Adelaide Wind Energy Centre
Natural Heritage Site Investigation Report

Prepared for:
NextEra Energy Canada
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Burlington, ON, L7L 6W6

Project No. 1230 Date: April 2012

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

ADELAIDE WIND ENERGY CENTRE
Natural Heritage Site Investigation Report

Project Team:

Staff	Role
Andrew G. Ryckman	Project Manager/Biologist
Kaitlin N. Powers	Terrestrial and Wetland Biologist
Andrew Dean	Terrestrial and Wetland Biologist
Charlotte Moore	Terrestrial and Wetland Biologist
Erin Pettit	Terrestrial and Wetland Biologist
Graham Wright	Terrestrial and Wetland Biologist
Heather Wright	Terrestrial and Wetland Biologist
Jessica Walker	Terrestrial and Wetland Biologist
Julia Lawler	Terrestrial and Wetland Biologist
Ken Burrell	Terrestrial and Wetland Biologist
Kim Watson	Terrestrial and Wetland Biologist
Megan Pope	Terrestrial and Wetland Biologist
Mitch Ellah	Terrestrial and Wetland Biologist
Nathan Miller	Terrestrial and Wetland Biologist
Gerry Schaus	GIS Technician

Report submitted on April 10, 2012

Andrew G. Ryckman

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1.0 Project Description

Natural Resource Solutions Inc. (NRSI) was retained in April 2011 by GL Garrad Hassan, on behalf of Kerwood Wind, Inc, a wholly-owned subsidiary of NextEra Energy Canada ULC to conduct a natural environment resource assessment in accordance with the Renewable Energy Approval (REA) Regulation. This assessment includes a records review, site investigation, evaluation of significance, and impact assessment of any potentially significant natural features at a proposed 60MW wind energy facility in Middlesex County and Township of Adelaide Metcalfe, Ontario. The analysis of the natural heritage features and biological factors affecting the proposed site is one issue being considered. Other factors, such as land ownership, social impacts, and cultural impacts are also being assessed by other team members, and will be addressed under separate covers as outlined by the regulation.

The Adelaide Wind Energy Centre („Adelaide"), proposed by Kerwood Wind Inc,, is located in the geographic Township of Adelaide Metcalfe, approximately 13km northwest of the Town of Strathroy. The general project area is roughly bordered by Centre Road, Townsend Line, Sexton road, and Napperton Drive. In addition, a transmission line is proposed to run north along Kerwood Road between Cuddy Drive and Nairn Road. This transmission line is then proposed to continue eastward across Nairn Road to an existing 500kV line and substation located west of Petty Street. The Adelaide wind energy generating facility is proposed to consist of up to thirty-eight GE 1.6-100 (1.62 MW) turbines for a total installed capacity of up to 61.56MW. The proposed GE 1.6-100 turbine is a 3-bladed, upwind, horizontal-axis turbine. The total rotor diameter of the turbine is 100m, resulting in a swept area of 7,854 m^2, and is designed to operate at between 9.75 and 16.18 revolutions per minute (rpm). The turbine rotor and nacelle are mounted on top of an 80m tubular tower which is manufactured in sections from steel plate. Each turbine is mounted on a steel reinforced concrete foundation and equipped with a transformer, located outside the base of the tower.

As identified the REA Regulation, the proposed layout of these features is collectively referred to as the „project location". In accordance with Section 25 of the Renewable Energy Approval (REA) Regulation (O. Reg. 359/09 of the Environmental Protection Act), NRSI has conducted a thorough records review of available background resources

to identify any potentially significant natural features within 120m of the project location. This includes areas within 120m of turbine blade tip as well as any areas that may be used as temporary lay-down areas, crane pads, access roads, connector, distribution and transmission lines. For the purposes of this report, NRSI will refer to the areas within 120m of the project location as the „project area".

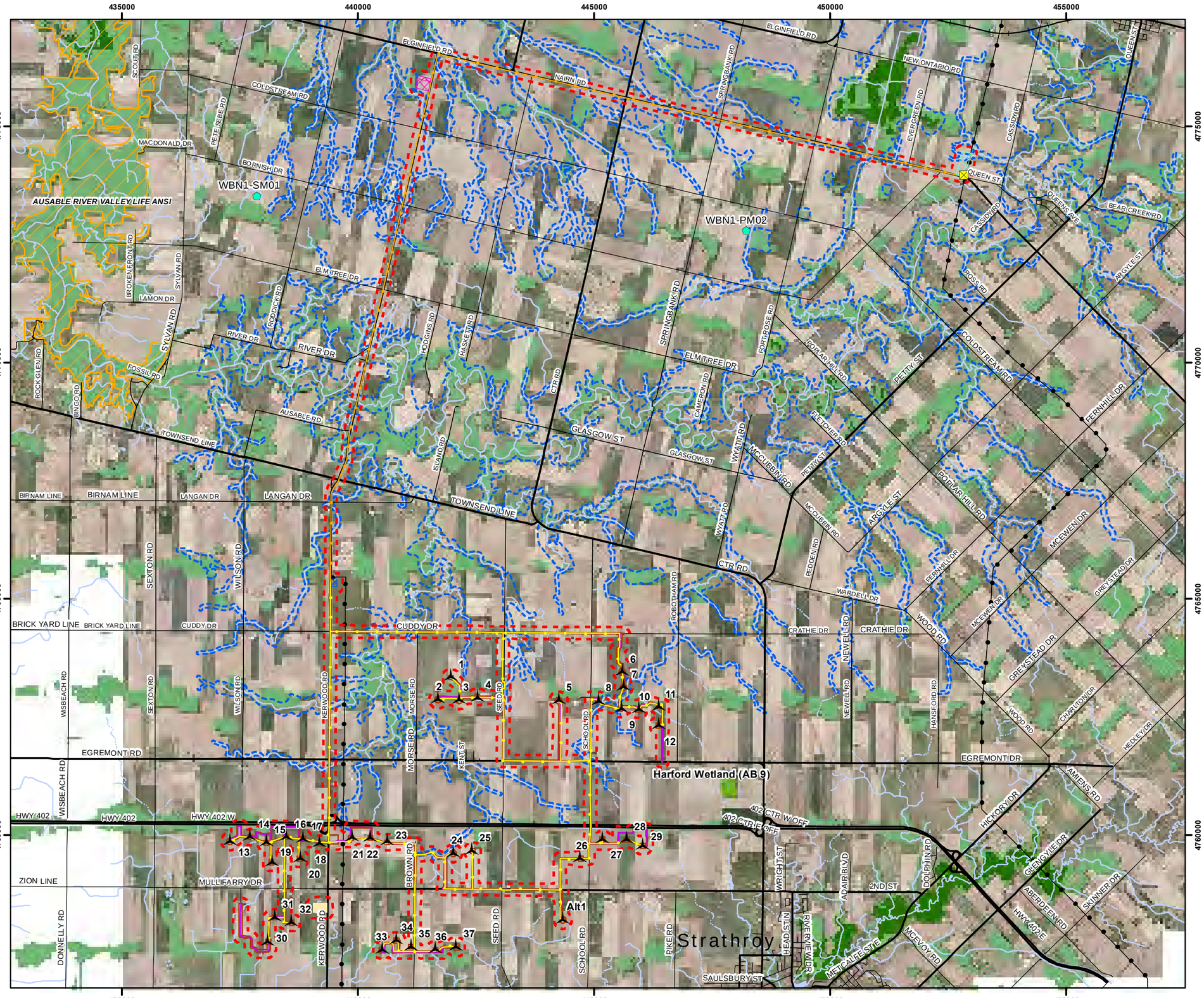
The project area is dominated by rotational agricultural crops of wheat, corn and soybeans. Other land uses, including hayfields and agricultural pasture, are also expected to be present within the project area. Natural features are generally small and isolated from other features; however, several large contiguous woodlands are present within the Adelaide project area. Habitats within the project area are expected to include woodlands, swamps, meadows, thickets, drainage ditches, ponds, creeks and hedgerows. See Figures 1 and 2 for maps of the project area and natural features.

As part of this project, NRSI has considered all aspects relating to provincially Threatened and Endangered species. However, since these species are addressed as part of the *Endangered Species Act* (2007), they have not been discussed within any of these Natural Heritage Assessment reports. These species will be address in full detail, including a description and results of field assessments, potential impacts, and recommended mitigation measures, as part of a separate *Approval and Permitting Requirements Document (APRD)* to be submitted to the MNR under a separate cover, where necessary.

Figure 1

Adelaide Wind Energy Centre

Project Area and Natural Features



Legend

- Project Area (120m Buffer)
- Turbine
- Point of Common Coupling (PCC)
- MET Station
- Access Road
- Interconnection Line
- Collector System
- Project Location
- Staging Area
- Interconnection Facilities
- Substation
- Switching Yard
- Existing Transmission Line
- Railroad
- Primary Road
- Secondary Road
- Waterbody
- Intermittent Watercourse
- Permanent Watercourse
- Provincially Significant Wetland (PSW)
- Other Wetland
- Wooded
- ANSI, Life Science
- ANSI, Earth Science
- Regulation Limit (ABCA)

Natural Resource Solutions Inc.
Aquatic, Terrestrial and Wetland Biologists

Project: 1230 Date: April 10, 2012	NAD83 - UTM Zone 17 Scale: 1:80,000 (11x17")

0 1,000 2,000 3,000 4,000 5,000 Metres

N

Path: X:\1230_AdelaideWindFarm\NRSI_1230_Fig1_AdelaideWF_NaturalFeatures_80K_2012_04_10_KEB.mxd

Figure 2

Adelaide Wind Energy Centre

Project Area and Natural Features

438000 440000 442000 444000 446000

4764000 4762000 4760000 4758000

CUDDY DR
WILSON RD
KERWOOD RD
MORSE RD
KENTST
FEASEYST
SCHOOL RD
ROBOTHAM RD
HWY 402
MULLIFARRY DR
SULLIVAN RD
SEED RD
BROWN RD

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 Alt1

Legend

- Project Area (120m Buffer)
- Turbine
- Point of Common Coupling (PCC)
- MET Station
- Access Road
- Collector System
- Interconnection Line
- Project Location
- Staging Area
- Interconnection Facilities
- Substation
- Existing Transmission Line
- Railroad
- Highway
- Primary Road
- Secondary Road
- Intermittent Watercourse
- Permanent Watercourse
- Waterbody
- Provincially Significant Wetland (PSW)
- Other Wetland
- Wooded
- ANSI, Life Science
- ANSI, Earth Science
- Regulation Limit (ABCA)

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

Project: 1230
Date: April 10, 2012

NAD83 - UTM Zone 17
Scale: 1:35,000 (11x17")

0 500 1,000 1,500 2,000 Metres

N

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2.0 REA Requirements

Ontario Regulation (O. Reg.) 359/09 – *Renewable Energy Approvals Under Part V.0.1 of the Act*, (herein referred to as the REA Regulation) made under the *Environmental Protection Act* identifies the requirements for the development of renewable energy projects in Ontario. In accordance with the REA Regulation, the Adelaide Wind Energy Centre, classified as a Class 4 wind facility, is required to complete a REA.

