



SPRINGWOOD WIND PROJECT
NATURAL HERITAGE ASSESSMENT
AND ENVIRONMENTAL IMPACT
STUDY

File No. 160960606
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Executive Summary

wpd Canada Corporation (wpd) is a renewable energy development company based in Mississauga, Ontario and is dedicated to providing renewable energy for Ontario. Further information can be found on our website at <http://wpd-canada.ca>. wpd is proposing to develop the Springwood Wind Project (the Project) in the Township of Wellington Centre, in Wellington County, Ontario, in response to the Government of Ontario's initiative to promote the development of renewable electricity in the province. The Project was awarded an Ontario Feed-In-Tariff (FIT) contract with the Ontario Power Authority (OPA) on May 3, 2010 (FIT Contract No. F-000666-WIN-130-601).

The Wind Project Study Area is generally bounded by i) Sideroad 20 to the Northwest; ii) Wellington Road 16 to the Northeast; iii) 2nd Line to the Southwest; and iv) Sideroad 15 to the Southeast. The connection point for the Project into the Hydro One grid is a switching station on 3rd Line, between Sideroad 20 and Sideroad 15. There is also a meteorological (MET) tower located at -80.406219°, 43.787097°, with a 60m met mast. As this is already in place, it is outside of the current assessment.

The basic components of the Project include four REpower MM92-2.05 MW wind turbine generators with a total maximum installed nameplate capacity of 8.2 MW (FIT Contract maximum of 9.2 MW), step-up transformers located adjacent to the base of each turbine, a 44 kV underground electrical power line system, a switching station, and turbine access roads. Temporary components during construction include work and storage areas at the turbine locations and along access roads and laydown areas. The underground collector system will transport the electricity generated from each turbine to a switching station located on private property adjacent to the municipal road allowance on 3rd Line. Hydro One Networks Inc. (HONI) will be responsible for building a new 44kV line into the switching station; construction of this line is therefore outside of the present assessment.

This Natural Heritage Assessment (NHA) and Environmental Impact Study (EIS) is intended to satisfy the requirements outlined within O. Reg. 359/09 (s. 24 through 28, 37 and 38) and is to be submitted as a component of the REA application.

The proposed Project Location, as defined in O. Reg. 359/09, includes any air space and all parts of the land in, on or over which the Project is proposed. The records review report, site investigation report, evaluation of significance report and Environmental Impact Study (for significant features located in or within 120 m of the Project Location) as required by O.Reg. 359/09 are found within this document.

Background data were collected and reviewed to identify natural features located in, or within 120 metres of the Project Location. The results of the records review search were used to determine whether the Project Location is in a natural feature, within 50 m of an Earth Science Area of Natural and Scientific Interest, or within 120 m of other natural features.

The site investigations in support of this report 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 the potential for candidate significant wildlife habitat were used to guide the scope and direction of site investigations.

Natural heritage information collected from the records review, the site investigation and consultations were analyzed to determine the significance and sensitivity of existing ecological features and functions. The following significant features are located within 120 m of the Project Location and require an EIS as per O. Reg 359/09, s. 27: provincially significant wetland and significant wildlife habitat (amphibian breeding habitat).

An EIS is provided for each significant natural feature that is found within 120 m of the Project Location. The EIS identifies and assesses any negative environmental effects and proposes measures to minimize and mitigate the potential negative impacts associated with the planning, design construction, and operation of the proposed Project.

Once the identified protective, mitigation and compensation measures are applied to the environmental features discussed above, the construction and operation of the Project is expected to have acceptable net negative effects on the significant features and functions identified through the Natural Heritage Assessment process. An environmental effects 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 to other natural elements.

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1.0 Introduction

1.1 BACKGROUND

wpd Canada Corporation (wpd) is a renewable energy development company based in Mississauga, Ontario and is dedicated to providing renewable energy for Ontario. Further information can be found on our website at <http://wpd-canada.ca/>. wpd is proposing to develop the Springwood Wind Project (the Project) in the Township of Wellington Centre, in Wellington County, Ontario, in response to the Government of Ontario's initiative to promote the development of renewable electricity in the province. The location of the Study Area is shown on Figure 1 (Appendix A). The Project was awarded an Ontario Feed-In-Tariff (FIT) contract with the Ontario Power Authority (OPA) on May 3, 2010 (FIT Contract No. F-000666-WIN-130-601).

The Project Study Area is generally bounded by i) Sideroad 20 to the Northwest; ii) Wellington Road 16 to the Northeast; iii) 2nd Line to the Southwest; and iv) Sideroad 15 to the Southeast. There is a switching station located on 3rd Line. There is also a meteorological (MET) tower located at -80.406219°, 43.787097°, with a 60m met mast. As this is already in place, it is outside of the current assessment.

The basic components of the Project include four REpower MM92-2.05 MW wind turbine generators with a total maximum installed nameplate capacity of 8.2 MW (FIT Contract maximum of 9.2 MW), step-up transformers located adjacent to the base of each turbine, a 44 kV underground electrical power line system, a switching station, and turbine access roads. Temporary components during construction include work and storage areas at the turbine locations and along access roads and laydown areas. The underground collector system will transport the electricity generated from each turbine to a switching station located on private property adjacent to the municipal road allowance on 3rd Line. Hydro One Networks Inc. (HONI) will be responsible for building a new 44kV line into the switching station; construction of this line is therefore outside of the present assessment.

The proposed Project Location, as defined in O. Reg. 359/09, includes any air space and all parts of the land in, on or over which the Project is proposed. This is defined as the area where site preparation and construction activities will occur and where infrastructure will be located (MNR, 2010a). The outer limit includes the turbine blade tip where that component forms the outer limit of the Project Location.

As required by the regulation, a 120 m "Zone of Investigation" has been identified around the outer limits of the Project Location; measured as 120 m from the outer limit of the Project Location.

wpd retained Stantec Consulting Ltd. (Stantec) to prepare a Renewable Energy Approval (REA) Application, as required under Ontario Regulation 359/09 - Renewable Energy Approvals under Part V.0.1 of the Act of the *Environmental Protection Act* (O. Reg. 359/09). According to

subsection 6.(3) of O.Reg.359/09, the Project is classified as a Class 4 Wind Facility and will follow the requirements identified in O.Reg.359/09 for such a facility.

This Natural Heritage Assessment and Environmental Impact Study (NHA/EIS) has been prepared in accordance with O. Reg. 359/09, and is one component of the REA application for the Project.

1.2 REPORT REQUIREMENTS

This Natural Heritage Assessment and Environmental Impact Study is intended to satisfy the requirements outlined within O. Reg. 359/09 (s. 24 through 28, 37 and 38) and is to be submitted as a component of the REA application. The Project is not located within the Niagara Escarpment Plan Area, 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 and/or within 120 metres of the Project Location:

- Wetlands;
- Coastal wetlands;
- Life Science Areas of Natural and Scientific Interest (ANSIs);
- Earth Science ANSIs (within 50 m);
- Valleylands;
- Woodlands;
- Wildlife habitat; and,
- Provincial parks and conservation reserves.

This report identifies the existence and boundaries of all natural features within 120 m of the Project Location based on a review of background records and on-site field investigations. As the Project Location is within 120 m of natural features, this report provides an evaluation of significance for each identified feature based on either an existing Ministry of Natural Resources (MNR) designation of the feature, or by using evaluation criteria or procedures established or accepted by the MNR.

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 is required that identifies and assesses any negative environmental effects and identifies mitigation measures (O.Reg. 359/09, s.38).

The results of the NHA/EIS must be consolidated into a report and submitted to MNR for confirmation in advance of submission of the REA application to the MOE. Written confirmation from the MNR, as well as any written comments received from the MNR, must be submitted along with the NHA and EIS to the MOE as part of the REA application.

1.3 GUIDANCE DOCUMENTS

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

- Draft *Natural Heritage Assessment Guide for Renewable Energy Projects* (MNR, 2010a) (Draft posted to Ontario's Environmental Registry [EBR] on December 8, 2010)
- Draft *Bats and Bat Habitats Guideline for Renewable Energy Projects* (MNR, 2010b) (Draft posted to EBR on April 6, 2010)
- Draft *Birds and Bird Habitats Guideline for Renewable Energy Projects* (MNR, 2010c) (Draft posted to EBR on November 5, 2010)
- Natural Heritage Reference Manual (MNR, 2010d)
- Significant Wildlife Habitat Technical Guide and Appendices (MNR, 2000)
- Significant Wildlife Habitat Decision Support System (MNR, undated)
- Ontario Wetland Evaluation System, Southern Manual (MNR, 2002)

2.0 Records Review

2.1 METHODS

This records review report was prepared in accordance with O. Reg. 359/09, s. 25 (3).

Background data were collected and reviewed to identify natural features located in, or within 120 metres of the Project Location. The search area used for the records review component of this NHA report includes lands beyond the Springwood Wind Project Location in order to capture natural features that may be located within, or partially within, 120 m of the Project Location. This approach is specifically intended to help in the identification of potential components of significant wildlife habitat that may be supported within the 120 m Zone of Investigation.

Documents reviewed and agencies contacted as part of the records review included but were not limited to:

Federal

- SARA Schedule Species at Risk web mapping application (Environment Canada, 2006)

Provincial

- Ministry of Natural Resources. Background information request submitted June 8, 2010. MNR provided background information on natural features and species at risk on June 24, 2010 (Appendix C). Stantec has been in correspondence with April Nix, Renewable Energy Planning Ecologist (June 2010- present);
- Natural Heritage Information Centre (NHIC) database. June 2010. Natural Areas and Species records search. Biodiversity explorer, <http://nhic.mnr.gov.on.ca>. MNR, Peterborough. Accessed June 2010;
- Ontario Ministry of Natural Resources (MNR). 2009. Land Information Ontario (LIO) digital mapping of natural features;
- Provincially Significant Wetland Evaluations for North Cumnock Complex (Ecologistics, 1989) and Living Springs Wetland Complex (Ecologistics, 1988);
- Renewable Energy Atlas (2010) Bat hibernacula mapping;
- *Bats and Bat Habitats. Guidelines for Wind Power Projects*. Draft. Ontario Ministry of Natural Resources. March, 2010;
- *Birds and Bird Habitats. Guidelines for Wind Power Projects*. Draft. Ontario Ministry of Natural Resources. October, 2010;

- Ontario Parks Planning and Management Information (<http://www.ontarioparks.com/english/plan-res.html>).

Conservation Authority

- Grand River Conservation Authority (GRCA) communications with Resource Planning Department (September 30, 2010);
- Grand River Conservation Authority GIS data layers and regulatory mapping (2010);
- Grand River Source Protection Area. Draft Assessment Report (2010); and,
- Grand River Watershed Characterization Report (Draft, 2008).

Municipal Government

- Wellington County. Communications with Mark Paoli, Senior Policy Planner, Planning and Development Department (January, 2011)
- The Township of Centre Wellington. Communications with Greg Wolowich, Planning and GIS Technician (January, 2011)
- Wellington County Official Plan (2010) and associated Schedules and Appendices
- Township of Centre Wellington Official Plan (2005)

Other data sources

- Important Bird Areas database (Bird Studies Canada and BirdLife International, undated)
- Ontbirds Archives (reports of winter raptors, Short-eared Owl, monitoring for spring, fall and summer sightings);
- Various wildlife atlases (birds, mammals, herpetofauna)

The information received from each source and the manner in which it was used to identify natural features, provincial parks or conservation reserves that exist in or within 120 m of the Project Location (50 m for Earth Science ANSIs) is detailed below (Section 2.2). Background information provided by MNR is included in Appendix C.

2.2 RESULTS

A review of available background information has indicated the presence of known and potential natural features occurring within the Study Area. The results of the records review search were used to determine whether the Project Location is in a natural feature, within 50 m of an Earth Science ANSI, or within 120 m of other natural features (as defined in Section 1.2).

2.2.1 Wetlands

A review of MNR mapping (LIO, 2009), GRCA mapping (2010) and the NHIC database has indicated the presence of two provincially significant wetland complexes within the Springwood Study Area. The majority of the wetland complexes are found outside of the Project Location, but small portions both complexes extend to within 120 m of the Project Location. No wetlands were identified in the Project Location. Each wetland as identified through the record review is shown on Figure 2, Appendix A.

Provincially Significant

- **North Cumnock Complex:** The wetland complex is 187.4 ha in size and is comprised of eight individual wetlands composed of two wetland types (86% swamp and 14% marsh) (NHIC 2010; Ecologistics 1989). The majority of the complex is located across an approximately 6 km stretch to the north and west of the Springwood Study Area. Wetland units found at the easternmost edge of the complex extend into the Study Area, however all components of the Project have been sited more than 120 m from these wetland features (Figure 2, Appendix A).
- **Living Springs Complex:** The wetland complex is 271.0 ha in size and is comprised of two wetland types (85% swamp and 15% marsh) (NHIC 2010; Ecologistics 1988). The wetland complex stretches from the eastern boundary of the Study Area south and east to Wellington County Road 19. A portion of the wetland extends to within 120 m of the Project Location (Feature 2; Figure 2, Appendix A).

Non-Provincially Significant Wetlands

No non-provincially significant wetlands were identified in the Project Location or the 120 m Zone of Investigation (LIO, 2009; NHIC, 2010; GRCA 2010, Wellington County OP, 2010).

