Samsung Renewable Energy Inc. and

Pattern Renewable Holdings Canada ULC

11 Summaries of Technical REA Reports for Aboriginal Communities

For

Armow Wind Project

Summary of Report Revisions

Section of Report	Report Date: August, 2012	Report Date: REA Submission November, 2012
Table 2	Project Lifespan (approval to decommissioning)	Revised: Project Lifespan (commercial operation)
General Update	A total of 99 turbines will be permitted to provide contingency positions.	Revised: A total of 98 turbines will be permitted to provide contingency positions.
Section 8.4 (Summary of Natural Heritage Reports)	45 wetlands were identified within 120 m of the Project Location, each of which requires an Evaluation of Significance in order to determine whether they need to be carried forward to the EIS.	Revised: 41 wetlands were identified within 120 m of the Project Location, each of which requires an Evaluation of Significance in order to determine whether they need to be carried forward to the EIS.
Section 8.4 (Summary of Natural Heritage Reports)	Mitigation measures include careful construction planning and best management practices, which will protect wetland plants and animals, and connections between surface water and groundwater.	Revised: Detailed mitigation measures have been identified in the EIS and include careful construction planning and best management practices, which will protect wetland plants and animals, and connections between surface water and groundwater.
Section 8.5 (Summary of Natural Heritage Reports)		Added: There are 173 candidate significant wildlife habitats confirmed within 120 m of the proposed development activities of the Project Location. After comparing site specific conditions to provincially established significance criteria, 118 significant wildlife habitats were identified within 120 m of the Project Location. These wildlife

Section of Report	Report Date: August, 2012	Report Date: REA Submission November, 2012
		habitats have either been confirmed or treated as significant.
Section 8.5 (Summary of Natural Heritage Reports)	All habitats currently identified as significant will require pre-construction surveys to confirm the significance prior to the development of this facility.	Revised: All habitats currently treated as significant will require pre-construction surveys to confirm their significance prior to the development of this facility.
Section 8.5 (Summary of Natural Heritage Reports)	■ Vegetation buffer	Revised: ■ Restoring temporary disturbance areas
Section 8.6 (Summary of Natural Heritage Reports)		Added: Detailed mitigation measures have been identified in the EIS and include careful construction planning and best management practices, such as sediment and erosion controls and spill response plans. Deleted: And therefore mitigation measures are unnecessary
Section 8.7 (Summary of Natural Heritage Reports)	There are 95 woodlands confirmed within 120 m of the proposed development activities of the Project Location. The size of these woodlands range in size from less than 0.12 hectares to 5093 ha.	Revised: There are 99 woodlands confirmed within 120 m of the proposed development activities of the Project Location. The size of these woodlands range in size from 2 ha to 5093 ha.
Section 8.7 (Summary of Natural Heritage Reports)	After comparing site specific conditions to provincially established significance criteria, 53 significant woodlands were identified within 120 m of the Project Location. These will be carried forward into the EIS where appropriate	After comparing site specific conditions to provincially established significance criteria, 59 significant woodlands were identified within 120 m of the Project Location. Detailed mitigation measures have been identified in the EIS and

Section of Report	Report Date: August, 2012	Report Date: REA Submission November, 2012
	mitigation measures will also be developed.	include careful construction planning and best management practices, such as sediment and erosion controls and spill response plans.
Section 9.3 (Summary of Noise Impact Assessment)	There are a total of 324 PoRs located within a radius of 1,500 m of a wind turbine or the substation, among which 116 are VLRs and 208 are dwellings or other sensitive receptors such as churches and cemeteries. There are 36 dwellings and one VLR considered as Participating Receptors. All PoRs are compliant with MOE Noise Guidelines.	Revised: There are a total of 397 PoRs located within a radius 1,500 m of a wind turbine or the substation, among which 147 are VLRs and 250 are dwellings or other sensitive receptors such as churches, cemeteries and schools. There are 36 dwellings and two VLRs considered as Participating Receptors. All receptors within 2000 m of Project infrastructure are compliant with MOE Noise Guidelines.

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November 2012

SP ARMOW ONTARIO LP - ARMOW WIND PROJECT

Summaries of Technical REA Reports for Aboriginal Communities

Director, Ministry of Environment
2 St. Clair West, Floor 12A
Toronto, Ontario
M4V 1L5

REPORT

Report Number: 11-1151-0247 DOC0118 Rev1

Distribution:

Ministry of Environment - 3 Copies
Samsung Renewable Energy Inc. - 1 Copy
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Golder Associated Ltd. - 1 Copy

Golder Associates

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Figure 2: Project Location

Figure 2
Project Location

1.0 GENERAL INFORMATION

The Armow Wind Project (the "Project") is an up to 180 megawatt (MW) commercial wind energy generation facility located primarily on leased privately owned lands in the Municipality of Kincardine, Bruce County, Ontario (see Figure 1). The Project is being developed by SP Armow Wind Ontario LP (the Proponent) by its general partner SP Armow Wind Ontario GP Inc. The Proponent is a joint venture limited partnership owned by affiliates of Pattern Renewable Holdings Canada ULC ("Pattern") and Samsung Renewable Energy Inc. ("Samsung"). The Proponent is proposing to develop, construct, and operate the Project in response to the Government of Ontario's plan to integrate more renewable energy into the province's power grid.