Section 26 of the REA Regulation requires proponents of Class 4 wind projects to undertake a natural heritage site investigation for the purpose of determining:

1. whether the results of the analysis summarized in the [Natural Heritage Records Review] report prepared under subsection 25 (3) are correct or require correction, and identifying any required corrections.
2. whether any additional natural features exist, other than those that were identified in the Natural Heritage Records Review Report prepared under subsection 25 (3).
3. the boundaries, located within 120m of the project location, of any natural feature that was identified in the records review or the site investigation.
4. the distance from the project location to the boundaries determined under clause (c).

Natural Features, as defined in Section 1.1 of the REA Regulation, are identified in Section 2.1 above.

Subsection 3 of Section 26 of the REA Regulation requires the proponent to prepare a report setting which includes the following:

1. A summary of any corrections to the report prepared under subsection 25 (3) and the determinations made as a result of conducting the site investigations under subsection (1).
2. Information relating to each natural feature identified in the records review and in the site investigations, including the type, attributes, composition and function of the feature.
3. A map showing
   a) the boundaries mentioned in clause (1) (c)
   b) the location and type of each natural feature identified in relation to the project location, and
   c) the distance mentioned in clause (1) (d).
4. The dates and times of the beginning and completion of the site investigation.
5. The duration of the site investigation.
6. The weather conditions during the site investigation.
7. A summary of methods used to make observations for the purposes of the site investigation.
8. The name and qualifications of any person conducting the site investigation.

9. Field notes kept by the person conducting the site investigation.

This Natural Heritage Site Investigation Report has been organized and prepared to satisfy the conditions of the requirements outlined above.

3.0 Staff Roles

The requirements of the REA process indicate that the name and qualifications of all staff participating in the site investigation should be included. As a result, the qualifications and roles of key staff participating in the site investigations at the Adelaide Wind Energy Centre have been outlined below.

Andrew G. Ryckman, B.Sc.
Andrew is a Terrestrial and Wetland Biologist with 7 years of environmental experience. He routinely manages the natural heritage aspects of renewable energy projects, with specific expertise relating to bats and herpetofauna. Andrew is certified in Ecological Land Classification (2010), and has successfully completed a Bat Conservation International (BCI) Acoustic Monitoring Workshop (2008).

Andrew's role was to act as the project manager, overseeing all aspects of the Natural Heritage Assessment, including all associated field work and reporting. He was the main contact point for agency staff and assisted with the preparation of all corresponding reports.

David E. Stephenson. M.Sc.
David specializes in natural resource inventories and evaluations, management, research and impact studies. He has managed hundreds of projects which have focused on the identification of important natural features and evaluation of the significance and sensitivity of these features. As a wetland specialist, David has worked extensively in wetland habitats throughout Ontario including the evaluation of over 150 wetlands using the standard Ontario Wetland Evaluation System (OWES). David has managed numerous studies focusing on development impacts on wetland ecology and functions and has developed solutions and recommendations for development proposals in and around wetlands, within the Wetlands Policy. David is OWES certified.

David's role in this project was to supervise the wetland boundary delineations and wetland information collection within the project area.

Kaitlin N. Powers, B.E.S
Kaitlin is a Terrestrial and Wetland Biologist with over 2 years experience working as an environmental technician in both public and private sectors. As a graduate in Environment and Resources Studies from the University of Waterloo, Kaitlin specialized in ecological restoration and is a member of the Society for Ecological Restoration of Ontario (SERO). She is certified in Ecological Land Classification (ELC) for northeastern Ontario (2011).

Kaitlin assisted in coordinating the field work for the project, and was directly involved in conducting Ecological Land Classification (ELC) mapping and wildlife habitat assessments. She was also the main author of this report.

Andrew Dean, B.E.S
Andrew is a Terrestrial and Wetland Biologist with 2 years of combined environmental consulting and not-for-profit work experience, monitoring both for the protection of natural areas within construction projects and for the rehabilitation of former aggregate extraction sites. He has a keen interest in botany and plant ecology and is a member of the Field Botanists of Ontario and the North American Native Plant Society. Andrew has participated in field investigations inventorying flora and fauna, their respective habitats and sensitive natural heritage features. Andrew is certified in the Ecological Land Classification (ELC) for southern Ontario (2010).

Andrew's role in the project was to collect ELC information, and to assist with mapping the wetland boundaries within the Project area.

Charlotte S. Moore, B.E.S.
Charlotte is a Terrestrial and Wetland Biologist with 3 field seasons of experience in butterfly ecology and various other environmental projects. Charlotte has completed her Bachelor of Environmental Studies and is a candidate for a Master of Environmental Studies (2013) at the University of Waterloo. Other environmental projects Charlotte has worked on include the use of Ecological Land Classification (ELC), bat habitat assessments, breeding bird surveys and reptile studies.

Charlotte assisted in completing ELC surveys and wildlife habitat assessments.

W. Graham Wright, B.E.S.
Graham is a Terrestrial and Wetland Biologist and a recent graduate of the University of Waterloo with a Bachelor of Environmental Studies. He has a year of experience working both as a field technician and as an Information Officer working with protected areas and Species At Risk in Ontario. He has also participated in various terrestrial and aquatic environmental monitoring projects.

Graham assisted with the completion of ELC surveys and wildlife habitat assessments.

Heather L. Wright, B.E.S.
Heather is a Field Biologist with experience in conducting vegetation inventories and reptile and mammal surveys. Heather graduated with a Bachelor of Environmental Studies from the University of Waterloo and completed a post-graduate certificate program in Ecosystem Restoration from Niagara College.

Her contributions to the project include assistance with Ecological Land Classification.

Jessica R. Walker, B.E.S
Jessica is a Terrestrial and Wetland Biologist with over 2 years of working the in the environmental field. Jessica has completed her Bachelor of Environmental Studies and is a candidate for a Masters of Environmental Studies (2012) at the University of Waterloo. Her Masters research involves mapping suitable habitat for the yellow-breasted chat (*Icteria virens virens*) in the Anders Field Complex in

Point Pelee National Park. Jessica has routinely conducted ecological assessments and collected field information on vegetation, birds, amphibians, and other wildlife species through Ontario.

Jessica assisted with the completion of ELC surveys and wildlife habitat assessments.

Kenneth G. Burrell, B.E.S.
Kenneth is a Terrestrial and Wetland Biologist who has 6 years of experience working on a variety of environmental projects. He specializes in bird ecology but has over 4 years of experience conducting floral inventories and wildlife studies focused on amphibians, reptiles, bats, and mammals. Kenneth has worked on multiple stages for a variety of renewable energy projects, primarily focusing on wind power. Kenneth has completed his Bachelor of Environment and Resource Studies and is a candidate for a Masters of Environment and Resource Studies (2013) at the University of Waterloo. He is also certified in Ecological Land Classification (ELC) for northeastern Ontario (2011).

Kenneth assisted with the preparation of this report.

Nathan Miller, M.Sc.
Nathan graduated from the University of Guelph with a B.Sc. in Wildlife Biology and a M.Sc. in Integrative Biology. Research for Nathan's M.Sc. focused on the migration and conservation of the monarch butterfly throughout Canada and the United States. Nathan also has extensive experience conducting research on a wide range of wildlife species including birds, mammals, herptiles, insects and plants, which were acquired while working as a naturalist for the Ministry of Natural Resources in Algonquin Park and as an environmental consultant. Nathan is also certified in the Ecological Land Classification System for northeastern Ontario (2011).

Nathan was responsible for completing Ecological Land Classification surveys on several natural features within the project location.

Gerry Schaus, B.A., GIS-AS
Gerry has over 4 years experience in the renewable energy sector and regularly prepares natural heritage mapping for wind, solar, and hydroelectric projects. This work includes mapping of natural features, vegetation communities, and aquatic habitats, terrestrial monitoring locations, constraints and proposed project layouts. Gerry has significant experience working with AutoCAD and (AutoCAD) Map3D.

Gerry's role in the project was as GIS technician. He reviewed and collected all available background mapping resources, digitized information gathered from site investigations, and integrated this information to generate this project's mapping.

4.0 Summary of Records Review

In accordance with the REA Regulation, an area of at least 120m beyond the project location was examined for natural heritage features, including Areas of Natural and Scientific Interest (ANSI), wetlands, woodlands, valleylands, and wildlife habitat. Numerous agencies were contacted to compile a comprehensive records review, including the Ministry of Natural Resources‟ (MNR) Renewable Energy Operation Team (REOT), the Ausable Bayfield Conservation Authority, and the St. Clair Region Conservation Authority. NRSI also utilized numerous background review sources, such as the Biodiversity Explorer, Ontario Breeding Bird Atlas (OBBA), Ontario Herpetofauna Atlas, and the Atlas of the Mammals of Ontario. The comprehensive results of the records review have been summarized in Tables 1 and 2. Table 1, below, outlines the presence of natural areas and wildlife habitat that have the potential to overlap with, or occur within 120m of, the project location. Changes to the Records Review tables can be found in Tables 17 and 18, following the main content of the Site Investigation Report.

Table 1. Summary of Records Review of the Adelaide Wind Energy Centre

Criteria	Result
Within 120m of a Provincial Park or Conservation Reserve	The Adelaide Wind Energy Centre project location is not within 120m of a Provincial Park or Conservation Reserve.
In a Natural Feature	The results of this records review indicate that project components (i.e. disturbance area, cabling, access roads etc…) of the Adelaide Wind Energy Centre overlap with 19 natural areas. These natural areas are woodlands that are expected to consist of deciduous forest with vegetation associations that are representative of this region of southwestern Ontario. The extent to which project locations overlap natural areas is variable and will be further examined and addressed in the site investigation phase of the project.
Within 50m of a ANSI-ES	No Earth Science (ES) ANSI features are located within 50m of the project location.
Within 120m of a Natural Feature	
a) ANSI-LS	No Life Science (LS) ANSI features are located within 120m of the project location.
b) Coastal Wetland	No coastal wetlands are present within 120m of the project location.
c) Northern Wetland	No northern wetlands are present within 120m of the project location.
d) Southern Wetland	No southern wetlands have been identified within 120m of the

	project location. Wetlands may be located within woodland boundaries.
e) Valleyland	No valleylands have been identified within 120m of the project location.
f) Wildlife Habitat	Sixty-five woodlands have been identified within 120m of the Adelaide Wind Energy Centre project location. These woodlands have the potential to provide several types of candidate Suitable Wildlife Habitat (SWH). Several linear features, including treed fencerows and naturalized drains, have been identified within 120 m of the project location. These features have the potential to act as SWH, specifically providing animal movement corridors and/or habitat for species of conservation concern. All of these wildlife habitats should be examined during the site investigation phase and/or the evaluation of significance phase of this project to identify other habitat features and identify the significance of each natural feature.
g) Woodland	Several woodlands have been identified during the records review process, including sixty-five woodlands within 120 m of the project location. Basemapping indicates that these woodlands range in size from 0.2ha to 137.2ha. These woodlands are expected to be primarily dominated by mid-aged to mature deciduous tree species; however young woodlands, treed plantations, or occasional coniferous woodlands may also be present within 120m of the project location.