Unevaluated

No unevaluated wetlands were identified in the Project Location. One small area found within 120 m of the Project Location was identified as unevaluated wetland (Feature 1; Figure 2, Appendix A) (LIO, 2009; GRCA, 2010).

2.2.2 Areas of Natural and Scientific Interest (ANSIs)

MNR identifies two types of ANSIs; life science and earth science (NHRM, 2010). Life Science ANSIs are significant representative areas of Ontario's biodiversity and natural landscapes, while Earth Science ANSIs are geological in nature and consist of some of the more significant representative examples of the bedrock, fossils and landforms in Ontario.

The Irvine Creek Regionally Significant Life Science ANSI is found approximately 2 km to the east of the Study Area. It is comprised of floodplain and slope forest, upland woods and open fields (NHIC, 2010).

No provincially significant earth science or life science ANSIs were identified in or within 120 m of the Project Location through the records review (LIO, 2009; NHIC, 2010; Wellington County OP, 2010 and GRCA, 2010).

2.2.3 Valleylands

Valleylands are linear natural areas that occur in a valley or other landform depression that has water flowing through or standing for some period of the year (NHRM, 2010).

The identification and evaluation of significant valleylands based on the recommended criteria from MNR (i.e. surface and groundwater functions, landform prominence, ecological features and functions) is the responsibility of planning authorities (municipalities) (MNR, 2010).

Significant valleylands have not been identified in the Wellington County OP (2010), but streams and valleylands are included in the County's Greenlands System. Mapped greenlands can include one or more natural features such as valleylands, streams, wetlands, environmentally sensitive areas, or woodlands (Wellington County OP, 2010).

GRCA (2010) has identified regulation areas (which can include valleys, floodplains, steep slopes and/or wetlands). These can be used to help identify the potential presence of valleylands. GRCA has also mapped river valley slopes.

The Wellington County Greenlands System, GRCA regulation mapping layers and GRCA identified valley slopes were compared to aerial photography, topographic mapping and a review of other identified natural features (i.e. linear vegetated communities) to identify valleylands occurring in or within 120 m of the Project Location. Topographic and GRCA slope mapping indicate that the Study Area is flat with little change in elevation. No valleylands were identified in or within 120 m of the Project Location through the record review.

2.2.4 Woodlands

The Study Area is located within the Huron-Ontario section of the Great Lakes – St. Lawrence Forest Region (Rowe, 1972). This section covers much of southwestern Ontario, the northern

boundary of which is generally coincident with the Precambrian Shield. Sugar maple and beech are common over the entire section, with associates such as basswood, white and red ash, yellow birch, red maple, red, white, black and bur oaks, aspen species, butternut, bitternut hickory, hop-hornbeam, black cherry, sycamore and black walnut. In lowlands, other hardwood species can be found, such as blue-beech, silver maple, red and rock elm, black ash, eastern white cedar. Coniferous species including eastern red cedar, eastern white pine, eastern hemlock and balsam fir can be found amongst hardwood species where appropriate conditions are present.

MNR's LIO mapping (2009) and aerial photography indicate the Springwood Study Area is predominately agricultural. According to Riley and Mohr (1994), Wellington County contains approximately 18.2% woodland cover. Centre Wellington contains 15.4% forest cover (GRCA, 2002).

No woodlands were identified in the Project Location. Wooded areas within the 120 m Zone of Investigation are primarily restricted to hedgerow features. MNR mapping (LIO, 2009) shows two woodlands extending to within 120 m of the Project Location (Features 2wo and 3; Figure 2, Appendix A). Feature 2 is also identified and mapped as PSW by MNR, GRCA and the County of Wellington (LIO, 2009; GRCA, 2010 and Wellington County OP, 2010).

2.2.5 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; NHRM, 2010). These are grouped into four categories (i.e., seasonal concentration areas, rare vegetation communities or specialized habitats, movement corridors and habitats of species of conservation concern).

A compilation of background information on known wildlife use within the regional context of the Springwood Study Area was undertaken. Using this information, a preliminary assessment was conducted to identify wildlife habitat features that may be present in or within 120 m of the Project Location to determine whether the area contains confirmed significant wildlife habitat (SWH) or involves a trigger for candidate SWH.

The Springwood Study Area is situated within the largely agricultural landscape of south central Ontario. It is comprised primarily of soybean, grain and corn fields, and contains scattered pockets of swamp wetland, evaluated as provincially significant wetland by MNR (LIO, 2009; NHIC, 2010, Ecologistics, 1988; Ecologistics 1989). Outside of these pockets, natural wildlife habitat is predominately restricted to hedgerows (Figure 2, Appendix A). The Springwood Study Area is found in the Lake Simcoe-Rideau Ecoregion (Ecoregion 6E) of Ontario.

The nearest Important Bird Area (IBA) is the Luther Marsh IBA (located approximately 13 km north of the Study Area). It is not located in close enough proximity to the Project Location to influence wildlife habitat and presence in the Study Area.

Secondary source data were used to determine potential wildlife use of the Springwood Project Location and 120 m Zone of Investigation. Inventories of wildlife that have been recorded within the range of the Project Study Area 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) and the Ontario Breeding Bird Atlas (Cadman et al., 2007).

Based a review of background information, 88 species of birds, 29 species of mammals, nine species of amphibians and nine species of reptiles are known to occur within the range of the Study Area. The species listed within the wildlife atlases are generally reflective of species found in agricultural landscapes. It is important to note that the exact location of species occurrences are not available from these atlases and, instead, are recorded within 10 x 10 km squares. The potential for species to be present within the Project Location will be limited by the habitat suitability and availability it supports. Therefore the identified species recorded from these databases may not occur in the Springwood Project Location or 120 m Zone of Investigation.

2.2.5.1 Seasonal Concentration Areas

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. The Significant Wildlife Habitat Technical Guide (MNR, 2000) identifies 14 potential types of seasonal concentration areas.

The 14 types of seasonal concentrations are:

1. winter deer yards;
2. moose late winter habitat;
3. colonial bird nesting sites;
4. waterfowl stopover and staging areas;
5. waterfowl nesting sites;
6. shorebird migratory stopover areas;
7. landbird migratory stopover areas;
8. raptor winter feeding and roosting areas;
9. Wild Turkey winter range;
10. Turkey Vulture summer roosting areas;
11. reptile hibernacula;

12. bat hibernacula;
13. bullfrog concentration areas; and
14. migratory butterfly stopover areas.

The Springwood Project Location is located in southern Ontario. A review of background information to assess the potential for seasonal concentration areas associated with this region of Ontario to be supported in the Study Area is provided below.

Winter Deer Yards

Deeryards are areas of key winter habitat for white-tailed deer. They usually consist of a core area of coniferous forest, which provides shelter from snow and wind, adjacent to an area of deciduous forest or other foraging habitat (MNR, 2000). White-tailed deer are known to occur in the vicinity of the Study Area (Dobbyn, 1994). There are no identified deer yards located in or within 120 m of the Project Location (LIO, 2009; Ecologistics, 1988; Ecologistics 1989). Site investigations were conducted to determine whether the habitat features to support deer yards are found in or within 120 m of the Project Location (see Section 3.0).

Colonial Bird Nesting Sites

Colonial bird nesting sites can be located in swamps and along large bodies of water for herons, islands for gulls and cliffs, banks and artificial structures for swallows (MNR, 2000).

The Study Area is located approximately four kilometers north of Belwood Lake Conservation Area, an area that supports colonies of Great Blue Heron and Ring-billed Gull (Cadman et al., 2007; Ontbirds Archives). Additionally, the Living Springs Wetland Complex has been identified as an active feeding area for nesting colonial waterbirds (i.e. gulls) (Ecologistics, 1988). Site investigations were conducted to determine whether colonial bird nesting sites are found in or within 120 m of the Project Location (see Section 3.0).

Waterfowl Stopover and Staging Areas

Areas generally considered candidate significant wildlife habitat for waterfowl staging areas are very large wetlands, associated with lakes that generally have a diversity of vegetation communities interspersed with open water (MNR, 2000). Marshes along Great Lakes shorelines are considered particularly valuable (MNR, 2000).

Belwood Lake Conservation Area supports waterfowl and herons in migration (Cadman et al., 2007; Ontbirds Archives). The Springwood Study Area is comprised of active agricultural fields. It does not contain open water or large marsh habitat and is not located along the Great Lakes shoreline. The Springwood Study Area does not contain the habitat or location to support candidate significant wildlife habitat for waterfowl stopover or staging.

Waterfowl Nesting Sites

Waterfowl nesting habitat typically includes upland habitat that is located near marshes, ponds or lakes. Sites considered candidate significant wildlife habitat for waterfowl nesting typically contain a high density of small and medium sized ponds, or are single wetlands that are large and diverse (MNR, 2000).

The Living Springs Wetland Complex is considered of little or no significance for waterfowl production or staging (Ecologistics, 1988). Site investigations were conducted to determine whether the habitat features to support waterfowl nesting are found in or within 120 m of the Project Location (see Section 3.0).

Shorebird Migratory Stopover Areas

Relatively undisturbed shorelines along the Great Lakes that produce abundant food (clams, insects, snails and worms) are used by shorebirds during migration (MNR, 2000). Field investigations conducted by Ecologistics to assess the wildlife habitat features supported by the PSW complexes in the Study Area confirm that they do not play a significant function for shorebirds during migration (Ecologistics, 1988; Ecologistics 1989). The Springwood Study Area is not located along a Great Lakes shoreline and is not considered to be located in an area that would constitute candidate significant wildlife habitat for a shorebird stopover area.

Landbird Migratory Stopover Areas

Migratory passerines are known to use forested landscapes along Great Lakes shorelines as stopover sites during spring and fall migration (Ewert et al., 2006; MNR, 2000). Landbirds tend to concentrate at tips of peninsulas, congregating in significant numbers at known significant stopover sites including Point Pelee and Long Point, while raptors and shorebirds concentrate along the Great Lakes during migration. Areas that provide a diversity of habitat types ranging from open grasslands to large woodlands within 5 km of the Lake Erie or Lake Ontario shorelines are considered potential candidate significant wildlife habitat for migrating landbird stopover areas (MNR, 2000).

Field investigations conducted by Ecologistics to assess the wildlife habitat features supported by the PSW complexes in the Study Area confirm that they do not play a significant function for migratory passerines during migration (Ecologistics, 1988; Ecologistics 1989).

The Springwood Study Area is not located adjacent to a Great Lakes shoreline and is not located in an area that would constitute candidate significant wildlife habitat for a migratory landbird stopover area.

Winter Raptor Feeding and Roosting Areas

Hay fields, pastures and open meadows that support large and productive small mammal populations can provide critical winter feeding areas (MNR, 2000). The best roosting sites are typically found in relatively mature mixed or coniferous woodlands that abut windswept fields, with scattered trees and fence posts providing perches for hunting (MNR, 2000).

Historically, observations of Snowy Owl have been regularly reported in and around the Metz area, approximately 5 km north of the Springwood Study Area (Ontbirds Archives). Occasional observations of Short-eared Owl (a provincial and federal species of conservation concern) have also occurred from this area (Ontbirds Archives). Site investigations were conducted to determine whether this type of seasonal concentration area is supported in or within 120 m of the Project Location (see Section 3.0).

Wild Turkey Winter Range

Dense older coniferous or mixed forest stands on valley slopes that contain a good proportion of conifers or oaks provide habitat for wintering wild turkeys. The presence of groundwater seeps in forests also enhances habitat for turkeys (MNR, 2000).

Wild Turkey are known to breed within the vicinity of the Study Area (Cadman et al., 2007) however the Springwood Study Area has not been identified as an area known to support Wild Turkey concentrations in winter (Ontbirds Archives; LIO 2009). Site investigations were conducted to determine whether this type of seasonal concentration area is supported in or within 120 m of the Project Location (see Section 3.0).

Turkey Vulture Summer Roosting Areas

Cliff ledges and large dead trees can serve as turkey vulture summer roosting areas. They are typically located in undisturbed areas and often near water (MNR, 2000).

Turkey Vultures are known to breed within the vicinity of the Study Area (Cadman et al., 2007) however it has not been identified as an area supporting Turkey Vultures summer roosting (Ontbirds Archives; LIO 2009). Site investigations were conducted to determine whether this type of seasonal concentration area is supported in or within 120 m of the Project Location (see Section 3.0).

Reptile Hibernacula

Potential hibernacula include features that would provide a route underground, such as buried concrete or rock (e.g., building foundations, culverts), rock crevices or animal burrows often in association with water to prevent desiccation (MNR, 2000). Frequently, hibernacula can be found among talus or karst areas.

The project is located within the ranges of various common species of snakes (Oldham and Weller, 2000) however there are no known reptile hibernacula in the Study Area. Site investigations were conducted to determine whether the habitat features to support this type of seasonal concentration area are found in or within 120 m of the Project Location (see Section 3.0).

Bat Hibernacula and Maternity Roosts

Bats required specific environmental conditions for hibernating. These are provided by features such as caves or abandoned mines (MNR, 2000). Karst topography and areas of exposed bedrock can be indicators of potentially suitable hibernacula habitat for bats.

No known bat hibernacula have been identified within the Study Area (Renewable Energy Atlas, 2010; MNR correspondence 2010).

