protect the significant woodland will include the following:

- Prior to construction the outer limits of the construction area will be staked and marked to ensure that contractors remain within the temporary construction areas;
- The boundaries of the significant woodland (and thus the wildlife habitat) within 30 m of the proposed construction area will be staked and flagged, and silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant woodland and to assist with the proper field installation of erosion and sediment controls measures;
- The silt fencing will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- The preferred design is to excavate soils for the purpose of underground collector system installation in the municipal road allowance 5 m away from the significant woodland boundary. Issues may arise in the detailed design or construction that requires the line be constructed closer than 5 m. In the event that subsurface condition do not allow for placement of the collector system 5 m away, the collector system will be placed as close to the road as safe and allowable by the Township or County to create as much buffer from the significant woodland. Cable trenches will be filled immediately after installation is complete to prevent soil erosion and sedimentation issues;
- Should the construction of underground collector lines not be feasible within the municipal road allowance on the edge of the feature, collector lines will be installed above ground on wooden poles;

- Tree pruning will be minimized to the greatest extent possible. To the extent practical, pruning will be avoided during leaf fall, typically between September and November. Prior to construction, the limits of tree pruning will be marked in the field. Tree pruning will be supervised by a qualified arborist. The Construction Contractor will ensure that no construction disturbance occurs beyond the marked limits;
- In some cases, tree removal may be necessary within the road allowance for health and safety or electrical safety reason. Tree removal required will be completed consultation with the MVCA and a certified arborist. As appropriate, and in consultation with the relevant parties (government, conservation authority, adjacent landowner) K2 Wind will replace trees removed with appropriate species in an alternate location;
- Where culverts upgrades are proposed within 30 m of the significant woodland and significant amphibian corridor, enhanced sediment and erosion control measure (i.e., straw bales, double rows of sediment fencing, check dams) will be installed as added protection to filter runoff and further minimize potential sedimentation within the downstream significant woodland. Culvert upgrades will be designed to maintain seasonal amphibian corridor habitat;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, no net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of ‘natural features’ within Feature 43 are predicted.

5.4.36 Feature 44

Feature 44 has been identified as containing a significant woodland, two significant wetlands, significant waterfowl nesting habitat, a significant rare vegetation community, significant interior forest breeding bird habitat, a significant rare vegetation community, significant amphibian woodland breeding habitats, significant terrestrial crayfish habitat and significant habitat of species of conservation concern (PIF bird species). The rare vegetation community, interior forest breeding bird habitat, terrestrial crayfish habitat and habitat of species of conservation

concern (PIF bird species) are considered generalized candidate significant wildlife habitat and are assumed to be existing and significant.

5.4.36.1 Adjacent Project Components

Feature 44 falls within 120 m of Turbines 261, 274 and 277, access roads, collector lines/data cables and temporary crane paths and turbine construction areas. The minimum distance from Project components to each significant natural feature within Feature 44 is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the significant woodland. There are two watercourse crossings upstream of Feature 44 on Halls Hill Line (see Figures 8.17 and 8.20, Appendix A). The preferred method of crossing would be open cut.

Project Component	Approx. Distance to Significant Woodland (m)	Approx. Distance to Significant Wetland (m)		Approx. Distance to Significant Waterfowl Nesting Habitat (m)	Approx. Distance to Significant Amphibian Woodland Breeding Habitat (m)
		44a	44b		44a
T-261 Blade Tip	106	--	--	--	--
T-274 Blade Tip	93	118	96	96	--
T-277 Base	92	--	82	--	109
T-277 Blade Tip	42	--	32	--	59
Access Road (T-274, T-276)	7	15	--	7	120
Temp. Construction Area (T-261)	47	--	--	--	--
Temp. Construction Area (T-274)	63	68	54	63	--
Temp, Construction Area (T-276)	103	--	--	--	--
Temp. Construction Area (T-277)	5	--	5	28	33
Collector System (within road allowance)	32	--	32	32	--

*The distance from the natural features to the temporary crane path and the collector system (under the access road) are assumed to correspond with the distance to the access road.

5.4.36.2 Pre-construction Monitoring (Habitat Use Study)

Pre-construction monitoring will be conducted within the significant waterfowl nesting habitat to confirm habitat use by waterfowl. Monitoring will consist of surveys every other week during the breeding season between the months of May and June to identify breeding territories, species diversity, the relative abundance of individuals and the density of active nests. Field surveys will follow recommended surveys outlined by the Canadian Wildlife Federation for bird ground surveys. Surveys will include a focus on large diameter trees (>40 cm dbh) to account for Wood Duck and Hooded Merganser nest sites. Field surveys will also determine the boundary of the

waterfowl nesting habitat; this may be greater or less than 120 m from the wetland but must provide enough habitat for waterfowl to nest successfully. Habitat use surveys will also identify the patterns of movement of nesting waterfowl to and from the site, as well as the success of any documented nesting sites. Visual surveys for waterfowl will be conducted using binoculars with a minimum 10x magnification.

Surveys will be conducted using the 'standardized area searches' protocols outlined in the *Birds and Bird Habitats: Guidelines for Wind Power Project*s (OMNR, 2011c). The standardized area searches will consist of a fixed width transects throughout the waterfowl nesting habitat. Transects will be continuous and traversed on foot, where possible based on land access permission on non-participating properties. To ensure accuracy of the surveys, pre-construction monitoring methodologies and transect locations will be reviewed by the OMNR prior to the commencement of field surveys.

Surveys will be undertaken during the early morning hours and not extend beyond noon. Data recorded will include:

- The level of effort for each visit (date, start time, finish time, hours of searching, weather conditions during the survey and the distance/area covered);
- A complete list and abundance of species detected on each visit/each day (including waterfowl species);
- A basic description of the habitats covered; and,
- A GPS track log or shape file representing the area searched.

Surveys shall occur in calm weather conditions without precipitation or winds greater than 3-4 on the Beaufort scale.

To be considered significant wildlife habitat, surveys must confirm the presence of three or more nesting pairs of listed species except Mallard or 10 or more nesting pairs for listed species including Mallard. Listed species include American Black Duck, Northern Pintail, Northern Shoveler, Gadwall, Blue-winged Teal, American Green-winged, Teal, Wood Duck, or Hooded Merganser.

There are two possible outcome scenarios which could result from the pre-construction monitoring, including: 1) less than three nesting pairs of specified waterfowl species except Mallard or 10 or more nesting pairs for listed species including Mallard are present at the site, or 2) habitat use by at least three nesting pairs of specified waterfowl species except Mallard or 10 or more nesting pairs for listed species including Mallard is confirmed.

If habitat use based on the criteria listed above is not met, the habitat will not be considered significant wildlife habitat. As such, no further monitoring will be required. If pre-construction monitoring does identify habitat use based on the criteria listed above, then mitigation measures will be needed to manage potential impacts. Potential effects to significant waterfowl nesting habitat, proposed mitigation and post-construction monitoring to be implemented in this scenario are discussed below.

Based on consultation with the OMNR, potential impacts of the Project on significant amphibian woodland breeding habitat may occur during construction and decommissioning. As such, habitat use studies to confirm significance are not necessary to implement appropriate mitigation. General mitigation measures will be applied and are discussed in 5.4.36.4. As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant wildlife habitat (in this case, rare vegetation community, interior forest breeding bird habitat, terrestrial crayfish habitat and habitat of species of conservation concern (PIF bird species) are to be considered existing and significant and do not require the application of habitat use studies to confirm significance.

5.4.36.3 Potential Effects

The potential effects of the Project on significant woodlands, significant wetlands and significant wildlife habitats (waterfowl nesting habitat, rare vegetation community, interior forest breeding bird habitat, amphibian woodland breeding habitat, terrestrial crayfish habitat, habitat of species of conservation concern (PIF bird species) and amphibian corridor habitat) are described in Sections 5.2.1, 5.2.2 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1, 5.2.2 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.36.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland, significant wetlands and significant wildlife habitats associated with Feature 44. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 44. The specific mitigation strategy to protect the significant woodland, significant wetlands and significant wildlife habitats will include the following:

- Prior to construction the outer limits of the construction area will be staked and marked to ensure that contractors remain within the temporary construction areas. A minimum distance of 5 m will be established and a silt barrier constructed between the significant wetland (44a) and temporary construction area;
- The boundaries of the significant woodland and wetland (and thus the wildlife habitat) within 30 m of the proposed temporary construction area for Turbines 261, 274 and 277 as well as access road, crane path and collector lines/data cables, and the collector system will be staked and flagged, and silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant woodland and to assist with the proper field installation of erosion and sediment controls measures;
- During construction, a 5 m buffer will be established between the drip line of the significant wetland/woodland and the permanent access road to minimize root zone damage and hydrological changes to the feature. Silt fencing will be established at the

edge of the buffer to prevent sedimentation and erosion of soils into the significant wetland/woodland. The buffer area will not be disturbed during construction and will be seeded with species native to the ecoregion upon completion of construction, if necessary;

- The silt fencing will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- Portions of the permanent access roads within 30 m of the wetland will be constructed at or near existing grade to maintain surface flow contributions to the wetland;
- To prevent damage to the root zone, excavation of soils for the purpose of underground collector system installation on private lands will occur at the minimum distance of 5 m away from the drip line of the significant woodland and wetland. Cable trenches within 30 m of the significant woodland and wetland will be filled immediately to prevent soil erosion and sedimentation issues;
- Power cable trenches within 30 m of the wetland will be bedded with sand and backfilled with native soils or appropriate fill material, with clay plugs every 30 m to ensure that potential groundwater entering the trenches is not drawn along the sand/fill conduit and hydrological conveyance to the wetland, if any, is maintained;
- The preferred design is to excavate soils for the purpose of underground collector system installation in the municipal road allowance 5 m away from the significant woodland boundary. Issues may arise in the detailed design or construction that requires the line be constructed closer than 5 m. In the event that subsurface condition do not allow for placement of the collector system 5 m away, the collector system will be placed as close to the road as safe and allowable by the Township or County to create as much buffer from the significant woodland. Cable trenches will be filled immediately after installation is complete to prevent soil erosion and sedimentation issues;
- The proposed preparation activities will be designed and implemented so as not to alter historic drainage patterns to wetlands, waterfowl nesting habitat and amphibian woodland breeding habitat and will not significantly alter the elevations throughout the Project Location;
- After turbines have been assembled, the temporary turbine construction area will be restored to pre-existing conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production;
- Tree pruning will be minimized to the greatest extent possible. To the extent practical, pruning will be avoided during leaf fall, typically between September and November. Prior to construction, the limits of tree pruning will be marked in the field. Tree pruning will be supervised by a qualified arborist. The Construction Contractor will ensure that no construction disturbance occurs beyond the marked limits;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Discharges from any de-watering shall be directed to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the

woodland or wetland unless required to maintain hydrological flow (based on detailed design);

- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, the net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of 'natural features' within Feature 44 are predicted to be low.

5.4.36.5 Post-Construction Monitoring

As avoidance behaviour of turbines is identified as a potential operational effect on waterfowl nesting habitat, a minimum three-year post-construction waterfowl monitoring plan to assess habitat disturbance to waterfowl nesting habitat will be implemented if the habitat is identified as significant wildlife habitat. The objective of the monitoring will be to determine if Project operations have an effect on waterfowl behaviour and habitat use. The same survey protocols which are implemented during pre-construction surveys will be used.

Since there was only one potential waterfowl nesting habitat identified within the General Project Area, comparisons cannot be made between potentially "impacted" sites (within 120 m of the Project Location) and "control" sites (not within 120 m of the Project Location). Comparisons can only be made between pre-construction and post-construction survey results. While this type of comparison is not ideal, post-construction data can be statistically compared to pre-construction data. However, without the use of control sites, data suggesting avoidance behaviour of nesting waterfowl shall be taken with caution as confounding factors such as weather, disease and/or predators may influence the analysis. Should pre-construction surveys

suggest the presence of other waterfowl nesting habitat in the area but not within 120 m of the Project Location, the Proponent will make efforts to use these sites as 'control' sites to allow for a Before-After-Control-Impact study design.

The OMNR, along with the proponent and other relevant agencies, will collectively review the results of the post-construction monitoring to determine if a negative environmental effect is occurring, and whether such an effect is attributable to the wind turbines and not external factors. These discussions will determine if and when contingency measures shall be undertaken. The best available science and information will be considered when determining appropriate mitigation and will be determined in consultation with MOE and OMNR based on post-construction monitoring results.

5.4.37 Feature 46

Feature 46 is comprised of a significant wetland and significant amphibian woodland breeding habitat. The wetland is 2.3 ha and is dominated by silver maple, with red ash and American elm. Jewelweed, false nettle, and scattered sedges and grass dominated the herbaceous ground layer. The amphibian corridor habitat within this feature is considered generalized candidate significant wildlife habitat and is assumed to be existing and significant.

5.4.37.1 Adjacent Project Components

Feature 46 falls within 120 m of Turbine 305 and the associated temporary turbine construction area. The minimum distance from Project components to the significant wetland is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the wetland. There are no watercourse crossings associated with this feature.

Project Component	Approx. Distance to Significant Wetland (m)
T-305 Blade Tip	83
Temp. Construction Area (T-305)	18

5.4.37.2 Pre-construction Monitoring (Habitat Use Study)

As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant amphibian woodland breeding habitat is considered existing and significant and does not require the application of a habitat use study to confirm significance.

5.4.37.3 Potential Effects

The potential effects of the Project on significant wetlands and significant wildlife habitats (amphibian woodland breeding habitat) are described in Sections 5.2.2 and 5.2.4, respectively.

No specific effects beyond those described in Sections 5.2.2 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.37.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant wetland and significant wildlife habitat associated with Feature 46. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 46. The specific mitigation strategy to protect the significant wetland and wildlife habitat will include the following:

- Prior to construction, the outer limits of the temporary construction area will be staked and marked to ensure that contractors remain within the temporary construction areas. A minimum distance of 5 m will be established and a silt barrier constructed between the wetland and temporary construction area;
- Prior to construction, the boundary of the wetland, significant woodland and valleyland (and thus the wildlife habitat) within 30 m of the proposed temporary construction areas for Turbine 305 will be staked and flagged, and a silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant feature and to assist with the proper field installation of erosion and sediment controls measures;
- The silt fencing will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- After turbines have been assembled, the temporary turbine construction area will be restored to pre-existing conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Discharges from any de-watering shall be directed to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the woodland or wetland unless required to maintain hydrological flow (based on detailed design);
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;

- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, no net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of 'natural features' within Feature 46 are predicted.

5.4.38 Feature 47

Feature 47 has been identified as containing a significant woodland, four significant wetlands, two significant amphibian woodland breeding habitats and significant habitat of species of conservation concern (PIF bird species). The habitat of species of conservation concern (PIF bird species) is considered generalized candidate significant wildlife habitat and is assumed to be existing and significant.

5.4.38.1 Adjacent Project Components

Feature 47 falls within 120 m of Turbine 321, an access road, collector lines/data cables and a temporary crane path and turbine construction area. The minimum distance from Project components to each significant natural feature within Feature 47 is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the significant woodland. There are no watercourse crossings associated with this feature.

Project Component	Approx. Distance to Significant Woodland (m)	Approx. Distance to Significant Wetland (m)				Approx. Distance to Significant Amphibian Woodland Breeding Habitat (m)	
		47a	47b	47c	47d	47a	47b
T-321 Blade Tip	97	--	109	97	--	--	--
Access Road (T-320, T-321)	6	28	17	--	116	20	99
Temp. Construction Area (T-320)	--	--	--	--	--	--	--
Temp. Construction Area (T-321)	48	--	48	43	--	79	--

*The distance from the natural features to the temporary crane path and the collector system (under the access road) are assumed to correspond with the distance to the access road.