The results of the records review for wildlife habitat are provided below in Table 2, which summarizes the presence of the full range of potential wildlife habitats within the project area. The purpose of this table is to guide the site investigation to further refine the types of wildlife habitats that have the potential to occur within the project area. Any wildlife habitats that have already been confirmed to be either not applicable to the project area or known to not occur within the project area will not be discussed in this report or in future Natural Heritage Assessment reports for the Adelaide Wind Energy Centre.

Table 2. Summary of Wildlife Habitat Records Review

Wildlife Habitat	Present Within 120m of Project Location	Present Within Project Location	Carried Forward to Site Investigation (Y/N)
Winter Deer Yards	No	No	**No**
Colonial-Nesting Bird Breeding Habitat (swallows)	Unknown	Unknown	**Yes**
Colonial-Nesting Bird Breeding Habitat (tree/shrub)	Unknown	Unknown	**Yes**
Colonial-Nesting Bird Breeding Habitat (ground)	Unknown	Unknown	**Yes**

Wildlife Habitat	Present Within 120m of Project Location	Present Within Project Location	Carried Forward to Site Investigation (Y/N)
Waterfowl Stopover and Staging Areas (terrestrial)	Unknown	Unknown	**Yes**
Waterfowl Stopover and Staging Areas (aquatic)	Unknown	Unknown	**Yes**
Waterfowl Nesting Habitat	Unknown	Unknown	**Yes**
Shorebird Migratory Stopover Areas	N/A	N/A	**No**
Landbird (including songbird) Migratory Stopover Areas	N/A	N/A	**No**
Raptor Winter Feeding and Roosting Areas	Unknown	Unknown	**Yes**
Wild Turkey Winter Range	N/A	N/A	**No**
Turkey Vulture Summer Roosting Areas	N/A	N/A	**No**
Reptile Hibernacula (snakes)	Unknown	Unknown	**Yes**
Bat Hibernacula	Unknown	Unknown	**Yes**
Bat Maternity Colonies	Unknown	Unknown	**Yes**
Amphibian Breeding Habitat (woodland)	Unknown	Unknown	**Yes**
Amphibian Breeding Habitat (wetland)	Unknown	Unknown	**Yes**
Migratory Butterfly Stopover Areas	N/A	N/A	**No**
Alvars	Unknown	Unknown	**Yes**
Tall-grass Prairies	Unknown	Unknown	**Yes**
Savannahs	Unknown	Unknown	**Yes**
Rare Forest Types	Unknown	Unknown	**Yes**
Talus Slopes	Unknown	Unknown	**Yes**
Rock Barrens	Unknown	Unknown	**Yes**
Sand Barrens	Unknown	Unknown	**Yes**
Great Lakes Dunes	N/A	N/A	**No**
Forests Providing High Diversity of Habitats	N/A	N/A	**No**
Old-growth or Mature Forest Stands	Unknown	Unknown	**Yes**
Foraging Areas with Abundant Mast	N/A	N/A	**No**
Turtle Nesting Habitat	Unknown	Unknown	**Yes**
Turtle-Over-wintering Habitat	Unknown	Unknown	**Yes**
Woodland Raptor Nesting Habitat	Unknown	Unknown	**Yes**
Osprey Nesting/Bald Eagle, Foraging, and Perching Habitat	Unknown	Unknown	**Yes**
Moose Calving Areas	N/A	N/A	**No**
Mineral Licks	N/A	N/A	**No**
Mink, Otter, Marten, and Fisher Denning Sites	Unknown	Unknown	**Yes (Mink Only)**
Highly Diverse Areas	N/A	N/A	**No**
Cliffs	No	No	**No**
Seeps and Springs	Unknown	Unknown	**Yes**
Amphibian Movement Corridors	Unknown	Unknown	**Yes**
Marsh Bird Breeding Habitat	Unknown	Unknown	**Yes**

Wildlife Habitat	Present Within 120m of Project Location	Present Within Project Location	Carried Forward to Site Investigation (Y/N)
Woodland Area Sensitive Breeding Birds	Unknown	Unknown	**Yes**
Open Country Breeding Bird Habitat	Unknown	Unknown	**Yes**
Shrub/Early Successional Bird Breeding Habitat	Unknown	Unknown	**Yes**
Terrestrial Crayfish	Unknown	Unknown	**Yes**
Special Concern Species	Unknown	Unknown	**Yes**
S1-S3, and SH Species and Communities	Unknown	Unknown	**Yes**

5.0 Site Investigation Methodology

Comprehensive site investigations to document the environmental and biological characteristics of the Adelaide Wind Energy Centre were undertaken in accordance with the REA Regulation and the specific requirements of the MNR. These site-specific field investigations focused on vegetation community mapping to support and build on the information collected during the records review phase of this project. The results of these site investigations will be used to identify and map the boundaries of the natural features within 120m of the project location. Information collected at this stage will be used to evaluate the significance of features in the Evaluation of Significance report.

5.1 Survey Dates

In accordance with the REA Regulation, NRSI recorded dates, times, duration, and weather conditions during each site investigation. This information has been summarized in Table 3, found below. Detailed descriptions of staff roles and qualifications can be found in Section 3.0 of this report, and detailed field forms can be found in Appendix I.

Table 3. Site Investigation Survey Dates

Staff Name(s)	Purpose	Date (2011)	Start Time (hrs)	Duration (hrs)	Weather Conditions		
					Temp. (°C)	Beaufort Wind	Cloud Cover (%)
Julia Lawler	Candidate Wildlife Habitat Assessment	May 26	1100	5.5	12	3	100
Julia Lawler	Candidate Wildlife Habitat Assessment	May 27	1115	6.5	12	2	100
Charlotte Moore Megan Pope Andrew Ryckman	Candidate Wildlife Habitat Assessment	June 7	1100	6	31	1-2	0
Charlotte Moore Megan Pope	Candidate Wildlife Habitat Assessment	June 8	0930	7	29	3	15
Charlotte Moore Megan Pope	Candidate Wildlife Habitat Assessment	June 9	0915	7	24	4	90
Andrew Dean Kaitlin Powers	OWES, ELC and Candidate Wildlife Habitat Assessment	June 20	1200	6	30	5	60
Andrew Dean Kaitlin Powers	ELC and Candidate Wildlife Habitat Assessment	July 21	0845	8	35	3	50
Andrew Dean Kaitlin Powers	OWES, ELC and Candidate Wildlife Habitat Assessment	July 22	0830	6	30	3	70
Charlotte Moore Kaitlin Powers	ELC and Candidate Wildlife Habitat Assessment	August 17	1100	6	27	3	60
Charlotte Moore Kaitlin Powers	OWES, ELC and Candidate Wildlife Habitat Assessment	August 18	0830	8	28	3	15
Charlotte Moore Kaitlin Powers	ELC and Candidate Wildlife Habitat Assessment	August 19	0830	6	29	2	40
Kaitlin Powers Jessica Walker	ELC and Candidate Wildlife Habitat Assessment	August 24	1300	1	26	4	15
Kaitlin Powers Andrew Dean	OWES Surveys	September 20	1120	1	11	4	100

Staff Name(s)	Purpose	Date (2011)	Start Time (hrs)	Duration (hrs)	Weather Conditions		
					Temp. (°C)	Beaufort Wind	Cloud Cover (%)
Kaitlin Powers Heather Wright	OWES, ELC and Candidate Wildlife Habitat Assessment	September 27	0845	5.5	22	2	25
Kaitlin Powers Heather Wright	ELC and Candidate Wildlife Habitat Assessment	September 28	1430	1.5	20	4	50
Pat Deacon, Kaitlin Powers	OWES Surveys	September 29	1430	1	18	3	75
Kaitlin Powers Kim Watson	ELC and Candidate Wildlife Habitat Assessment	October 4	1200	4.5	19	3	0
Kaitlin Powers Graham Wright	OWES, ELC and Candidate Wildlife Habitat Assessment	October 5	0900	4.5	14	2	50
Graham Wright Heather Wright	ELC and Candidate Wildlife Habitat Assessment	October 11	1030	7	19	1	30
Graham Wright Heather Wright	ELC and Candidate Wildlife Habitat Assessment	October 12	0845	4.5	15	1	100
Graham Wright Heather Wright	ELC and Candidate Wildlife Habitat Assessment	October 13	1400	4	15	2	100
Andrew Dean Kaitlin Powers	OWES, ELC and Candidate Wildlife Habitat Assessment	October 20	0845	3	9	3	100
Mitch Ellah Graham Wright	ELC and Candidate Wildlife Habitat Assessment	October 24	1400	3.5	13	4	60
Mitch Ellah Graham Wright	ELC and Candidate Wildlife Habitat Assessment	October 25	0845	8.5	8	2	100
Mitch Ellah Graham Wright	ELC and Candidate Wildlife Habitat Assessment	October 28	1100	5	7	1	5

Staff Name(s)	Purpose	Date (2011)	Start Time (hrs)	Duration (hrs)	Weather Conditions		
					Temp. (°C)	Beaufort Wind	Cloud Cover (%)
Andrew Dean Kaitlin Powers	ELC and Candidate Wildlife Habitat Assessment	November 24	0915	7.5	5	5	100
Charlotte Moore Kaitlin Powers	ELC and Candidate Wildlife Habitat Assessment	December 2	0930	4	1	3	100

5.2 Woodlands

Woodlands, as identified by the Natural Heritage Assessment Guide (OMNR 2011c), are defined as being a “treed area, woodlot or forested area, other than a cultivated fruit or nut orchard or a plantation established for the purpose of producing Christmas trees…”.

To assist in the identification of woodlands within the project area, NRSI biologists have conducted detailed Ecological Land Classification (ELC) mapping of all vegetation communities within the project area. This ELC mapping was completed using the 2009 draft revisions to the ELC manual (Lee et. al. 1998). ELC polygons were delineated during site investigation and through visual observation of vegetation communities. These observations were compared with available aerial photography to finalize boundaries. Although some vegetation characteristics were obtained from natural area reports, no previous ELC mapping was available or used during these surveys. Woodland boundaries were delineated along the dripline of the woodland.