In 2009, the Government of Ontario introduced the *Green Energy and Green Economy Act* and Ontario Regulation (O. Reg.) 359/09. The regulatory amendments to O.Reg 359/09 came into force on July 1, 2012 as O. Reg 195/12[1]. The Renewable Energy Approval ("REA") integrates previous requirements under the *Environmental Assessment Act* with clear provincial rules and standards in a new regulation under the *Environmental Protection Act*. This Aboriginal Summaries Report has been prepared to provide details of the Project as part of the REA.

Table 1, below, highlights the requirements and how they are addressed in this Aboriginal Summary Report.

Table 1: Aboriginal Summary Requirements under O. Reg. 359/09, as amended

O. Reg. 359/09 Requirement, as amended	Report Section
A summary of each document submitted as part of the application, other than the consultation report	Sections 2 to 10

This Aboriginal Summary Report will be provided to Aboriginal communities following the distribution requirements and timing constraints outlined in O. Reg. 359/09, as amended, and the Draft Technical Guide to Renewable Energy Approvals (MOE, 2012).

This summary provides information about the reports and studies that have been completed for this Project. The following reports are summarized:

- The Project Description Report;
- The Design and Operations Report;
- The Construction Plan Report;
- The Decommissioning Plan Report;
- The Archaeological Assessment Report;
- The Cultural Heritage Report;
- The Natural Heritage Reports;
- The Noise Impact Assessment Report; and,

[1] All references to Ontario Regulation 359/09 refer to the Regulation as amended Regulation 195/12 which came into force July 1, 2012

- The Wind Turbine Specifications Report.

In addition to these report summaries, a copy of all the reports, in their entirety, will be provided to Aboriginal Communities at least 60 days prior to the final public meeting.

1.1 The Project Location

The proposed Project is situated in Bruce County, 3 km from Lake Huron, approximately 2 km northeast of Kincardine, Ontario (see Figure 2).

The Project location, is defined in O. Reg. 359/09, as amended, (in relation to a renewable energy project) to mean “a part of land and all or part of any building or structure in, on or over which a person is engaging in or proposes to engage in the project and any air space in which a person is engaging in or proposed to engage in the project”. The Project location is bounded by Highway 21 to the west, Concession 4 to the north, County Road 1 to the east and the North Line to the south. The area encompassed by these boundaries is referred to in this document as the “Project Study Area”.

The proposed Project Study Area, covering approximately 18,800 hectares of land in the Municipality of Kincardine, Ontario, is primarily comprised of agricultural lands with fragmented blocks of forest and riparian areas associated with small creeks and farm drains (see Figure 2). The Project will be located primarily within portions of privately owned land parcels with collection cables being placed in public road allowances. Portions of privately owned land parcels that contain Project infrastructure will be under lease or easement to the Proponent for the duration of the Project.

The location of the Project was established based on interest expressed by local landowners, its proximity to high-voltage transmission lines, and its excellent wind resource.

1.2 Project Vital Statistics

Table 2: Summary of Project Vital Statistics

General	
Project Name	Armow Wind Project
Project Ownership and Operation	SP Armow Wind Ontario LP
Project Lifespan (commercial operation)	20 years
Project Nameplate Capacity	Up to 180 MW
Project Area (as shown in Figure 2)	
Location of Project	Privately-owned land and Public Road Allowances, Municipality of Kincardine, County of Bruce
Total Project Study Area	18,800 ha
Total Area of Project Location (total disturbance area)	472.9 ha
Wind Turbine Generators	
Model	Siemens SWT-2.3-101
Total Number Permitted	98
Approximate Number Constructed	90
Nominal Power	1.8 to 2.3 MW
Number of Blades	3
Blade Length	49 m
Hub Height	99.5 m
Rotor Diameter	101 m
Cut-in Wind Speed	3 m/s
Cut-out Wind Speed	25 m/s
Rated Wind Speed	12 – 13 m/s
Swept Area	8,000 m^2
Foundation Dimensions	20 m in diameter
Access Roads	
Operation Roads (include shoulder, travel, width and ditch)	58 km x 4-8 m
Construction Roads (with shoulder)	58 km x 7-15 m
Temporary Roads / Crane Walks	3 km x 7-15 m
Collector Lines	
34.5 kV Collector Lines in public ROW (total combined length of proposed underground and/or overhead)	132 km x 2-6 m
34.5 kV Collector Lines on private lands (underground)	60 km x 2-6 m
Project Structures and Facilities	
Collector Substation	200 m x 150 m
Operations and Maintenance Building	50 m x 30 m
Point of Interconnect	1 acre

General	
Temporary Land Use (Construction and Installation)	
Construction Staging Areas	10 acres
Wind Turbine Laydown Area (each turbine)	5000 m^2
Crane Pads	40 m x 20 m

1.3 Contact Information

Applicant

The proponent for the Project is SP Armow Wind Ontario LP, by its general partner SP Armow Wind Ontario GP Inc. The Proponent is a joint venture limited partnership owned by affiliates of Pattern Renewable Holdings Canada ULC and Samsung Renewable Energy Inc. The contacts for the Project are as follows:

Brian Edwards
Manager, Project Development
Samsung Renewable Energy Inc.
55 Standish Court, 9th Floor
Mississauga, ON, L5R 4B2
Phone: (519) 396-9433
Email: info@armowwind.com

Jody Law
Project Developer
Pattern Energy
100 Simcoe Street, Suite 105
Toronto, ON, M5H 3G2
Phone: (519) 396-9433
Fax: (416) 979-8428
Email: info@armowwind.com

Consultant

The Proponent has retained Golder Associates Ltd. (Golder) to prepare an REA Application under O. Reg. 359/09, as amended. Contact information for the Golder Project Manager is as follows:

Ian Callum, Project Manager
Golder Associates Ltd.
2390 Argentia Road
Mississauga, ON, L5N 5Z7
Phone: (905) 567-4444
Fax: (905) 567-6561
E-mail: Ian_Callum@golder.com

Project

Project email: info@armowwind.com
Project website: www.armowwind.com

ABORIGINAL REPORT SUMMARIES

Project Description Report Summary

2.0 PROJECT DESCRIPTION REPORT SUMMARY

This section provides a summary of the Project Description Report. This summary describes the Project Location, Project phases and potential impacts to the environment.

2.1 Proponent Information

SP ARMOW WIND ONTARIO GP INC

The Project is being developed by SP Armow Wind Ontario LP (the Proponent) by its general partner SP Armow Wind Ontario GP Inc. The Proponent is a joint venture limited partnership owned by affiliates of Pattern Renewable Holdings Canada ULC ("Pattern") and Samsung Renewable Energy Inc. ("Samsung").

SAMSUNG RENEWABLE ENERGY INC.

Samsung has partnered with some of the world's leading renewable energy companies to produce state-of-the-art clean energy components in four new manufacturing facilities in Ontario. Samsung, founded in 1938, will be developing, building and operating 2,500 MW of renewable energy, in the form of wind and solar for Ontario.

Pattern is one of North America's leading independent wind and transmission companies with projects in operation and under construction totalling over 775 MW. In addition Pattern is developing over 4,000 MW of wind power and transmission projects in North America and Latin America.

Pattern

2.2 Project Description

The Project is a Class 4 wind facility which will generate electricity through approximately 90 Siemens SWT-2.3-101 wind turbines rated between 1.8 MW and 2.3 MW. The Proponent is seeking permits for a total of 98 turbines to provide contingency positions. The capacity of the entire Project, or the most electricity that the wind turbines will produce, is 180 MW. This is enough energy to power nearly 50,000 homes.

The Project was formerly known as the Armow Wind Power Project, an 80 MW wind facility under development by Acciona Renewable Energy Canada Holdings Inc. In August, 2011, Acciona sold all of its interests to the Proponent, who is proposing to expand the Acciona Project within the same Project Study Area.

2.3 Project Location

The Project Study Area covers approximately 18,800 hectares (ha) of privately-owned agricultural lands in the Municipality of Kincardine within Bruce County. Collection cables will be placed in public road allowances. The Project Study Area contains some forest and aquatic areas such as small creeks and farm drains. The location

of the Project was established based on interest expressed by local landowners, its proximity to high-voltage transmission lines, and its excellent wind resource.

2.3.1 Project Phase Timing and Scheduling

Table 3 provides an overview of the projected timing and scheduling for the Project.

Table 3: Projected Project Timing and Scheduling

Project Task	Projected Date
Distribute Notice of Proposal	November 2011
Environmental Studies and Reporting	September 2011 to March 2012
Open House #1	December 2011
Draft Project Reports and Summaries to Aboriginal Communities	August 2012
Draft Project Reports to Municipality of Kincardine	August 2012
Draft Project Reports to Public	September 2012
Open House #2	November 2012
Submit REA Application	November 2012
Site Preparation and Construction	Summer 2013
Operations and Maintenance Phase	January 2014 – 2034
Decommissioning or Repowering Phase	2034

2.4 Project Components

The major components of the Project include:

- Wind turbine generators;
- Access roads;
- Collector lines;
- Collector substation;
- Meteorological towers; and,
- An operations building.

To facilitate the construction of the proposed Project, a number of temporary construction components are required. These temporary components include:

- Crane pads;
- Wind turbine laydown areas; and,
- Potential construction staging areas.

2.5 Project Phases

2.5.1 Pre-Construction

The pre-construction phase includes optioning lands, design and engineering, site surveys of the finalized turbine locations, purchasing Project equipment and obtaining government permits.

2.5.2 Site Preparation and Construction

The following key activities are associated with the site preparation and construction of the proposed Project:

- Delineation of temporary work areas;
- Upgrading of existing access roads and the construction of new access roads;
- Site grading as necessary;
- Preparation and establishment of construction staging areas;
- Preparation of the collector substation laydown area;
- Delivery of construction vehicles and equipment;
- Installation of wind turbine foundations;
- Installation of crane pads and turbine laydown areas;
- Erection of wind turbines;
- Installation of pad-mounted transformers;
- Installation of collector lines on private lands;
- Installation of collector lines in municipal road allowances;
- Construction of collector substation and grid connection;
- Construction of operations and maintenance building; and,
- Reclamation of turbine laydown areas, construction staging area, and collector substation laydown area.