The Niagara Escarpment, which is a prominent landscape feature that provides potential habitat for bat hibernacula, is approximately 25 km east of the Study Area. A review of the Ontario Geological Survey (1999) mapping indicates that the entire Springwood Study Area is underlain by the Middle and Lower Silurian Guelph formation. Correspondence with Mr. Frank Brunton, an Aggregate & Industrial Minerals Geologist with the Sedimentary Geoscience Branch of the Ontario Ministry of Northern Development and Mines, indicated that karst formations tend to be more common along joints between two different bedrock formations. Also, thin drift and exposed bedrock terrains with deep joints and potential features at edges of bedrock valleys and cliff edges are prime areas for karst, crevasse or cave formation. This scenario is absent from the Springwood Study Area (Brunton, personal communication). Within the Study Area there is an overburden depth of 40-50m over the bedrock layer and there is no access to karst formations. There is no karst mapped in the Project Study Area (Brunton, 2008) and no habitat features that would support bat hibernacula were identified through the records review (i.e., caves, karst topography, abandoned mines) in, or within 120 m of the Project Location.

Depending on the species, maternity roosts for bats can include tree foliage, tree cavities and crevices under loose bark, or buildings. There are no known maternity roosts in the Study Area. Site investigations were conducted to determine whether the habitat features to support this type of seasonal concentration area are found in or within 120 m of the Project Location (see Section 3.0).

MNR wetland evaluation records indicate bullfrog was absent from the North Cumnock PSW complex but was recorded in the Living Springs Wetland Complex (Ecologistics, 1988; Ecologistics 1989). Air photo interpretation indicates that the habitat required by bullfrogs is not found in or within 120 m of the Project Location. Site investigations were conducted to determine whether this type of seasonal concentration area is supported in or within 120 m of the Project Location (see Section 3.0).

Migratory Butterfly Stopover Areas

During fall migration, monarchs tend to move along the north shore of the Great Lakes (Calvert, 2001). Monarchs can be observed throughout southern Ontario during migration; however these areas do not host the significant thousands that regularly occur at main staging areas. Sites located within 5km of Lake Ontario or Lake Erie and containing a variety of habitat types are considered important habitat components for potentially significant butterfly stopovers (MNR, 2000). The Springwood Study Area is not considered to be in an area that would serve as a significant butterfly stopover.

Seasonal Concentration Areas Summary

No known seasonal concentration areas were identified in or within 120 m of the Project Location through the records review.

Though not identified within the Study Area, background information indicates that the regional landscape has historically been used by winter raptors. The potential for the Project Location and 120 m Zone of Investigation to support this function warranted further verification and assessment through the site investigation program. Site investigations were also considered necessary to determine whether the critical habitat features required to support winter deer yards, colonial bird nesting sites, waterfowl nesting sites, Wild Turkey wintering areas, Turkey Vulture summer roosting areas, reptile hibernacula, bullfrog concentration areas or bat maternity roosts were located in or within 120 m of the Project Location.

2.2.5.2 Animal Movement Corridors

Animal movement corridors are elongated, naturally vegetated parts of the landscape used by animals to move from one habitat to another (MNR, 2000). No known animal movement corridors were identified in the Study Area (LIO, 2009).

Hedgerows can serve as small linkages (MNR, 2000). A review of aerial photography indicates the presence of small linear hedgerows within 120 m of the Project Location.

2.2.5.3 Rare Vegetation Communities or Specialized Habitats

Rare Vegetation Communities

A search of the NHIC database did not identify any records of rare vegetation communities in the Study Area. Aerial photo interpretation and a review of available background information also indicate that there are no known rare vegetation communities in the Study Area (LIO, 2009; NHIC, 2010; Wellington County OP, 2010; GRCA, 2010).

Specialized Habitats

Specialized habitats are microhabitats that are critical to some wildlife species. The SWHTG identifies the following potential specialized habitats:

- habitat for area-sensitive species;
- forests providing a high diversity of habitats;
- old-growth or mature forest stands;
- foraging areas with abundant mast;
- amphibian woodland breeding ponds;
- turtle nesting habitat;
- specialized raptor nesting habitat;
- moose calving areas;
- moose aquatic feeding areas;
- mineral licks;
- mink, otter, marten, and fisher denning sites;
- highly diverse sites;
- cliffs; and
- seeps and springs.

Based on an assessment of habitat in the Study Area, historic species records, available background information, and data provided by agencies specific to this Project, the Study Area does not contain natural habitats of sufficient size or type to be considered candidate significant wildlife habitat for the majority of specialized habitats. Specialized habitats restricted to northern Ontario are not considered in this assessment (i.e. moose feeding and calving areas).

Habitats for Area-Sensitive Species

Appendix C of the SWHTG (MNR, 2000) contains a list of area-sensitive wildlife. Ontario Breeding Bird Atlas information indicates that the 10x10km atlas squares that encompass the Springwood Study Area contain records of woodland and grassland area-sensitive breeding birds.

Woodlands larger than 30 ha are considered to have the potential to support and sustain populations of area-sensitive species (MNR, 2000). Woodlands must provide interior habitat (i.e. at least 100m from the woodland edge), which is influenced by the woodland size and shape (MNR, 2000). The woodland found within 120 m of the Project Location is substantially

smaller than 30 ha and does not contain interior habitat (see Feature 2wo, Figure 2 Appendix A). It does not meet the criteria to support populations of area-sensitive woodland species.

Large, contiguous undisturbed grasslands of at least 30 ha (and preferably 50 ha or more) are considered likely to support and sustain a diversity of grassland species (MNR, 2000). The Study Area is predominately used for high intensity agriculture and land cover consists primarily of corn, grain and soybean fields. Grassland habitat with the potential to be considered candidate significant wildlife habitat is not present in or within 120 m of the Project Location.

Forests Providing a Diversity of Habitats

Older forest stands (i.e. greater than 100 years old) that contain a variety of vegetation communities are likely to support higher diversities of plant and wildlife species. Cavities, an abundance of ground structure and the presence of very tall trees that grow above the main canopy provide important habitat components that should be considered in identifying candidate significant wildlife habitat for this type of specialized habitat (MNR, 2000). Site investigations were conducted to determine the presence of these features in and within 120 m of the Project Location (see Section 3.0).

Old-growth or Mature Forest Stands

Old growth forests are characterized by having a large proportion of trees in older age classes, many of them over 120 to 140 years old (MNR, 2000). These forest stands are rare throughout Ontario, particularly in southern Ontario, largely due to past logging practices. Old (i.e. more than 120 years old) undisturbed forest stands that have experienced little or no forestry management would be considered candidate significant wildlife habitat. Site investigations were conducted to determine the presence of these features in and within 120 m of the Project Location (see Section 3.0).

Foraging Areas with Abundant Mast

Forests containing numerous large beech and red oak can provide important food sources to enhance the survival and productivity of those birds and mammals that subsist on a fruit and nut diet (MNR, 2000). Site investigations were conducted to determine the presence of these features in and within 120 m of the Project Location (see Section 3.0).

Amphibian Woodland Breeding Ponds

Woodland ponds may provide important habitat for local amphibian populations. Ponds that contain a variety of vegetation structure in and around the edge of the pond, are undisturbed and are found adjacent to closed canopy woodlands with dense undergrowth that maintain a damp environment typically provide the best ponds for breeding (MNR, 2000).

The Ontario Herpetofaunal Summary (Oldham and Weller, 2000) indicates the Project Study Area falls within the range of a number of common amphibian species. Woodland and wetland habitat is present within 120 m of the Project Location and may provide amphibian habitat (Feature 2ah; Figure 2, Appendix A).

Turtle Nesting Habitat

Sandy or fine gravel soils are a requirement for turtle nesting (MNR, 2000). Areas that would be considered candidate significant wildlife habitat for turtle nesting include areas containing sandy or fine gravel soils (i.e. shoreline beaches) adjacent to turtle habitat (weedy wetlands, lake or river shorelines). Snapping Turtle is a provincial species of special concern and is addressed further in Table 2.1 (Appendix B) within the context of Species of Conservation Concern (see section 2.2.5.4). Snapping Turtles were considered absent from the North Cumnock and Living Springs PSW Complexes (Ecologistics, 1988; Ecologistics 1989). The Springwood Study Area is not located along a shoreline beach, river or lake. It does not provide the necessary location or sandy soils to support candidate significant wildlife habitat for turtle nesting.

Specialized Raptor Nesting Habitat

The Significant Wildlife Habitat Technical Guide indicates that some raptors require somewhat specialized habitats. Under the criteria and guidelines outlined in Appendix Q (MNR, 2000) critical habitat features that would support specialized Bald Eagle and Osprey nesting habitat are identified as waterbodies with fish populations and trees with good visibility and flight lines.

MNR identified the presence of an Osprey nest on an artificial nesting platform on a hydro pole at 2nd Line and Wellington Rd. 19 (MNR, personal correspondence). It is located 5 km south of the Project Location. No candidate specialized habitat for raptor nesting was identified in or within 120 m of the Project Location through the record review.

Mink, Otter, Marten and Fisher Denning Sites

Mink, otter, marten and fisher are predators that have specific habitat components that are critical to their survival. Marten, otter and fisher are found on the Canadian Shield and their range does not extend to within the Springwood Study Area (Dobbyn, 1994). Mink are found throughout southern Ontario and prefer natural undisturbed shorelines dominated by coniferous or mixed forests for feeding and denning (MNR, 2000). Mink are dependent on the presence of aquatic components such as lakes, ponds or rivers. The Springwood Study Area is not found in a shoreline location and no open aquatic features that could support mink are found in or within 120 m of the Project Location. The Project Location and adjacent 120 m do not contain the critical habitat components to support candidate significant wildlife habitat for mink denning sites.

Highly Diverse Sites

Highly diverse sites are those that contain good diversities of vegetation communities and high numbers of species. These rich sites typically contain a good diversity of vegetation and vertical structure, a diversity of ecosystems, representation of specialized biophysical features (i.e. cliffs, seeps or springs) and are relatively undisturbed by humans. The presence of these characteristics were identified during site investigations (see Section 3.0).

Cliffs

Cliffs are dominated by bedrock with sharp or variable broken edges and a vertical relief greater than three metres (MNR, 2000). No known cliffs occur in the Study Area and topographic maps do not indicate the presence of areas of sharp relief in the Study Area.

Seeps and Springs

Seepage areas and springs provide habitat for numerous uncommon species and may support a high diversity of plant species (MNR, 2000). In winter, these areas provide foraging opportunities for Wild Turkey and white-tailed deer (MNR, 2000). Those that occur within forested areas where the canopy maintains cool, shaded conditions are most important (MNR, 2000). There are no known seeps or springs within the Study Area. The presence of seeps and springs in and within 120 m of the Project Location was identified during site investigations (see Section 3.0).

Rare Vegetation Communities or Specialized Habitats Summary

No confirmed significant wildlife habitat for rare vegetation communities or specialized habitats was identified in or within 120 m of the Springwood Project Location through the records review.

The records review indicates that the Springwood Study Area does not possess the required habitat components for area-sensitive breeding bird species, turtle nesting (i.e. sandy soils located along shorelines); the required landscape components for mink denning (i.e. shorelines) or geological conditions for cliffs and caves. No potential candidate significant wildlife habitat could be supported within the Springwood Study Area for these types of specialized habitats.

Site investigations are considered necessary to determine whether the following candidate significant wildlife habitats are supported in or within 120 m of the Springwood Project Location: forests with a diversity of habitats, old-growth or mature forest stands, foraging areas with abundant mast, amphibian woodland breeding ponds, specialized raptor nesting habitat, highly diverse sites or seeps and springs.

2.2.5.4 Species of Conservation Concern

Species of conservation concern include four types of species: those that are rare, those whose populations are significantly declining, those that have been identified as being at risk from certain common activities, and those with relatively large populations in Ontario compared to the remainder of the globe.

Rare species are considered at five levels: globally rare, nationally rare (with designations by COSEWIC), provincially rare, regionally rare (at the Site Region level), and locally rare (in the municipality or MNR Site District). This is also the order of priority that should be assigned to the importance of maintaining species. Some species have been identified as being susceptible to certain practices, and their presence may result in an area being designated significant wildlife habitat. The final group of species of conservation concern includes species that have a high proportion of their global population in Ontario. Although they may be common in Ontario, they are found in low numbers in other jurisdictions.

Rare Species

NHIC, wildlife atlases and information provided by MNR (personal communication June 24, 2010) were used to identify historic records of species of conservation concern that occur from the regional landscape containing the Springwood Study Area. Wildlife species that would be considered of conservation concern (i.e. special concern, low s-ranks), and whose presence would be assessed within an evaluation of candidate significant wildlife habitat in the Study Area are listed in Table 2.1 (Appendix B). This list of species and their habitat requirements was cross referenced with habitat mapping, aerial photography and vegetation classifications to determine the suitability of the Springwood Study Area to support them.

Within the context of O.Reg 359/09, endangered and threatened species are addressed as part of MNR's *Approval and Permitting Requirements Document for Renewable Energy Projects* (APRD) requirements (September 2009). Information required as part of these requirements is being submitted to MNR as part of the Springwood APRD Report (separate cover). Where this information indicates that approvals or permits are required these will be addressed separately through the applicable statute and its permitting process.