ELC surveys included walking area searches within each polygon and the concurrent completion of detailed vegetation inventories for private properties where right-of-entry was obtained. During these area searches, NRSI biologists documented a wide range of applicable information as outlined in the ELC manual (Lee et al. 1998), including vegetation layer cover codes and dominance, polygon descriptions, stand composition, size class analysis, and the completion of detailed plant inventory lists and wildlife habitat assessments. The completion of substrate sampling (soil augering) was determined unnecessary for the identification of woodlands, but was used for the identification of wetlands, and is discussed in more detail below. The complete suite of information collected within each polygon can be seen on the completed field data sheets which can be found in Appendix I.

ELC vegetation community codes assigned to polygons were based on the second approximation of ELC codes. Any natural features classified as forested communities (>60% canopy cover) are considered to be woodlands, and any natural features classified as savannahs or woodlands were roughly compared to the criteria above to assess if they meet the criteria for woodlands.

For properties where site-specific access could not be obtained, NRSI biologists conducted ELC mapping from the closest observable point (i.e. roadside, neighbouring property, etc.) and compared this to a detailed review of aerial photographs to characterize the polygon to the lowest level possible. Where this alternative methodology had to be employed, it is clearly indicated on the ELC field data sheets found in Appendix I of this report.

The completed ELC mapping is provided in Figures 3 to 9.

5.3 Wetlands

Wetlands include habitats that are seasonally or permanently covered by shallow water and display the presence of specific soil types and vegetation communities (OMNR 2011c). Preliminary wetland identifications were made through the implementation of ELC mapping to identify lowland forests, wetlands, or other habitat types that may function as wetlands (reference ELC methods in section 5.2). The wetland boundary is drawn where the presence of upland species was consistently observed in a ratio generally greater than 50% of the species identified within the community.

In addition to the detailed ELC methods described above, soil sampling (augering) was also conducted in suspect wetlands to confirm the moisture regime and vegetation inventories were used to identify the presence and abundance of wetland indicator species. These habitats were then compared to the Ontario Wetland Evaluation System (OWES) manual to confirm their wetland status. Any communities identified as wetlands were delineated using site-specific field investigations combined with the use of detailed aerial photography. The delineated wetland boundary and field notes were reviewed by OWES-certified staff.

In potential wetlands where site access or right-of-entry could not be obtained, NRSI biologists conducted ELC mapping to the highest level possible from the nearest observation point, such as roadside or property boundary. The limitations of this alternative method are that detailed habitat or substrate information are not easily determined, and could not be properly assessed. In these instances where borderline wetlands are present, assuming no direct overlap with project location, NRSI has assumed these features to be wetlands in the absence of appropriate habitat

characteristics. Instances where site access could not be obtained are clearly identified on the completed field data forms that have been included in Appendix I of this report.

5.4 Valleylands

In accordance with the Natural Heritage Assessment Guide (OMNR 2011c), valleylands are considered to occur in a valley or other depression, with flowing or standing water present for a portion of the year. The identification of these features is largely based on geomorphology and aquatic resources. The St. Clair Region Conservation Authority and Ausable Bayfield Conservation Authority were consulted during the records review phase of the project to determine whether valleylands are present within 120m of the project location. Neither conservation authority identified valleylands within 120m of the project location. Nonetheless, the presence of valleylands was examined during the site investigation phase in order to confirm their absence from within 120m of the project location. The physical boundary of valleylands were determined as follows:

- For well-defined valleys, the physical boundary was defined by the stable top-of-bank or the predicted top-of-bank (also known as top of slope or top of valley); and,
- For a less well-defined valley or stream corridor, the physical boundary was defined through the consideration of riparian vegetation, the flooding hazard limit, the meander belt or the highest general level of seasonal inundation.

5.5 Wildlife Habitat

The identification of wildlife habitat within the project area uses the definitions used in the Natural Heritage Assessment Guide (OMNR 2011c) and Significant Wildlife Habitat Technical Guide (SWHTG) (OMNR 2000), which generally includes areas where plants and animals live, with adequate food, water, shelter, and space to sustain their populations (OMNR 2011c).

Candidate wildlife habitat assessments took place during ELC surveys so that as vegetation communities were delineated, surveys could be conducted for wildlife habitat features that are associated with the identified vegetation community. These surveys were delivered through areas searches for habitat features and through recording wildlife observations (i.e. visual sightings, vocalizations, tracks etc.) of specific species. Habitat features for which area searches were performed include, but are not limited to: nests, snags, fallen logs, tree cavities, cliffs/banks, caves, burrows, dens, rock piles/stone walls, organics piles, karst, old foundations, vernal pools/woodland ponds, sand, fine

sandy gravel, as well as crayfish chimneys. All preliminary candidate wildlife habitat assessments were conducted between May 26, 2011 and August 24, 2012. Sites that were identified as requiring further study were revisited during a time of year appropriate for the specific type of wildlife habitat being assessed (e.g rare plant surveys conducted from late June through November). Criteria used to define the boundary of significant wildlife habitat was taken from the draft 7E Ecoregion Criteria Schedule (OMNR, 2012).

For the purposes of the Natural Heritage Assessment reports, NRSI has separated the discussion on wildlife habitat into the 4 habitat categories, including seasonal concentration areas, rare vegetation communities and specialized wildlife habitat, habitats of species of conservation concern, and animal movement corridors. Each of these broad habitat types has been described in more detail in the following sections and the field notes for each have been provided in Appendix I.

5.5.1 Seasonal Concentration Areas

Wildlife seasonal concentration areas are defined as areas where animals occur in relatively high densities for all, or portions, or their life cycle (OMNR 2011c). These areas are generally relatively small in size, particularly when compared to areas used by these species during other times of the year. Habitats of seasonal concentrations of animals have been identified by using the habitat criteria found in the SWHTG and Significant Wildlife Habitat: Ecoregion 7E Criteria Schedules (OMNR 2012b). The habitat criteria for each potential seasonal concentration area has been summarized in Table 4 below.

Table 4. Characteristics Used to Identify Candidate Seasonal Concentration Areas

Candidate Seasonal Concentration Area	Criteria	Methods
Colonial-Nesting Bird Breeding Habitat (Bank and Cliff)	• Eroding banks, sandy hills, borrow pits, steep slopes, sand piles, cliff faces, bridge abutments, silos, or barns found in any of the following Community Types: Meadow (ME), Thicket (TH), Savannah (SV), Bluff (BL), Cliff (CL)[1]. • A colony identified as SWH will include a 50m radius habitat area from the peripheral nests[1]. • Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, soil or aggregate stockpiles. • Does not include a licensed/permitted Mineral Aggregate Operation • Relative importance of the site to local bird populations[3] • Quality of habitat[3] • Size of site[3] • Level of disturbance[3] • Historical use[3]	• Habitat identification occurred through the detailed ELC mapping that was conducted throughout the project area. • During area searches associated with ELC mapping, NRSI biologists also assessed the presence of colonially-nesting bird species within suitable ELC communities.
Colonial-Nesting Bird Breeding Habitat (Tree/Shrubs)	• Any of the following Community Types: Mixed Swamp (SWM), Deciduous Swamp (SWD), Coniferous Treed Fen (FETC1)[1]. • The edge of the colony and a minimum 300m area of habitat or extent of the Forest Ecosite containing the colony or any island <15.0ha with a colony is the SWH[1]. • Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used. • Most nests in trees are 11 to 15 m from ground, near the top of the tree. • Relative importance of the site to local bird populations[3] • Quality of habitat[3] • Size of site[3] • Level of disturbance[3] • Historical use[3] • Potential concerns of the planning authority[3]	• Habitat identification occurred through the detailed ELC mapping that was conducted throughout the project area. • During area searches associated with ELC mapping, NRSI biologists also assessed the presence of colonially-nesting bird species within suitable ELC communities.
Colonial-Nesting Bird Breeding Habitat (Ground)	• Any rocky island or peninsula within a lake or large river, close proximity to watercourses in open fields or pastures with scattered trees or	• Habitat identification occurred through the detailed ELC mapping that was conducted throughout the project area. • During area searches associated with

Candidate Seasonal Concentration Area	Criteria	Methods
	shrubs found in any of the following Community Types: Meadow Marsh (MAM), Shallow Marsh (MAS), Meadow (ME), Thicket (TH), Savannah (SV)[1]. • Nesting colonies of gulls and terns on islands or peninsuluas associated with open water or in marshy areas • Brewers Blackbird colonies are found loosely on the ground or in low bushes in close proximity to streams and irrigation ditches within farmlands • The edge of the colony and a minimum 150m area of habitat, or the extent of the ELC ecosites containing the colony or any island <3.0ha with a colony is the SWH[1]. • Relative importance of the site to local bird populations[3] • Quality of habitat[3] • Size of site[3] • Level of disturbance[3] • Historical use[3] • Potential concerns of the planning authority[3]	ELC mapping, NRSI biologists also assessed the presence of colonially-nesting bird species within suitable ELC communities.
Waterfowl Stopover and Staging Area (Terrestrial)	• Fields with sheet water during Spring (mid-March to May) or annual spring melt water flooding found in any of the following Community Types: Meadow (ME), Thicket (TH)[1]. • A 100-300m radius buffer around habitat has been considered the candidate SWH[1]. • Agricultural fields with waste grains are commonly used by waterfowl, these are not considered SWH unless used by Tundra Swans in the Long Point, Rondeau, Lk. St. Clair, Grand Bend and Pt. Pelee areas. • Relative importance of the site to local waterfowl populations[3] • Quality of habitat[3] • Size of site[3]	• Habitat identification occurred through the detailed ELC mapping that was conducted throughout the project area. • Information was collected from the Strathroy Area Birding Club website (http://strathroybirdclub.wordpress.com) on areas of significant bird concentrations during migration. . • Background information on waterfowl use within the project area has also been used to guide the identification of suitable habitat for waterfowl stopover and staging within the project.
Waterfowl Stopover and Staging Area (Aquatic)	• The following Community Types: Meadow Marsh (MAM), Shallow Marsh (MAS), Shallow Aquatic (SA), Deciduous Swamp (SWD)[1]. • Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migration • These habitats have an abundant food supply (mostly aquatic invertebrates and vegetation in shallow water) • The combined area of the ELC ecosites and a 100m radius area is	• Habitat identification occurred through the detailed ELC mapping that was conducted throughout the project area.