5.4.38.2 Pre-construction Monitoring (Habitat Use Study)

Based on consultation with the OMNR, potential impacts of the Project on significant amphibian woodland breeding habitat may occur during construction and decommissioning. As such, habitat use studies to confirm significance are not necessary to implement appropriate mitigation. General mitigation measures will be applied and are discussed in 5.4.38.4. As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant habitat of species of conservation concern is considered existing and significant and does not require the application of a habitat use study to confirm significance.

5.4.38.3 Potential Effects

The potential effects of the Project on significant woodlands, significant wetlands and significant wildlife habitats (amphibian woodland breeding habitat and habitat of species of conservation concern) are described in Sections 5.2.1, 5.2.2 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1, 5.2.2 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.38.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland, significant wetlands and significant wildlife habitats associated with Feature 47. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 47. The specific mitigation strategy to protect the significant woodland, significant wetlands and significant wildlife habitats will include the following:

- Prior to construction the outer limits of the construction area will be staked and marked to ensure that contractors remain within the temporary construction areas. A minimum distance of 5 m will be established and a silt barrier constructed between the significant wetlands and temporary construction area;

- The boundaries of the significant woodland (and thus the wildlife habitat and wetlands) within 30 m of the proposed access road, crane path and collector system for Turbine 321 will be staked and flagged, and silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant woodland and to assist with the proper field installation of erosion and sediment controls measures;
- During construction, a buffer will be established from the stem line to the drip line where the significant woodland is immediately adjacent to a permanent access road. The purpose of the buffer is to minimize root zone damage and compaction. Silt fencing will be established at the edge of the drip line to prevent sedimentation and erosion of soils into the significant woodland. The buffer area will not be disturbed during construction and will be seeded with species native to the ecoregion upon completion of construction, if necessary;
- The silt fencing will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- Portions of the permanent access roads within 30 m of the wetland will be constructed at or near existing grade to maintain surface flow contributions to the wetland;
- Excavation of soils for the purpose of underground collector system installation will occur at the minimum distance of 5 m from the wetland features under the outer most edge of the access road (away from the feature) and within the 'buildable area'. Cable trenches within 30 m of the significant woodland will be filled immediately to prevent soil erosion and sedimentation issues;
- Power cable trenches within 30 m of the wetland will be bedded with sand and backfilled with native soils or appropriate fill material, with clay plugs every 30 m to ensure that potential groundwater entering the trenches is not drawn along the sand/fill conduit and hydrological conveyance to the wetland is maintained;
- After turbines have been assembled, the temporary turbine construction area will be restored to pre-existing conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production;
- Tree pruning will be minimized to the greatest extent possible. To the extent practical, pruning will be avoided during leaf fall, typically between September and November. Prior to construction, the limits of tree pruning will be marked in the field. Tree pruning will be supervised by a qualified arborist. The Construction Contractor will ensure that no construction disturbance occurs beyond the marked limits;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Discharges from any de-watering shall be directed to settling sumps, or overland to vegetated areas where appropriate, and shall not be released directly into the woodland or wetlands;
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;

- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, the net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of 'natural features' within Feature 47 are predicted to be low.

5.4.39 Feature 48

Feature 48 is comprised of a significant woodland, significant wetland, significant bat maternal colony roost habitat, six significant amphibian woodland breeding habitats and significant habitat of species of conservation concern (PIF bird species). The habitat of species of conservation concern (PIF bird species) within this feature is considered generalized candidate significant wildlife habitat and is assumed to be existing and significant.

5.4.39.1 Adjacent Project Components

Feature 48 falls within 120 m of Turbines 281, 290 and 297, access roads, collector lines/data cables and temporary crane paths and turbine construction areas. The minimum distance from Project components to the significant natural features are provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the significant woodland. There is one watercourse crossing downstream of Feature 48 on Lanesville Line (see Figure 8.20, Appendix A). The preferred method of crossing would be open cut.

Project Component	Approx. Distance to Significant Woodland (m)	Approx. Distance to Significant Wetland (m)	Approx. Distance to Significant Bat Maternal Colony Roost Habitat (m)
T-281 Blade Tip	74	--	74
T-290 Base	101	--	101
T-290 Blade Tip	51	111	51
T-297 Blade Tip	103	--	103
Access Road (T-281)	3	--	3
Access Road (T-290)	78	--	78
Temp. Construction Area (T-281)	18	--	18
Temp. Construction Area (T-290)	17	53	17
Temp. Construction Area (T-297)	44	--	44

*The distance from the natural features to the temporary crane path and the collector system (under the access road) are assumed to correspond with the distance to the access road.

Project Component	Approx. Distance to Significant Amphibian Woodland Breeding Habitat (m)					
	48b	48c	48d	48f	48g	48h
T-281 Blade Tip	--	--	--	--	--	--
T-290 Base	--	--	--	--	--	--
T-290 Blade Tip	--	--	--	--	--	--
T-297 Blade Tip	--	--	--	--	--	--
Access Road (T-281)	105	94	106	38	55	64
Access Road (T-290)	--	--	--	--	--	--
Temp. Construction Area (T-281)	--	--	--	--	--	--
Temp. Construction Area (T-290)	--	--	--	--	--	--
Temp. Construction Area (T-297)	--	--	--	--	--	--

*The distance from the natural features to the temporary crane path and the collector system (under the access road) are assumed to correspond with the distance to the access road.

5.4.39.2 Pre-construction Monitoring (Habitat Use Study)

Pre-construction monitoring will be conducted within the significant bat maternal colony roost habitat to confirm habitat use by bats. Candidate roost trees (snags/cavity trees) will be monitored for evidence of maternity colonies through exit surveys following the protocols outlined in OMNR's *Bat and Bat Habitats: Guidelines for Wind Power Projects* (OMNR, 2011b). To ensure accuracy of the surveys, pre-construction monitoring methodologies will be reviewed by the OMNR prior to the commencement of field surveys.

A total of 26 snags/cavity trees will be surveyed throughout the feature, as per the OMNR's requirement for 10 snags/cavity trees plus one snag/cavity tree per hectare above the 10 ha size threshold (the feature is 19.0 ha) The best candidate trees for the exit surveys will be determined based on the criteria outlined in Section 4.1.4.1 (Bat Maternal Colony Roost Habitat). Exit surveys will be conducted during the month of June. Surveyors will choose a location with a clear view of

the cavity opening or crevice (multiple surveyors may be required if multiple openings are present in one snag). The cavity opening or crevice will be monitored for any evidence of bats beginning 30 minutes before dusk until 60 minutes after dusk for evidence of bats. Modern broadband bat detectors (automated systems in conjunction with computer software analysis packages or manual devices) with condenser microphones may be used in conjunction with visual surveys to determine species using roost habitats. Each candidate roost tree will only be monitored once prior to construction. If any two bats are observed or detected, it will serve as confirmation that a maternity roost is present.

There are two possible outcome scenarios which could result from the pre-construction monitoring, including; 1) there is no evidence of habitat use in the candidate roost trees, or 2) habitat use by at least two bats is confirmed in at least one candidate roost tree.

If pre-construction monitoring confirms habitat use by at least two bats in any one candidate bat maternal colony roost trees, then the entire ELC stand (woodland) will be considered significant wildlife habitat and mitigation measures will be applied to manage potential impacts. The results of all pre-construction monitoring will be shared with the OMNR/MOE to confirm significance and modify mitigation measures, where necessary. Potential effects, proposed mitigation and post-construction monitoring to be implemented in this scenario are discussed below.

Based on consultation with the OMNR, potential impacts of the Project on significant amphibian woodland breeding habitat may occur during construction and decommissioning. As such, habitat use studies to confirm significance are not necessary to implement appropriate mitigation. As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant habitat of species of conservation concern is considered existing and significant and does not require the application of habitat use studies to confirm significance.

As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant wildlife habitat (in this case, habitat of species of conservation concern and amphibian corridor habitat) are to be considered existing and significant and do not require the application of habitat use studies to confirm significance.

5.4.39.3 Potential Effects

The potential effects of the Project on significant woodlands, significant wetlands and significant wildlife habitats (bat maternal colony roost habitat, amphibian woodland breeding habitat, habitat of species of conservation concern and amphibian corridor habitat) are described in Sections 5.2.1, 5.2.2 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1, 5.2.2 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.39.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland and significant wildlife habitats associated with Feature 48. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 48. The specific mitigation strategy to protect the significant woodland and significant wildlife habitat will include the following:

- Prior to construction the outer limits of the construction area will be staked and marked to ensure that contractors remain within the temporary construction areas;
- The boundaries of the significant woodland (and thus the wildlife habitat) within 30 m of the proposed temporary turbine construction areas, access roads, crane paths, and collector systems for Turbines 281, 290, and 297 will be staked and flagged, and silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant woodland and to assist with the proper field installation of erosion and sediment controls measures;
- During construction, a buffer will be established from the stem line to the drip line where the significant woodland is immediately adjacent to a permanent access road. The purpose of the buffer is to minimize root zone damage and compaction. Silt fencing will be established at the edge of the drip line to prevent sedimentation and erosion of soils into the significant woodland. The buffer area will not be disturbed during construction and will be seeded with species native to the ecoregion upon completion of construction, if necessary;
- The silt fencing will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- To prevent damage to the root zone, excavation of soils for the purpose of underground collector system installation on private lands will occur at the minimum distance of 5 m away from the drip line of the significant woodland. Cable trenches within 30 m of the significant woodland will be filled immediately to prevent soil erosion and sedimentation issues;
- After turbines have been assembled, the temporary turbine construction area will be restored to pre-existing conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Discharges from any de-watering shall be directed to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the woodland unless required to maintain hydrological flow (based on detailed design);
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;

- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, the net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of 'natural features' within Feature 48 are predicted to be low.

5.4.39.5 Post-Construction Monitoring

As avoidance behaviour of turbines is identified as a potential operational effect, a minimum three-year post-construction bat monitoring plan will be implemented if the habitat is identified as significant wildlife habitat. The objective of the monitoring will be to determine if Project operations have an effect on bat behaviour and habitat use. The same protocols which are implemented during pre-construction surveys will be applied post-construction. Significant bat maternal colony roost habitats will be monitored for evidence of maternity colonies through exit surveys following the protocols outlined in OMNR's *Bat and Bat Habitats: Guidelines for Wind Power Projects* (OMNR, 2011b). All snags/cavity trees identified during pre-construction surveys, regardless of evidence of habitat use, will be surveyed during post-construction monitoring.

Species diversity and density will be compared between pre-construction and post-construction conditions. If bat maternal colony trees are located within the ELC stand but not within 120 m of the Project Location, these sites will be used as 'control' sites to document potential changes in species diversity and density compared to potential 'impacted' sites (within 120 m of the Project Location). This approach allows for a Before-After-Control-Impact design. Consistency in the survey methods will allow for defensible comparisons of the post-construction disturbance effects. Post-construction data will be statistically compared to pre-construction data. This will

allow yearly comparisons of potential post-construction effects while statistically controlling for external factors such as weather, disease and depredation.

The OMNR, along with the proponent and other relevant agencies, will collectively review the results of the post-construction monitoring to determine if a negative environmental effect is occurring, and whether such an effect is attributable to the wind turbines and not external factors. These discussions will determine if and when contingency measures shall be undertaken. The best available science and information will be considered when determining appropriate mitigation and will be determined in consultation with MOE and OMNR based on post-construction monitoring results.

5.4.40 Feature 49

Feature 49 has been identified as containing a significant woodland, significant wetland, significant amphibian wetland breeding habitat, significant terrestrial crayfish habitat and significant habitat of species of conservation concern (PIF bird species and snapping turtle). The amphibian wetland breeding habitat, terrestrial crayfish habitat and habitat of species of conservation concern (PIF bird species) is considered generalized candidate significant wildlife habitat and is assumed to be existing and significant.

5.4.40.1 Adjacent Project Components

Feature 49 falls within 120 m of Turbine 288, 292, and 302, access roads, collector lines/data cables and temporary crane paths and turbine construction areas. The minimum distance from Project components to each significant natural feature within Feature 49 is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant habitat of species of conservation concern (PIF bird species) can be considered the edge of the significant woodland and the distance to the generalized candidate significant terrestrial crayfish habitat can be considered the edge of the meadow marsh wetland. There are two watercourse crossings upstream of Feature 49 on Zion Road (see Figures 8.19 and 8.22, Appendix A). The preferred method of crossing would be open cut.

Project Component	Approx. Distance to Significant Woodland (m)	Approx. Distance to Significant Wetland (m)	Approx. Distance to Significant Habitat of Species of Conservation Concern (Snapping Turtle) (m)
T-292 Blade Tip	92	--	--
T-298 Base	--	84	84
T-298 Blade Tip	88	34	34
T-302 Base	105	--	--
T-302 Blade Tip	55	--	--
Access Road (T-292)	10	--	--
Access Road (T-286, T-298)	--	105	105
Access Road (T-302, T-310)	8	--	--
Temp. Construction Area (T-292)	1	--	--
Temp. Construction Area (T-298)	62	8	8
Temp. Construction Area (T-302)	1	--	--

*The distance from the natural features to the temporary crane path and the collector system (under the access road) are assumed to correspond with the distance to the access road.

5.4.40.2 Pre-construction Monitoring (Habitat Use Study)

Based on consultation with the OMNR, potential impacts of the Project on significant snapping turtle habitat may occur during construction, operation and decommissioning; however, habitat use studies to confirm significance are not necessary to implement appropriate mitigation. As such, general mitigation measures will be applied and are discussed in 5.4.40.4. As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant wildlife habitat (in this case, habitat of species of conservation concern (PIF bird species), amphibian wetland breeding habitat and terrestrial crayfish habitat) are to be considered existing and significant and do not require the application of habitat use studies to confirm significance.