Declining Populations

The Ontario Partners In Flight (PIF) program has identified a number of species that are considered conservation priorities for Bird Conservation Region ("BCR") 13 (Lower Great Lakes/St. Lawrence Plain region of southern Ontario) (Ontario PIF, 2008). The potential for the Project Location to support populations of forest, grassland or shrub/successional birds designated as declining by PIF was considered.

PIF indicates that the Springwood Study Area is located within an area of southern Ontario that supports low relative densities of priority avian species associated with shrub-successional and

grassland habitats, and low to moderate densities of priority species associated with forest habitat (Ontario PIF, 2008). As discussed in Section 2.2.5.3 the Project Location and its 120 m Zone of Investigation do not provide the habitat requirements to support candidate significant wildlife habitat for woodland or grassland breeding bird populations. It does not support shrub/successional habitat.

2.2.6 Provincial Parks and Conservation Reserves

There were no provincial parks or conservation reserves identified in or within 120 m of the Project Location through the records review (NHIC, 2010; Ontario Parks 2010).

Belwood Lake Conservation Area, owned and operated by the GRCA is located approximately 4 km south of the Project Location. The lake was created in 1942 when the Shand Dam was constructed for water conservation and flood control purposes (NHIC, 2010; GRCA, 2010). Today, the Conservation Area is used primarily for recreational purposes, providing opportunities for fishing, boating and swimming.

2.3 SUMMARY

The results of the records review indicate that the Project Location is not located in any known natural features.

Natural features that occur within 120 m of the Project Location as identified through the records review include:

- Wetlands
 - Provincially Significant Wetland in Feature 2we;
 - Unevaluated Wetland in Feature 1; and
- Two Woodlands (Features 2wo and 3).

A summary of the natural features identified in, and within 120 m of the Project Location through the record review is found in Table 2.2, Appendix B.

Background information has also identified additional wildlife habitat functions for which field investigations were deemed necessary to determine whether the required habitat types and characteristics were present within the Study Area, and if so, to confirm whether the function was supported in or within 120 m of the Project Location. These include:

- Seasonal concentration areas (winter deer yards, winter raptor feeding and roosting areas, colonial bird nesting sites, waterfowl nesting sites, Wild Turkey wintering areas, Turkey Vulture summer roosting areas, reptile hibernacula, bullfrog concentration areas or bat maternity roosts);

- Animal movement corridors;
- Rare vegetation communities and specialized habitats (forests with a diversity of habitats, old-growth or mature forest stands, foraging areas with abundant mast, amphibian woodland breeding ponds, specialized raptor nesting habitat, highly diverse sites or seeps and springs); and
- Species of conservation concern as indicated in Table 2.1 (Appendix B).

A site investigation is required to confirm the presence and boundaries of known natural features identified through the record review, as well as determine whether any additional natural features exist in, or within 120 m of, the Project Location.

3.0 Site Investigation

The site investigations were conducted in accordance with O. Reg 359/09, s. 26 (1), Natural Heritage Site Investigation. This report is prepared in accordance with s. 26 (3) with guidance provided from the *Natural Heritage Assessment Guide for Renewable Energy Projects* (Draft) (MNR, 2010).

The site investigations in support of this report were completed with the purpose of confirming the status and boundaries of natural features identified through the records review (see Section 2.3) and identifying any additional features. Data collected during the records review concerning natural features and species occurrences were used to guide the scope of the site investigation. The extent of the site investigation program and type of field surveys included in the program are scoped to reflect the extent and types of natural features that are identified within a Study Area and the potential for candidate significant wildlife habitat components to be found. The Springwood Wind Project is primarily sited within active agricultural fields and has been sited more than 120 m from the majority of natural features in the Study Area.

MNR was consulted on the proposed site investigation work program for the Springwood Wind Project (Stantec, June 8, 2010). MNR provided comments on the proposed work program in person on June 17, 2010 and in writing on June 24, 2010 (Appendix C).

A map showing the boundaries of all natural features located within 120 m of the Project Location, the location and type of each natural feature and the distance from the Project Location to the natural feature boundaries is provided in Figure 2 (Appendix A).

The results of the records review indicated that the Project Location is not located in any known natural features.

Natural features that occur within 120 m of the Springwood Project Location as identified through the records review include:

- Wetlands
 - Provincially Significant Wetland in Feature 2we;
 - Unevaluated Wetland in Feature 1; and
- Two Woodlands (Features 2wo and 3).

The record review indicated that there is also the potential for the following candidate significant wildlife habitat components to be found in or within 120 m of the Project Location:

- Seasonal concentration areas (winter deer yards, winter raptor feeding and roosting areas, colonial bird nesting sites, waterfowl nesting sites, Wild Turkey wintering areas,

Turkey Vulture summer roosting areas, reptile hibernacula, bullfrog concentration areas or bat maternity roosts);

- Animal movement corridors;
- Rare vegetation communities and specialized habitats (forests with a diversity of habitats, old-growth or mature forest stands, foraging areas with abundant mast, amphibian woodland breeding ponds, specialized raptor nesting habitat, highly diverse sites or seeps and springs); and
- Species of conservation concern as indicated in Table 2.1 (Appendix B).

A summary of the natural features identified in, and within 120 m of the Project Location through the record review is found in Table 2.2, Appendix B.

3.1 METHODS

Land access was available for all land parcels where components of the wind project are proposed. The Project Location (turbine locations, access roads and collector lines) and associated 120 m Zone of Investigation was traversed on foot and physically inventoried.

The field surveys undertaken detail current conditions within the Project Location and the 120 m Zone of Investigation. The location of all field investigations was based on the information about the Project lands and siting that was current at the time of the respective survey. Dates, times, duration, field personnel and weather for each field survey are presented in Table 3.1 (Appendix B). Curricula vitae for each person involved in conducting the site investigation are provided in Appendix D.

3.1.1 Wetlands

Site investigations were undertaken June 21, 2010 to confirm presence and extent of wetland communities that occurred within 120 m of the Project Location. Wetland communities were identified and delineated using methods outlined by Ontario Wetland Evaluation System (OWES) Southern Manual protocol (MNR, 2002), by an OWES certified surveyor. The wetland boundaries were surveyed using a Thales MobileMapper CE sub-metre GPS.

Survey dates, times, weather conditions and field personnel are summarized in Table 3.1, Appendix B.

3.1.2 Woodlands

The limits of all woodlands that occur, or partially occur, within 120 metres of the Project Location were delineated through aerial photo interpretation. Information regarding woodland size, ecological function and uncommon characteristics was collected during ELC surveys and through GIS analysis. Treed areas identified during vegetation surveys were compared to the definition of woodlands provided in O.Reg 359/09 to delineate the limits of “woodlands” (i.e. 1,000 trees of any size, 750 trees over 5 cm in diameter, 500 trees over 12 cm, 250 trees over 20 cm). Treed areas were also compared to the definition of woodland provided in the Natural Heritage Reference Manual (2010).

3.1.3 Candidate Significant Wildlife Habitat

3.1.3.1 Vegetation Community and Vascular Plants Surveys

As many candidate significant wildlife habitats can be identified through presence of required habitat types, vegetation community assessments were conducted of all naturally vegetated features occurring within 120 m of the Project Location (i.e. features 1, 2we/wo/ah and 3). The vegetation surveys will determine whether the required habitats for the following candidate significant wildlife habitat components (those identified through the record review as having the potential to occur) are found within the Study Area.

- Seasonal concentration areas (winter deer yards, winter raptor feeding and roosting areas, colonial bird nesting sites, waterfowl nesting sites, Wild Turkey wintering areas, Turkey Vulture summer roosting areas, reptile hibernacula, bullfrog concentration areas or bat maternity roosts);
- Animal movement corridors;
- Rare vegetation communities and specialized habitats (forests with a diversity of habitats, old-growth or mature forest stands, foraging areas with abundant mast, amphibian woodland breeding ponds, specialized raptor nesting habitat, highly diverse sites or seeps and springs); and
- Species of conservation concern as indicated in Table 2.1 (Appendix B).

A botanical inventory and Ecological Land Classification (ELC) of the vegetation communities in the Study Area was conducted on June 21 and September 20 2010. Survey times, weather conditions and field personnel are summarized in Table 3.1, Appendix B.

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

3.1.3.2 Additional Wildlife and Wildlife Habitat Assessment Surveys

Additional surveys to assess wildlife use of the Project Location and to determine the presence of microhabitat features that would support seasonal concentrations of animals or specialized habitat for wildlife as outlined in the Significant Wildlife Habitat Technical Guide (MNR, 2000) were conducted on June 21, July 21, and September 20 2010 of all naturally vegetated features occurring within 120 m of the Project Location (i.e. features 1, 2we/wo/ah and 3). Survey times, weather conditions and field personnel are summarized in Table 3.1, Appendix B.

Surveys focused on identifying any wildlife habitat features that occurred within 120 m of the Project Location such as seeps, springs, vernal pools, hibernacula, weasel denning sites, raptor nests, heronries etc. as well as assessing the presence of supporting habitat features such as snags, downed debris, logs and tree cavities.

Because use of the regional landscape by winter raptors was identified through the record review, targeted studies to determine whether this function was supported within the Project Location and adjacent 120 m were undertaken. Specific emphasis was also placed on determining whether the critical habitat features required to support reptile hibernacula, bat maternity roosts, amphibian breeding habitat or species of conservation concern (as identified through the record review) were provided within the Study Area. Methods are further described below.

Winter Raptor and Short-eared Owl Surveys

Winter raptor and Short-eared Owl surveys were conducted monthly (in December, January and February) between December 2008 and February 2010. Survey dates, times and weather conditions are summarized in Table 3.1 (Appendix B). Each survey involved driving the main roads within the Study Area at slow speeds (i.e., 30-40km/h) to achieve maximum coverage of the site. A daytime survey was conducted for raptors and the same route was retraced in early evening (from just before sunset to dusk) to look for Short-eared Owls. The fields and woodlands were scanned using binoculars to detect birds. A spotting scope was used for closer inspection of stationary birds. When raptors or owls were observed, the location, species, number, behaviour (i.e. perched, flying, hunting) and height was noted. All other bird and wildlife observations were also recorded and mapped.

Bat Maternity Roost Habitat Assessment

Surveys for habitat features that would support potential bat maternity roosts focused on woodlands identified through the record review as occurring within the Study Area (i.e. features 2wo and 3). Wooded areas were traversed and the presence and frequency of features that may support maternity colonies of bats were recorded (i.e. large, mature snags, hollow trees or trees with large slabs of loose bark). Criteria used to identify potential bat maternity roosts in the field included the presence of multiple large-diameter (>40 cm) snags, snags that are taller than surrounding trees and snags that are in relatively open areas.

Amphibian Habitat Assessment

The small swamp community in Feature 2ah was the only portion of the Springwood Study Area that was not under active agricultural cultivation and provided potential habitat for breeding amphibians. The community was visited June 21 and July 21 2010, and areas of standing water or areas which showed evidence of holding water through the spring (based on topography and vegetation) were identified. During the surveys, areas of standing water were visually inspected to identify the presence of tadpoles. Size of pools, presence and depth of standing water, potentially active hydroperiod, surrounding vegetation community, emergent and submergent vegetation and canopy cover were recorded.

Reptile Hibernacula Assessment

As the Project Study Area consists primarily of cultivated agricultural cropland, the search for reptiles and associated hibernacula features focused on edges of natural feature communities, and along hedgerows.

On June 21 and July 21, 2010 evidence of reptiles was searched for, including direct observation of basking individuals. All lands in and within 120 m of the Project Location were searched. Habitat features that would provide a route underground and could act as potential hibernacula were recorded, including buried concrete or rock (e.g. building foundations, culverts with cracks/entry points, bridge abutments), exposed rock crevices or inactive animal burrows.

3.1.3.3 Species of Conservation Concern

Habitat within the Study Area was assessed for its suitability to support historic species of conservation concern that are known to occur within the regional landscape containing the Study Area (see Table 2.1, Appendix B). All natural vegetation communities within 120 m of the Project Location (i.e. features 1, 2we/wo/ah and 3) were traversed on foot and assessed for suitability to support these species.

All field surveys were conducted by qualified ecologists and are used as a means of recording all wildlife observed on site. Targeted surveys were also conducted to assess the presence of wintering Short-eared Owl, a provincial and federal species of special concern, within the Study Area (see Section 3.1.3.2)

During vegetation surveys (as described in Section 3.1.3.1) specific emphasis was placed on searching for plant species of conservation concern that were identified through the records review with historical occurrences within the Wellington County Region (see Table 2.1, Appendix B). Plant species were considered rare if designated provincially as S1 (critically imperiled), S2 (imperiled), or S3 (vulnerable). Species having a high coefficient of conservatism (9 or 10) as designated by Oldham et al. (1995) were also considered species of note.

3.2 RESULTS

A summary of the corrections to the features, or potentially occurring features, identified through the records review as a result of the site investigation program are outlined in Table 3.2, Appendix B. Figure 2 (Appendix A) show the natural features boundaries located within 120 m of the Project Location, the location and type of each feature and the distance from the Project Location to the natural feature boundaries. Field notes for the site investigation are provided in Appendix E.