Candidate Seasonal Concentration Area	Criteria	Methods
	the SWH[1]. • Sewage treatment ponds and storm water ponds do not qualify as a SWH, however a reservoir managed as a large wetland or pond/lake does qualify. • Relative importance of the site to local waterfowl populations[3] • Quality of habitat[3] • Size of site[3]	
Waterfowl Nesting Area	• Upland habitats of any kind located adjacent to (≤120m) any wetland or the following wetland Community Types: Meadow Marsh (MAM), Shallow Marsh (MAS), Shallow Aquatic (SA), Bedrock Thicket (RBS), Mineral Thicket Swamp (SWT), or Mineral Deciduous Swamp (SWD)[1]. • Wetland is >0.5ha or cluster of 3 or more smaller wetlands within 120m of each other where waterfowl nesting occurs[1]. • Upland areas should be at least 120m wide[1]. • Wood ducks and hooded mergansers utilize large diameter trees (>40cm dbh) in woodlands for cavity nest sites • The boundary of the waterfowl nesting habitat may be greater or less than 120m from the wetland and will provide enough habitat for waterfowl to successfully nest. • Relative importance of the site to local waterfowl populations[3] • Size of area[3] • Quality of habitat[3] • Location of site[3] • Level of disturbance[3]	• Habitat identification occurred through the detailed ELC mapping that was conducted throughout the project area. • Proximity of upland habitat to wetland habitat, and determination of wetland size have been confirmed through GIS mapping.
Raptor Winter Feeding and Roosting Areas	• Presence of fields and woodlands. I.e. at least one of the following Community Types: Forest (FO), , in addition to one of the following Community Types: Meadow (CUM), Thicket (CUT), Savannah (CUS), Woodland (CUW) (<60% cover) that are >20ha and provide roosting, foraging and resting habitats for wintering raptors[1]. • Upland habitat (CUM, CUT, CUS, CUW), must represent at least 15ha of the 20ha minimum size. • Relative importance of the site[3] • Size of site[3] • Level of disturbance[3] • Location of site[3]	• Habitat identification occurred through the detailed ELC mapping that was conducted throughout the project area. • Habitat size has been determined using GIS mapping.

Candidate Seasonal Concentration Area	Criteria	Methods
	• Habitat quality[3] • Historical use of area[3]	
Reptile Hibernacula (Snakes)	• Hibernation occurs in sites located below frost lines in burrows, rock crevices, broken and fissured rock, wetlands such as conifer or shrub swamps and swales, poor fens, or depressions in bedrock terrain with sparse trees or shrubs with sphagnum moss or sedge hummock ground cover[1]. • Any ecosite in central Ontario other than very wet ones, The following Community Types may be directly related to snake hibernacula: Talus (TA), Rock Barren (RB), Crevice (CCR), Cave (CCA), and Alvar (RBOA1, RBSA1, RBTA1)[1]. • The feature in which the hibernacula is located plus a 30 m buffer is the SWH[1]. Wetlands can also be important over-wintering habitat in conifer or shrub swamps and swales, poor fens, or depressions in bedrock terrain with sparse trees or shrubs with sphagnum moss or sedge hummock ground cover. • Relative importance of the site[3] • Habitat quality[3] • Location of site[3] • Level of disturbance[3]	• Habitat identification occurred through the detailed ELC mapping that was conducted throughout the project area. • During area searches associated with ELC mapping, NRSI biologists documented any potential hibernation sites that may provide habitat below the frost line.
Bat Hibernacula	• Caves, mine shafts, underground foundations, Karsts or one of the following Community Types: Crevice (CCR), Cave (CCA)[1]. • The area includes 1000m radius around the entrance of the hibernaculum[1]. • Does not include buildings[1]. • Relative importance of the site[3] • Habitat quality[3] • Location of site[3] • Level of disturbance[3]	• Known sites Identified by OMNR and based on topography. • Potential sites based on MNDM abandoned mines locations • Potential sites based on karst topography
Bat Maternity Colonies	• Any of the following Community Types: Deciduous Forest (FOD), Mixed Forest (FOM), that have>10/ha wildlife trees >25cm diameter at breast height (dbh) [1]. • Maternity colonies can be found in tree cavities, vegetation and often in buildings (buildings are not considered to be SWH)[1]. • Maternity roosts are not found in caves and mines in Ontario[1].	• For habitats surveyed pre-July 2011 (before snag densities was established as a criteria), NRSI biologists conducted area searches within each woodland to look for suitable snags. Original criteria used by NRSI biologists to identify suitable habitats included large snags (>20cm dbh) with obvious cracks, cavities, or crevices that would be deemed suitable size for a maternal colony.

Candidate Seasonal Concentration Area	Criteria	Methods
	• The area of the habitat includes the entire woodland or the forest stand ELC Ecosite containing the maternity colonies[1] • Female Bats prefer wildlife tree (snags) in early stages of decay, class 1-3 or class 1 or 2. • Northern Myotis prefer contiguous tracts of older forest cover for foraging and roosting in snags and trees • Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in tree cavities and small hollows. Older forest areas with at least 21 snags/ha are preferred	• For features that were sampled after July 2011, snag-density was calculated by randomly selecting plots within a candidate natural feature. Ten plots were selected for natural features ≤10ha, with one plot being added for each hectare over 10ha to a maximum of 30 plots. These sampling plots were 12.6m radius (0.05ha) plots. The number of snags/cavity trees ≥25cm dbh were counted in each plot. The snag density of these plots was then extrapolated to the natural feature.

[1]: OMNR Significant Wildlife Habitat Ecoregion 6E Criterion Schedule: Addendum to SWHTG (Working Draft) (2011b)
[2]: OMNR Significant Wildlife Habitat Technical Guide (2000)
[3]: OMNR Significant Wildlife Habitat Technical Guide Appendix Q (2000)

5.5.2 Rare Vegetation Communities and Specialized Wildlife Habitat

Rare vegetation communities are areas that contain a provincially rare vegetation community and/or areas that contain a vegetation community that is rare within the planning area (OMNR 2000). Specialized wildlife habitats are considered to be areas that support wildlife species that have highly specific habitat requires, areas with exceptionally high species diversity or community diversity, or areas that provide habitat that greatly enhances a species" survival (OMNR 2000).

Rare vegetation communities and specialized wildlife habitat have been identified in the Adelaide Wind Energy Centre by using the habitat criteria found in the SWHTG and Significant Wildlife Habitat: draft 7E Ecoregion Criteria Schedules (OMNR 2012). The habitat criteria for rare vegetation communities and specialized wildlife habitat have been summarized in Table 5 below.

Table 5. Characteristics Used to Identify Rare Vegetation Communities and Candidate Specialized Wildlife Habitat

Candidate Specialized Wildlife Habitat	Criteria	Methods
Alvars	• An alvar is typically a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by thin veneer of soil. The hydrology of alvars is complex with alternating periods of inundation and drought. • Any of the following Community Types: ALO1(Open Alvar Rock Barren Ecosite), ALS1 (Alvar Shrub Rock Barren Ecosite), ALT1 (Treed Alvar Rock Barren Ecosite), FOC1 (Dry Pine Calcareous Shallow Coniferous Forest Ecosite), FOC2 (Dry Cedar Calcareous Shallow Coniferous Forest Ecosite), CUM2 (Bedrock Cultural Meadow Ecosite), CUS2 (Bedrock Cultural Savannah Ecosite), CUT2-1 (Common Juniper Cultural Alvar Thicket Type), CUW2 (Bedrock Cultural Woodland Ecosite) that are >0.5ha in size[1]. • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics)[1]. • Alvar is particularly rare in ecoregion 7E where the only known sites are found in the western islands of Lake Erie • Current representation of community type within the planning area[3] • Condition of community[3] • Size and location of site[3] • Potential for long-term protection of the site[3] • Provision of significant wildlife habitat[3]	• Habitat identification occurred through the detailed ELC mapping that was conducted throughout the project area.
Tall-grass Prairies	• Tallgrass prairie has ground cover dominated by prairie grasses. An open Tallgrass prairie habitat has <25% tree cover. • No minimum size to site • Any of the following Community Types: TPO1 (Dry Tallgrass Prairie Ecosite), TPO2 (Fresh-Moist Tallgrass Prairie Ecosite). • These communities must be restored or natural[1]. • Remnant sites such as railway right of ways are not considered to be SWH • Area of the ELC Ecosite is the SWH[1]. • Current representation of community	• Habitat identification occurred through the detailed ELC mapping that was conducted throughout the project area.

Candidate Specialized Wildlife Habitat	Criteria	Methods
	type within the planning area[3] • Condition of community[3] • Size and location of site[3] • Potential for long-term protection of the site[3] • Provision of significant wildlife habitat[3]	
Savannahs	• A savannah is a tallgrass prairie habitat that has tree cover between 25-60% • No minimum size to site • Any of the following Community Types: TPS1 (Dry-Fresh Tallgrass Mixed Savanna Ecosite), TPS2 (Fresh-Moist Tallgrass Deciduous Savanna Ecosite), TPW1 (Dry-Fresh Black Oak Tallgrass Deciduous Woodland Ecosite), TPW2 (Fresh-Moist Tallgrass Deciduous Woodland Ecosite), CUS2 (Bedrock Cultural Savannah Ecosite). • These communities must be restored or natural[1]. • Remnant sites such as railway right of ways are not considered SWH • Area of the ELC Ecosite is the SWH[1]. • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics)[1]. • In ecoregion 7E, known Tallgrass Prairie and savannah remnants are scattered between Lake Huron and Lake Erie, near Lake St. Clair, north of and along the Lake Erie shoreline, in Brantford and in the Toronto area (north of Lake Ontario). • Current representation of community type within the planning area[3] • Condition of community[3] • Size and location of site[3] • Potential for long-term protection of the site[3] • Provision of significant wildlife habitat[3]	• Habitat identification occurred through the detailed ELC mapping that was conducted throughout the project area.
Rare Forest Types	• Woodlands with >60% forest cover, containing regionally/locally or provincially rare tree species or tree associations. • Rare forest types are listed in Appendix J and Mof the SWHTG[2]. • Current representation of community type within the planning area[3] • Condition of community[3] • Size and location of site[3] • Potential for long-term protection of	• Habitat identification occurred through the detailed ELC mapping that was conducted throughout the project area.

Candidate Specialized Wildlife Habitat	Criteria	Methods
	the site[3] • Provision of significant wildlife habitat[3]	
Talus Slopes	• Talus slope is a rock rubble at the base of a cliff made up of coarse rocky debris. • Any of the following Community Types: TAO (Open Talus), TAS (Shrub Talus), TAT (Treed Talus)[1]. • Current representation of community type within the planning area[3] • Condition of community[3] • Size and location of site[3] • Potential for long-term protection of the site[3] • Provision of significant wildlife habitat[3]	• Habitat identification occurred through the detailed ELC mapping that was conducted throughout the project area.
Rock Barrens	• Open to moderately-treed sites (up to 60% crown coverage), characterized by exposed bedrock and very shallow soils (less than 15 cm). • Found on limestone plains adjacent to the Precambrian Shield[2]. • Current representation of community type within the planning area[3] • Condition of community[3] • Size and location of site[3] • Potential for long-term protection of the site[3] • Provision of significant wildlife habitat[3]	• Habitat identification occurred through the detailed ELC mapping that was conducted throughout the project area.
Sand Barrens	• Sand barrens typically are exposed sand, generally sparsely vegetated and cause by lack of moisture, periodic fires and erosion. • Any of the following Community Types: SBO1 (Open Sand Barren Ecosite), SBS1 (Shrub Sand Barren Ecosite), SBT1 (Treed Sand Barren Ecosite)[1]. • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics)[1]. • Vegetation cover varies from patchy and barren to continuous meadow (SBO1), thicket-like (SBS1), or more closed and treed (SBT1). Tree cover always $\leq$ 60%. • No minimum size for sand barren area • Current representation of community type within the planning area[3] • Condition of community[3] • Size and location of site[3]	• Habitat identification occurred through the detailed ELC mapping that was conducted throughout the project area.