5.4.40.3 Potential Effects

The potential effects of the Project on significant woodlands, significant wetlands and significant wildlife habitats (amphibian wetland habitat, habitat of species of conservation concern and terrestrial crayfish habitat) are described in Sections 5.2.1, 5.2.2 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1, 5.2.2 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.40.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland, significant wetlands and significant wildlife habitats associated with Feature 49. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 49. The specific

mitigation strategy to protect the significant woodland, significant wetlands and significant wildlife habitats will include the following:

- Prior to construction, the outer limits of the temporary construction area will be staked and marked to ensure that contractors remain within the temporary construction areas. A minimum distance of 5 m will be established and a silt barrier constructed between the wetland and temporary construction area;
- Prior to construction, the boundary of the significant woodland and wetland (and thus the wildlife habitat) within 30 m of the proposed temporary turbine construction areas for Turbines 292, 298, 302 and the access roads, crane paths, and collector systems for Turbines 292 and 302 will be staked and flagged, and a silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant feature and to assist with the proper field installation of erosion and sediment controls measures;
- During construction, a buffer will be established from the stem line to the drip line where the significant woodland is immediately adjacent to a permanent access road. The purpose of the buffer is to minimize root zone damage and compaction. Silt fencing will be established at the edge of the drip line to prevent sedimentation and erosion of soils into the significant woodland. The buffer area will not be disturbed during construction and will be seeded with species native to the ecoregion upon completion of construction, if necessary;
- The silt-fencing barriers will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- Excavated soils from Turbine 298 will be stockpiled, stabilized and surrounded by silt-fencing to prevent snapping turtle nesting;
- Where the Project Location is located within 120 m of the turtle habitat, turbine excavations, access road construction and collector line installation will be conducted outside the turtle nesting season (late May to mid-July). Should construction be required during this period, the edge of excavation areas will be fenced off (with silt fencing) where excavations are left overnight to prevent turtles from entering turbine excavation areas and attempting to nest;
- To prevent damage to the root zone, excavation of soils for the purpose of underground collector system installation on private lands will occur at the minimum distance of 5 m away from the drip line of the significant woodland. Cable trenches within 30 m of the significant woodland will be filled immediately to prevent soil erosion and sedimentation issues;
- Tree pruning will be minimized to the greatest extent possible. To the extent practical, pruning will be avoided during leaf fall, typically between September and November. Prior to construction, the limits of tree pruning will be marked in the field. Tree pruning will be supervised by a qualified arborist. The Construction Contractor will ensure that no construction disturbance occurs beyond the marked limits;

- To avoid impacts to wetland hydrology and maintain existing overland flows and continuous surface water conveyance to Wetland 49, a culvert has been proposed beneath the permanent access roads to convey runoff following storm events. The culvert will be placed under the access road between Turbines 302 and 310 (see Figure 8.3, Appendix A). The culvert will be appropriately sized in consultation with the Maitland Valley Conservation Authority and where required, permits will be sought from the Conservation Authority and/or the Department of Fisheries and Oceans. All installation activities will conform to Ontario Provincial Standard Specification 421 (OPSS) – Construction Specification for Pipe Culvert Installation in Open Cut. Site specific refinement to the location of individual culverts may occur during detailed design to ensure proper placement and maintain conveyance flows, prevent pooling and maintain hydrology;
- After turbines have been assembled, the temporary turbine construction area will be restored to pre-existing conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Discharges from any de-watering shall be directed to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the woodland or wetland unless required to maintain hydrological flow (based on detailed design);
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, the net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of 'natural features' within Feature 49 are predicted to be low.

5.4.41 Feature 51

Feature 51 has been identified as containing a significant woodland, significant wetland, significant interior forest breeding bird habitat, significant amphibian woodland breeding habitats and significant habitat of species of conservation concern (PIF bird species). The interior forest breeding bird habitat, amphibian woodland breeding habitat and habitat of species of conservation concern are considered generalized candidate significant wildlife habitat and are assumed to be existing and significant.

5.4.41.1 Adjacent Project Components

Feature 51 falls within 120 m of Turbine 311 and the associated temporary turbine construction area. The minimum distance from Project components to each significant natural feature within Feature 51 is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the significant woodland. There are no watercourse crossings associated with this feature.

Project Component	Approx. Distance to Significant Woodland (m)	Approx. Distance to Significant Woodland (m)
T-311 Blade Tip	94	94
Temp. Construction Area (T-311)	45	45

5.4.41.2 Pre-construction Monitoring (Habitat Use Study)

As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant wildlife habitat (in this case, interior forest breeding bird habitat, amphibian woodland breeding habitat and habitat of species of conservation concern) are to be considered existing and significant and do not require the application of habitat use studies to confirm significance.

5.4.41.3 Potential Effects

The potential effects of the Project on significant woodlands, significant wetlands and significant wildlife habitats (interior forest breeding bird habitat, amphibian woodland breeding habitat and habitat of species of conservation concern) are described in Sections 5.2.1, 5.2.2 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1, 5.2.2 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific

effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.41.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland, significant wetlands and significant wildlife habitats associated with Feature 51. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 51. The specific mitigation strategy to protect the significant woodland, significant wetland and significant wildlife habitats will include the following:

- Prior to construction the outer limits of the construction area will be staked and marked to ensure that contractors remain within the temporary construction areas;
- The boundary of the significant woodland and wetland (and thus the wildlife habitat) within 30 m of the temporary construction area for Turbine 311 will be staked and flagged, and silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant woodland and wetland and to assist with the proper field installation of erosion and sediment controls measures;
- The silt fencing will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- After turbines have been assembled, the temporary turbine construction area will be restored to pre-existing conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Discharges from any de-watering shall be directed to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the woodland or wetland unless required to maintain hydrological flow (based on detailed design);
- To avoid impacts to wetland hydrology and maintain existing overland flows and continuous surface water conveyance from Wetland 51, a culvert has been proposed beneath the permanent access roads to convey runoff following storm events. The culvert will be placed under the access road between Turbines 307 and 311 (see Figure 8.3, Appendix A). The culvert will be appropriately sized in consultation with the Maitland Valley Conservation Authority and where required, permits will be sought from the Conservation Authority and/or the Department of Fisheries and Oceans. All installation activities will conform to Ontario Provincial Standard Specification 421 (OPSS) – Construction Specification for Pipe Culvert Installation in Open Cut. Site specific refinement to the location of individual culverts may occur during detailed design

to ensure proper placement and maintain conveyance flows, prevent pooling and maintain hydrology;

- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, the net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of 'natural features' within Feature 51 are predicted to be low.

5.4.42 Feature 53

Feature 53 is comprised of a significant woodland and significant habitat of species of conservation concern (PIF bird species). The significant woodland feature is 6.0 ha and is consistent with white ash deciduous forest, with ironwood and poplar associates. The habitat of species of conservation concern (PIF bird species) within this feature is considered generalized candidate significant wildlife habitat and is assumed to be existing and significant.

5.4.42.1 Adjacent Project Components

Feature 53 falls within 120 m of the collector system within a municipal road allowance. The minimum distance from Project components to the significant woodland is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats were only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the significant woodland. There is one watercourse crossing associated

with Feature 53 along the access road to Turbines 309, 312, 313 and 315 (see Figure 8.21, Appendix A). A culvert would be installed to construct the access road with collector lines installed beneath the culvert.

Project Component	Approx. Distance to Significant Woodland (m)
Collector System (within road allowance)	5

5.4.42.2 Pre-construction Monitoring (Habitat Use Study)

As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant habitat of species of conservation concern is considered existing and significant and does not require the application of a habitat use study to confirm significance.

5.4.42.3 Potential Effects

The potential effects to significant woodlands and significant wildlife habitats (habitat of species of conservation concern) are described in Sections 5.2.1 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.42.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland and significant wildlife habitat associated with Feature 53. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 53. The specific mitigation strategy to protect the significant woodland will include the following:

- Prior to construction the outer limits of the construction area will be staked and marked to ensure that contractors remain within the temporary construction areas;
- The boundaries of the significant woodland (and thus the wildlife habitat) within 30 m of the collector system will be staked and flagged, and silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant woodland and to assist with the proper field installation of erosion and sediment controls measures;
- The silt fencing will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- The preferred design is to excavate soils for the purpose of underground collector system installation in the municipal road allowance 5 m away from the significant woodland boundary. Issues may arise in the detailed design or construction that requires the line be constructed closer than 5 m. In the event that subsurface condition do not allow for

placement of the collector system 5 m away, the collector system will be placed as close to the road as safe and allowable by the Township or County to create as much buffer from the significant woodland. Cable trenches will be filled immediately after installation is complete to prevent soil erosion and sedimentation issues;

- Areas where vegetation is removed and soils excavated for the purpose of collector system installation within municipal road allowances will be re-seeded following construction as soon as practical with vegetation native to the ecoregion;
- Should the construction of underground collector lines not be feasible within the municipal road allowance on the edge of the feature, collector lines will be installed above ground on wooden poles;
- Tree pruning will be minimized to the greatest extent possible. To the extent practical, pruning will be avoided during leaf fall, typically between September and November. Prior to construction, the limits of tree pruning will be marked in the field. Tree pruning will be supervised by a qualified arborist. The Construction Contractor will ensure that no construction disturbance occurs beyond the marked limits;
- In some cases, tree removal may be necessary within the road allowance for health and safety or electrical safety reason. Tree removal required will be completed consultation with the MVCA and a certified arborist. As appropriate, and in consultation with the relevant parties (government, conservation authority, adjacent landowner) K2 Wind will replace trees removed with appropriate species in an alternate location;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, no net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of ‘natural features’ within Feature 53 are predicted.

5.4.43 Feature 54

Feature 54 is comprised of a significant woodland and significant habitat of species of conservation concern (PIF bird species). The significant woodland feature is 6.0 ha and is consistent with white ash deciduous forest, with ironwood and poplar associates. The habitat of species of conservation concern (PIF bird species) within this feature is considered generalized candidate significant wildlife habitat and is assumed to be existing and significant.

5.4.43.1 Adjacent Project Components

Feature 54 falls within 120 m of a collector system within a municipal road allowance. The minimum distance from Project components to the significant woodland is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats were only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the significant woodland. There is one watercourse crossing associated with Feature 53 along the access road to Turbines 309, 312, 313 and 315 (see Figure 8.21, Appendix A). A culvert would be installed to construct the access road with collector lines installed beneath the culvert.

Project Component	Approx. Distance to Significant Woodland (m)
Collector System (within road allowance)	99

5.4.43.2 Pre-construction Monitoring (Habitat Use Study)

As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant habitat of species of conservation concern is considered existing and significant and does not require the application of a habitat use study to confirm significance.

5.4.43.3 Potential Effects

The potential effects to significant woodlands and significant wildlife habitats (habitat of species of conservation concern) are described in Sections 5.2.1 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.43.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland and significant wildlife habitat associated with Feature 54. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on

significant nature features associated with Feature 54. The specific mitigation strategy to protect the significant woodland will include the following:

- Prior to construction the outer limits of the construction area will be staked and marked to ensure that contractors remain within the temporary construction areas;
- The boundary of the significant woodland is greater than 30 m away from the construction area therefore silt fencing is not required. In the event that it is found that significant sediment is mobilizing from the temporary construction area silt fencing will be installed to reduce the likelihood of material entering the significant woodland through surface flow;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, no net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of ‘natural features’ within Feature 54 are predicted.

5.4.44 Feature 55

Feature 55 is comprised of a significant woodland and significant habitat of species of conservation concern. The significant woodland is 7.2 ha and is dominated by white ash with large-toothed aspen and black cherry in the canopy and sub-canopy respectively. The understory is dominated by white ash, cherry and alternate-leaved dogwood. The habitat of species of conservation concern within this feature is considered generalized candidate significant wildlife habitat and is assumed to be existing and significant.

5.4.44.1 Adjacent Project Components

Feature 55 falls within 120 m of Turbine 317 and its associates access road, collector system and temporary turbine construction area. The minimum distance from Project components to the significant woodland is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the significant woodland. There are no watercourse crossings associated with this feature.

Project Component	Approx. Distance to Significant Woodland (m)
T-317 Base	81
T-317 Blade Tip	31
Access Road (T-317)	81
Temp. Construction Area (T-317)	5

*The distance from the natural features to the temporary crane path and the collector system (under the access road) are assumed to correspond with the distance to the access road.

5.4.44.2 Pre-construction Monitoring (Habitat Use Study)

As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant habitat of species of conservation concern is considered existing and significant and does not require the application of a habitat use study to confirm significance.

5.4.44.3 Potential Effects

The potential effects of the Project on significant woodlands and significant wildlife habitats (habitat of species of conservation concern) are described in Sections 5.2.1 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.44.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland and significant wildlife habitat associated with Feature 55. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 55. The specific mitigation strategy to protect the significant woodland and wildlife habitat will include the following:

- Prior to construction the outer limits of the construction area will be staked and marked to ensure that contractors remain within the temporary construction areas;
- The boundary of the significant woodland (and thus the wildlife habitat) within 30 m of the temporary construction area for Turbine 311 will be staked and flagged, and silt

barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant woodland and to assist with the proper field installation of erosion and sediment controls measures;

- The silt fencing will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- After turbines have been assembled, the temporary turbine construction area will be restored to pre-existing conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Discharges from any de-watering shall be directed to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the woodland unless required to maintain hydrological flow (based on detailed design);
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, no net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of ‘natural features’ within Feature 55 are predicted.

5.4.45 Feature 57

Feature 57 is composed of a significant woodland, significant wetland and significant habitat of species of conservation concern (PIF bird species). The significant woodland feature is 5.5 ha and is dominated by white ash, with sugar maple, basswood and ironwood associates in the canopy, sub-canopy and understory. The habitat of species of conservation concern within this feature is considered generalized candidate significant wildlife habitat and is assumed to be existing and significant.

5.4.45.1 Adjacent Project Components

Feature 57 is within 120 m of Turbines 326 and 327, an access road, collector system and temporary crane paths and turbine construction areas. The minimum distance from Project components to the significant woodland within Feature 57 is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the significant woodland. There is one watercourse crossings downstream of Feature 57 on Kintail Line (see Figure 8.24, Appendix A). The preferred method of crossing would be open cut.

Project Component	Approx. Distance to Significant Woodland (m)	Approx. Distance to Significant Wetland (m)
T-326 Blade Tip	91	120
T-327 Base	83	99
T-327 Blade Tip	33	49
Access Road (T-326, T-327)	3	7
Temp. Construction Area (T-326)	32	62
Temp. Construction Area (T-327)	1	5

*The distance from the natural features to the temporary crane path and the collector system (under the access road) are assumed to correspond with the distance to the access road.

5.4.45.2 Pre-construction Monitoring (Habitat Use Study)

As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant habitat of species of conservation concern is considered existing and significant and does not require the application of a habitat use study to confirm significance.

5.4.45.3 Potential Effects

The potential effects of the Project on significant woodlands, significant wetlands and significant wildlife habitats (habitat of species of conservation concern) are described in Sections 5.2.1, 5.2.2 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1, 5.2.2 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR,

2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.45.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland and significant wildlife habitat associated with Feature 57. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 57. The specific mitigation strategy to protect the significant woodland and significant wildlife habitat will include the following:

- Prior to construction the outer limits of the construction area will be staked and marked to ensure that contractors remain within the temporary construction areas;
- The boundaries of the significant woodland and wetland (and thus the wildlife habitat) within 30 m of the temporary turbine construction areas, access roads, crane path, and collector system for Turbines 326 and 327 will be staked and flagged, and silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant woodland and to assist with the proper field installation of erosion and sediment controls measures;
- During construction, a 5 m buffer will be established between the drip line of the significant wetland/woodland and the permanent access road to minimize root zone damage and hydrological changes to the feature. Silt fencing will be established at the edge of the buffer to prevent sedimentation and erosion of soils into the significant wetland/woodland. The buffer area will not be disturbed during construction and will be seeded with species native to the ecoregion upon completion of construction, if necessary;
- The silt fencing will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- Portions of the permanent access roads within 30 m of the wetland will be constructed at or near existing grade to maintain surface flow contributions to the wetland;
- To prevent damage to the root zone, excavation of soils for the purpose of underground collector system installation on private lands will occur at the minimum distance of 5 m away from the drip line of the significant woodland and wetland. Cable trenches within 30 m of the significant woodland and wetland will be filled immediately to prevent soil erosion and sedimentation issues;
- Power cable trenches within 30 m of the wetland will be bedded with sand and backfilled with native soils or appropriate fill material, with clay plugs every 30 m to ensure that potential groundwater entering the trenches is not drawn along the sand/fill conduit and hydrological conveyance to the wetland, if any, is maintained;
- After turbines have been assembled, the temporary turbine construction area will be restored to pre-existing conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production;

- Tree pruning will be minimized to the greatest extent possible. To the extent practical, pruning will be avoided during leaf fall, typically between September and November. Prior to construction, the limits of tree pruning will be marked in the field. Tree pruning will be supervised by a qualified arborist. The Construction Contractor will ensure that no construction disturbance occurs beyond the marked limits;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Discharges from any de-watering shall be directed to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the woodland or wetland unless required to maintain hydrological flow (based on detailed design);
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, no net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of ‘natural features’ within Feature 57 are predicted.