2.5.3 Operations

Operation of the facility is expected to begin in 2014. During the operation of the proposed Project, on-site activities will be limited primarily to scheduled maintenance of the Project components. These following key activities are associated with the operations and maintenance of the proposed Project:

- Preventative and unplanned maintenance for Project components;
- Proponent Staff Transport: periodic travel of technical staff between the operations and maintenance building and wind turbine locations using light trucks);
- Natural Heritage Field Monitoring;
- Meter calibrations;
- Field Monitoring: to evaluate the performance of the Project components and to conduct investigations/field visits to follow-up with any complaints received by the Proponent;
- Remote operation of the wind turbines;
- Collector line maintenance; and,
- Grounds maintenance in the vicinity of Project components.

2.5.4 Decommissioning

If the Project is not extended past its operational life (20 years) the wind turbine structures will be removed to the base of the foundation and the foundations will be excavated and backfilled with subsoil and topsoil to allow agricultural activities to continue. Access road removal will be dependent on the requirements and agreements in place with the individual landowner. Areas of land will be reseeded where appropriate, to restore the area to pre-construction state. Decommissioning procedures will be similar, but in reverse order to those carried out in the construction phase.

2.6 Description of Potential Environmental Effects and Proposed Mitigation Measures

2.6.1 Archaeological Resources

In order to determine if the Project Study Area contains heritage resources and protected properties, the Proponent has completed a Heritage Assessment Report. A Stage 1 Archaeological Assessment was completed which applied archaeological potential criteria used by the Ontario Ministry of Tourism and Culture and Sports. The archaeological potential for Aboriginal and Euro-Canadian sites was deemed to be moderate to high on these properties and a Stage 2 Archaeological Assessment was recommended. The Stage 2 Archaeological Assessment was completed. A total of 36 archaeological sites were identified during the Stage field work. This inventory includes 16 pre-contact Aboriginal sites, one possible post-contact Aboriginal site, and

19 historic Euro-Canadian sites. Where archaeological resources were discovered, appropriate mitigation measures were assessed. Based on the 2011 *Standards and Guidelines for Consultant Archaeologists*, 12 of the sites were recommended for Stage 3 archaeological assessment, of which three were pre-contact Aboriginal sites and nine were historic Euro-Canadian sites. Changes were made to the Project layout to avoid these sites and no further archaeological assessment is required.

2.6.2 Heritage Resources

In order to determine if the Project Study Area contains heritage resources and protected properties, the Proponent has completed a Heritage Assessment Report. If protected properties and/or cultural heritage resources were to be determined to have cultural heritage value or interest, a comprehensive Heritage Impact Assessment would be completed for each individual instance. No such properties and/or cultural heritage resources were identified.

2.6.3 Natural Heritage

2.6.3.1 Potential Effects

The following provides examples of typical effects of the proposed Project on the natural environment that could be encountered during the site preparation and construction, operations and decommissioning phases:

- Activities associated with the site preparation and construction of the Project may have the potential to affect terrestrial habitats, individual species or specific life stages or activities (e.g., nesting birds);
- Noise associated with heavy machinery and construction activities could result in sensory disturbance and, under exceptional circumstances, habitat alienation, displacement, or desertion;
- Creation of dust can coat vegetation in the Project Study Area;
- Turbine operations have the potential to displace birds, cause nest abandonment and stress, impart hazards along avian flight paths, and could result in reduced breeding success within the specific adjacent habitats present, when these habitats are being utilized; and,
- Bat mortality has been documented at operational wind development projects in southwestern Ontario and elsewhere and the mortalities have often been attributed to in-flight collisions with wind turbine blades or the tower structures and, more recently, to barotraumas.

2.6.3.2 Proposed Mitigation Measures

The Project layout is currently being developed and includes consideration of the natural features and wildlife habitats identified within the area of influence (i.e., 50/120 m) as determined through the records review, with a desire to minimize impacts to significant natural heritage features, functions and attributes. The following provides mitigation measures proposed:

- Project layout was developed to minimize direct impact on significant natural features;

- Project infrastructure will be located at an appropriate distance from significant natural heritage features to reduce residual impacts, as was determined through the Environmental Impact Study;
- Dust will be minimized by employing mitigation measures and best management practices such as limiting vehicle speed and watering gravel roads, as necessary;
- Tree protection fencing, equipment laydown exclusion fencing, silt fencing adjacent to watercourses/wetlands;
- Nesting surveys prior to vegetation clearing;
- Timing construction to avoid sensitive wildlife windows; and,
- Adherence to the Department of Fisheries and Oceans Canada ("DFO's") Operational Statements for water crossing techniques.

2.6.4 Water Bodies

2.6.4.1 Potential Effects

The following is a summary of the potential effects on water bodies associated with the Project:

- Construction of watercourse crossings has the potential to negatively affect surface water quality, quantity and flow patterns and natural hazard risks (e.g., flooding, erosion);
- Dewatering for turbine foundation construction has the potential to temporarily alter the quantity or the flow of groundwater to a natural feature (i.e., watercourses, wetlands, other features with seasonal inundation);
- Land clearing and site grading near watercourses has the potential to increase sediment runoff, decrease bank stability, and alter riparian vegetation conditions affecting aquatic habitats;
- Pumping of groundwater from the foundation excavation and subsequent release to a watercourse has the potential to introduce sediment to the watercourse and change watercourse hydrology and water temperature; and,
- During the site preparation and construction phase negative effects to surface or groundwater sources could occur through accidental spills or releases of substances which may contain contaminants.