Candidate Specialized Wildlife Habitat	Criteria	Methods
	• Potential for long-term protection of the site[3] • Provision of significant wildlife habitat[3]	
Old-growth or Mature Forest Stands	• No minimum size criteria t in any of the following Community Types: FOD (Deciduous Forest), FOM (Mixed Forest), FOC (Coniferous Forest)[1]. • If dominant trees species of the ecosite are >140 years old, then stand is SWH[1]. • The area of Forest Ecosites combined to make up the stand is the SWH[1]. • The stand will have experienced no recognizable forestry activities[1]. • Forests with a wide range of tree sizes, uneven canopy and canopy gaps, abundant fallen logs in varying states of decomposition, trees in older age classes (often 120-140yrs+)[2]. • Current representation of old growth or mature forest stands within the planning area[3] • Age of trees[3] • Age classes of trees in stand[3] • Presence of old growth characteristics[3] • Provision of SWH[3] • Potential for long-term protection of site[3] • Stand history[3] • Size and location of site[3] • Degree of disturbance[3]	• Habitat identification occurred through the detailed ELC mapping that was conducted throughout the project area. • Habitat size and extent of interior habitat were determined using GIS mapping.
Turtle Nesting Habitat	• Exposed mineral soil (sand or gravel) areas <100m from or within the following Community Types: Any of the following Community Types: Mineral or Organic Meadow Marsh (MAM), Shallow Marsh (MAS), Shallow Aquatic (SA), Open Bog (BOO), Open Fen (FEO)[1]. • Best nesting habitat for turtles are close to water and away from roads • For an area to function as a turtle nesting area it must provide sand and gravel that turtles are able to dig in and are located in open, sunny areas. • Nesting on the side of roads of municipal and provincial road embankments and shoulders are not SWH • A radius of 30-100m around the	• Habitat identification occurred through the detailed ELC mapping that was conducted throughout the project area.

Candidate Specialized Wildlife Habitat	Criteria	Methods
	nesting area has been considered the candidate SWH[1]. • Travel routes from wetland to nesting area are to be considered within the SWH[1]. • Size of habitat[3] • Location of site[3] • Substrate[3] • Level of predation[3] • Presence of movement corridor [3] • Degree of disturbance[3] • Degree of threat[3]	
Turtle-Over-wintering Habitat	• Over-wintering areas are permanent water bodies, large wetlands, and bogs or fens with adequate Dissolved Oxygen, and generally utilize the same habitat as their core habitat. • Water has to be deep enough not to freeze and have soft mud substrates • These habitats are found in the following Community Types: Swamp (SW), Marsh (MA), Open Water (OA), Shallow Water (SA), Open Fen (FEO), Open Bog (BOO)[1]. • The mapped ELC ecosite area with the over wintering turtles is the SWH. If the hibernation site is within a stream or river, the deep-water pool where the turtles are over wintering is the SWH[1].	• Habitat identification occurred through the detailed ELC mapping that was conducted throughout the project area.
Woodland Raptor Nesting Habitat	• Any of the following Community Types: Forest (FO), Treed Swamp (SW), Coniferous Plantation (TAGM1) that are >30ha with >4ha of interior habitat[1] (interior habitat having a 200m buffer of surrounding woodland and/or forest[3]). • Presence of 1 or more active nests from species list is considered significant[1]. • May also be found in SWC, SWM, SWD and CUP3	• Habitat identification occurred through the detailed ELC mapping that was conducted throughout the project area. • Habitat size, interior habitat, and edge buffer were all determined through GIS mapping. • During ELC mapping, the presence of stick nests within suitable habitats was also documented.
Osprey Nesting, Foraging, and Perching Habitat	• Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands or on structures over water • Any of the following Community Types: Forest (FO), or Swamp (SW) that are immediately adjacent to rivers, lakes, ponds, and wetlands. • Nests may be located in dead trees over water along forested shorelines, islands or structures. • Nests on man-made objects are not	• Habitat identification occurred through the detailed ELC mapping that was conducted throughout the project area. • During area searches of this habitat, NRSI biologists looked for large, suitable, trees, or the presence of stick nests within suitable treed habitats.

Candidate Specialized Wildlife Habitat	Criteria	Methods
	SWH[1]. • Access to foraging areas[3] • Presence of large, sturdy trees near shoreline[3] • Degree of disturbance[3] • Current representation of potential sites[3] • Degree of threat[3]	
Mink Denning Sites	• Shorelines with coniferous or mixed forest • Presence of suitable habitat[3] • Degree of disturbance[3] • Size of local fish population[3]	• Habitat identification occurred through the detailed ELC mapping that was conducted throughout the project area.
Amphibian Breeding Habitat (Woodland)	• Any of the following Community Types: Forests (FO), Treed Swamps (SW), in addition to wetlands/lakes/ponds found within or adjacent to (<120m) the woodland[1]. • The habitat is the woodland (ELC polygons) and wetland (ELC polygons) combined[1]. • Provision of significant wildlife habitat[3] • Degree of permanence[3]. (vernal pools must exist until mid July) • Size and number of ponds[3] • Diversity of submergent and emergent vegetation[3] • Presence of shrubs, logs at edge of pond[3] • Adjacent forest habitat[3] • Water quality[3] • Level of disturbance[3]	• Area searches for suitable habitat, conducted during ELC mapping. • Since ELC mapping was not conducted during a time period that can be related to the presence of vernal pooling, NRSI biologists assessed the potential for vernal pooling by examining topography, observed hydrology, vegetation species, and other habitat characteristics to assess the potential for seasonal pooling of water for amphibian breeding. • Proximity to other features was determined through GIS mapping.
Amphibian Breeding Habitat (Wetland)	• Any of the following Community Types: Swamp (SW), Marsh (MA), Fen (FE), Bog (BO), Open Water (OA), Shallow Aquatic (SA), including vernal pools, that are >500m2 or 25m in diameter, and located >120m from woodlands[1]. • Bullfrogs require permant water bodies with abundant emergent vegetation • The ELC ecosite wetland area and the shoreline are the SWH[1].	• Habitat identification occurred through the detailed ELC mapping that was conducted throughout the project area. • Habitat size and proximity to other habitats were determined through GIS mapping.
Seeps and Springs	• Locations where groundwater comes to surface, often in forested headwater areas. • Any forested area (with <25% meadow, field, or pasture) within the headwaters of a stream or river system may have seeps or springs[1]. • The area of an ELC forest ecosite containing the seeps/springs is the SWH[1].	• Habitat identification occurred through the detailed ELC mapping that was conducted throughout the project area.

Candidate Specialized Wildlife Habitat	Criteria	Methods
	• Presence of a site with 2 or more seeps/springs should be considered SWH[1]. • Abundance of seeps/springs[3] • Duration of surface water[3] • Nature of adjacent area[3] • Location of seeps/springs[3]	

[1]: OMNR Significant Wildlife Habitat Ecoregion 6E Criterion Schedule: Addendum to SWHTG (Working Draft) (2011b)
[2]: OMNR Significant Wildlife Habitat Technical Guide (2000)
[3]: OMNR Significant Wildlife Habitat Technical Guide Appendix Q (2000)

5.5.3 Habitats of Species of Conservation Concern

Habitats of species of conservation concern are those habitats that have been identified as important in maintaining long-term, viable populations of these species. The habitat characteristics for species of conservation concern have been summarized in Table 6 below. The presence of these habitat characteristics was investigated during project location surveys in order to determine whether habitat for species of conservation concern is present within 120m of the project location.

Table 6. Characteristics Used to Identify Candidate Habitat for Species of Conservation Concern

Candidate Habitat for Species of Conservation Concern	Criteria	Methods
Marsh Bird Breeding Habitat	• Nesting occurs in wetlands. For Green Heron, habitat is at the edge of water such as sluggish streams, ponds and marshes sheltered by shrubs and trees. Less frequently it may be found in upland shrubs or forest at a considerable distance from water. • All wetland habitats with shallow water and emergent aquatic vegetation. • May include any of the following Community Types: Meadow Marsh (MAM), Shallow Aquatic (SA), Open Bog (BOO), Open Fen (FEO), or for Green Heron: SW (Swamp), MA (Marsh) and Meadow (ME) Community Types[1]. • Condition of existing habitat at site[3]	• Habitat identification occurred through the detailed ELC mapping that was conducted throughout the project area. • During ELC mapping and area searches, NRSI biologists documented the presence of any potential nesting locations.

Candidate Habitat for Species of Conservation Concern	Criteria	Methods
	• Size and location of habitat[3] • Potential for long-term protection of the habitat[3] • Representation of species/habitat within the municipality[3]	
Woodland Area-sensitive Bird Breeding Habitat	• Habitats where interior forest (at least 200m from the forest edge) breeding birds are breeding. • These include any of the following Community Types: Forest (FO), Treed Swamp (SW) that are mature (>60 years old) and >30ha[1]. • Condition of existing habitat at site[3] • Size and location of habitat[3] • Potential for long-term protection of the habitat[3] • Representation of species/habitat within the municipality[3]	• Habitat identification occurred through the detailed ELC mapping that was conducted throughout the project area. • Woodland size and interior forest calculations were determined through GIS mapping.
Open Country Bird Breeding Habitat	• Grassland areas > 30ha, not Class 1 or Class 2 agricultural lands, with no row-cropping or intensive hay or livestock pasturing in the last 5 years, in the following Community Type: Meadow (ME)[1]. • Condition of existing habitat at site[3] (level of disturbance is an important consideration. For example, fields with intensive agriculture are not considered candidate habitat. Fields with light grazing are considered candidate habitat) • Size and location of habitat[3] • Potential for long-term protection of the habitat[3] • Representation of species/habitat within the municipality[3]	• Habitat identification occurred through the detailed ELC mapping that was conducted throughout the project area. • Habitat size was determined through GIS mapping, • Landowners were consulted where there were any questions regarding past land use of these fields.
Shrub/Early Successional Bird Breeding Habitat	• Oldfield areas succeeding to shrub and thicket habitats >10ha, not Class 1 or Class 2 agricultural lands, with no row-cropping or intensive hay or livestock pasturing in the last 5 years, in the following Community Types: Thickets (TH), Savannahs (SV)[1]. • Condition of existing habitat at site[3] • Size and location of habitat[3] • Potential for long-term protection of the habitat[3] • Representation of species/habitat within the municipality[3]	• Habitat identification occurred through the detailed ELC mapping that was conducted throughout the project area.
Terrestrial Crayfish	• Area of ELC Ecosite polygon is the SWH[1] • MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, MAS1, MAS2, MAS3[1]	• Area searches occurred within suitable habitats (MAM and MAS) to look for terrestrial crayfish and chimneys, • These surveys were conducted during