5.4.46 Feature 58b

Feature 58b is composed of a significant terrestrial crayfish habitat. The terrestrial crayfish habitat is located within a small cultural savannah (0.5 ha). The cultural savannah is dominated by grasses with isolated white ash and American elm in the canopy and sub-canopy. Chokecherry, willow and raspberry are associated with the understory. The feature is

associated with a watercourse. The terrestrial crayfish habitat within this feature is considered generalized candidate significant wildlife habitat and is assumed to be existing and significant.

5.4.46.1 Adjacent Project Components

Feature 58b falls within 120 m of Turbine 336 and its associated temporary turbine construction area. The distance of Project components to the generalized candidate significant terrestrial crayfish habitat is not provided as these habitats are only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the cultural savannah. There is one watercourse crossings upstream of Feature 58b on Kintail Line (see Figure 8.24, Appendix A). The preferred method of crossing would be open cut.

5.4.46.2 Pre-construction Monitoring (Habitat Use Study)

As per the NHAG (OMNR, 2011a), a natural feature identified as generalized candidate significant terrestrial crayfish habitat is considered existing and significant and does not require the application of a habitat use study to confirm significance.

5.4.46.3 Potential Effects

The potential effects of the Project on significant terrestrial crayfish habitat are described in Section 5.2.4. No specific effects beyond those described in Section 5.2.4 are expected on this significant natural feature. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.46.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant wildlife habitat associated with Feature 58b. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 58b. The specific mitigation strategy to protect the significant wildlife habitat will include the following:

- Prior to construction the outer limits of the construction area will be staked and marked to ensure that contractors remain within the temporary construction areas;
- The boundaries of the wildlife habitat (in this case the cultural savannah) within 30 m of the temporary construction area for Turbine 336 will be staked and flagged, and silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the wildlife and to assist with the proper field installation of erosion and sediment controls measures;

- The silt fencing will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- After turbines have been assembled, the temporary turbine construction area will be restored to pre-existing conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Discharges from any de-watering shall be directed to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the woodland unless required to maintain hydrological flow (based on detailed design);
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, no net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of ‘natural features’ within Feature 58b are predicted.

5.4.47 Feature 59

Feature 59 is comprised of a significant woodland, significant wetland, significant winter raptor feeding and roosting habitat, significant waterfowl nesting habitat, significant amphibian woodland breeding habitat and significant habitat of species of conservation concern (PIF bird species). In addition, Feature 59 overlaps with the Lothian-Lake Warren Shorelines ANSI

(Earth Science). The significant waterfowl nesting habitat, amphibian woodland breeding habitat and habitat of species of conservation concern within this feature are considered generalized candidate significant wildlife habitat and are assumed to be existing and significant.

5.4.47.1 Adjacent Project Components

Feature 59 falls within 120 m of Turbines T-339 and 347, access roads, crane paths, collector system and temporary turbine construction areas. The minimum distance from Project components to each significant natural feature within Feature 59 is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the significant woodland. There are no watercourse crossings associated with this feature.

Project Component	Approx. Distance to Significant Woodland (m)	Approx. Distance to Significant Wetland (m)	Approx. Distance to Significant Winter Raptor Feeding and Roosting Habitat (m)
T-339 Base	105	--	104
T-339 Blade Tip	55	--	55
T-347 Base	120	--	120
T-347 Blade Tip	70	--	70
Access Road (T-339)	53	--	53
Access Road (T-347)	47	--	47
Access Road (T-325, T-332, T-323)	52	--	52
Temp. Construction Area (T-339)	26	--	26
Temp. Construction Area (T-342)	120	--	120
Temp. Construction Area (T-347)	37	--	37
Collector System (within road allowance)	5	5	5

*The distance from the natural features to the temporary crane path and the collector system (under the access road) are assumed to correspond with the distance to the access road.

5.4.47.2 Pre-construction Monitoring (Habitat Use Study)

Pre-construction monitoring will be conducted within the significant raptor winter feeding and roosting habitat to confirm habitat use by raptors. Preliminary habitat use surveys will consist of three surveys conducted 7-10 days apart during the month of December to document habitat use by raptors. Based on the results of the first three surveys and in consultation with the OMNR, further surveys may be required. Should the OMNR request further surveys based on the results of the preliminary raptor surveys, additional raptor surveys will be conducted 7-10 days apart through January and February to document habitat use.

Surveys will be conducted using the 'standardized area searches' protocols outlined in the *Birds and Bird Habitats: Guidelines for Wind Power Project*s (OMNR, 2011c). The standardized area

searches will consist of a fixed width transects, in which all raptors within a fixed distance (edge of the natural feature) of transects will be recorded. Transects will be continuous, traversed on foot and focus on the woodland edges and the 100 m of the surrounding open habitat, where possible based on land access permission on non-participating properties. To ensure accuracy of the surveys, pre-construction monitoring methodologies and transect locations will be reviewed by the OMNR prior to the commencement of field surveys. Visual surveys for raptors will be conducted using binoculars with a minimum 10x magnification.

Surveys will be undertaken during daylight hours, between late morning and the afternoon. Data recorded will include:

- The level of effort for each visit (date, start time, finish time, hours of searching, weather conditions during the survey and the distance/area covered);
- A complete list and abundance of species detected on each visit/each day (including non-raptor species);
- A basic description of the habitats covered; and,
- A GPS track log or shape file representing the area searched.

As the start of the raptor wintering season is variable and based on weather conditions, the OMNR will be consulted to determine the appropriate time to commence the surveys. Surveys shall occur in calm weather conditions without precipitation or winds greater than 3-4 on the Beaufort scale.

In addition to diversity and density studies, behavioural surveys will be conducted concurrently with standardized area searched. The behavioural studies will determine how raptors are using the area and whether they are flying through areas that will be swept by blades after the turbines are built or are using habitats that will be directly affected by the construction and/or operation process. Beyond the data collection described above, data recorded will include: summary statistics on how often and how many birds flew through potential turbine locations, the estimated height of flight to determine whether the raptors are flying within, above or below the proposed blade sweep area and how often the raptors used area that would be disturbed by construction.

There are two possible outcome scenarios which could result from the pre-construction monitoring, including; 1) habitat use is insufficient to determine the raptor winter feeding and roosting habitat as significant, or 2) habitat use confirms the presence of two or more of the species listed in the Draft SWH Ecoregion Criteria Schedules (Schedule 2; OMNR, 2009) and 10 or more individuals for a minimum of 20 days per season.

If there is insufficient habitat use at the site for it to be determined as significant wildlife habitat based on criteria provided in the Draft SWH Ecoregion Criteria Schedules (Schedule 2; OMNR, 2009), no further monitoring will be required. If pre-construction monitoring does identify habitat use by two or more of the species listed in the Draft SWH Ecoregion Criteria Schedules (Schedule 2; OMNR, 2009) and 10 or more individuals for a minimum of 20 days per season, then the site is determined to be significant wildlife habitat and mitigation measures will

be needed to manage potential impacts. Potential effects, proposed mitigation and follow-up monitoring to be implemented in this scenario are discussed below.

As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant wildlife habitat (in this case, waterfowl nesting habitat, amphibian woodland breeding habitat and habitat of species of conservation concern) are to be considered existing and significant and do not require the application of habitat use studies to confirm significance.

5.4.47.3 Potential Effects

The potential effects of the Project on significant woodlands, significant wetlands and significant wildlife habitats (winter raptor feeding and roosting habitat, waterfowl nesting habitat, amphibian woodland breeding habitat and habitat of species of conservation concern) are described in Sections 5.2.1, 5.2.2 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1, 5.2.2 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.47.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland and significant wildlife habitat associated with Feature 59. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 59. The specific mitigation strategy to protect the significant woodland and significant wildlife habitat will include the following:

- Prior to construction the outer limits of the construction area will be staked and marked to ensure that contractors remain within the temporary construction areas;
- The boundary of the significant woodland (and thus the wildlife habitat) within 30 m of the temporary construction areas, access roads, collector system, and crane paths for Turbines 336 and 347 will be staked and flagged, and silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant woodland and wetland and to assist with the proper field installation of erosion and sediment controls measures;
- The silt fencing will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- After turbines have been assembled, the temporary turbine construction area will be restored to pre-existing conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production;
- The preferred design is to excavate soils for the purpose of underground collector system installation in the municipal road allowance 5 m away from the wetland and significant woodland boundary. Issues may arise in the detailed design or construction that

requires the line be constructed closer than 5 m. In the event that subsurface condition do not allow for placement of the collector system 5 m away, the collector system will be placed as close to the road as safe and allowable by the Township or County to create as much buffer from the wetland and significant woodland. Given the shallow nature of the works no appreciable changes to the groundwater or surface water flows are anticipated. Cable trenches will be filled immediately after installation is complete to prevent soil erosion and sedimentation issues;

- Should the construction of underground collector lines not be feasible within the municipal road allowance on the edge of the feature, collector lines will be installed above ground on wooden poles;
- Power cable trenches within 30 m of the wetlands will be bedded with sand and backfilled with native soils or appropriate fill material, with clay plugs every 30 m to ensure that potential groundwater entering the trenches is not drawn along the sand/fill conduit and hydrological conveyance to the wetland, if any, is maintained;
- Tree pruning will be minimized to the greatest extent possible. To the extent practical, pruning will be avoided during leaf fall, typically between September and November. Prior to construction, the limits of tree pruning will be marked in the field. Tree pruning will be supervised by a qualified arborist. The Construction Contractor will ensure that no construction disturbance occurs beyond the marked limits;
- In some cases, tree removal may be necessary within the road allowance for health and safety or electrical safety reason. Tree removal required will be completed consultation with the MVCA and a certified arborist. As appropriate, and in consultation with the relevant parties (government, conservation authority, adjacent landowner) K2 Wind will replace trees removed with appropriate species in an alternate location;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Discharges from any de-watering shall be directed to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the woodland unless required to maintain hydrological flow (based on detailed design);
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;

- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, the net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of 'natural features' within Feature 59 are predicted to be low.

5.4.47.5 Post-Construction Monitoring

As avoidance behaviour of turbines is identified as a potential operational effect on winter raptors, a minimum three-year post-construction raptor winter monitoring plan to assess habitat disturbance to raptor winter feeding and roosting habitat will be implemented if the habitat is identified as significant wildlife habitat. The objective of the monitoring will be to determine if Project operations have an effect on raptor behaviour and habitat use. The same survey protocols which are implemented during pre-construction surveys will be used.

Since there are only two potential winter raptor feeding and roosting habitats identified within the General Project Area (associated with Features 13, 14, 16 and 59), comparisons cannot be made between potentially "impacted" sites (within 120 m of the Project Location) and "control" sites (not within 120 m of the Project Location). Comparisons can only be made between pre-construction and post-construction survey results. While this type of comparison is not ideal, post-construction data can be statistically compared to pre-construction data. However, without the use of control sites, data suggesting avoidance behaviour of wintering raptor should be taken with caution as confounding factors such as weather, disease and/or predators may influence the analysis. Should pre-construction surveys suggest the presence of other winter raptor feeding and roosting habitat in the area but not within 120 m of the Project Location, the Proponent will make efforts to use these sites as 'control' sites to allow for a Before-After-Control-Impact study design.

The OMNR, along with the proponent and other relevant agencies, will collectively review the results of the post-construction monitoring to determine if a negative environmental effect is occurring, and whether such an effect is attributable to the wind turbines and not external factors. These discussions will determine if and when contingency measures shall be undertaken. The best available science and information will be considered when determining appropriate mitigation and will be determined in consultation with MOE and OMNR based on post-construction monitoring results.

5.4.48 Feature 61

Feature 61 is comprised of a significant wetland. The wetland is small (0.6 ha), oval shaped and dominated by willow, with large-toothed aspen on the periphery. Sedges and grasses dominate the herbaceous layer and standing water is present. The edges are bordered by rocks suggesting the feature has anthropogenic origins. No significant wildlife habitat features are associated with Feature 61.

5.4.48.1 Adjacent Project Components

Feature 61 falls within 120 m of the access road, collector system and crane path to Turbine 345. The minimum distance from Project components to the significant wetland feature is provided in the table below. There are no watercourse crossings associated with this feature.

Project Component	Approx. Distance to Significant Wetland (m)
Access Road (T-342, T-345)	13

*The distance from the natural features to the temporary crane path and the collector system (under the access road) are assumed to correspond with the distance to the access road.

5.4.48.2 Potential Effects

The potential effects of the Project on significant wetlands are described in Sections 5.2.2. No specific effects beyond those described in Sections 5.2.2 are expected on this significant natural feature.

5.4.48.3 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant wetland associated with Feature 61. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 61. The specific mitigation strategy to protect the significant wetland will include the following:

- Prior to construction, the outer limits of the temporary construction area will be staked and marked to ensure that contractors remain within the temporary construction areas;
- The boundary of the wetland within 30 m of the proposed access road for Turbine 345 will be staked and flagged, and silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the wetland and to assist with the proper field installation of erosion and sediment controls measures;
- During construction, a 5 m buffer will be established between the drip line of the significant wetland and the permanent access road to minimize root zone damage and hydrological changes to the feature. Silt fencing will be established at the edge of the buffer to prevent sedimentation and erosion of soils into the significant wetland. The buffer area will not be disturbed during construction and will be seeded with species native to the ecoregion upon completion of construction, if necessary;

- The silt fencing will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- Portions of the permanent access roads within 30 m of the wetland will be constructed at or near existing grade to maintain surface flow contributions to the wetland;
- Excavation of soils for the purpose of underground collector system installation will occur at the minimum distance of 5 m from the wetland. Cable trenches within 30 m of the wetland will be filled immediately to prevent soil erosion and sedimentation issues;
- Power cable trenches within 30 m of the wetland will be bedded with sand and backfilled with native soils or appropriate fill material, with clay plugs every 30 m to ensure that potential groundwater entering the trenches is not drawn along the sand/fill conduit and hydrological conveyance to the wetland, if any, is maintained;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Discharges from any de-watering shall be directed to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the wetland unless required to maintain hydrological flow (based on detailed design);
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, no net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of ‘natural features’ within Feature 61 are predicted.

5.4.49 Feature 63

Feature 63 has been identified as containing a significant woodland, significant wetland, significant colonial bird nesting habitat (herons), significant amphibian woodland breeding habitats and significant habitat of species of conservation concern (PIF bird species). The amphibian woodland breeding habitat and habitat of species of conservation concern are considered generalized candidate significant wildlife habitat and are assumed to be existing and significant. In addition, Feature 63 overlaps with the Lothian-Lake Warren Shorelines ANSI (Earth Science).

5.4.49.1 Adjacent Project Components

Feature 63 falls within 120 m of the access roads, collector system and temporary crane paths and turbine construction areas for Turbines 337 and 341, and the temporary construction area for Turbine 340. The minimum distance from Project components to each significant natural feature within Feature 63 is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the significant woodland. There are no watercourse crossings associated with this feature.

Project Component	Approx. Distance to Significant Woodland (m)	Approx. Distance to Significant Wetland (m)	Approx. Distance to Significant Colonial Bird Nesting Habitat – Herons (m)
Access Road (T-329, T-337)	36	67	36
Access Road (T-340, T-341)	10	--	10
Temp. Construction Area (T-337)	70	89	--
Temp. Construction Area (T-341)	97	103	--
Temp. Construction Area (T-340)	77	--	116

*The distance from the natural features to the temporary crane path and the collector system (under the access road) are assumed to correspond with the distance to the access road.