3.2.1 Natural Heritage Overview

The Project Location has been sited primarily in actively cultivated cropland (soybean, grain and corn fields). No naturally vegetated features are located within the Project Location. Natural habitat within 120 m of the Project Location was restricted to a pocket of swamp and a small (0.1 ha) dogwood thicket. Outside of this pocket, potential natural wildlife habitat is restricted to hedgerows (Figure 2, Appendix A).

Vegetation communities occurring within 120 m of the Project Location, as identified by field investigations are described in Table 3.3, Appendix B and shown on Figure 3, Appendix A. A list of vascular plant species found in the Project Study Area is provided in Appendix F. Field notes are provided in Appendix E.

Within the Project Location and 120 m Zone of Investigation 45 species of vascular plants were recorded. Of that number, 33 species (73%) were native and 12 species (27%) were exotic. Of the native species observed, 94% are ranked S5 (common and secure in Ontario), and 6% are ranked S4 (apparently secure in Ontario).

Over the course of the site investigation program two dragonfly, eight butterfly, three amphibian, 37 bird, and four mammal species were observed within the Springwood Study Area (Appendix G). Of the 37 bird species, 33 were observed during the breeding season. Species that were not considered breeding consisted primarily of species observed only during winter raptor surveys whose breeding range does not include the Springwood Study Area (i.e. Rough-legged Hawk, Snowy Owl). All wildlife species observed in the Study Area are ranked S5 (Secure; common and widespread), or S4 (Apparently secure; uncommon but not rare).

Site investigations identified three discrete naturally-vegetated features within 120 m of the Project Location. Each feature has been assigned an identification number (Figure 3, Appendix A) which serves as a point of reference for the discussions that follow in the next sections.

3.2.2 Wetlands

Provincially Significant Wetlands

The site investigations confirmed that no provincially significant wetlands were located in the Project Location.

A portion of the Living Springs PSW existed within 120 m of the Project Location (Turbine 3, access road and collector line). Field investigations confirmed a willow thicket swamp community occurred within 120 m of the Project Location. Type, attributes, composition and functions of the thicket swamp are described in Table 3.4, Appendix B. No rare or protected plant species were observed within the wetland community. Delineation of the wetland boundary confirmed that the wetland boundary as mapped by MNR (LIO, 2009) was accurate.

Provincially significant wetland communities and boundaries as mapped by MNR (LIO, 2009) were confirmed as accurate by site investigations conducted for the Springwood Wind Project. No changes are required to the records review (Table 3.2, Appendix B).

Non-Provincially Significant Wetland

No wetland units identified as non-provincially significant were identified during the records review (LIO, 2009; NHIC 2010). No changes are required to the records review as a result of site investigations (Table 3.2, Appendix B).

Unevaluated Wetlands

The record review identified unevaluated wetland (GRCA 2010; LIO, 2009) in Feature 1 (Figure 2, Appendix A).

During site investigations a 0.1 ha red-osier thicket swamp was confirmed in Feature 1. This feature is illustrated on Figure 3, Appendix A and discussed in Table 3.4, Appendix B.

Additional features

During site investigations no additional wetland communities were observed in or within 120 m of the Project Location.

Wetlands Summary

No wetlands occurred in the Project Location. Wetlands identified during the site investigation that occurred within 120 m of the Project Location are listed in Table 3.4, Appendix B. Corrections made to the records review for wetlands as a result of the site investigations are summarized in Table 3.2 (Appendix B).

3.2.3 Areas of Natural and Scientific Interest (ANSIs)

ANSIs are defined as areas with life or earth science values related to protection, scientific study or education. No life or earth science ANSIs were identified within the Springwood Study Area through the records review. The site investigation did not identify the presence of life science or earth science values.

No ANSIs were identified in, or within 120 m of the Project Location. No corrections were required to the results of the record review as a result of the site investigation (Table 3.2, Appendix B).

3.2.4 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 water flowing through or standing for some period of the year (NHRM, 2010). Section 8.3 of the NHRM (2010) was used guide the identification of valleylands within the Study Area. Site investigations confirmed that the topography of the Springwood Study Area is flat. No landform depressions were present. ELC and vegetation assessments confirmed that no linear vegetated systems are present (Figure 3, Appendix A). No valleylands were identified in, or within 120 m of the Project Location. No corrections were required to the results of the record review as a result of the site investigation (Table 3.2, Appendix B).

3.2.5 Woodlands

The vegetation communities found within the Study Area are described in Table 3.3, Appendix B and shown on Figure 3, Appendix A. A complete list of vascular plant species recorded in the Study Area is provided in Appendix F.

Woodland was defined in accordance with the definition provided in O.Reg 359/09 (i.e. 1,000 trees of any size, 750 trees over 5 cm in diameter, 500 trees over 12 cm, 250 trees over 20 cm). Features not meeting this definition were not considered “woodlands” for the purposes of this evaluation.

During the record review MNR mapping identified Feature 3 as a woodland (Figure 2, Appendix A). Site investigations confirmed that this feature was a hedgerow that did not meet the definition of woodland (as provided above). This correction was made to the record review (Table 3.2, Appendix B).

Site investigations confirmed that one woodland extends to within 120 m of the Project Location (Feature 2; Figure 2, Appendix A).

Table 3.4 (Appendix B) provides a description of the vegetation communities and attributes, composition and function for the woodland identified as occurring within 120 m of the Project

Location based on the site investigations (vegetation and wildlife habitat assessment surveys) and GIS analysis of the landscape context.

Additional features

During site investigations no additional unmapped woodland features were observed.

Woodlands Summary

No woodlands were located in the Project Location. One woodland is found within 120 m of the Project Location and is listed in Table 3.4, Appendix B. Corrections made to the records review for woodland as a result of the site investigations are summarized in Table 3.2 (Appendix B).

3.2.6 Wildlife Habitat

Results of the site investigation program are provided below to identify natural features supported by the Project Location. The results are considered within the context of criteria for significant wildlife habitat as outlined within the Significant Wildlife Habitat Technical Guide (2000) in order to determine whether the Project Location supports candidate or confirmed significant wildlife habitat.

The Project Location is comprised entirely of cultivated agricultural fields. Natural wildlife habitat within the 120 m Zone of Investigation is restricted to a portion of the Living Springs PSW, one small red-osier dogwood thicket and hedgerows.

3.2.6.1 Seasonal Concentration Areas

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. The Significant Wildlife Habitat Technical Guide (MNR, 2000) identifies 14 potential types of seasonal concentration areas (see Section 2.2.5.1).

No known significant wildlife habitat for seasonal concentration areas was identified in or within 120 m of the Project Location through the record review. Site investigations were conducted to determine whether candidate significant wildlife habitat for winter deer yards, winter raptor feeding and roosting areas, colonial bird nesting sites, waterfowl nesting sites, Wild Turkey wintering areas, Turkey Vulture summer roosting areas, reptile hibernacula, bullfrog concentration areas or bat maternity roosts was present within the Study Area.

The results of the site investigation were used to identify other seasonal concentration areas that might exist within 120 m of the Project Location.

Winter Deer Yards

No known deer yards were identified in or within 120 m through the record review. Deer yards typically have a long history of use. There is no known historic use of the Study Area as a deer yard (LIO, 2009). Deer yards usually consist of a core area of coniferous forest, which provides shelter from snow and wind, adjacent to an area of deciduous forest or other foraging habitat including corn and grain agricultural lands. Site investigations indicated that the required coniferous cover is not found in or within 120 m of the Project Location (Figure 3, Appendix A). Given the lack of historic use of the study area and the absence of coniferous cover no candidate significant wildlife habitat for winter deer yards was identified in or within 120 m of the Project Location.

Winter Raptor Feeding and Roosting

During the course of winter raptor and Short-eared Owl field surveys conducted over two seasons, five Red-tailed Hawks, two Rough-legged Hawks, one Bald Eagle, and one Snowy Owl were observed. Of the birds observed only one Red-tailed Hawk was observed within 120 m of the Project Location. One additional Red-tailed Hawk was observed in the Springwood Study Area with all other observations from outside the Study Area. The Bald Eagle was observed approximately 8 km south of the Study Area, along the Grand River.

On three of the six surveys no raptors were recorded. No Short-eared Owls were observed during the Short-eared Owl Surveys. Results of winter raptor surveys are detailed in Table 3.5 (Appendix B). The number of raptors recorded over the surveys was low and observations of raptors were dispersed. Raptor density, calculated as the number of raptors per kilometer of survey across the study area, yielded densities of 0- 0.1 raptors per km.

Fields such as hayfields, pastures and meadows support large and productive small mammal populations and are required to support raptors during winter (MNR, 2000). The Short-eared Owl uses large expanses of prairie and coastal grasslands, heathlands, shrub-steppe, and tundra but also agricultural areas in winter. In Ontario it is most common in areas comprised of large amounts of abandoned farmland and is typically associated with dense coniferous stands that serve as roosts (Sandilands, 2010). The site investigation confirmed that the majority of the Study Area was used for row crops; primarily soybeans, grain and corn (Figure 3, Appendix A). Habitat to support Short-eared Owl or large populations of raptors in winter was not present.

Candidate significant wildlife habitat for winter raptor feeding and roosting area is not found in or within 120 m of the Project Location.

Colonial Bird Nesting Sites

No evidence of colonial bird nesting sites (i.e. heronries, swallow colonies) was identified during field work completed in the Study Area (Appendix E). Candidate significant wildlife habitat for colonial nesting bird sites does not occur in or within 120 m of the Wind Project Location.

Waterfowl Nesting Sites

Waterfowl nesting habitat typically includes upland habitat that is located near marshes, ponds or lakes. Sites considered candidate significant wildlife habitat for waterfowl nesting typically contain a high density of small and medium sized ponds, or are single wetlands that are large and diverse (MNR, 2000).

While two small swamp thickets (Features 1 and 2we) were identified within 120 m of the Wind Project Location, important habitat components required to support significant waterfowl nesting areas such as clusters of pond habitats or flooded or poorly drained landscapes were not present (Figure 3, Appendix A; Appendix E). Candidate significant wildlife habitat for seasonal concentration areas supporting waterfowl nesting sites is considered absent in or within 120 m of the Wind Project Location.

Wild Turkey Wintering Areas

Dense older coniferous or mixed forest stands on valley slopes that contain a good proportion of conifers or oaks provide habitat for wintering wild turkeys. The presence of groundwater seeps in forests also enhances habitat for turkeys (MNR, 2000).

Site investigations confirmed that valley slopes are absent in or within 120 m of the Project Location. No seeps were identified during site investigations for the NHA or those conducted for the Water Assessment and Water Body Report (Appendix E; Stantec, 2011). Habitat features to support candidate significant wildlife habitat for seasonal concentrations areas supporting Wild Turkey winter ranges was not found in or within 120 m of the Project Location.

Turkey Vulture Summer Roosting Areas

Cliff ledges and large dead trees can serve as turkey vulture summer roosting areas (MNR, 2000). As discussed in Section 2.2.5.1 the geology of the Study Area does not support the presence of cliffs. During site investigations, no large dead trees were observed (Appendix E). Candidate significant wildlife habitat for seasonal concentrations areas supporting Turkey Vulture summer roosting areas was not found in or within 120 m of the Project Location.

Reptile Hibernacula

During the fall, snakes seek out areas in which to hibernate below the frost line. MNR indicates that the most important sites are associated with cliffs in large woodlands > 30 ha with an interior of mature forest, which have a more moderate climate than forest edges or small or narrow woodlands (Decision Support System Index #4, MNR, undated). An abundance of tree stumps or logs, burrows, and rock crevices (often associated with broken and fissured rock) is required.

Snake hibernacula features such as buried concrete or rock (e.g. building foundations, culverts), rock crevices or abandoned animal burrows were absent from the Project Location and 120 m Zone of Investigation.

The Project Location and associated 120 m Zone of Investigation did not support candidate significant wildlife habitat for reptile hibernacula.

Bullfrog Concentration Area

Bullfrogs are found in deep, permanent water with abundant emergent plants and are considered area-sensitive, requiring at least 1 ha of suitable habitat (MNR, 2000).

Two small wetland features occurred within 120 m of the Project Location (Feature 1 at 0.1 ha and Feature 2we at 0.4 ha). Neither contained permanent water or was of sufficient size to support bullfrogs. Site investigations confirmed that the open water habitat required by bullfrogs is not found in or within 120 m of the Project Location (Figure 3, Appendix A; Appendix E) and the Project Location or 120 m Zone of Investigation did not support candidate significant wildlife habitat for seasonal concentration areas for bullfrog concentration areas.

Bat Maternity Roosts

Bat maternity roosts may occur in loose bark, hollow trees, snags or rock faces, but buildings are the most commonly used roost structures (Fenton, 1970). Large diameter trees (living or dead) that are taller than surrounding trees and relatively uncluttered by adjacent vegetation are requirements for important natural roosts of forest-dwelling bats (Kunz and Lumsden, 2003). No snags or trees meeting these criteria were observed within 120 m of the Project Location.

No natural critical habitat features were identified in or within 120 m of the Project Location that may support significant maternity colonies (Figure 3, Appendix A and Table 3.4, Appendix B).

The Project Location and associated 120 m Zone of Investigation did not contain candidate significant wildlife habitat for seasonal concentration areas for bats.