2.6.4.2 Proposed Mitigation Measures

The following provides a summary of the mitigation measures proposed:

- Site specific field surveys of the aquatic resources within the Project Study Area have been completed along all potential water bodies within 120m of the Project location;
- Completion of an Environmental Impact Study to ensure any potentially negative or permanent impacts to these features will be mitigated appropriately;

- Implementation of mitigation measures and best management practices associated with the use of construction equipment in the Project Study Area (i.e., contained re-fuelling areas) will reduce the chances of accidental spills of contaminants;
- Where possible, and in consideration of other constraints, the Proponent will maintain a 120 metre setback from watercourses or will conduct an water assessment report that demonstrates that significant residual impacts to aquatic resources will not occur;
- Appropriate silt fencing will be placed to prevent siltation of adjacent watercourses and wetlands; and,
- If the watercourse is determined to be fish habitat, the crossing technique first considered will be from a DFO Operational Statement such that a fish and fish habitat review will not be required. Any other technique used in fish habitat that does not conform to a DFO Operational Statement will require a fish and fish habitat review.

2.6.5 Waste Generation

2.6.5.1 Potential Effects

The proposed Project is not expected to produce any significant amount of waste. All waste generated during the lifespan of the Project (i.e., construction to decommissioning) will be transported from the Project location. Maintenance of the turbines will require oil and filters. Lubricants are also required for wind turbines.

2.6.5.2 Proposed Mitigation Measures

- Waste generated during the lifespan of the Project (i.e., construction to decommissioning) will be transported from the Project location;
- All surplus lubricating oils, grease, rags, batteries, and filers will be removed and disposed of at an MOE approved disposal and/or recycling facility according to provincial and municipal requirements; and,
- Household wastes (e.g. cardboard, plastics, etc.,) generated at the operations and maintenance building will either be recycled or disposed of at a local facility.

All waste generated will be disposed in a manner consistent with existing guidelines and regulations.

2.6.6 Dust

2.6.6.1 Potential Effects

Fugitive dust emissions could potentially increase as a result of Project activities during the site preparation and construction phase and the decommissioning phase due to the increased presence of construction equipment and transport vehicles and through the loss of vegetation. Emissions will be highest during staging and laydown area preparation and other activities that involve significant levels of material handling (e.g., upgrading and construction of new access roads, and installation of conductor lines).

2.6.6.2 Proposed Mitigation Measures

- Implementation of a speed limit, which will lead to reduced disturbance of dust on paved and unpaved surfaces;
- Application of dust suppressants to unpaved areas (i.e., unpaved roads, storage piles), which may include the use of water. The frequency of application will be determined based on site conditions during the construction process, and will be adjusted based on climatic factors;
- Land clearing and heavy construction activities will be staged to reduce the opportunity of simultaneous operation of large dust generating equipment;
- Re-vegetation of cleared areas, as soon as possible, and maintenance of the vegetation to ensure growth;
- If possible, the installation of wind fences in areas where they may be required; and,
- Implementation of a complaint response program, whereby complaints received from the public are recorded and investigated. The investigations should be focused on determining the cause of the complaint and, if necessary, mitigation measures should be implemented.

2.6.7 Air

2.6.7.1 Potential Effects

The Project activities associated with the site preparation and construction phase and the decommissioning phase will lead to emission products, including but not limited to, greenhouse gases (e.g., methane, CO_2), nitrogen dioxide, sulphur dioxide, and suspended particles from vehicles and machinery operation.

2.6.7.2 Proposed Mitigation Measures

- Ensure proper maintenance of all vehicles, to reduce the potential for abnormal operation and increases in emissions;
- Implementation of a speed limit; and,
- Implementation of rules regarding idling of engines, to limit idling of vehicles as much as possible.

2.6.8 Noise

2.6.8.1 Potential Effects

Activities occurring during construction and decommissioning have the potential to affect noise levels due to the operation of heavy equipment. The operation of wind turbines, collector substation and the operations and maintenance building will generate noise.

2.6.8.2 Proposed Mitigation Measures

- All construction and decommissioning equipment will be kept in good repair and will not exceed the noise emissions as specified in MOE publication NPC-115; and,

- All turbines will respect the minimum setback requirement of 550 m from a Point of Reception in accordance with O. Reg. 359/09, as amended, and will comply with the MOE's permissible sound limits at all identified Points of Reception.

2.7 Health and Safety

2.7.1 Construction and Public Safety

2.7.1.1 Potential Effects

During Project construction and decommissioning, workers will be working at high elevations and falling poses the greatest potential negative effect. In addition, during the excavation of trenches for underground collector lines workers could potentially be injured.

2.7.1.2 Proposed Mitigation Measures

All construction workers will be trained to assess safety hazards and to manage risk related to operating the heavy machinery associated with construction and decommissioning.

In order to ensure public safety for the duration of the site preparation and construction, the turbine manufacturer or the construction contractor will ensure that the following safety measures are implemented as appropriate:

- Properly trained staff;
- Appropriate warning signage;
- Speed restrictions;
- Road closures;
- Vehicle lighting;
- Safety fencing surrounding trenches, or work space, as necessary; and,
- Traffic direction.