Candidate Habitat for Species of Conservation Concern	Criteria	Methods
	• Meadow and edges of shallow marshes (no minimum size) identified should be surveyed for terrestrial crayfish[1] • Species whose range is solely or primarily found in Ontario (i.e., provincial responsibility)[3] • Condition of existing habitat at site[3] • Size and location of habitat[3] • Potential for long-term protection of the habitat[3] • Representation of species/habitat within the municipality[3] • Evidence of use of the habitat[3] • Species of particular interest to the planning authority (e.g., the CAC may recommend certain species such as indicator species)[3]	ELC mapping.
S1-S3, Special Concern and SH Species and Communities	• All Species Concern or provincial rare plant and animal species element occurrences within a 1 or 10km grid[1]. • Condition of existing habitat at site[3] • Size and location of habitat[3] • Potential for long-term protection of the habitat[3] • Representation of species/habitat within the municipality[3]	• Area searches to determine candidate habitat for any identified species or communities, conducted during ELC mapping.
Birds		
Red-headed Woodpecker	• Open woodland and woodland edges, especially in oak savannahs and riparian forest • Can be found in fields or pastures, orchards and small woodlots (OMNR 2000) • Habitats contain a higher density of dead trees, which they commonly use for nesting and perching (OMNR 2008a) • Require a tree with a diameter at breast height of at least 40 cm for tree cavity nesting and require around 4 ha for territory (OMNR 2000)	• Area searches within suitable habitat (FO/WO/ME/SW/AG) for large (>40cm dbh) cavity trees were conducted in conjunction with ELC mapping, with snag size class analysis documented on ELC data sheets, • Based on the generalist nature of this species, specific breeding habitat for this species is often difficult to identify, as such, any incidental observations while conducting ELC mapping were also used to narrow down potential breeding locations.
Golden-winged Warbler	• Early successional habitat such as shrubby grassy abandoned fields, small deciduous trees bordered by low woodland or swamp (OMNR 2000) • Also may be found in field edges, hydro or utility right of ways or recently logged areas • Require more than 10 ha of continuous habitat (OMNR 2000)	• ELC mapping to determine if candidate habitat is present. • Area searches within suitable habitat (FO/WO/ME/TH) for golden-winged warbler were conducted in conjunction with ELC mapping • Habitat for this species is covered under the consideration of Shrub/Early Successional Bird Breeding Habitat.

Candidate Habitat for Species of Conservation Concern	Criteria	Methods
Short-eared Owl	• Habitat is grasslands, open areas, meadows that are grassy or bushy, marshes, bogs or tundra • Both diurnal and nocturnal habits • Ground nester • Home range 25 to125 ha • Requires 75 to100 ha of contiguous open habitat (OMNR 2000)	• ELC mapping to determine if candidate habitat is present. • Habitat for this species is covered under the consideration of Raptor Wintering Areas.
Long-tailed duck	• This species requires subarctic and arctic wetlands, coastal marine waters and large freshwater lakes	• ELC mapping to determine if candidate habitat is present, • This species breeds in the Arctic, not considered in this project area for nesting.
Louisiana Waterthrush	• Steep, forested ravines with fast-flowing streams, woodland swamps or large tracts of deciduous or mixed forests. • Canopy cover is essential • Strong affinity to nest sites; nests on ground (OMNR 2000)	• ELC mapping to determine if candidate habitat is present • Area searches within suitable habitat for Lousiana Waterthrush were conducted in conjunction with ELC mapping
Herpetofauna		
Common Snapping Turtle	• Permanent or semi-permanent fresh water marshes, swamps, bogs or rivers and streams with soft muddy bottoms • Soft soil or clean, dry sand are used for nesting. May use man-made structures such as gravel road shoulders (OMNR 2009) • Home range of around 28 ha is required (OMNR 2000)	• Habitat for this species has been determined through the consideration of Turtle Nesting and Over-wintering Habitat
Eastern Milksnake	• Farmlands, meadows, hardwood or aspen stands, pine forests with brushy or woody cover • May also be found in river bottoms or bog woods • Often hides under logs, stones, boards or in outbuildings • This species will often use communal sites (OMNR 2000)	• Habitat for this species has been determined through the consideration of Snake Hibernacula.
Eastern Ribbonsnake	• Sunny grassy areas with low dense vegetation near bodies of shallow permanent quiet water • Also found in wet meadows, grassy marshes or sphagnum bogs or borders of ponds, lakes or streams • Hibernates in groups (OMNR 2000)	• Habitat for this species has been determined through the consideration of Snake Hibernacula.
Vegetation		
Narrow-leaved Wild Leek	• Rich woods (OMNR 2000) • Is differentiated from a similar species: *Allium tricoccum*, by the bloom time; narrow-leaved wild leek flowers mid to	• Area searches for suitable narrow-leaved wild leek habitat (FO/WO) were conducted in conjunction with ELC mapping

Candidate Habitat for Species of Conservation Concern	Criteria	Methods
	late June, while *Allium tricoccum* flowers in late June through to early August (Michigan Flora Online 2011)	• Searches for evidence of narrow-leaved wild leek occurred throughout each polygon while conducting vegetation inventories (late June through November) • Distinguished post-flowering from all other *Allium* species by leaves that disappear by flowering time. Leaves are distinctly narrower, silvery-green and pale-based (Michigan Flora Online 2011)
Puttyroot	• Moist deciduous forest (OMNR 2000) • Blooms late May to Mid-June (Natural Heritage and Endangered Species Program; Massachusetts Division of Fisheries and Wildlife)	• Area searches for suitable puttyroot habitat (FODM) were conducted in conjunction with ELC mapping • Searches for evidence of puttyroot occurred throughout each polygon while conducting vegetation inventories (late June through November) • Distinguished post-flowering from other species by the two connecting bulbs of this erect 1-2" tall forb. The leaves are gray-green with whitish veins and overall withered appearance (University of Wisconsin n.d.)
Green Dragon	• Wet bottomlands along rivers and creeks (OMNR 2000) • Blooms May-June (University of Wisconsin n.d.)	• Area searches for suitable green dragon habitat (FO/WO/SW) were conducted in conjunction with ELC mapping • Searches for evidence of green dragon occurred throughout each polygon while conducting vegetation inventories (late June through November) • Distinguished post-flowering from all other species by distinctively long stalked leaf divided into 7-13 leaflets (University of Wisconsin n.d.)
Cooper"s Milk Vetch	• Open woods (OMNR 2000) • Limestone plains (OMNR 2000) • Blooming occurs throughout June, while fruiting occurs throughout July (Wisconsin Department of Natural Resources 2011)	• Area searches for suitable Cooper"s milk vetch habitat (WO/FO) were conducted in conjunction with ELC mapping • Searches for evidence of Cooper"s milk vetch occurred throughout each polygon while conducting vegetation inventories (late June through November) • Distinguished post-flowering from all other species by pinnately divided leaves into 11-23 leaflets with hairs beneath (Wisconsin Department of Natural Resources 2011)

Candidate Habitat for Species of Conservation Concern	Criteria	Methods
Carey"s Sedge	• Mesic to dry-mesic hardwood forests and floodplain woods (OMNR 2000) • Blooming occurs throughout June, while fruiting occurs throughout July (Wisconsin Department of Natural Resources 2011)	• Area searches for suitable carey"s sedge habitat (moist FO/WO) were conducted in conjunction with ELC mapping • Searches for evidence of carey"s sedge occurred throughout each polygon while conducting vegetation inventories (late June through November) • Very difficult to distinguish from other sedge species post-flowering.
Hairy-fruited Sedge	• Riverbanks (OMNR 2000) • Blooming occurs June to August (Wisconsin Department of Natural Resources 2011)	• Area searches for suitable hairy-fruited sedge habitat (ME/TH/WO/FO/AG/WE) were conducted in conjunction with ELC mapping • Searches for evidence of hairy-fruited sedge occurred throughout each polygon while conducting vegetation inventories (late June through November)
Chinese Hemlock Parsley	• Calcareous cedar swamps, wet borders of streams and rivers, seepage slopes in wet coniferous woods, swampy thickets, moist clearings and damp roadsides (OMNR 2000) • in northern Ontario in *Salix alnus* thickets, moist *Populus* stands and moist sandy shorelines (OMNR 2000) • Blooms August-September (University of Wisconsin n.d.)	• Area searches for suitable Chinese hemlock parsley habitat (FOC/WOC/SW) were conducted in conjunction with ELC mapping • Searches for evidence of Chinese hemlock parsley occurred throughout each polygon while conducting vegetation inventories (late June through November)
Tall Tickweed	• Damp prairies, thickets and open woods (OMNR 2000) • Blooms July-September (University of Wisconsin n.d.)	• Area searches for suitable tall tickweed habitat (TH/WO) were conducted in conjunction with ELC mapping • Searches for evidence of tall tickweed occurred throughout each polygon while conducting vegetation inventories (late June through November)
Ovate Beak Grass	• Riparian woodlands (OMNR 2000) • Flowers from June-October (Grasses of Iowa n.d.)	• Area searches for suitable ovate beak grass habitat (WO/FO) were conducted in conjunction with ELC mapping • Searches for evidence of ovate beak grass occurred throughout each polygon while conducting vegetation inventories (late June through November)
Harbinger of Spring	• Rich, moist deciduous woods, open, wooded river floodplains and bottomlands (OMNR 2000) • Also stream banks and limestone	• Area searches for suitable harbinger of spring habitat (WO/FO/SW) were conducted in conjunction with ELC mapping