5.4.49.2 Pre-construction Monitoring (Habitat Use Study)

Habitat use of the significant colonial bird nesting habitat was confirmed during a site investigation in 2010; however, the number of nests located within the feature could not be determined as access to the property was not granted by the landowner. As such, a pre-construction monitoring will be conducted to confirm that at least five active nests are present within the feature, in accordance with confirmation of significance criteria outlined in the Draft SWH Ecoregion Criteria Schedules (Schedule 2; OMNR, 2009). Ground surveys will be conducted throughout the Feature 63 to determine the number of nests present. Should access not be granted, a helicopter fly-over (either passenger helicopter or a remote helicopter with a camera) to determine the number of stick nests present within the colony may be necessary prior to leaf-out (April). If at least five nests are identified at this time, additional site visits will be

conducted in the spring to confirm continued habitat use. Spring site visits will occur bi-weekly beginning at the start of May and continuing until the end of June through ground surveys (pending permission to enter from property owner). Habitat use surveys will also identify the ingress and egress patterns of Great Blue Herons at the feature. It was initially observed that herons tend to enter and leave the site at the south-east edge; however, these preliminary observations will be confirmed during the pre-construction monitoring. Heron nests are most active in the early morning and in the evening. Each day of site investigations, monitoring will take place at both of these times.

There are two possible outcome scenarios which could result from the pre-construction monitoring, including: 1) less than five active heron nests are identified or, 2) at least five active heron nests are identified confirming the feature as significant wildlife habitat.

If there are less than five active heron nests present in the feature, then the habitat is not considered significant wildlife habitat based on the criteria provided in the Draft SWH Ecoregion Criteria Schedules (Schedule 2; OMNR, 2009). As such, no further monitoring will be required. If pre-construction monitoring does identify at least five active heron nests, then mitigation measures will be needed to manage potential impacts. Potential effects to significant colonial bird (heron) nesting habitat, proposed mitigation and post-construction monitoring to be implemented in this scenario are discussed below.

As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant wildlife habitat (in this case, amphibian woodland breeding habitat and habitat of species of conservation concern) are considered existing and significant and do not require the application of habitat use studies to confirm significance.

5.4.49.3 Potential Effects

The potential effects of the Project on significant woodlands, significant wetlands and significant wildlife habitats (colonial bird nesting habitat for herons, amphibian woodland breeding habitat and habitat of species of conservation concern) are described in Sections 5.2.1, 5.2.2 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1, 5.2.2 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.49.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland, significant wetlands and significant wildlife habitats associated with Feature 63. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 63. The specific mitigation strategy to protect the significant woodland, significant wetlands and significant wildlife habitats will include the following:

- A 1,000 m buffer around the colonial bird nesting habitat shall be implemented for all construction and decommissioning activities during the breeding season (May 1st to August 1st). In effect, the buffer will restrict construction of Turbines 329, 335, 337, 339, 340, 341, 342, 343, 344, 345, and 346 between May 1st and August 1st;
- Prior to construction the outer limits of the construction area will be staked and marked to ensure that contractors remain within the temporary construction areas;
- The boundary of the significant woodland and wetland (and thus the wildlife habitat) within 30 m of the temporary turbine construction areas, Turbines 337, 340, and 341; and the proposed access roads, crane paths; and collector systems for Turbines 337 and 341 will be staked and flagged, and silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant woodland and to assist with the proper field installation of erosion and sediment controls measures;
- During construction, a buffer will be established from the stem line to the drip line where the significant woodland is immediately adjacent to a permanent access road. The purpose of the buffer is to minimize root zone damage and compaction. Silt fencing will be established at the edge of the drip line to prevent sedimentation and erosion of soils into the significant woodland. The buffer area will not be disturbed during construction and will be seeded with species native to the ecoregion upon completion of construction, if necessary;
- The silt fencing will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- After turbines have been assembled, the temporary turbine construction area will be restored to pre-existing conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production;
- No excavation of soils for the purpose of access road construction will occur within 30 m of the wetland to reduce the effects of hydrological changes from Project construction. Portions of the permanent access roads within 30 m of the wetland will be constructed above-grade;
- To prevent damage to the root zone, excavation of soils for the purpose of underground collector system installation on private lands will occur at the minimum distance of 5 m away from the drip line of the significant woodland and wetland. Cable trenches within 30 m of the significant woodland and wetland will be filled immediately to prevent soil erosion and sedimentation issues;
- The proposed preparation activities will be designed and implemented so as not to alter historic drainage patterns to wetlands and the colonial bird nesting habitat and will not significantly alter the elevations in the area;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Power cable trenches within 30 m of the significant woodland and wetland will be bedded with sand and backfilled with native soils or appropriate fill material, with clay

plugs every 30 m to ensure that potential groundwater entering the trenches is not drawn along the sand-filled conduit and hydrological conveyance to the significant woodland and wetland is maintained;

- To avoid impacts to wetland hydrology and maintain existing overland flows and continuous surface water conveyance to Wetland 63, a culvert has been proposed beneath the permanent access roads to convey runoff following storm events. The culvert will be placed under the access road between Turbines 329 and 337 (see Figure 8.3, Appendix A). The culvert will be appropriately sized in consultation with the Maitland Valley Conservation Authority and where required, permits will be sought from the Conservation Authority and/or the Department of Fisheries and Oceans. All installation activities will conform to Ontario Provincial Standard Specification 421 (OPSS) – Construction Specification for Pipe Culvert Installation in Open Cut. Site specific refinement to the location of individual culverts may occur during detailed design to ensure proper placement and maintain conveyance flows, prevent pooling and maintain hydrology;
- Discharges from any de-watering shall be directed to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the woodland or wetland unless required to maintain hydrological flow (based on detailed design);
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, the net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of ‘natural features’ within Feature 63 are predicted to be low.

5.4.49.5 Post-Construction Monitoring

As avoidance behaviour of turbines and access roads is identified as a potential operational effect on colonial bird nesting habitat, a minimum three-year post-construction colonial bird nesting monitoring plan to assess habitat disturbance to herons will be implemented if pre-construction habitat use studies confirm the habitat as significant wildlife habitat. The objective of the monitoring will be to determine if Project operations have an effect on heron behaviour and habitat use. To assess disturbance effects to nesting Great Blue Herons, the same protocols which were implemented during pre-construction surveys will be used. Spring site visits will occur bi-weekly beginning at the start of May and continuing until the end of June through ground surveys (pending permission to enter from property owner).

Since there was only one heron colony identified within the General Project Area, comparisons cannot be made between potentially "impacted" sites (within 120 m of the Project Location) and "control" sites (not within 120 m of the Project Location). Comparisons can only be made between pre-construction and post-construction survey results. While this type of comparison is not ideal, post-construction data can be statistically compared to pre-construction data. However, without the use of control sites, data suggesting avoidance behaviour of Great Blue Herons shall be taken with caution as confounding factors such as weather, disease and/or predators may influence the analysis. Should pre-construction surveys suggest the presence of other Great Blues Heron colonies in the area but not within 120 m of the Project Location, the Proponent will make efforts to use these sites as 'control' sites to allow for a Before-After-Control-Impact study design.

The OMNR, along with the proponent and other relevant agencies, will collectively review the results of the post-construction monitoring to determine if a negative environmental effect is occurring, and whether such an effect is attributable to the wind turbines and not external factors. These discussions will determine if and when contingency measures shall be undertaken. The best available science and information will be considered when determining appropriate mitigation and will be determined in consultation with MOE and OMNR based on post-construction monitoring results.

5.4.50 Feature 64

Feature 64 is composed of a significant woodland and significant habitat of species of conservation concern (PIF bird species). The significant woodland feature is 20.6 ha and is dominated by sugar maple, with white ash, American beech, ironwood and basswood associates in the canopy, sub-canopy and understory. Deciduous swamp ecosites are also present within the significant woodland, but are outside the 120 m Zone of Investigation. The habitat of species of conservation concern within this feature is considered generalized candidate significant wildlife habitat and is assumed to be existing and significant.

5.4.50.1 Adjacent Project Components

Feature 64 is within 120 m of Turbine 324 and the associated access road, collector system and temporary crane path and construction pad. The minimum distance from Project components to the significant woodland within Feature 64 is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the significant woodland. There is one watercourse crossing upstream of Feature 64 on Lanesville Line (see Figures 8.23 and 8.26, Appendix A). The preferred method of crossing would be open cut.

Project Component	Approx. Distance to Significant Woodland (m)
T-324 Base	83
T-324 Blade Tip	33
Access Road (T-324)	119
Temp. Construction Area (T-324)	5

*The distance from the natural features to the temporary crane path and the collector system (under the access road) are assumed to correspond with the distance to the access road.

5.4.50.2 Pre-construction Monitoring (Habitat Use Study)

As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant habitat of species of conservation concern is considered existing and significant and does not require the application of a habitat use study to confirm significance.

5.4.50.3 Potential Effects

The potential effects of the Project on significant woodlands and significant wildlife habitats (habitat of species of conservation concern) are described in Sections 5.2.1 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.50.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland and significant wildlife habitat associated with Feature 64. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 64. The specific mitigation strategy to protect the significant woodland and significant wildlife habitat will include the following:

- Prior to construction the outer limits of the construction area will be staked and marked to ensure that contractors remain within the temporary construction areas;

- The boundaries of the significant woodland (and thus the wildlife habitat) within 30 m of the temporary turbine construction area for Turbine 324 will be staked and flagged, and silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant woodland and to assist with the proper field installation of erosion and sediment controls measures;
- The silt fencing will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- After turbines have been assembled, the temporary turbine construction area will be restored to pre-existing conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Discharges from any de-watering shall be directed to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the woodland unless required to maintain hydrological flow (based on detailed design);
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, no net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of ‘natural features’ within Feature 64 are predicted.

5.4.51 Feature 65

Feature 65 is composed of a significant wetland, significant amphibian woodland breeding habitat and significant habitat of species of conservation concern (PIF bird species). The wetland feature is dominated by Freeman maple with scattered red-osier dogwood and buttonbush. The amphibian woodland breeding habitat and habitat of species of conservation concern within this feature is considered generalized candidate significant wildlife habitat and is assumed to be existing and significant.

5.4.51.1 Adjacent Project Components

Feature 65 falls within 120 m of the temporary turbine construction area for Turbine 322 and a collector system within a municipal road allowance. The minimum distance from Project components to the significant wetland is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the wetland. There are no watercourse crossings associated with this feature.

Project Component	Approx. Distance to Significant Wetland (m)
T-322 Blade Tip	103
Temp. Construction Area (T-322)	64
Crane Path	11
Collector System (within road allowance)	40

5.4.51.2 Pre-construction Monitoring (Habitat Use Study)

As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant wildlife habitat (in this case, amphibian woodland breeding habitat and habitat of species of conservation concern) are to be considered existing and significant and do not require the application of habitat use studies to confirm significance.

5.4.51.3 Potential Effects

The potential effects of the Project on significant wetlands and significant wildlife habitats (amphibian woodland breeding habitat and habitat of species of conservation concern) are described in Sections 5.2.2 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.2 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.51.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant wetland and significant wildlife habitat associated with Feature 65. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 65. The specific mitigation strategy to protect the significant wetland and wildlife habitat will include the following:

- Prior to construction, the outer limits of the temporary construction area will be staked and marked to ensure that contractors remain within the temporary construction areas. A minimum distance of 5 m will be established and a silt barrier constructed between the wetland and temporary construction area (crane path);
- The boundary of the wetland (and thus the wildlife habitat) within 30 m of the temporary crane path between Turbines 332 and 330 will be staked and flagged, and silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant wetland and to assist with the proper field installation of erosion and sediment controls measures;
- The silt fencing will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- The preferred design is to excavate soils for the purpose of underground collector system installation in the municipal road allowance on the east side of Lanesville Line and over 30 m away from the wetland boundary. Issues may arise in the detailed design or construction that requires the line be constructed 25 m from the wetland. In the event that subsurface condition do not allow for placement of the collector system over 30 m from the wetland, the collector system will be placed as close to the road as safe and allowable by the Township or County to create as much buffer from the wetland. Silt fencing will be established on the edge of the road allowance within 30 m of the wetland. Given the shallow nature of the works no appreciable changes to the groundwater or surface water flows are anticipated. Cable trenches will be filled immediately after installation is complete to prevent soil erosion and sedimentation issues;
- Should the construction of underground collector lines not be feasible within the municipal road allowance on the edge of the feature, collector lines will be installed above ground on wooden poles;
- Tree pruning will be minimized to the greatest extent possible. To the extent practical, pruning will be avoided during leaf fall, typically between September and November. Prior to construction, the limits of tree pruning will be marked in the field. Tree pruning will be supervised by a qualified arborist. The Construction Contractor will ensure that no construction disturbance occurs beyond the marked limits;
- In some cases, tree removal may be necessary within the road allowance for health and safety or electrical safety reason. Tree removal required will be completed consultation with the MVCA and a certified arborist. As appropriate, and in consultation with the relevant parties (government, conservation authority, adjacent landowner) K2 Wind will replace trees removed with appropriate species in an alternate location;

- Power cable trenches under the access roads within 30 m of the wetland will be bedded with sand and backfilled with native soils or appropriate fill material, with clay plugs every 30 m to ensure that potential groundwater entering the trenches is not drawn along the sand/fill conduit and hydrological conveyance to the wetland, if any, is maintained;
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) to control during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, no net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of ‘natural features’ within Feature 65 are predicted.

5.4.52 Feature 66

Feature 66 is comprised of a significant woodland, significant interior forest breeding bird habitat, significant amphibian woodland breeding habitats and significant habitat of species of conservation concern (PIF bird species). The interior forest breeding bird habitat and habitat of species of conservation concern within this feature are considered generalized candidate significant wildlife habitat and are assumed to be existing and significant.

5.4.52.1 Adjacent Project Components

Feature 66 falls within 120 m of Turbine 348 and the associated access road, collector system and temporary construction pad. The minimum distance from Project components to the significant natural features are provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the Feature based on landscape and

topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the significant woodland. There are two watercourse crossings downstream of Feature 66 on Zion Road (see Figure 8.27 and 8.28, Appendix A). The preferred method of crossing would be open cut.

Project Component	Approx. Distance to Significant Woodland (m)	Approx. Distance to Significant Amphibian Woodland Breeding Habitat (m)
T-348 Blade Tip	88	--
Access Road (T-348)	25	99
Temp. Construction Area (T-348)	59	--
Collector System (within road allowance)	5	89

*The distance from the natural features to the temporary crane path and the collector system (under the access road) are assumed to correspond with the distance to the access road.

5.4.52.2 Pre-construction Monitoring (Habitat Use Study)

Based on consultation with the OMNR, potential impacts of the Project on significant amphibian woodland breeding habitat may occur during construction and decommissioning. As such, habitat use studies to confirm significance are not necessary to implement appropriate mitigation. General mitigation measures will be applied and are discussed in 5.4.52.4. As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant wildlife habitat (in this case, interior forest breeding bird habitat and habitat of species of conservation concern) are to be considered existing and significant and do not require the application of habitat use studies to confirm significance.