Prior to commencing construction and installation activities, the Proponent will make copies of a detailed emergency response and communication plan available to the appropriate regulatory agencies, Bruce County, Municipality of Kincardine, local residents and Aboriginal communities. The content of the communication plans can be found in Section 6 of the Design and Operations Report. Typically the plan will include the following:

- Designation of Project emergency coordinators;
- Process description;
- Objectives;
- Administration;

- Regulatory references;
- Training requirements;
- Project location information and 911 addresses;
- Project emergency procedures;
- Immediate site evacuation procedure;
- Delayed site evacuation procedure;
- Response to personnel injuries/serious health conditions;
- Fire response plan;
- Chemical/oil spills, releases and reporting; and,
- Weather-related emergencies.

2.8 Traffic and Transportation Infrastructure

2.8.1 Potential Effects

The road capacity and local traffic could be affected during construction and decommissioning related activities. Project related activities during construction and decommissioning could result in a temporary increase in slow moving traffic volume on local roads.

2.8.2 Proposed Mitigation Measures

A traffic management plan will be prepared by SP in consultation with local governments to mitigate problems such as minor damage to roads and traffic congestion that may arise during the construction and decommissioning phases. This plan may include measures such as:

- Signage;
- Road closures;
- Speed restrictions;
- Load restrictions;
- Equipment inspections; and,
- Municipal and County Road modifications.

Through consultation with the Municipality of Kincardine and Bruce County, the Proponent will ensure that emergency response services are prepared to respond to any emergencies, albeit unlikely, related to

construction operations or decommissioning of the Project (e.g., high elevation rescue). The Plan will be given to the appropriate regulatory agencies, Bruce County, local residents and Aboriginal communities and will include:

- Contact information;
- Evacuation procedures;
- An incident response plan;
- A spill response plan; and
- Information regarding turbine operations, safety features and what emergency workers can expect when they arrive on site.

2.9 Closing

The Project Description Report has been completed to fulfill regulatory requirements as mandated by the provincial government for the development of the Project. This Report is consistent with the provisions of Ontario Regulation 359/09, as amended for a Class 4 Wind Facility as set out by the Green Energy and Green Economy Act, 2009. Significant adverse effects from the construction and installation, operational, and decommissioning activities to the environment will be minimized through careful facility layout planning, the application of appropriate mitigation measures, and adherence to all regulatory requirements.

ABORIGINAL REPORT SUMMARIES

Design and Operations Report Summary

3.0 DESIGN AND OPERATIONS REPORT SUMMARY

The following summarizes the Design and Operations Report. The Report describes the location, operation and maintenance for the wind turbines, as well as potential environmental effects and health and safety concerns that may arise.

3.1 Project Location and Design Plan

The Project Study Area covers approximately 18,800 hectares (ha) of private land and public road allowances in the Municipality of Kincardine in Bruce County. The proposed Project will include approximately 90 Siemens SWT-2.3-101 wind turbines. The Proponent is seeking permits for a total of 98 turbines to provide contingency positions... Each turbine will have three blades, 49 m in length, and will stand approximately 100 m high at hub height. The wind turbines will be built on concrete foundations approximately 2.5 m below ground. The Project with include approximately 60 kilometres (km) of gravel access roads that will be needed to access the wind turbines. The Project will also include up to three meteorological towers to monitor wind conditions and a substation that will increase the electrical voltage for distribution through the Hydro One Transmission corridor. A map of the Project Location is provided at the end of this Report (Figure 2).

3.2 Project Components

The major components of the Project include:

- Wind turbine generators;
- Access roads;
- Collector lines;
- Collector substation;
- Meteorological towers; and,
- Operations building.

To facilitate the construction of the proposed Project, a number of temporary construction components are required. These temporary components include:

- Crane pads;
- Wind turbine laydown areas; and,
- Potential construction staging areas.

3.3 Project Operational Plan

The proposed Project is scheduled to be in operation for 20 years. The operation of the proposed Project will require ten to fourteen trained technical and administrative staff, including turbine maintenance technicians and a site supervisor. During the operation of the proposed Project, on-site activities will be limited primarily to scheduled maintenance of the Project components. Additional on-site activities during the operation of the proposed Project will include:

- Equipment Maintenance;
- Proponent Staff Transport: Periodic (i.e., daily to weekly) travel of technical staff between the operations and maintenance building and wind turbine locations using light trucks;
- Natural Heritage Field Monitoring; and,
- Field monitoring may also be required to evaluate the performance of Project components.

3.3.1 Storms, High Winds and Lightning Strikes

The safe operation of the proposed Project will involve the real-time collection of a series of operational parameters, including: wind speed, wind direction, air temperature, atmospheric pressure, and electrical parameters. Each turbine is automated and will be monitored remotely or from an operations and maintenance building. The wind turbines are designed to operate in wind speeds between 3 metres per second (m/s) or 11 kilometres per hour (km/h) and 25 m/s, or 90km/h. If wind speeds exceed 13 m/s, or 47 km/h, the wind turbine blades will feather out to reduce pressure applied on the turbines. Feathering adjusts the pitch of the blade to be parallel to the airflow minimizing drag.