Candidate Habitat for Species of Conservation Concern	Criteria	Methods
	shingle shores (OMNR 2000) • Blooms from March to May (University of Wisconsin n.d.)	• Searches for evidence of harbinger of spring occurred throughout each polygon while conducting vegetation inventories (late June through November) • Distinguished post-flowering from all other species by the purplish stem with a green base and a round root tuber as well as the repeatedly three parted leaf that is widely oval in outline (University of Wisconsin n.d.)
Burning Bush	• Dry to moist thickets and woods (OMNR 2000) • Blooms in June (Missouri Botanical Garden n.d.)	• Area searches for suitable burning bush habitat (TH/WO/FO) were conducted in conjunction with ELC mapping • Searches for evidence of burning bush occurred throughout each polygon while conducting vegetation inventories (late June through November) • Distinguished from other *Euonymus* spp. post –flowering by the finely pubescent leaf blades over the entire surface (Michigan Flora 2012)
Pumpkin Ash	• Swamps (Gleason and Cronquist 1991) • Moist woods (OMNR 2000) • Blooms April to May (Missouri Botanical Garden n.d.)	• Area searches for suitable pumpkin ash habitat (SW) were conducted in conjunction with ELC mapping • Searches for evidence of pumpkin ash occurred throughout each polygon while conducting vegetation inventories (late June through November) • Distinguished by leaf and leaflet shape. The leaves of pumpkin ash are much larger, with the leaflets more clearly petioled (the leaflet bases generally rounded rather than tapered to an indistinct petiole) and the leaflets are entire, while in green ash they are often toothed (Michigan Flora Online 2011)
Stiff Gentian	• Moist soil, roadsides, stream banks, edges of woods and prairie habitats (OMNR 2000) • Blooms August to October (University of Wisconsin n.d.)	• Area searches for suitable stiff gentian habitat (WO/FO) were conducted in conjunction with ELC mapping • Searches for evidence of stiff gentian occurred throughout each polygon while conducting vegetation inventories (late June through November)
Shrubby St. John"s-wort	• Old fields, meadows, prairies, and open forested habitats (OMNR 2000) • Blooms July to September	• Area searches for suitable St. John"s-wort habitat (WO/FO/ME) were conducted in conjunction with ELC mapping

Candidate Habitat for Species of Conservation Concern	Criteria	Methods
		• Searches for evidence of St. John"s-wort occurred throughout each polygon while conducting vegetation inventories (late June through November)
Yellow Stargrass	• Dry open sandy woods and wet to dry meadows and prairies (OMNR 2000) • Blooms April-July (University of Wisconsin n.d.)	• Area searches for suitable yellow stargrass habitat (WO/FO/ME) were conducted in conjunction with ELC mapping • Searches for evidence of yellow stargrass occurred throughout each polygon while conducting vegetation inventories (late June through November) • Very difficult to distinguish from other grass species post-flowering.
Tall Blazing Star	• Open, sandy woods, dry roadsides and sandy prairies (OMNR 2000) • Blooms August-October (University of Wisconsin n.d.)	• Area searches for suitable tall blazing star habitat (WO/FO) were conducted in conjunction with ELC mapping • Searches for evidence of tall blazing star occurred throughout each polygon while conducting vegetation inventories (late June through November)
American Gromwell	• Dry woods, thickets and fields (Gleason and Cronquist 1991) • Also found in river floodplains and open areas near edges of woods (OMNR 2000) • Blooms May-June (University of Wisconsin n.d.)	• Area searches for suitable American gromwell habitat (WO/FO/TH/AG/ME) were conducted in conjunction with ELC mapping • Searches for evidence of American gromwell occurred throughout each polygon while conducting vegetation inventories (late June through November) • Distinguished post-flowering from all other species by oval to oblong leaves with 2-3 prominent veins on each side. The fruit is nutlet white, shiny and egg shaped (University of Wisconsin n.d.)
Winged Loosestrife	• Wet meadows, moist prairies, open woods and wet disturbed areas (OMNR 2000) • Blooms July-September (University of Wisconsin n.d.)	• Area searches for suitable winged loosestrife habitat (ME/WO/FO) were conducted in conjunction with ELC mapping • Searches for evidence of winged loosestrife occurred throughout each polygon while conducting vegetation inventories (late June through November)
Moss Phlox	• Dry sandy and rocky woods, sandy roadsides, and lakeshores (OMNR 2000) • Blooms in May (University of Wisconsin n.d.)	• Area searches for suitable moss phlox habitat (FO/CVI/SH) were conducted in conjunction with ELC mapping • Searches for evidence of moss phlox occurred throughout each polygon while conducting vegetation

Candidate Habitat for Species of Conservation Concern	Criteria	Methods
		inventories (late June through November) • Distinguished post-flowering from all other species by many branches and the crowded, mostly opposite leaves that are less than ½" in length and are sharply pointed (University of Wisconsin n.d.)
Slim-flowered Muhly	• Rich, deciduous forests, often on rocky or sandy soil (OMNR 2000) • Blooms in the fall (Utah State University Herbarium)	• Area searches for suitable slim-flowered muhly habitat (WO/FO) were conducted in conjunction with ELC mapping Searches for evidence of slim-flowered muhly occurred throughout each polygon while conducting vegetation inventories (late June through November)
Slender Mountain-mint	• Upland woods and prairies (Gleason and Cronquist 1991) • Dry, open areas (OMNR 2000) • Blooms July-September (University of Wisconsin n.d.)	• Area searches for suitable slender mountain-mint habitat (WO/FO) were conducted in conjunction with ELC mapping • Searches for evidence of slender mountain-mint occurred throughout each polygon while conducting vegetation inventories (late June through November) • Distinguished post-flowering from other mint spp. by the small toothless, needle-like leaves (University of Wisconsin n.d.).
Woodland Bulrush	• Near seeps and stream edges (OMNR 2000)	• Area searches for suitable woodland bulrush habitat (ME/TH/WO/FO/AG/WE) were conducted in conjunction with ELC mapping • Searches for evidence of woodland bulrush occurred throughout each polygon while conducting vegetation inventories (late June through November) • Very difficult to distinguish from other grass species post-flowering.
Riddell's Goldenrod	• Wet, marshy ground, old fields and prairies (OMNR 2000) • Blooms August-October (University of Wisconsin n.d.)	• Area searches for suitable Riddell's goldenrod habitat (OAG/ME/MA) were conducted in conjunction with ELC mapping • Searches for evidence of riddell's goldenrod occurred throughout each polygon while conducting vegetation inventories (late June through November)
Perfoliate Tinkersweed	• Rich deciduous woods (OMNR 2000) • Blooms May to June	• Area searches for suitable perfoliate tinkersweed habitat (WO/FO) were

Candidate Habitat for Species of Conservation Concern	Criteria	Methods
		conducted in conjunction with ELC mapping • Searches for evidence of perfoliate tinkersweed occurred throughout each polygon while conducting vegetation inventories (late June through November) • Distinguished post-flowering from similar species by the large leaves connected at the base as well as an abundance of short, dense hairs on the stem.
Giant Ironweed	• Mesic prairies, thickets, moist woods, roadsides and grassy meadows (OMNR 2000) • Blooms August-September (Missouri Botanical Garden n.d.)	• Area searches for suitable giant ironweed habitat (WO/FO/ME) were conducted in conjunction with ELC mapping • Searches for evidence of giant ironweed occurred throughout each polygon while conducting vegetation inventories (late June through November)
Striped Cream Violet	• Rich, floodplain forests and low, wet woods (OMNR 2000) • Blooms April-June (University of Wisconsin n.d.)	• Area searches for suitable striped cream violet habitat (WO/FO/SW) were conducted in conjunction with ELC mapping • Searches for evidence of striped cream violet occurred throughout each polygon while conducting vegetation inventories (late June through November) • Distinguished post-flowering from other violet spp. by the finely toothed and pleated leaves (University of Wisconsin n.d)
Mammals		
Woodland Vole	• Mid-age to mature deciduous forest in the Carolinian forest zone with loose sandy soil and deep humus (OMNR 2000) • Also grasslands, meadows and orchards with groundcover of duff or grass (OMNR 2000)	• Area searches for suitable woodland vole habitat (FOD/ME) were conducted in conjunction with ELC mapping • Searches for evidence of woodland voles occurred throughout each polygon while conducting vegetation inventories.
Odonates		
Blue-ringed Dancer	• Large rivers, creeks and streams that are often well vegetated and can also be found around lakes and ditches (Lam 2004)	• Area searches for suitable blue-ringed dancer habitat (were conducted in conjunction with ELC mapping and aquatic habitat assessments • Searches for evidence of blue-ringed dancer occurred throughout each polygon while conducting vegetation inventories and aquatic assessments

Candidate Habitat for Species of Conservation Concern	Criteria	Methods
Tawny Emperor	• Open woodlands and roadsides where hackberry occurs	• Area searches for suitable tawny emperor habitat (WO/FO/CVI) were conducted in conjunction with ELC mapping and aquatic habitat assessments • Searches for evidence of tawny emperor occurred throughout each polygon while conducting vegetation inventories and aquatic assessments
Double-striped Bluet	• Lakes and ponds and is often found in temporary habitats with little vegetation (Lam 2004) • They can also be occasionally found in slow streams (Lam 2004)	• Area searches for suitable double-striped bluet habitat (AQ)were conducted in conjunction with ELC mapping and aquatic habitat assessments • Searches for evidence of double-striped bluet occurred throughout each polygon while conducting vegetation inventories and aquatic assessments
Pronghorn Clubtail	• Ponds, lakes and slow streams (Lam 2004)	• Area searches for suitable pronghorn clubtail habitat (AQ) were conducted in conjunction with ELC mapping and aquatic habitat assessments • Searches for evidence of pronghorn clubtail occurred throughout each polygon while conducting vegetation inventories and aquatic assessments

[1]: OMNR Significant Wildlife Habitat Ecoregion 6E Criterion Schedule: Addendum to SWHTG (Working Draft) (2011b)
[2]: OMNR Significant Wildlife Habitat Technical Guide (2000)
[3]: OMNR Significant Wildlife Habitat Technical Guide Appendix Q (2000)

5.5.4 Animal Movement Corridors

Animal movement corridors are defined by the Ontario Ministry of Natural Resources (2000) as, “elongated, naturally vegetated parts of the landscape used by animals to move from one habitat to another”. Animal movement corridors are represented by a diversity of landscape features such as stream and river valleys, woodlands, fencerows, as well as abandoned road and rail allowances (OMNR 2000). Aerial photography and site-specific field investigations were used to identify animal movement corridor features within 120m of the Adelaide Wind Energy Centre. More specifically, the presence of amphibian movement corridor features was examined. These habitat characteristics are outlined in Table 7. In the event that significant amphibian breeding habitat is present

within 120m of the project location, further investigation of the presence of amphibian movement corridors will be completed.

Table 7. General Characteristics Used to Identify Animal Movement Corridors

Wildlife Habitat Type	Criteria	Methods
Amphibian Movement Corridors	• Movement corridors must be considered when Amphibian Breeding Habitat is confirmed as SWH. • Movement corridors are between breeding habitat and summer habitat • Corridors may be found in all ecosites associates with water[1]. • Corridors should be at least 200m wide with gaps <20m and if following riparian area with at least 15m of vegetation on both sides of waterway[1]. • Importance of areas to be linked by corridor[3] • Importance of corridor to survival of target species[3] • Dimensions[3] • Continuity[3] • Habitat and structure[3] • Risk of mortality[3] • Protection[3] • Other related values[3]	• Significant amphibian breeding habitat to be examined for amphibian movement corridors • The width and presence of gaps along potential corridors were determined using GIS mapping.

[3]:OMNR Significant Wildlife Habitat Technical Guide Appendix Q (2000)