5.4.52.3 Potential Effects

The potential effects of the Project on significant woodlands and significant wildlife habitats (interior forest breeding bird habitat, amphibian woodland breeding habitat and habitat of species of conservation concern) are described in Sections 5.2.1 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.52.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland and significant wildlife habitats associated with Feature 66. The mitigation strategy to protect the significant woodland and significant wildlife habitat will include the following:

- Prior to construction the outer limits of the construction area will be staked and marked to ensure that contractors remain within the temporary construction areas;

- The boundaries of the significant woodland (and thus the wildlife habitat) within 30 m of the temporary construction area, access road, and collector system for Turbine 348 will be staked and flagged, and silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant woodland and to assist with the proper field installation of erosion and sediment controls measures;
- The silt fencing will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- After turbines have been assembled, the temporary turbine construction area will be restored to pre-existing conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production;
- The preferred design is to excavate soils for the purpose of underground collector system installation in the municipal road allowance 5 m away from the significant woodland boundary. Issues may arise in the detailed design or construction that requires the line be constructed closer than 5 m. In the event that subsurface condition do not allow for placement of the collector system 5 m away, the collector system will be placed as close to the road as safe and allowable by the Township or County to create as much buffer from the significant woodland. Cable trenches will be filled immediately after installation is complete to prevent soil erosion and sedimentation issues;
- Should the construction of underground collector lines not be feasible within the municipal road allowance on the edge of the feature, collector lines will be installed above ground on wooden poles;
- Tree pruning will be minimized to the greatest extent possible. To the extent practical, pruning will be avoided during leaf fall, typically between September and November. Prior to construction, the limits of tree pruning will be marked in the field. Tree pruning will be supervised by a qualified arborist. The Construction Contractor will ensure that no construction disturbance occurs beyond the marked limits;
- In some cases, tree removal may be necessary within the road allowance for health and safety or electrical safety reason. Tree removal required will be completed consultation with the MVCA and a certified arborist. As appropriate, and in consultation with the relevant parties (government, conservation authority, adjacent landowner) K2 Wind will replace trees removed with appropriate species in an alternate location;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Discharges from any de-watering shall be directed to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the woodland unless required to maintain hydrological flow (based on detailed design);
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected

and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;

- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, the net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of 'natural features' within Feature 66 are predicted to be low.

5.4.53 Feature 67

Feature 67 is composed of a significant woodland and significant habitat of species of conservation concern (PIF bird species). The significant woodland feature is 9.3 ha and dominated by a mix of black walnut and white pine plantation and sugar maple dominated forest. The habitat of species of conservation concern within this feature is considered generalized candidate significant wildlife habitat and is assumed to be existing and significant.

5.4.53.1 Adjacent Project Components

Feature 67 is within 120 m of Turbines 349 and 350, an access road, collector lines/data cables, collector system within the road allowance, and temporary crane path and temporary turbine construction areas. The minimum distance from Project components to the significant woodland within Feature 67 is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the significant woodland. There is one watercourse crossing downstream of Feature 67 on 18 Mile Line (see Figure 8.29, Appendix A). The preferred method of crossing would be overhead on shared poles.

Project Component	Approx. Distance to Significant Woodland (m)

T-349 Base	68
T-349 Blade Tip	18
T-350 Base	69
T-350 Blade Tip	19
Access Road (T-349, T-350)	17
Temp. Construction Area (T-349)	5
Temp. Construction Area (T-350)	6
Collector System (within road allowance)	63

*Distance of the collector system under access road to natural features assumed to be the same as distance of access road.

5.4.53.2 Pre-construction Monitoring (Habitat Use Study)

As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant habitat of species of conservation concern is considered existing and significant and does not require the application of a habitat use study to confirm significance.

5.4.53.3 Potential Effects

The potential effects of the Project on significant woodlands and significant wildlife habitats (habitat of species of conservation concern) are described in Sections 5.2.1 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.53.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland and significant wildlife habitat associated with Feature 67. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 67. The specific mitigation strategy to protect the significant woodland and significant wildlife habitat will include the following:

- Prior to construction the outer limits of the construction area will be staked and marked to ensure that contractors remain within the temporary construction areas;
- The boundaries of the significant woodland (and thus the wildlife habitat) within 30 m of the temporary turbine construction area, access roads, and collector lines/data cables for Turbines 349 and 350, and the collector system will be staked and flagged, and silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant woodland and to assist with the proper field installation of erosion and sediment controls measures;

- The silt fencing will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- After turbines have been assembled, the temporary turbine construction area will be restored to pre-existing conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production;
- To prevent damage to the root zone, excavation of soils for the purpose of underground collector system installation on private lands will occur at the minimum distance of 5 m away from the drip line of the significant woodland. Cable trenches within 30 m of the significant woodland will be filled immediately to prevent soil erosion and sedimentation issues;
- Excavation of soils for the purpose of underground collector system installation within the municipal road allowance will be filled immediately to prevent soil erosion and sedimentation issues;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Discharges from any de-watering shall be directed to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the woodland unless required to maintain hydrological flow (based on detailed design);
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, no net residual effects of the construction, operation and

decommissioning of the proposed Project within 120 m of 'natural features' within Feature 67 are predicted.

5.4.54 Feature 68

Feature 68 is composed of a significant woodland, significant valleyland, significant turtle over-wintering habitat, significant turtle nesting habitat and significant habitat of species of conservation concern (PIF bird species). The significant woodland and valleyland is dominated by a mixture of deciduous and mixed forest ecosites composed of white ash, sugar maple and balsam poplar, and white cedar and white birch, with white ash and sugar maple associates in the canopy, respectively. Part of the valleyland is also used for agriculture production. The habitat of species of conservation concern within this feature is considered generalized candidate significant wildlife habitat and is assumed to be existing and significant. Feature 68 crosses two roads (Laurier Line and 18 Mile Line); however, these roads do not divide the significant woodland or valleyland features.

5.4.54.1 Adjacent Project Components

Feature 68 falls within 120 m of Turbines 351 and 352, an access road, collector lines/data cables, the collector system within the road allowance, and temporary crane paths and turbine construction areas. The minimum distance from Project components to each significant natural feature within Feature 68 is provided in the table below. Distances of Project components to natural features identified as generalized candidate significant wildlife habitat are not provided as these habitats are only considered to exist within the Feature based on landscape and topography. For the purpose of identifying potential effects and mitigation, the distance to generalized candidate significant wildlife habitat can be considered the edge of the significant woodland. There is one watercourse crossings directly adjacent to Feature 68 in the municipal road allowance on 18 Mile Line (see Figure 8.29, Appendix A). The preferred method of crossing would be overhead on shared poles.

Project Component	Approx. Distance to Significant Woodland (m)	Approx. Distance to Significant Valleyland (m)	Approx. Distance to Significant Turtle Over-Wintering Habitat (m)	Approx. Distance to Significant Turtle Nesting Habitat (m)
T-351 Base	82	82	82	82
T-351 Blade Tip	32	33	33	33
T-352 Blade Tip	104	104	104	104
Access Road (T-351, T-352)	15	15	15	15
Temp. Construction Area (T-351)	5	5	5	5
Temp. Construction Area (T-352)	16	16	16	16
Collector System (within road allowance)	2	0	2	2

*The distance from the natural features to the temporary crane path and the collector system (under the access road) are assumed to correspond with the distance to the access road.

5.4.54.2 Pre-construction Monitoring (Habitat Use Study)

Based on consultation with the OMNR, potential impacts of the Project on significant turtle over-wintering habitat and turtle nesting habitat may occur during construction, operation and decommissioning; however, habitat use studies to confirm significance are not necessary to implement appropriate mitigation. As such, general mitigation measures will be applied and are discussed in 5.4.54.4. As per the NHAG (OMNR, 2011a), natural features identified as generalized candidate significant habitat of species of conservation concern is considered existing and significant and does not require the application of a habitat use study to confirm significance.

5.4.54.3 Potential Effects

The potential effects of the Project on significant woodlands, significant valleylands and significant wildlife habitats (habitat of species of conservation concern) are described in Sections 5.2.1, 5.2.3 and 5.2.4, respectively. No specific effects beyond those described in Sections 5.2.1, 5.2.3 and 5.2.4 are expected on these significant natural features. As per the NHAG (OMNR, 2011a), specific effects of Project operations on natural features identified as generalized candidate significant wildlife habitat are not predicted.

5.4.54.4 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant woodland, significant valleyland and significant wildlife habitat associated with Feature 68. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 68. The specific mitigation strategy to protect the significant woodland, significant valleyland and significant wildlife habitat will include the following:

- Prior to construction the outer limits of the construction area will be staked and marked to ensure that contractors remain within the temporary construction areas;
- The boundaries of the significant woodland and valleyland (and thus the wildlife habitat) within 30 m of the proposed access road and temporary construction area for Turbines 351 and 352 will be staked and flagged, and silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant woodland and to assist with the proper field installation of erosion and sediment controls measures;
- During construction, a buffer will be established from the stem line to the drip line where the significant woodland is immediately adjacent to a permanent access road. The purpose of the buffer is to minimize root zone damage and compaction. Silt fencing will be established at the edge of the drip line to prevent sedimentation and erosion of soils into the significant woodland. The buffer area will not be disturbed during construction and will be seeded with species native to the ecoregion upon completion of construction, if necessary;

- The silt fencing will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- Excavated soils from Turbine 351 and 352 will be stockpiled, stabilized and surrounded by silt-fencing to prevent turtle nesting;
- Where the Project Location is located within 120 m of the significant turtle nesting habitat, turbine excavations, access road construction and collector line installation will be conducted outside the turtle nesting season (late May to mid-July). Should construction be required during this period, the edge of excavation areas will be fenced off (with silt fencing) where excavations are left overnight to prevent turtles from entering turbine excavation areas and attempting to nest;
- After turbines have been assembled, the temporary turbine construction area will be restored to pre-existing conditions as soon as practical. The pre-existing conditions at each turbine site are primarily agricultural and thus will be converted back into agricultural production;
- To prevent damage to the root zone, excavation of soils for the purpose of underground collector system installation on private lands will occur at the minimum distance of 5 m away from the drip line of the significant woodland and valleyland. Cable trenches within 30 m of the significant woodland and valleyland will be filled immediately to prevent soil erosion and sedimentation issues;
- The preferred design is to excavate soils for the purpose of underground collector system installation in the municipal road allowance 5 m away from the significant woodland and valleyland boundaries. Issues may arise in the detailed design or construction that requires the line be constructed closer than 5 m. In the event that subsurface condition do not allow for placement of the collector system 5 m away, the collector system will be placed as close to the road as safe and allowable by the Township or County to create as much buffer from the significant woodland and valleyland. Cable trenches will be filled immediately after installation is complete to prevent soil erosion and sedimentation issues;
- Should the construction of underground collector lines not be feasible within the municipal road allowance on the edge of the feature, collector lines will be installed above ground on wooden poles;
- Tree pruning will be minimized to the greatest extent possible. To the extent practical, pruning will be avoided during leaf fall, typically between September and November. Prior to construction, the limits of tree pruning will be marked in the field. Tree pruning will be supervised by a qualified arborist. The Construction Contractor will ensure that no construction disturbance occurs beyond the marked limits;
- In some cases, tree removal may be necessary within the road allowance for health and safety or electrical safety reason. Tree removal required will be completed consultation with the MVCA and a certified arborist. As appropriate, and in consultation with the relevant parties (government, conservation authority, adjacent landowner) K2 Wind will replace trees removed with appropriate species in an alternate location;
- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);

- Discharges from any de-watering shall be directed to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the woodland unless required to maintain hydrological flow (based on detailed design);
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, the net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of 'natural features' within Feature 68 are predicted to be low.

5.4.55 Feature 69

Feature 69 is comprised of a significant wetland. The wetland is small (0.5 ha), oval shaped and dominated by willow, red-osier dogwood and red ash in the understory. Sugar maple and white ash are present on the narrow fringe of the wetland. No significant wildlife habitat features are associated with Feature 69.

5.4.55.1 Adjacent Project Components

Feature 69 falls within 120 m of the access road and collector system to Turbines 351 and 352. The minimum distance from Project components to the significant wetland feature is provided in the table below. There are no watercourse crossings associated with this feature.

Project Component	Approx. Distance to Significant Wetland (m)
Access Road (T-351, T-352)	14

*The distance from the natural features to the temporary crane path and the collector system (under the access road) are assumed to correspond with the distance to the access road.

5.4.55.2 Potential Effects

The potential effects of the Project on significant wetlands are described in Sections 5.2.2. No specific effects beyond those described in Sections 5.2.2 are expected on this significant natural feature.

5.4.55.3 Mitigation and Net Effects

Construction activities are planned within 120 m of the significant wetland associated with Feature 69. General mitigation measures and best management practices outlined in Section 5.3 will be applied, as applicable, to mitigate potential impacts on significant nature features associated with Feature 69. The specific mitigation strategy to protect the significant wetland will include the following:

- Prior to construction the outer limits of the construction area will be staked and marked to ensure that contractors remain within the temporary construction areas;
- The boundary of the wetland within 30 m of the collector lines/data cables and access road for Turbines 351 and 352 will be staked and flagged, and silt barrier will be constructed in consultation with a qualified ecologist prior to construction to assist with the demarcation of the construction area, to ensure construction activities avoid the significant woodland and to assist with the proper field installation of erosion and sediment controls measures;
- During construction, a 5 m buffer will be established between the drip line of the significant wetland and the permanent access road to minimize root zone damage and hydrological changes to the feature. Silt fencing will be established at the edge of the buffer to prevent sedimentation and erosion of soils into the significant wetland. The buffer area will not be disturbed during construction and will be seeded with species native to the ecoregion upon completion of construction, if necessary;
- The silt fencing will be regularly monitored and properly maintained during and following construction until soils in the construction area are re-stabilized with vegetation or the area has been returned to pre-disturbance conditions, after which it will be removed;
- Portions of the permanent access roads within 30 m of the wetland will be constructed at or near existing grade to maintain surface flow contributions to the wetland;
- Excavation of soils for the purpose of underground collector system installation will occur at the minimum distance of 5 m from the wetland. Cable trenches within 30 m of the wetland will be filled immediately to prevent soil erosion and sedimentation issues;
- Power cable trenches within 30 m of the wetland will be bedded with sand and backfilled with native soils or appropriate fill material, with clay plugs every 30 m to ensure that potential groundwater entering the trenches is not drawn along the sand-filled conduit and hydrological conveyance to the wetland is maintained;

- All sediment and erosion control measures shall be installed, maintained and removed in accordance with the Ontario Provincial Standard Specification (OPSS) standards for Temporary Erosion and Sediment Control Measures (OPSS 805);
- Discharges from any de-watering shall be directed to settling sumps or overland to vegetated areas where appropriate. Discharges shall not be released directly into the wetland unless required to maintain hydrological flow (based on detailed design);
- Traffic during construction and follow-up activities will be limited to existing and designated roadways, and must not detour through fields or natural areas;
- During construction/decommissioning and operation, vehicle traffic shall be restricted to daytime hours unless emergency access is needed. Speed limit signage will be erected and shall be restricted to 30 km/h or less on access roads and within temporary construction areas;
- When appropriate, contractors will be required to provide properly working machinery and equipment with adequate noise suppression devices that meet current government requirements;
- Maintain vehicles, machinery and equipment in good repair, equipped with emission controls, as applicable, and operate them within regulatory requirements;
- As necessary, suppress releases of dust using water mist or calcium chloride dust suppressant on the work sites as required (calcium chloride shall not be used on agricultural fields) during construction and decommissioning activities;
- Detailed protocols shall be established for employee/contractors regarding equipment maintenance and inspections as well as procedures for minimizing both the duration and severity of any accidents or malfunctions. An emergency spill plan shall be prepared;
- As appropriate, cover or otherwise contain loose materials that have potential to release airborne particulates during their transport, installation or removal; and,
- No refuelling or maintaining vehicles within 30 m of the natural features.

With the implementation of effective mitigation plans, monitoring and inspection of standard site control measures described above, no net residual effects of the construction, operation and decommissioning of the proposed Project within 120 m of ‘natural features’ within Feature 69 are predicted.