The wind turbines are also equipped with lightning safeguards that protect turbines from the tip of the blades to the foundation. These safeguards enable the lightning current to by-pass all vital wind turbine components, limiting the potential for damage. Each blade of each turbine will also have a lightning detector mounted on it to collect data about which blades were hit, when they were hit and how powerful the lightning strike was. This data will be used to evaluate the need to carry out a field inspection of the wind turbine generator after a storm.

3.4 Description of Potential Environmental Effects and Proposed Mitigation Measures

3.4.1 Cultural Heritage

During the operation of the proposed Project there are no negative effects anticipated to cultural heritage (i.e., protected properties, archaeological and heritage resources). Protecting identified cultural heritage resources will be achieved by implementing mitigation strategies during construction and installation activities.

3.4.2 Natural Heritage

3.4.2.1 Potential Effects

Negative environmental effects during the Operations Phase include:

- Sensory disturbance to wildlife from operating turbines; and,
- Potential mortality associated with bird and/or bat impacts with the turbine blades, the turbine tower or permanent meteorological masts.

3.4.2.2 Proposed Mitigation Measures

- Project layout was developed to minimize direct impact on significant natural features;
- Bird and bat surveys were undertaken, or committed to within the Environmental Impact Study, to determine the presence of significant bird or bat habitats;
- Seasonal surveys were completed to assess bird habitats during the winter and spring months. Summer breeding bird surveys and surveys to assess potential bat maternity roost colonies will be conducted summer 2012. Additional surveys for amphibian breeding habitat and waterfowl and colonial bird nesting may occur in spring 2013 as necessary;
- Turbine and other required lighting will be installed in a manner that is least likely to attract birds and/or bats, while maintaining compliance with regulatory requirements;
- Operational monitoring of bird and bat mortality will be conducted for a minimum of 3 years as per the Birds and Birds Habitats: Guidelines for Wind Power Project (MNR 2011a) and the Bats and Bats Habitats: Guidelines for wind power projects (MNR, 2011b); and,
- A meeting will be held with the MNR followed by annual reports to MNR and CWS detailing the outcomes of the monitoring.

3.4.3 Water Resources

3.4.3.1 Potential Effects

During the operation of the proposed Project there is the potential for an increase in surface water runoff due to changes in site topography and placement of Project components (e.g., access roads).

3.4.3.2 Proposed Mitigation Measures

- Proper site grading that will reduce the potential for runoff;
- Reseeding of the Project location where necessary to help stabilize the soil and prevent erosion;
- Installing drainage ditches/culvert to divert overland flow;
- Implementing BMPs to minimize siltation and control water flow;

- Drainage monitoring in the Project Study Area will be carried out following storm events to ensure no negative environmental effects from surface water runoff are occurring; and,
- As a contingency measure, drainage ditches/culverts will be installed and/or expanded where required to ensure that no environmental effects from surface water runoff are occurring.

3.4.4 Contamination of Surface and Ground Water

3.4.4.1 Potential Effects

Accidental spills or releases of contaminants may occur during the refuelling, operation, or maintenance of Project equipment. Accidental spills have the potential to contaminate ground and surface water and soils in the Project Study Area.

3.4.4.2 Proposed Mitigation Measures

- Proper maintenance of vehicles and maintenance equipment;
- Regular inspection of vehicles and equipment to ensure BMPs and other mitigation measures are being used consistently and in the correct manner to reduce the likelihood of any spills;
- Conducting refuelling and maintenance in designated areas;
- Maintenance of a supply of spill control materials (absorbent material, absorbent booms, etc.) as required in locations where maintenance equipment is maintained and used;
- Proper training of workers for spill prevention and containment;
- Regular review of the spill response plan by all operation and maintenance workers; and,
- Minimizing maintenance activities during wet weather.

3.4.5 Water Bodies

3.4.5.1 Potential Effects

- Presence of increased traffic and ongoing maintenance activities, possibility of additional erosion and sedimentation into nearby water bodies;
- Additional dust generation from passing vehicles;
- Potential for spills associated to the increased vehicle use; and,
- Spills related to any chemicals, cleaners, lubricants, or other fluids that might be used as part of the maintenance of the project components.

3.4.5.2 Proposed Mitigation Measures

- As part of the Environmental Impact Study prepared for this project, the potential impacts of this project on water bodies during the operation phase has been considered;
- Posted speed limits along access roads will limit the potential for dust and sedimentation during the operation of the project;
- The Spill Response Plan developed for the construction phase of the Project; and,
- Spill clean-up kits and supplies will be stored within the Project Study Area in strategic locations to allow for timely response to spills.

3.4.6 Air Quality

3.4.6.1 Potential Effects

- Infrequent and short-term fugitive dust and vehicle emissions.

3.4.6.2 Proposed Mitigation Measures

- Ensure proper maintenance of all vehicles to reduce the potential for abnormal operation and increases in emissions;
- Implementation of a speed limit on access roads; and,
- Implementation of rules to limit the idling of engines.

3.4.7 Noise

3.4.7.1 Potential Effects

The operation of wind turbine generators and the collector substation will generate noise that has the potential to affect local residents.