3.2.6.2 Animal Movement Corridors

Animal movement corridors are elongated, naturally vegetated parts of the landscape used by animals to move from one habitat to another (MNR, 2000).

As indicated in the SWHTG (2000), it is seldom possible to observe wildlife species using corridors. ELC site investigations, mapping and aerial photography were used to assess the potential of areas with sufficient vegetation cover, natural areas and enough connectivity across the landscape to be considered candidate significant wildlife habitat.

Narrow, sparsely vegetated hedgerows that divide the agricultural fields are present within the Zone of Investigation. The canopy cover of these features was limited. The hedgerows are considered to have limited utility for wildlife, primarily due to their narrow width, limited tree cover and low degree of connectivity. Hedgerows within the Zone of Investigation did not meet the criteria of candidate animal movement corridors as defined in the SWHTG (MNR, 2000).

No candidate significant wildlife habitat for animal movement corridors was found in or within 120 m of the Project Location.

3.2.6.3 Rare or Specialized Habitats

Rare Vegetation Communities

No rare vegetation communities were identified during site investigations in or within 120 m of the Project Location (Table 3.4, Appendix B; Figure 3; Appendix A and Appendix E).

Specialized Habitat- Forests Providing a Diversity of Habitats

Older forest stands (i.e. greater than 100 years old) that contain a variety of vegetation communities are likely to support higher diversities of plant and wildlife species. Cavities, an abundance of ground structure and the presence of very tall trees that grow above the main canopy provide important habitat components that should be considered in identifying candidate significant wildlife habitat for this type of specialized habitat (MNR, 2000).

The only woodland found within 120 m of the Project Location is a young to mid-aged open cultural woodland. Site investigations confirmed that this woodland was not greater than 100 years old (Table 3.4, Appendix B; Appendix E) and did not contain the supporting habitat components (a number of cavities, abundance of ground structure, or presence of very tall trees that grow above the main canopy) to be considered candidate significant wildlife habitat for specialized habitat for forests providing a diversity of habitats (Table 3.4 Appendix B; Appendix E).

Specialized Habitat- Old-growth or Mature Forest Stands

Old (i.e. more than 120 years old) undisturbed forest stands that have experienced little or no forestry management would be considered candidate significant wildlife habitat (MNR, 2000).

As noted above, no mature woodlands were identified during site investigations and no woodlands meeting the definition of old-growth (i.e. more than 120 years old) were identified in or within 120 m of the Project Location (Table 3.4 Appendix B; Appendix E).

Specialized Habitat- Foraging Areas with Abundant Mast

Forests containing numerous large beech and red oak can provide important food sources to enhance the survival and productivity of those birds and mammals that subsist on a fruit and nut diet (MNR, 2000). No red oak or beech trees were observed in or within 120 m of the Project

Location (Appendix F). No candidate significant wildlife habitat for this type of habitat was identified in or within 120 m of the Project Location.

Amphibian Woodland Breeding Ponds

According to the Significant Wildlife Habitat Decision Support System Index #40 (MNR, undated), characteristics of significant wildlife habitat in the form of amphibian woodland breeding ponds are ponds that must contain all of the following three elements: 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. All potential breeding ponds within closed-canopy woodlands are considered to be candidate significant wildlife habitat. Site investigations identified the presence standing water in wetlands within 120 m of the Project Location, in Feature 2 (Table 3.4, Appendix B). No amphibian habitat was identified in the Project Location.

Feature 2 was a mineral thicket swamp with adjacent cultural woodland. The feature is a unit of the Living Springs PSW Complex. The mineral thicket swamp contained surface water at depths of up to 10 cm during June and July surveys. Soil was moist, with no surface water by September. Tadpoles were not present.

Feature 2 is located within 120 m of the Project Location and was considered candidate significant wildlife habitat for amphibian breeding, requiring an evaluation of significance.

Specialized Habitat- Specialized Raptor Nesting Habitat

No raptor nests were observed during the course of site investigations and candidate significant wildlife habitat for specialized raptor nesting sites is considered absent from in or within 120 m of the Project Location.

Specialized Habitat- Highly Diverse Sites

Highly diverse sites are those that contain good diversities of vegetation communities and high numbers of species. These rich sites typically contain a good diversity of vegetation and vertical structure, a diversity of ecosystems, representation of specialized biophysical features (i.e. cliffs, seeps or springs) and are relatively undisturbed by humans.

Feature 2 contains a cultural woodland (2wo) and a willow thicket swamp (2we), Feature 1 is a small dogwood thicket and Feature 3 is a hedgerow. None of these features supported a diversity of vegetation communities, high numbers of species or specialized habitat features (Figure 3, Appendix A; Table 3.3 and 3.4, Appendix B; Appendix E and Appendix F).

No candidate significant wildlife habitat for a highly diverse site was found in or within 120 m of the Project Location.

Specialized Habitat- Seeps and Springs

No seeps or springs were identified during site investigations for the NHA or those conducted for the Water Assessment and Water Body Report (Appendix E; Stantec, 2011). Candidate significant wildlife habitat for specialized habitats (seeps and springs) was not found in or within 120 m of the Project Location.

3.2.6.4 Species of Conservation Concern

All of the native plant and animal wildlife species recorded within the Study Area are ranked S5 (Secure in Ontario) or S4 (Apparently secure in Ontario).

No plant species of conservation concern were observed during the site investigation.

One wildlife species of conservation concern was observed within the Springwood Study Area; Monarch is a provincial and federal species of special concern.

Monarch were observed in relatively low numbers (i.e. less than 5 individuals) within the Study Area on July 21, 2010. Site investigations confirmed that the habitat requirements to support significant populations of Monarch (old-field habitats with abundant milkweed plants) did not occur in or within 120 m of the Project Location. Candidate significant wildlife habitat for populations of Monarchs did not occur in or within 120 m of the Springwood Project Location.

Results of the site investigation and habitat assessment in and within 120 m of the Project Location for species of conservation concern identified through the records review are provided in Table 2.1, Appendix B.

3.2.6.5 Wildlife Habitat Summary

No candidate significant wildlife habitat was present in the Project Location. The following candidate significant wildlife habitat feature was present within 120 m of the Project Location, requiring an evaluation of significance:

- Specialized habitat for amphibian woodland breeding (Feature 2ah)

Corrections made to the records review for wildlife habitat as a result of the site investigations are summarized in Table 3.2 (Appendix B).

3.3 SITE INVESTIGATION RESULTS SUMMARY

The identification of natural features in the record review and as confirmed through the site investigation program is provided in Table 3.4, Appendix B. Corrections made to the record review are provided in Table 3.2, Appendix B.

No natural features were identified or confirmed through the site investigation as occurring in the Project Location.

The following natural features were identified or confirmed through the site investigation as occurring within 120 m of the Project Location and require an evaluation of significance:

- Wetlands (in Feature 1 and 2we);
- Woodland (in Feature 2wo); and
- Candidate significant wildlife habitat for amphibian breeding habitat (Feature 2ah).

3.4 QUALIFICATIONS

Personnel responsible for conducting the site investigation are listed in Table 3.1, Appendix B. *Curricula vitae* are provided in Appendix D.

4.0 Evaluation of Significance

Natural heritage information collected from the records review, the site investigation and consultations were analyzed to determine the significance and sensitivity of existing ecological features and functions. For all natural features existing in, or within 120 m of, the Project Location a determination was made of whether the natural feature is provincially significant, significant, not provincially significant or not significant.

Wetlands, Life Science ANSIs and Earth Science ANSIs are to be determined to be provincially significant if they have been identified as such by MNR.

Valleylands, wildlife habitat and woodlands are considered to be significant if MNR has identified them as such or when evaluated as significant using procedures established by MNR.

Comments and information received from MNR (Appendix C) were used to assist in the evaluation of significance.

Global, national and provincial status of wildlife and plants was provided by the Natural Heritage Information Centre. Status rankings are primarily based on the number of occurrences within each respective jurisdiction.

Provincial designations for special concern species were obtained from the most recent Committee on the Status of Species at Risk in Ontario (COSSARO) assessments. Federally, designations for endangered, threatened and special concern species were obtained from the most recent Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assessments and the schedules of the *Species At Risk Act* (SARA) were used to determine species protection.

Within the context of O.Reg 359/09, endangered and threatened species are addressed as part of MNR's *Approval and Permitting Requirements Document for Renewable Energy Projects* (APRD) requirements (September 2009). Information required as part of these requirements is being submitted to MNR as part of the Springwood APRD Report (separate cover). Where this information indicates that approvals or permits are required these will be addressed separately through the applicable statute and its permitting process.

No natural features were identified or confirmed through the site investigation as occurring in the Project Location.

The following natural features were identified or confirmed through the site investigation as occurring within 120 m of the Project Location and require an evaluation of significance:

- Wetlands (in Feature 1 and 2we);
- Woodland (in Feature 2wo); and
- Candidate significant wildlife habitat for amphibian breeding habitat (Feature 2ah).

These are shown on Figure 2 (Appendix A). Specific methods used in the evaluation of significance for each type natural feature are detailed below.

4.1.1 Wetlands

4.1.1.1 Methods

Significance of wetlands is determined by the MNR using procedures established in the Ontario Wetland Evaluation System (OWES) (MNR, 2002). Non-provincially significant wetlands are those that have been evaluated but did not receive sufficient points to be considered significant. Wetlands that have yet to be examined are termed unevaluated or 'other' wetlands.

For the purposes of this evaluation wetlands previously identified and confirmed by MNR as provincially significant or non-provincially significant are considered to meet the requirements for a determination of significance. Unless field investigations provided evidence to contradict these assessments the designation as assigned by MNR is used.

One wetland features not evaluated by MNR is found within 120 m of the Project Location. This feature (Feature 1) was assessed using a method for Wetland Characteristics and Ecological Functions Assessment (MNR, 2010) to provide a set of evaluation criteria focused on wetland attributes relevant to the completion of an Environmental Impact Statement (EIS) for renewable energy projects. The criteria to be evaluated are presented in Appendix C of the *Natural Heritage Assessment Guide for Renewable Energy Projects* (MNR, December 2010). All wetlands assessed under this approach are considered as provincially significant for the purposes of the NHA and project siting, and will be treated as such (MNR, December 2010).

Data were collected through desktop procedures (e.g. aerial photograph interpretation) and on-site field investigations conducted from the property boundary. The criteria and procedures found within Appendix C of the Draft *Natural heritage Assessment Guide for Renewable Energy Projects* (MNR, 2010) are based on sections of the OWES – Southern Edition (MNR, 2002). Although this procedure does not evaluate the significance of these wetlands, it provides a procedure by which the significance of these wetlands can be assumed and their functions assessed based on the criteria established within the OWES manual. Specifically, these criteria were addressed in the following manner:

Biological Component

Wetland Size: This figure will be based on the overall size of the contiguous wetland, including areas that are within but extend outside of 120m zone. Data will be based on field surveys and/or aerial photo interpretation. (OWES Section 1.3)

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

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

Vegetation Communities: Each vegetation community in the contiguous unit will be listed, based on the requirements of OWES. Data will be based on field surveys where possible. (OWES Section 1.2.2)

Proximity to Other Wetlands: The approximate distance to the next closest wetland unit will be provided. Data will be based on field surveys and/or aerial photo interpretation. (OWES Section 1.2.4)

Interspersion: An estimate of the total number of interspersion points will be provided, with consideration given to the scale of the map and complexity of the wetland type delineations. The interspersion number will be provided in the Table. Data will be based on field surveys and/or aerial photo interpretation. (OWES Section 1.2.5)

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

Hydrological Component

Flood Attenuation: The general proximity of the wetland within the local watershed will be stated, indicating if it is headwater, mid-reach, or river-mouth. An estimate of the catchment area will also be provided, either based on Digital Elevation Mapping, or topographic map interpretation.

Water Quality Improvement (Short Term):

- *Watershed Improvement Factor (WIF)* – this is based on presence/absence of specific site types (i.e. riverine, lacustrine wetlands at lake inflow or outflow; or palustrine wetlands with inflow isolated wetlands, or palustrine wetlands with no inflow or lacustrine wetlands on lake shoreline. The data will be derived from field surveys where possible [OWES Section 3.2.1.1]):

- *Adjacent and Watershed Land Use (LUF)* – estimated percent of land use and land use type (i.e. agricultural, urban or forested) was included for the catchment (data derived from field surveys where possible [OWES Section 3.2.1.2]):
- *Pollutant Uptake Factor (PUT)* – this is based on the single *most* dominant vegetation form observed within the wetland community (data derived from field surveys where possible [OWES Section 3.2.1.3]), described as:
 - high proportion of emergent, submergent, and/or floating vegetation.
 - a high proportion of live trees, shrubs, herbs, or mosses.
 - a high proportion of wetland with little or no vegetation.

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

- *Water Quality Improvement (Groundwater Discharge):* OWES establishes eight wetland features that provide evidence of discharge, where the evaluator must make observations on as many of the features as possible (OWES Section 3.2.3). Where available, data indicative of groundwater discharge was provided.
- *Shoreline Erosion Control:* Shoreline wetlands provide a measure of protection from shoreline erosion caused by flowing water or waves. A description of the dominant shoreline vegetation was provided based on field surveys and/or aerial photo interpretation (OWES Section 3.4):
- *Groundwater Recharge (Site Type):* Site type was included based on field surveys where possible (OWES Section 3.5.1):
- *Groundwater Recharge (Soils):* Soil type was indicated for each wetland unit, based on county soil mapping. (OWES Section 3.5.2)

Special Features

Species Rarity: All rare species observed during field surveys or species known to be present were documented and listed in the WCEFA results table (Table 2.3). Data was based on field surveys, review of background materials (including existing wetland evaluations), and correspondence with agencies where possible (OWES Section 4.1.2).