5.5 Summary of Impacts and Mitigation

The potential impacts, mitigation, net effects and monitoring recommendations for all natural features are summarized in Table 5.1 (Appendix B). With the implementation of mitigation measures discussed in the preceding sections, Project construction and operation is expected to be within acceptable levels of environmental effects.

5.6 Construction and Post-Construction Monitoring Plans

5.6.1 Construction Monitoring Plan

Details regarding the potential negative impacts, mitigation strategy, objectives, monitoring plan and contingency measures to be implemented during the construction of the Project are

provided in Table 5.2 (Appendix B). The following is a summary of the proposed monitoring plan.

During construction, best management practices pertaining to dust generation, soil erosion and sedimentation, chemical/fuel spills and soil contamination, noise and air emission pollution, root cutting or root zone compaction, habitat and sensory disturbance to wildlife, and short-term hydrological changes have been recommended for significant woodlands, wetlands, valleylands and significant wildlife habitat. To ensure these measures are properly employed, the following monitoring measures are recommended:

- Weekly visual inspections of silt barriers and dust suppression controls (and following major storm events) to ensure proper maintenance and functioning; rectify any discrepancies immediately;
- Weekly visual inspections to ensure proper storage of fuel or other potential contaminants to minimize potential for on-site spills; rectify any discrepancies immediately;
- Weekly monitoring of equipment and vehicle condition to ensure proper functioning; rectify any discrepancies immediately;
- Weekly monitoring of silt fences to prevent encroachment of sediments into adjacent natural features; rectify any discrepancies immediately; and,
- Weekly inspection of drainage ditches, culverts and general flow patterns to ensure proper site drainage.

Further details on the post-construction monitoring are provided in Table 5.2 (Appendix B).

5.6.2 Post-Construction Monitoring Plan

A post-construction monitoring plan for birds and bats has been developed in consultation with the OMNR and is consistent with guidance provided in the OMNR's *Birds and Bird Habitats: Guidelines for Wind Power Projects* (OMNR, 2011c) and the *Bats and Bat Habitats: Guidelines for Wind Power Projects* (OMNR, 2011b). Details regarding the potential negative effects, mitigation strategies, monitoring objectives, monitoring plan principles (including general methods, location, frequency, rationale and reporting) and contingency measures to be implemented are summarized in Table 5.2 (Appendix B).

5.6.2.1 Mortality Monitoring

Details regarding the mortality monitoring required in accordance with the OMNR bird and bat guidelines are discussed in EEMP (Appendix I). This information forms the basis of the monitoring components of the Construction Plan Report and has been submitted in the Design and Operations Report as part of the REA application. Mortality monitoring is not a necessary component of this NHA, but elements of the post-construction monitoring program will include the following:

- Mortality monitoring for birds and bats at 43 turbines (at least 30% of turbines) twice-weekly from May 1st to October 31st, with raptor mortality surveys continued once per

week from November 1st to November 30th, for a period of three years. Searcher efficiency and scavenger trials will be conducted each year according to the OMNR guidance documents (see Appendix I).

5.6.2.2 Avoidance Behaviour Monitoring

Elements of the post-construction monitoring plan are discussed within the context of relevant natural features in Section 5.4. Post-construction monitoring will be conducted for significant natural features where avoidance behaviour was identified as a potential negative environmental effect due to Project operation. The following sections provided a summary of the proposed post-construction monitoring for significant colonial nesting bird habitat, significant waterfowl nesting habitat, significant bat maternal colony roost habitat and significant winter raptor feeding and roosting habitat.

Colonial Bird Nesting Habitat - Herons

One significant colonial nesting bird habitat was identified as occurring with 120 m of the Project Location, and was associated with Feature 63 (see Figure 8.25, Appendix A). As avoidance behaviour of turbines and access roads is identified as a potential operational effect on colonial bird nesting habitat, a minimum three-year post-construction colonial bird nesting monitoring plan to assess habitat disturbance to herons will be implemented if pre-construction habitat use studies confirm the habitat as significant wildlife habitat. The objective of the monitoring will be to determine if Project operations have an effect on heron behaviour and habitat use. The same protocols which are implemented during the pre-construction surveys will be applied post-construction.

Initial pre-construction ground surveys will be conducted once every two weeks from May to the end of June. Surveys will identify the ingress and egress patterns of Great Blue Herons at the feature and the number of active nest within the colony (pending permission to enter from property owner). Heron nests are most active in the early morning and in the evening. Monitoring will take place at both of these times on each day of site investigations. If the colonial bird nesting habitat for herons is identified as significant through pre-construction monitoring, post-construction monitoring will be initiated.

To assess any potential avoidance behaviour by Great Blue Herons, post-construction monitoring will follow the same protocols as pre-construction monitoring. Since there was only one heron colony identified within the General Project Area, comparisons cannot be made between potentially “impacted” sites (within 120 m of the Project Location) and “control” sites (outside 120 m from the Project Location). Comparisons can only be made between pre-construction and post-construction survey results. While this type of comparison is not ideal, post-construction data can be statistically compared to pre-construction data. However, without the use of control sites, data suggesting avoidance behaviour of Great Blue Herons shall be taken with caution as confounding factors such as weather, disease and/or predators may influence the analysis. Should pre-construction surveys suggest the presence of other Great Blues Heron colonies in the area but not within 120 m of the Project Location, the Proponent will

make efforts to use these sites as 'control' sites to allow for a Before-After-Control-Impact study design.

The OMNR, along with the proponent and other relevant agencies, will collectively review the results of the post-construction monitoring to determine if a negative environmental effect is occurring, and whether such an effect is attributable to the wind turbines and not external factors. These discussions will determine if and when contingency measures shall be undertaken. The best available science and information will be considered when determining appropriate mitigation and will be determined in consultation with MOE and OMNR based on post-construction monitoring results.

Waterfowl Nesting Habitat

One significant waterfowl nesting habitat was identified within 120 m of the Project Location, and is associated with Feature 44 (see Figure 8.20, Appendix A). As avoidance behaviour of turbines is identified as a potential operational effect on waterfowl nesting habitat, a minimum three-year post-construction waterfowl monitoring plan to assess habitat disturbance will be implemented if pre-construction habitat use studies confirm the habitat as significant wildlife habitat. The objective of the monitoring will be to determine if Project operations have an effect on waterfowl behaviour and habitat use. The same protocols which are implemented during the pre-construction surveys will be applied post-construction.

Initial pre-construction surveys will be conducted once every two weeks from May to the end of June. Surveys will identify breeding territories, species diversity, relative abundance and the density of active nests. Attempts to identify the patterns of movement of nesting waterfowl to and from the site will be assessed, as well as the success of any documented nesting sites. If the waterfowl nesting habitat is identified as significant through pre-construction monitoring, post-construction monitoring will be initiated.

To assess any potential avoidance behaviour of waterfowl nesting habitat by waterfowl, post-construction monitoring will follow the same protocols as pre-construction monitoring. Since there was only one potential waterfowl nesting habitat identified within the General Project Area, comparisons cannot be made between potentially "impacted" sites (within 120 m of the Project Location) and "control" sites (not within 120 m of the Project Location). Comparisons can only be made between pre-construction and post-construction survey results. While this type of comparison is not ideal, post-construction data can be statistically compared to pre-construction data. However, without the use of control sites, data suggesting avoidance behaviour of nesting waterfowl shall be taken with caution as confounding factors such as weather, disease and/or predators may influence the analysis. Should pre-construction surveys suggest the presence of other waterfowl nesting habitat in the area but not within 120 m of the Project Location, the Proponent will make efforts to use these sites as 'control' sites to allow for a Before-After-Control-Impact study design.

The OMNR, along with the proponent and other relevant agencies, will collectively review the results of the post-construction monitoring to determine if a negative environmental effect is

occurring, and whether such an effect is attributable to the wind turbines and not external factors. These discussions will determine if and when contingency measures shall be undertaken. The best available science and information will be considered when determining appropriate mitigation and will be determined in consultation with MOE and OMNR based on post-construction monitoring results.

Bat Maternal Colony Roost Habitat

Eight significant bat maternal colony roost habitats were identified within 120 m of the Project Location, and are associated with Features 5, 13, 28, 32, 33, 36, 39 and 48 (see Figure 8.1 to 8.29, Appendix A). As avoidance behaviour of turbines is identified as a potential operational effect, a minimum three-year post-construction bat maternal colony roost monitoring plan will be implemented if the habitat is identified as significant wildlife habitat. The objective of the monitoring will be to determine if Project operations have an effect on bat behaviour and habitat use. The same protocols which are implemented during the pre-construction surveys will be applied post-construction.

Initial pre-construction monitoring will consist of monitoring significant bat maternal colony roost habitat during the month of June. Surveyors will choose a location with a clear view of the cavity opening or crevice (multiple surveyors may be required if multiple openings are present in one snag). The cavity opening or crevice will be monitored for any evidence of bats beginning 30 minutes before dusk until 60 minutes after dusk for evidence of bats. Modern broadband bat detectors (automated systems in conjunction with computer software analysis packages or manual devices) with condenser microphones may be used in conjunction with visual surveys to determine species using roost habitats. Each candidate roost tree will only be monitored once prior to construction. Species diversity and density will be measured for each significant bat maternal colony roost tree. If the bat maternal colony roost habitats are identified as significant through pre-construction monitoring, post-construction monitoring will be initiated.

To assess any potential avoidance behaviour of maternal colony roost habitat by bats, post-construction monitoring will follow the same protocols as pre-construction monitoring. Species diversity and density will be compared between pre-construction and post-construction conditions. If bat maternal colony trees are located within the ELC stand but not within 120 m of the Project Location, these sites will be used as ‘control’ sites to document potential changes in species diversity and density compared to potential ‘impacted’ sites (within 120 m of the Project Location). This approach allows for Before-After-Control-Impact design. Consistency in the survey methods will allow for defensible comparisons of the post-construction disturbance effects. Post-construction data will be statistically compared to pre-construction data. This will allow yearly comparisons of potential post-construction effects while statistically controlling for external factors such as weather, disease and depredation.

The OMNR, along with the proponent and other relevant agencies, will collectively review the results of the post-construction monitoring to determine if a negative environmental effect is occurring, and whether such an effect is attributable to the wind turbines and not external factors. These discussions will determine if and when contingency measures shall be

undertaken. The best available science and information will be considered when determining appropriate mitigation and will be determined in consultation with MOE and OMNR based on post-construction monitoring results.

Winter Raptor Feeding and Roosting Habitat

Two significant winter raptor feeding and roosting habitats were identified within 120 m of the Project Location, and are associated with Features 16 and 59 (see Figure 8.6 and 8.25, Appendix A). As the avoidance of turbines is identified as a potential operational effect on winter raptors, a minimum three-year post-construction winter raptor monitoring plan to assess habitat disturbance to winter raptor feeding and roosting habitat will be implemented if the habitat is identified as significant wildlife habitat. The objective of the monitoring will be to determine if Project operations have an effect on winter raptor behaviour and habitat use.

Initial pre-construction monitoring will consist of three surveys conducted in December to determine the potential for significant habitat use. Based on the results of the first three surveys and in consultation with the OMNR, further surveys may be required in January and March. If the raptor winter feeding and roosting habitats are identified as significant through pre-construction monitoring, post-construction monitoring will be initiated.

To assess any potential avoidance behaviour of winter feeding and roosting habitat by raptors, post-construction monitoring will follow the same protocols as pre-construction monitoring. Since there were only two potential winter raptor feeding and roosting habitats identified within the General Project Area, comparisons cannot be made between potentially “impacted” sites (within 120 m of the Project Location) and “control” sites (not within 120 m of the Project Location). Comparisons can only be made between pre-construction and post-construction survey results. While this type of comparison is not ideal, post-construction data can be statistically compared to pre-construction data. However, without the use of control sites, data suggesting avoidance behaviour of wintering raptor should be taken with caution as confounding factors such as weather, disease and/or predators may influence the analysis. Should pre-construction surveys suggest the presence of other winter raptor feeding and roosting habitat in the area but not within 120 m of the Project Location, the Proponent will make efforts to use these sites as ‘control’ sites to allow for a Before-After-Control-Impact study design.

The OMNR, along with the proponent and other relevant agencies, will collectively review the results of the post-construction monitoring to determine if a negative environmental effect is occurring, and whether such an effect is attributable to the wind turbines and not external factors. These discussions will determine if and when contingency measures shall be undertaken. The best available science and information will be considered when determining appropriate mitigation and will be determined in consultation with the OMNR.

Amphibian Woodland Breeding Habitat

Eight significant amphibian woodland breeding habitats were identified within 120 m of the Project Location that require post-construction monitoring. These habitats are associated with Features 12, 13, 24, 33, 35, 36, 37 and 39 (see Figure 8.5, 8.13, 8.15 and 8.18, Appendix A). As avoidance behaviour of access roads is identified as a potential operational effect on amphibians, a minimum three-year post-construction amphibian monitoring plan will be implemented if the habitat is identified as significant wildlife habitat. The objective of the post-construction monitoring will be to assess habitat disturbance to amphibians and to determine if Project operations have an effect on habitat use. The same protocols which are implemented during the pre-construction surveys will be applied post-construction.

Initial pre-construction monitoring will be conducted in April, May and June 2012 and consist of a vernal pool and amphibian egg mass survey, and three amphibian call and visual surveys at each amphibian woodland breeding habitat to determine significant habitat use. If the amphibian woodland breeding habitats are identified as significant through pre-construction monitoring, post-construction monitoring will be initiated.

Species diversity and density will be compared between pre-construction and post-construction conditions. If amphibian breeding habitats are located within the ELC polygons, but not within 120 m of the Project Location, these sites will be used as 'control' sites to document potential changes in species diversity and density compared to potential 'impacted' sites (within 120 m of the Project Location). This approach allows for a Before-After-Control-Impact design. Consistency in the survey methods will allow for defensible comparisons of the post-construction disturbance effects. Post-construction data will be statistically compared to pre-construction data. This will allow yearly comparisons of potential post-construction effects while statistically controlling for external factors such as weather, disease and depredation.

Amphibian Corridors

Five significant amphibian corridors were identified within 120 m of the Project Location that require post-construction monitoring. These corridor habitats are associated with Features 12, 13, 24, 33, 35, 36, 37 and 39 (see Figure 8.5, 8.13, 8.15 and 8.18, Appendix A). As avoidance behaviour of access roads is identified as a potential operational effect on amphibians, a minimum three-year post-construction amphibian monitoring plan will be implemented if the habitat is identified as significant wildlife habitat. The objective of the post-construction monitoring will be to assess habitat disturbance to amphibians and to determine if Project operations have an effect on habitat use. The same protocols which are implemented during the pre-construction surveys will be applied post-construction.

Initial pre-construction monitoring will be conducted in June 2012 and consist of movement surveys. The surveys will consist of erecting barriers (silt fence) in the location of the proposed access roads in the significant amphibian corridor habitats prior to the juvenile emergence season. To the greatest extent possible, the barriers will be located where amphibians are most likely to be ingressing or egressing the features (i.e., near vernal pools). The length of the

barriers will vary from 20 to 60 m depending on the amphibian corridor (see pre-construction subsections for Features 12, 13, 24, 33, 35, 36, 37 and 39 for feature-specific details). The barriers will be surveyed every day for one week in June to document amphibians using the corridor and once again in July/August, if necessary (based on consultation with the OMNR). The barriers will be left standing for the full week and will be monitored at dawn, mid-day and dusk to prevent desiccation of amphibians. Any amphibian identified along the edge of the barriers will be moved to the closest woodland/wetland feature to prevent desiccation of amphibians. The surveys will consist of walking the extent of the barriers (on both sides) to identify amphibians. The extent of the proposed access road between the two nodes (features) will also be walked to survey visually for amphibian movement. Should amphibian mortality be detected due to the presence of the semi-permanent barriers, the barriers will be set up before dusk each day of the survey, checked at dawn and then laid down flat or removed for the day.