Significant Features and Habitats: All significant features and habitats present in the wetland was documented and listed in the Table. Features/Habitat of interest include Colonial Waterbird Habitat, Winter Wildlife Cover, Waterfowl Staging and/or Moulting Areas, Waterfowl Breeding, and Migratory Passerine, Shorebird, or Raptor Stopover Areas. Data will be based on field surveys, background data, and correspondence with agencies where possible (OWES Section 4.2). The extensive field and background data gathered for the Project, with respect to avian wildlife, was reviewed as part of the assessment of significant features and habitats.

Information on significant deeryards, obtained from Land Information Ontario (LIO) mapping, was also reviewed.

Fish Habitat: OWES (guided by the Canada Fisheries Act) states that the presence of individual species of fish is not scored. Instead, fish habitat values are based on presence spawning and nursery habitat, and presence of staging and migration habitat. An indication of presence/absence was provided, as well as its hydro-period (i.e., permanent or intermittent). (OWES Section 4.2.6)

4.1.1.2 Results

Portions of the Living Springs Wetland Complex (Feature 2) extend to within 120 m of the Project Location. This complex has been evaluated by MNR as provincially significant (Ecologistics, 1988).

The results of the Wetland Characteristics and Ecological Functions Assessment for Feature 1 are presented in **Table 4.1 (Appendix B)**. All wetlands assessed under this protocol are considered provincially significant for the purposes of the NHA and project siting, and will be treated as such. The feature is shown on **Figure 4, Appendix A**.

120 mNo wetlands are found in the Project Location. Provincially significant wetlands occurring within 120 m of the Project Location were identified in Features 1 and 2we and areshown on Figure 4 (Appendix A).

4.1.2 Woodlands

4.1.2.1 Methods

In addition to assessing vegetation communities and surveying plant species on June 21 and September 20 2010, information relating to the attributes and functions of each woodland occurring within 120 m of the Project Location was collected. Tree height, estimated stand age, presence of large and mature trees, snags, cavities, stick nests, disturbance and specialized habitat features such as seeps, springs and vernal pools were recorded and detailed. Dates, times, duration, field personnel and weather for each field survey are presented in Table 3.1 (Appendix B). Curricula vitae for each person involved in conducting the evaluation of significance are provided in Appendix D. Field notes are provided in Appendix E.

Guidance provided in Section 7 of the Natural Heritage Reference Manual (2010) was used to evaluate woodlands. The NHRM (2010) notes that the local planning authority has a responsibility for designating significant woodlands, using criteria based on those that are provided in the NHRM.

The Springwood Study Area falls within Wellington County. Wellington County has defined criteria to be used in the evaluation of significance for woodlands; woodlands larger than 10 hectares are considered significant (Wellington County Official Plan, 2010).

4.1.2.2 Results

The portion of Feature 2 that extended to within 120 m of the Project Location was a mid-aged woodland comprised of open cultural woodland with the canopy dominated by crabapple, hawthorn, trembling aspen and white ash. Because of the open canopy (30-50%) the understory composition was reflective of a cultural meadow. The total woodland area was 8 ha. Site investigations found the woodland did not support uncommon species composition or structure. It was disturbed by trails that have been created by all-terrain-vehicles and associated use of the trails by ATVs. It did not meet the criteria established by Wellington County to be considered significant.

No significant woodlands were found in or within 120 m of the Project Location.

4.1.3 Specialized Habitats: Amphibian Woodland Breeding

Methods: The Significant Wildlife Habitat Technical Guide (MNR, 2000) and its Decision Support System (SWHTGDSS) were used to help decide what areas and features should be considered candidate significant wildlife habitat (see Section 3.2.6). As a result of site investigations, one feature (Feature 2ah) found within 120 m of the Project Location was assessed as candidate significant wildlife habitat for amphibian breeding, requiring an evaluation of significance. No candidate significant wildlife habitat for amphibian breeding was identified in the Project Location.

Information from site investigations (Table 3.4, Appendix B; Figures 3-A and 3-B, Appendix A; and Appendix E) was used to evaluate the candidate habitat in relation to the three essential components of amphibian woodland breeding pools described in the Decision Support System Index #40 (MNR, undated): 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 provided in Appendix Q (Table Q-2) of the Significant Wildlife Habitat Technical Guide (MNR, 2000) and Index #40 of the Decision Support System (MNR, undated) were used to determine significance of amphibian woodland breeding ponds. Criteria outlined in the SWHTG (2000) include provision of significant wildlife habitat, degree of permanence, species diversity, presence of rare species, size and number of ponds, diversity of vegetation, presence of shrubs and logs at edge of pond, adjacent forest habitat, water quality and level of disturbance.

4.1.3.1 Results

The vegetation community that extends to within 120 m of the Wind Project Location was a 0.4 ha willow thicket swamp, with dense shrub cover. This vegetation community is part of an 8.4 ha unit of the Living Springs PSW Complex and is also associated with some deciduous forest habitat. This feature contained standing water of up to 10cm into late July, however no tadpoles

were observed. Some disturbance from all terrain vehicles was noted within the feature. Based on the degree of permanence and adjacent forest habitat, Feature 2ah is considered to provide significant wildlife habitat for amphibians.

No significant wildlife habitat is present in the Project Location. Significant wildlife habitat is present within 120 m of the Project Location. It was identified and designated based on specialized habitat for amphibian woodland breeding (Feature 2ah; Figure 4, Appendix A).

4.2 SUMMARY

This Natural Heritage Assessment was undertaken to identify natural features found within, and within 120 m of, the Springwood Wind Project Location and evaluate their significance. This report has been prepared in accordance with O. Reg. 359/09 s.24-27.

Based on an assessment of background information and the results of on-site field investigations, the following natural features were located in or within 120 m of the Project Location, requiring an Environmental Impact Study (EIS) under O.Reg 359/09 s.38:

- Provincially significant wetland (Features 1 and 2we); and
- Significant wildlife habitat for amphibian woodland breeding habitat (Feature 2ah).

An EIS is required to identify and assess any negative environmental effects and develop mitigation measures to the above-noted significant features that occur in or within 120 m of the Project Location.

4.3 QUALIFICATIONS

The evaluation of significance was conducted from May 2010- January 2011. The following Stantec personnel were responsible for the application of evaluation criteria and procedures:

- Nicole Kopysh, Project Manager
- James Leslie, Terrestrial Ecologist (wetland evaluation)

Curricula vitae are provided in Appendix D.

5.0 Environmental Impact Study

An EIS is required to identify and assess any negative environmental effects and develop mitigation measures to significant features that occur in or within 120 m of the Project Location.

The Natural Heritage Reference Manual (MNR, 2010d), the Significant Wildlife Habitat Technical Guide (MNR, 2000), the SWHTG Decision Support System (SWHTGDSS; MNR undated) and the Natural Heritage Assessment Guide for Renewable Energy Projects (MNR, 2010a) were used to assist in the evaluation of impacts and mitigation measures.

The primary mitigation measure employed to reduce impacts to natural features and functions was avoidance; micrositing decisions made during the development of the Project layout considered minimizing impacts to natural features, wildlife and wildlife habitat. The Project is sited entirely within actively cultivated agricultural land with no natural habitat removal required for the Project. Modifications were made to site Project components as far as possible from features identified as significant through the site investigation and evaluation of significance for this Project.

5.1 PROJECT FOOTPRINT OVERVIEW

The basic components of the Project include four REpower MM92-2.05 MW wind turbine generators with a total maximum installed nameplate capacity of 8.2 MW (FIT Contract maximum of 9.2 MW), step-up transformers located adjacent to the base of each turbine, a 44 kV underground electrical power line system, a switching station, and turbine access roads. Temporary components during construction include work and storage areas at the turbine locations and along access roads and laydown areas. The underground collector system will transport the electricity generated from each turbine to a switching station located on private property adjacent to the municipal road allowance on 3rd Line. Hydro One Networks Inc. (HONI) will be responsible for building a new 44kV line into the switching station; construction of this line is therefore outside of the present assessment.

Each turbine will have a poured-in-place reinforced concrete foundation. The foundation will likely be an inverted “T” configuration, with a diameter of approximately 18 m. An area approximately 23 m x 23 m will be excavated, and the foundation is anticipated to be 3 m deep. The foundation is then backfilled and compacted.

A staging area within the construction area at each turbine will be used for temporary storage of the turbine components, parking and foundation spoil (excavated soil from foundation area) pile. Turbine components will be delivered directly to the staging areas for temporary storage until assembled. Staging areas will not be excavated or gravelled, and will be restored to pre-existing conditions at the end of construction. Turbine staging areas will be used to varying degrees throughout the construction phase.

Approximately 2 kilometres (km) of new access roads will be constructed to support construction and transportation vehicles. The gravel access roads will be used periodically during operation for ongoing turbine maintenance. The access roads will be 15.0 m wide (15.5 m at a turning radius), including road and staging areas. Staging areas (10.0 m) will be temporary and will be restored to pre-existing conditions at the end of the construction phase. Access roads will be reduced to 5 m for the operation phase.

From each step-up transformer, 44 kV underground collector lines carry the electricity generated by the turbines to the switching station located adjacent to the municipal road allowance.

The Project Location footprint has been sited entirely in active agricultural cropland (4 turbines and approximately 2 km of access road and collector lines). Construction activities are anticipated to be ongoing throughout Spring 2012 to Winter 2012.

Although unlikely, there is the potential for groundwater to be encountered during installation of turbine bases and collector lines. Should this occur significant dewatering is not expected. Site specific geotechnical investigations will be completed prior to construction activities will provide further details related to geologic conditions. Dewatering requirements will be re-assessed as part of the geotechnical investigations. If groundwater is encountered during excavations, good construction practices will be used, such as minimizing the length of time that the excavation is open and monitoring seepage into the excavation. Should pumping be required to dewater excavated areas, water will be directed into the nearest drain or spread across the buildable area and will be directed away from significant natural features. Additional detail is provided in the Construction Plan Report (separate cover).

All components of the Project and the associated 120 m Zone of Investigation in relation to significant natural features are shown on Figure 4 (Appendix A).

No significant natural features are found in the Project Location.

As noted in Section 4.2, the following significant features occur within 120 m of the Project Location:

- Provincially significant wetland (Features 1 and 2we); and
- Significant wildlife habitat for amphibian breeding habitat (Feature 2ah).

The project location is not permitted in a provincially significant southern wetland (O. Reg 359/09). Projects may be sited within 120 m of a provincially significant southern wetland and in, or within 120 m of a significant wildlife habitat if an environmental impact study is prepared that identifies and addresses any negative environmental effects on the feature and identifies mitigation measures.

Significant features found within 120 m of the Springwood Project Location are provided below.

SPRINGWOOD WIND PROJECT

NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY

Environmental Impact Study

June 2011

Significant Features found within 120 m of the Project Location

Feature Number	Significant Natural Features	Project Component(s) located in Natural Features	Project Component(s) located within 120 m
Feature 1	<ul style="list-style-type: none"> Wetland (considered significant for the purposes of this report) 	None	Access Road: 2.3 m at closest point
Features 2we and 2ah	<ul style="list-style-type: none"> Provincially Significant Wetland Significant wildlife habitat (amphibian breeding) 	None	Turbine 3: 117m from blade tip Access Road: 98 m at closest point Crane Area: 85 m <i>(Note, the turbine base is 162m from the feature and the collector line is 127 m)</i>

An analysis of the potential impacts and proposed mitigation measures for Features 1 and 2 (2ah and 2we) are provided below.

A synthesis of all potential impacts and proposed mitigation measures for the Project is provided in Table 5.1 (Appendix B).

5.2 FEATURE 1

Feature 1 is a small red-osier thicket. It is considered significant for the purposes of this report. All proposed components of the Project (turbines, access roads, switching station etc.) are located outside of Feature 1.

The Project Location in relation to the wetland boundary is shown on Figure 4, Appendix A. The following Project components are sited within 120 m of the boundary:

Project Component	Approximate distance from wetland boundary (at closest point)
Access Road and Collector Line	2.3 m at closest point

5.2.1 Potential Effects

All components of the Project are sited outside of Feature 1 therefore there will be no direct loss or fragmentation wetland or the functions for which it was identified.

Potential indirect effects may arise through changes to wetland hydrology during or after construction, either by increasing or decreasing flow contributions (runoff) to these features. To

accommodate existing overland flows and maintain surface water contributions to wetlands, and therefore avoid impacting wetland hydrology, culverts will be installed as necessary beneath the access road to T2 to convey runoff following storm events.

A collector line will be installed at a depth of approximately 1 m using a trench. The trench will be backfilled with the excavated materials. Installation of the collector lines is expected to be very short term in duration and would be completed within a two week period. This phase of the construction is scheduled to occur in October/November 2012. Given the short term duration and the shallow nature of the works no effects to the wetland hydrology are expected.

Indirect impacts resulting from construction activities, such as disturbance from dust generation, sedimentation and erosion, are expected to be short term, temporary in duration and mitigable through the use of standard site control measures. During construction, there will be increased traffic and the potential for accidental spills.

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. Large quantities of these materials will not be stored onsite and do not represent a significant potential adverse effect to natural features in the event of accidental spills.

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

5.2.2 Proposed Mitigation

Construction will be required within 120 m of the feature. Appropriate protection and mitigation measures should be undertaken in this area, as wetlands can be particularly sensitive to soil compaction and indirect hydrological effects. The following mitigation measures should be implemented:

- No development is permitted within the wetland boundary.
- Silt barriers (e.g., fencing) will be erected along the edge of Feature 1 to minimize potential sediment transport to the natural features.
- Inspectors will ensure construction vehicles and personnel stay within the demarcated construction areas, thereby limiting the potential disturbance of natural vegetation.
- All refuelling activities will occur well away from Feature 1. In the event of an accidental spill, the MOE Spills Action Centre should be contacted and emergency spill procedures implemented immediately.
- Any fuel storage and activities with the potential for contamination will occur in properly protected and sealed areas. In addition, a Construction Emergency Response and Communications Plan will be developed by the Construction Contractor and/or wpd and will include protocols for the proper handling of material spills and associated

procedures to be undertaken in the event of a spill. Additional details are available in the Construction Report (separate cover).

- Requirements for culverts will be assessed during the Project's detailed design phase and will be added where necessary to the access road to T2 to ensure existing water flow regimes are maintained.
- Surface material stripped for construction of the access road will be stockpiled and re-used on site, as feasible. If not feasible, the soil will be disposed of at an approved off-site facility. Stockpiling of materials will not occur within 30 m of Feature 1.
- The area between the access road and Feature 1 will be naturalized (seeded) to establish a natural vegetated buffer along the edge of the community. All seeding and /or replanting of these areas will use species native to Ecoregion 6E and will be native to the site and/or surrounding natural features.

5.2.3 Net Effects

Given there will be no removal of native vegetation and that the footprint of the Project within 120 m of the wetland feature is limited, the implementation of the mitigation measures described in Section 5.2.2 will ensure no adverse effects to wetland community during construction and operation of the Project.

5.3 FEATURE 2WE AND 2AH

Feature 2we and 2ah is a willow thicket swamp that has been identified as part of the Living Springs PSW Complex (Feature 2we), and also evaluated as significant wildlife habitat for significant amphibian breeding habitat (Feature 2ah).

The willow thicket swamp is located within 120 m of the Project Location. All proposed components of the Project (turbines, access roads, switching station etc.) are located outside of provincially significant wetland and significant amphibian breeding habitat.

The Project Location in relation to the PSW and significant wildlife habitat boundary is shown on Figure 4, Appendix A. The following Project components are sited within 120 m of the boundary:

Project Component	Approximate distance from PSW and Amphibian Habitat boundary (at closest point)
T3	117 m from blade tip
Access Road to T3	98 m
Crane Laydown Area for T3	85 m

**Note, the turbine base is 162m from the feature and the collector line is 127 m*

5.3.1 Potential Effects

Provincially Significant Wetland

As all components of the Project are sited outside the Living Springs PSW boundary there will be no direct loss of wetland habitat or function as a result of the Project. Indirect impacts resulting from construction activities, such as dust generation, sedimentation, and erosion, are expected to be short term, temporary in duration and mitigable through the use of standard site control measures. During construction, there will be increased traffic and the potential for accidental spills.

Buffer widths of a minimum of 10m are generally recommended to protect wetland functions from adjacent development projects (i.e. residential developments) with buffers of 30m considered sufficient to protect ecological functions (NHRM, 2010). Construction activities are proposed 98 m at their closest point to Feature 2we. This distance is considered sufficient to attenuate potential negative effects. Due to the Project Location's rural and agricultural land uses currently occurring directly adjacent to natural features, the features are not considered highly sensitive to temporary disturbances. The majority of the wetland unit occurs more than 120 m from the Project Location. Research indicates that impacts from development activities do not generally extend to distances beyond 120 m (NHRM, 2010).

In general, changes in surface water drainage or groundwater flow can affect wetlands. No underground connector lines are proposed within 120 m of the wetland, and the turbine foundations are located 162 m from the wetland. Access roads come within 98 m of the PSW boundary at their closest point. Access roads will be narrow (4.5m wide), relatively flat, unpaved permeable roads that will receive relatively little regular traffic. When the distances of the Project components to Feature 2we (i.e. over 90m) are considered together with the size and magnitude of the closest component (i.e. a narrow permeable road and small diameter subsurface collector lines), no changes to groundwater flow or surface water drainage are anticipated.

The access road to Turbine 4 crosses a watercourse (the Herbert Wilson Drain) that eventually extends through the PSW. A culvert has been placed where the access road crosses the watercourse which will maintain water flow regimes.

No dewatering activities are anticipated for the project, though site specific geotechnical investigations will be completed prior to construction. Excavation activity (which could potentially lead to dewatering requirements) is to occur more than 120 m from Feature 2we (162 m to turbine base and 127 m to collector line). This separation distance is considered sufficient to avoid potential negative impacts to the feature, however should dewatering be required, good construction practices will be used and all pumped water will be directed away from natural features.

There will be no clearing of trees in or near the feature that could result in desiccation or drying. No known microhabitat changes have been identified as a result of wind turbines and ancillary infrastructure. Airborne dust which could result in microclimate effects will be mitigated where land based disturbance is proposed within 120 m of the feature.

During operation of the facility, some materials such as lubricating oils and other fluids associated with turbine maintenance have the potential for discharge to the on-site environment through accidental spills resulting in a potential impact to the wetland through ground or surface water contamination. Large quantities of these materials will not be stored onsite and do not represent a significant potential adverse effect to the wetland in the event of accidental spills, particularly given the separation distance between storage areas for materials and the natural feature (ie. more than 120 m).

Significant Wildlife Habitat: Specialized Habitat for Amphibian Breeding

Indirect impacts during construction and operation could include disturbance or disruption to the wildlife function supported by the feature. Turbine 3 is sited within 120 m of significant amphibian breeding habitat (117m from blade tip, 162 m from base). The access road is 98m from the feature. No habitat loss or fragmentation to amphibian breeding habitat will result as a result of construction of access roads.

Roads can impact wildlife populations through direct mortality from vehicles, as well as through the increased isolation of populations resulting in decreased genetic diversity (LesBarreres, 2007). Traffic speed is one of the key factors which influences mortality (Farmer and Brooks, 2007), and traffic volume influences both mortality (Fahrig, 2007) and connectivity.

During construction of the turbines, the access roads will experience some traffic, which will vary in intensity as the construction phase progresses. Amphibians are at an increased risk from vehicle collisions in spring, particularly on cool rainy nights as they move towards warmer road surfaces (SWHTGDSS, Index #40). Given the 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) the risk of increased mortality during construction is considered low. Some limited mortality is possible, however, the potential long-term effects to wildlife populations from this mortality and from barrier effects is anticipated to be minimal.

Individual reproductive success has been directly related to calling effort in frogs (Sun and Narins, 2004). Therefore, noise can be a concern during construction and operation because it could potentially interfere with calling rates, which could in turn impact fitness (Sun and Narins, 2004, Penna et al., 2005). As well, noise may not allow breeding frogs to properly hear and move toward breeding aggregations (Maxell and Hokit, 1999).

Masking of auditory environmental signals, such as amphibian calls, may be significant immediately underneath the turbine (Rabin et al., 2006), but the effects rapidly decline with

distance from the turbine. A study of low frequency noise and vibration at a modern wind farm determined that vibration is 1/5th to 1/100th of the limit of human perception within 25 m of the turbine base (Legerton et al., 1996). While amphibians may be more perceptive of vibration, vibration magnitude drops off significantly as distance increases (K. Smith, Aercoustics, pers. comm.). No turbine bases are sited within 162 m of significant amphibian breeding habitat. This is considered a sufficient setback to mitigate any noise and vibration effects to amphibians.

5.3.2 Proposed Mitigation

Avoidance was the main strategy used to minimize impacts to PSW and amphibian breeding habitat within 120 m of the Project Location. All components of the Project are sited outside the feature boundary. One turbine is located within 120 m; T3 is 117 m from turbine blade tip to the PSW boundary. Its base is sited more than 120 m from the feature (162 m). At its closest point, the access road to T3 will approach within 98 m of the PSW. Access roads will be narrow, relatively flat, unpaved roads that will receive relatively little regular traffic. As such, the distance between the road and feature would be effective for attenuation of potential negative impacts.

Construction will be required within the 120 m Zone of Investigation of the feature. Appropriate protection and mitigation measures should be undertaken in this area, as wetlands can be particularly sensitive to soil compaction and indirect hydrological effects. The following mitigation measures should be implemented:

- No development is permitted within the PSW boundary.
- Inspectors will ensure construction vehicles and personnel stay within the demarcated areas, thereby limiting the disturbance of natural vegetation.
- Should wildlife be found within the construction area, the use of standard care protocols for the removal of species will be used.
- A culvert will be installed beneath the access road to Turbine 4 at the watercourse crossing to maintain hydrological flows.
- All refuelling activities will occur well away from the wetland. In the event of an accidental spill, the MOE Spills Action Centre should be contacted and emergency spill procedures implemented immediately. In addition, a Construction Emergency Response and Communications Plan will be developed by the Construction Contractor and/or wpd and will include protocols for the proper handling of material spills and associated procedures to be undertaken in the event of a spill. Additional details are available in the Construction Report (separate cover).
- Any fuel storage and activities with the potential for contamination will occur in properly protected and sealed areas.

- To minimize the risk of road mortality to amphibians, maintenance vehicle traffic will primarily be restricted to daytime hours during operation of the facility. Vehicle speeds should be restricted to 30 km/h or less.
- Speed limit signage will be erected along the access road to Turbine 3 to communicate 30km/hr limit.

5.3.3 Net Effects

The setback of more than 150 m of turbine bases from PSWs will ensure that there is no disruption of wetland function and no net loss of wetland area. These separation distances will attenuate disturbance effects due to operational activities including turbine operation and maintenance. At one point, the access road approaches within 98 m of the PSW. This is considered a sufficient buffer to attenuate any negative impacts during construction or from occasional maintenance during operation. The mitigation measures described above will ensure no adverse effects to the PSW during construction and operation.

Considering the temporary nature of construction effects, the distance between the feature and the Project components, and the periodic nature of maintenance activities, it is likely that resident amphibians will adapt to the Project quickly. Consequently, no significant net negative effects are anticipated to amphibian breeding populations and their habitats.

5.4 POST-CONSTRUCTION MONITORING

Post-construction monitoring to demonstrate how any negative environmental effects identified in the Environmental Impact Study will be mitigated is required as part of the REA Application. This information is contained within the Environmental Effects Monitoring Plan provided in the Design and Operations Report. In addition to the mitigation measures identified through the EIS, the Environmental Effects Monitoring Plan must include post-construction monitoring for birds and bats (MNR, 2010b and 2010c).

A post-construction monitoring study for birds and bats has been developed in consultation with the Ministry of Natural Resources that is consistent with guidance and requirements provided in MNR's Bat Guidelines (2010) and MNR's Bird Guidelines (2010). A summary of the potential negative effects to significant natural features, mitigation strategies, performance objectives, monitoring plan principles (including general methods, location, frequency, rationale and reporting), and contingency measures are outlined in Table 5.2 (Appendix B). This information forms the basis of the monitoring components of the Construction Plan Report and the Environmental Effects Monitoring Plan provided in the Design and Operations Report.

Elements of the post-construction monitoring program will include:

- Mortality monitoring at all turbines from May 1- October 31, with raptor mortality surveys continuing to November 30th for a period of three years. Searcher efficiency and

scavenger trials should be conducted each year according to MNR's protocols (2010a and 2010b).

- Regular reporting that includes analysis and submission of results to MNR.

The monitoring program should be reassessed by MNR and wpd at the end of each monitoring year. Pending the reassessment results, the program methodologies, frequencies, and durations may be reasonably modified by the parties to better reflect the findings.

5.5 SUMMARY OF IMPACTS AND MITIGATION

Table 5.1 (Appendix B) summarizes the general impacts, suggested mitigation measures and application to minimize and mitigate the potential negative impacts to significant natural features associated with the planning, design and construction of the proposed Project.

6.0 Conclusions

This Natural Heritage Assessment and Environmental Impact Study for the Springwood Wind Project has been prepared in accordance with O.Reg 359/09, s. 24-28 and 37-38.

Once the identified protective, mitigation and compensation measures are applied to the environmental features discussed above, the construction and operation of the Project is expected to have acceptable net negative effects on the significant features and functions identified through the Natural Heritage Assessment process. An environmental effects monitoring plan that includes a post-construction monitoring program has been developed to confirm the accuracy of predicted effects as well as to monitor the effects to other natural elements.

Stantec Consulting Ltd. prepared this Natural Heritage Assessment and Environmental Impact Study for wpd for the Springwood Wind Project. wpd is committed to implementing the appropriate protection and mitigation measures as they apply to the construction and operation of the proposed Project.

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