Since there are only five potential amphibian corridor habitats identified within the General Project Area (associated with Features 12, 13, 24, 33, 35, 36, 37 and 39), comparisons cannot be made between potentially "impacted" sites (within 120 m of the Project Location) and "control" sites (not within 120 m of the Project Location). Comparisons can only be made between pre-construction and post-construction survey results. While this type of comparison is not ideal, post-construction data can be statistically compared to pre-construction data. However, without the use of control sites, data suggesting avoidance behaviour of amphibian corridor habitats should be taken with caution as confounding factors such as weather, disease and/or predators may influence the analysis. Should pre-construction surveys suggest the presence of other amphibian corridor habitat in the area but not within 120 m of the Project Location, the Proponent will make efforts to use these areas as 'control' sites to allow for a Before-After-Control-Impact study design.

5.7 Qualifications

AMEC personnel responsible for conducting the evaluation of significance include:

- Jeff Balsdon, M.Sc. (Terrestrial Ecologist); and,
- Matt Evans, Ph.D. (Senior Ecologist).

Curricula vitae are provided in Appendix H.

6.0 CONCLUSIONS

This Natural Heritage Assessment and Environmental Impact Study have revealed that there are many significant natural heritage features located within 120 m of the K2 Wind Power Project Location. Significant natural features include woodlands, wetlands, valleylands, wildlife habitats (colonial nesting bird habitat, waterfowl nesting habitat, winter raptor feeding and roosting habitat, turtle over-wintering habitat, bat maternal colony roost habitat, rare vegetation communities, interior forest breeding bird habitat, amphibian woodland breeding habitat, amphibian wetland breeding habitat, terrestrial crayfish habitat, habitat of species of conservation concern and amphibian corridor habitat) and ANSI (life science and earth science). Although the majority of the Project has been planned to occupy previously disturbed agricultural cropland and avoid natural heritage features, portions of the development are located within the 120 m Zone of Investigation and as such, the Environmental Impact Study was prepared. The impact study concluded that through the application of best management practices and the prescribed mitigation measures and management plans, adverse residual effects resulting from the Project's construction, operation, and decommissioning will not be significant. Post-construction monitoring programs have been designed to assess operational mortality rates for bird and bats and to assess any avoidance of habitats by birds, bats and amphibians due to operational activities.

AMEC Environment & Infrastructure, a division of AMEC Americas Limited, prepared this Natural Heritage Assessment and Environmental Impact Study for K2 Wind Ontario LP. K2 Wind Ontario LP is committed to implementing all the appropriate protection, mitigation and monitoring measures as they apply to the construction, operation and decommissioning of the Project. This information is respectfully submitted in support of the proposed K2 Wind Power Project on behalf of K2 Wind Ontario LP.

Sincerely,

AMEC Environment & Infrastructure,
a Division of AMEC Americas Limited

Jeff Balsdon, M.Sc.
Terrestrial Ecologist
Tel: (905) 568-2929
Fax: (905) 568-1686
jeff.balsdon@amec.com

Matt Evans, Ph.D.
Senior Ecologist
Tel: (905 568-2929
Fax: (905) 568-1686
matt.evans@amec.com

Peter Rostern, B.Eng., M.B.A., P.Eng.
Project Manager
Tel: (905) 568-2929
Fax: (905) 568-1686
peter.rostern@amec.com

7.0 REFERENCES

Argus, G.W., K.M. Pryer, D.J. White, and C.J. Keddy (eds.). 1982-1987. Atlas of the rare vascular plants of Ontario. 4 parts. National Museum of Natural Sciences, Ottawa, Ontario. Looseleaf.

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. xxii + 706 pp.

Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2000. COSEWIC assessment and update status report on the Hooded Warbler *Wilsonia citrina* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 11 pp.

Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2002a. COSEWIC assessment and update status report on the Eastern Ribbon Snake *Thamnophis sauritus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 24 pp.

Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2002b. COSEWIC assessment and update status report on the Milksnake *Lampropeltis triangulum* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 29 pp.

Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2007. COSEWIC assessment and status report on the Common Nighthawk *Chordeiles minor* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 25 pp.

Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2008a. COSEWIC assessment and status report on the Canada Warbler *Wilsonia canadensis* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 35 pp.

Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2008b. COSEWIC assessment and update status report on the Short-eared Owl *Asio flammeus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 24 pp.

Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2008c. COSEWIC assessment and status report on the Snapping Turtle *Chelydra serpentina* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 47 pp.

Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2010. COSEWIC assessment and status report on the Monarch *Danaus plexippus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 43 pp.

Cowan, W.R., A.J. Cooper, and J.J. Pinch. 1986. Quaternary Geology of the Wingham-Lucknow Area, Southern Ontario. Map P.2957, 1:50,000 with marginal notes.

Cowan, W.R., and J.J. Pinch. 1986. Quaternary Geology of the Walkerton-Kincardine Area, Southern Ontario, Map P. 2956, 1:50,000 with marginal notes.

Crum, H.A. and L.E. Anderson. 1981. Mosses of eastern North America, Volume 1. Columbia University Press, New York. 665 pp.

Dechant, J.A., M. F. Dinkins, D.H. Johnson, L.D. Igl, C.M. Goldade, B.D. Parkin, and B.R. Euliss. 2003. Effects of management practices on grassland birds: Upland Sandpiper. Northern Prairie Wildlife Research Center, Jamestown, ND. Northern Prairie Wildlife Research Center Online. (Version 12DEC2003). http://www.npwrc.usgs.gov/resource/literatr/grasbird/upsa/upsa.htm

Dobbyn, J.S. 1994. Atlas of the Mammals of Ontario. Federation of Ontario Naturalists. Don Mills, ON. vii + 120 pp.

Dunkle, S.W. 2000. Dragonflies through binoculars: a field guide to dragonflies of North America. Oxford University Press, New York, New York.

Eagles, P.F.J. 1987. Yellow-breasted Chat. P. 424 in Atlas of the breeding birds of Ontario (M.D. Cadman, P.F.J. Eagles, and F.M. Helleiner, eds.). Univ. of Waterloo Press, Waterloo, ON.

Eckerle, K.P., and C.F. Thompson. 2001. Yellow-breasted Chat (*Icteria virens*). In The Birds of North America, No. 575 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.

Environment Canada. 2005. Best Practices for the Reduction of Air Emissions From Construction and Demolition Activities. Prepared by: Cheminfo Services Inc., In conjunction with the Construction and Demolition Multi-stakeholder Working Group. Prepared for: Environment Canada, Transboundary Issues Branch. March 2005.

Environment Canada/Canadian Wildlife Service. 2007a. Wind Turbines and Birds: A Guidance Document for Environmental Assessment. Interim Report. July 2005.

Environment Canada. 2007b. Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds. Prepared by the Canadian Wildlife Service. Final Report, February 2007.

Erickson, W., K. Kronner, and B. Gritski. 2003. Nine Canyon Wind Power Project Avian and Bat Monitoring Report. Report Prepared for: Nine Canyon Technical Advisory Committee, Energy Northwest. http://www.west-inc.com/reports/nine_canyon_monitoring_final.pdf

Evers, D.C., J.D. Paruk, J.W. Mcintyre and J.F. Barr. 2010. Common Loon (*Gavia immer*), The Birds of North America Online (A. Poole, ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/313

Fenton, M.B. 1970. Population studies of *Myotis lucifugus* (Chiroptera: Vespertilionidae) in Ontario. Life Science Contributions, Royal Ontario Museum, 77:1-34.

Huron County. 2010. Online Interactive Mapping. http://gis.huroncounty.ca/imf/imf.jsp?site=Huron_County&user=guest&pass=guest

Johnson, D.H., and L.D. Igl. 2001. Area requirements of grassland birds: a regional perspective. Auk 118:24-34.

Kerlinger, P. and J. Dowdell. 2003. Breeding Bird Survey for the Flat Rock Wind Power Project, Lewis County, New York. Report Prepared for: Atlantic Renewable Energy Corporation. http://www.powernaturally.org/About/documents/FR%20DEIS%20App%20F%20Avian%20Supp%20Rpt%20120303.pdf

Kingsley, A. and B. Whittam. 2007. Wind Turbines and Birds: A Background Review for Environmental Assessment. Prepared for the Canadian Wildlife Service. Draft April 2, 2007.

Konze, K. and M. McLaren. 1997. Wildlife Monitoring Programs and Inventory Techniques for Ontario. Ontario Ministry of Natural Resources. Northeast Science and Technology. Technical Manual TM-009. 139 pp.

Kunz, T.H., and L.F. Lumsden. 2003. Ecology of cavity and foliage roosting bats. Pp. 3–89, in Bat ecology (T.H. Kunz and M.B. Fenton, eds.). The University of Chicago Press, Chicago, 779 pp.

Lee, H.T., W.D. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig, and S. McMurray. 1998. Ecological Land Classification for Southern Ontario: First Approximation and its Application. Ontario Ministry of Natural Resources, Southern Science Section, Science Development and Transfer Branch. SCSS Field Guide FG-02. 225 pp.

Maitland Valley Conservation Authority (MVCA). 2010. MVCA Watershed Report Card. Cited online:http://www.mvca.on.ca/uploads/docs/MVCA%20Watershed%20Report%20Card.pdf. Accessed October 2010.

NWCC (National Wind Coordinating Committee). 2002. Permitting of Wind Energy Facilities.

Oldham, M.J., and S.R. Brinker. 2009. Rare Vascular Plants of Ontario, Fourth Edition. Natural Heritage Information Centre, Ontario Ministry of Natural Resources. Peterborough, Ontario. 188 pp.

Oldham, M.J., and W.F. Weller. 2000. Ontario Herpetofaunal Atlas. Natural Heritage Information Centre, Ontario Ministry of Natural Resources. Updated 15-01-2010. Cited online: [http://nhic.OMNR.gov.on.ca/OMNR/nhic/herps/ohs.html]. Accessed May, 2010.

Ontario Ministry of Natural Resources (OMNR). 2000. Significant Wildlife Habitat Technical Guide. Fish and Wildlife Branch, Wildlife Section, Science Development and Transfer Branch, South-central Sciences Section. 151 pp.

Ontario Ministry of Natural Resources (OMNR). 2002a. Ontario Wetland Evaluation System, Southern Manual, 3rd Edition. NEST Technical Manual TM-002, March 1993, revised December 2002.

Ontario Ministry of Natural Resources (OMNR). 2002b. Earth Science Inventory Checklist: Lothian-Lake Warren Shorelines and Lothian South. Compiler: Daryl W. Cowell, March 2005.

Ontario Ministry of Natural Resources (OMNR). 2009. Draft Significant Wildlife Habitat Ecoregion Criteria Schedules. Addendum to Significant Wildlife Habitat Technical Guide, Ontario Ministry of Natural Resources, Working Draft January 2009.

Ontario Ministry of Natural Resources (OMNR). 2010a. Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement, 2005. Second Edition, March 2010. Toronto: Queen's Printer for Ontario. 248 pp.

Ontario Ministry of Natural Resources (OMNR). 2010b. Ontario Natural Heritage Information Centre (NHIC) Element Occurrence Search. Cited online: [http://www.OMNR.gov.on.ca/OMNR/nhic/queries/geographic.cfm]. Accessed November, 2010 and October 2011.

Ontario Ministry of Natural Resources (OMNR). 2010c. Land Information Ontario (LIO). http://www.OMNR.gov.on.ca/en/Business/LIO/2ColumnSubPage/STEL02_167954.html

Ontario Ministry of Natural Resources (OMNR). 2010d. Ontario Renewable Energy Atlas. http://www.OMNR.gov.on.ca/en/Business/Renewable/2ColumnSubPage/276957.html

Ontario Ministry of Natural Resources (OMNR). 2011a. Natural Heritage Assessment Guide for Renewable Energy Projects. First Edition, July 2011. Toronto: Queen's Printer for Ontario. 99 pp.

Ontario Ministry of Natural Resources (OMNR). 2011b. Bats and Bat Habitats. Guidelines for Wind Power Projects. Second Edition. July, 2011. 25 pp.

Ontario Ministry of Natural Resources (OMNR). 2011c. Birds and Bird Habitats. Guidelines for Wind Power Projects. October, 2011. 32 pp.

Ontario Partners in Flight (PIF). 2008. Ontario Landbird Conservation Plan: Lower Great Lakes/St. Lawrence Plain, North American Bird Conservation Region 13. Ontario Ministry of Natural Resources, Bird Studies Canada, Environment Canada. 172 pp.

Opler, P.A., K. Lotts, and T. Naberhaus, coordinators. 2011. Butterflies and Moths of North America. http://www.butterfliesandmoths.org/.

Poole, A. (ed). 2005. The Birds of North America Online: http://bna.birds.cornell.edu/BNA/. Cornell Laboratory of Ornithology, Ithaca, NY.

Reijnen, R., R. Foppen, C. Terbraak, and J. Thissen. 1996. The effects of car traffic on breeding bird populations in woodland. III. Reduction of density in relation to the proximity of main roads. Journal of Applied Ecology 32: 187–202.

Riley, J.L. and P. Mohr. 1994. The Natural Heritage of Southern Ontario's Settled Landscapes. A Review of Conservation and Restoration Ecology for Land-Use and Landscape Planning. Ontario Ministry of Natural Resources, Southern Region, Aurora, Science and Technology Transfer, Technical Report TR-001. 78pp.

Rowe, J.S. 1972. Forest Regions of Canada. Ottawa, Canadian Forest Service. Pub. No. 1300. 172 pp.

Sibley, D.A. 2001. The Sibley Guide to Bird Life and Behaviour. National Audubon Society. Published by Alfred A. Knopf, Inc. Chanticleer Press, Inc. 587 pp.

Sample, D., and M. Mossman. 1997. Managing Habitat for Grassland Birds: A Guide for Wisconsin. Wisconsin Department of Natural Resources: Madison, WI.

Smith, K.G., J.H. Withgott, and P.G. Rodewald. 2000. Red-headed Woodpecker (*Melanerpes erythrocephalus*). In The Birds of North America, No. 518 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.

Sun, W.C., and P.M. Narins. 2004. Anthropogenic sounds differentially affect amphibian call rate. Biological Conservation 121:419-427.

Swanson, D.A. 1998 (revised 2002). Effects of management practices on grassland birds: Savannah Sparrow. Northern Prairie Wildlife Research Center, Jamestown, ND. 30 pp.

Ultsch, GR. 2006. The ecology of overwintering among turtles: where turtles overwinter and its consequences. Biological Reviews of the Cambridge Philosophical Society 81(3):339-367.

Vennesland, R.G., and R.W. Butler. 2011. Great Blue Heron (*Ardea herodias*), The Birds of North America Online (A. Poole, ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/025

Vickery, P.D. 1996. Grasshopper Sparrow (*Ammodramus savannarum*), The Birds of North America Online (A. Poole, ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/239

Warner, B.G., and C.D.A. Rubec. 1997. Ontario Wetland Classification System. National Wetlands Working Group, University of Waterloo, Waterloo, Ontario. 68 pp.

Watt, R.W., and M.C. Caceres. 1999. Managing for Snags in the Boreal Forests of Northeastern Ontario. OMNR. Northeast Science and Technology. Technical Note-016. 20p.

Wheelwright, N.T., and J.D. Rising. 2008. Savannah Sparrow (*Passerculus sandwichensis*), The Birds of North America Online (A. Poole, ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/045