3.4.7.2 Proposed Mitigation Measures

- As required by O. Reg. 359/09, as amended, wind turbine generators are located a minimum of 550 m from all non-participating noise receptors;
- The Noise Impact Assessment demonstrates that the operation of the Project complies with MOE noise guidelines based on predictive modeling;
- The performance objective for noise during the operation of the proposed Project is 40.0 dBA at all non-participating receptors;
- Wind turbine generators will be monitored remotely or from a operations center;

- Any noise complaints that are received will be addressed by following the communications plan detailed in Section 3.6; and,
- Contingency measures related to noise generated by the Project include suspending and repairing wind turbine generators that are unable to meet operational standards until they are fixed.

3.5 Local Interests, Land Use, Infrastructure and Resources

3.5.1 Local Businesses and Facilities

3.5.1.1 Potential Effects

Local infrastructure, including schools, was taken into consideration during the design phase of the Project. All turbines have been sited to meet or exceed MOE's required setbacks.

3.5.1.2 Proposed Mitigation Measures

- During the development of the Project design, the location of existing infrastructure was considered; and,
- Prior to commencing Project activities, the Proponent will make copies of a detailed communication plan available to the appropriate regulatory agencies, Bruce County, Municipality of Kincardine, local residents and Aboriginal communities to establish and maintain procedures required for effectively responding to complaints, emergencies or accidents.

3.5.2 Land Use

3.5.2.1 Potential Effects

The loss of agricultural lands while the Project is in operation represents a potential interaction between the Project and current land use.

3.5.2.2 Proposed Mitigation Measures

- The loss of agricultural land during the lifespan of the project due to turbine footprints and access roads will represent less than 0.5% of all lands within the Project Study Area and associated crops; and,
- Landowners that are participating in the Project have been consulted and included in the design phase to develop the proposed location of Project infrastructure on their properties.

3.5.3 Provincial and Local Infrastructure

3.5.3.1 Potential Effects

- Road capacity and local traffic could be affected if maintenance activities involve the replacing of a major wind turbine generator component;

- The delivery of specialized equipment could result in a temporary increase in slower moving traffic volumes on local roads;
- Any maintenance activities adjacent to or in road easements could also result in temporary disruptions to the flow of traffic on some local roads; and,
- Electromagnetic interference represents a potential effect of the Project on telecommunications infrastructure near the Project Study Area.

3.5.3.2 Proposed Mitigation Measures

- Appropriate permits related to maintenance activities will be obtained from provincial and municipal agencies, including (but not limited to) the Ministry of Transportation (MTO), Bruce County and the Municipality of Kincardine;
- Where appropriate, the public will be notified about maintenance activities;
- The Proponent will follow the recommended consultation process outlined in the Radio Advisory Board of Canada (RABC) and the Canadian Wind Energy Association (CanWEA) Technical Information and Coordination Process between Wind Turbines and Radiocommunication and Radar Systems (2010); and,
- The Proponent will log any communication and complaints under the emergency response and communications plan.

3.5.4 Recreational Areas

3.5.4.1 Potential Effects

A potential interaction exists between the Project and the conservation of Saugeen Valley Conservation Authority (SVCA) lands. Any recreational areas in the immediate vicinity of the Project location have the potential to be affected by the operation of the Project.

3.5.4.2 Proposed Mitigation Measures

- During the development of the Project design the location of SVCA land and recreational areas were considered and MOE setback distances were adhered to; and,
- With the exception of sections of collector lines in public road allowances, the Project location is situated on private lands and does not include any recreational areas.

3.6 Emergency Response and Communication Plan

Prior to commencing construction and installation activities, the Proponent will make copies of a detailed emergency response and communication plan available to the appropriate regulatory agencies, Bruce County,

Municipality of Kincardine, local residents and Aboriginal communities. The purpose of the emergency response and communications plan is to establish and maintain procedures required for effectively responding to complaints, emergencies or accidents.

The content of the emergency response and communication plan is subject to local requirements, but typically includes the following information:

- Designation of Project emergency coordinators;
- Process description;
- Objectives;
- Administration;
- Regulatory references;
- Training requirements;
- Project location information and 911 addresses;
- Project emergency procedures;
- Immediate site evacuation procedure;
- Delayed site evacuation procedure;
- Response to personnel injuries/serious health conditions;
- Fire response plan;
- Chemical/oil spills, releases and reporting; and,
- Weather-related emergencies.

3.7 Emergency Communications

If there is an emergency, local emergency responders (i.e., Police, Fire, Ambulance) will be contacted via the 911 Operator.

Prior to the commencement of construction and installation activities, permanent emergency contact signs will be posted at the entrance point to any of the Project components (e.g., an access road leading to a wind turbine generator).

Following this preliminary contact, a hard copy incident response report will be provided within 24 hours of phone or e-mail contact noting:

- The parameter exceeded;

- The magnitude of the exceedance; and,
- Mitigative measures implemented, including details of emergency responders contacted, if required.

Stakeholders, local community members, and Aboriginal communities will be notified of an operational exceedance or emergency at the discretion of the Proponent through one or a combination of the following mediums depending on the actual or perceived risk level: media advertisements, mailings, local newspapers, letters, and direct contact. Aboriginal communities will be contacted to determine a designated person or persons for the Proponent to contact in the event of an operational exceedance or emergency.

For unintended release or discharge of material to air, land or water (i.e., spills), the spills procedures outlined in the MOE "Spill Reporting – A Guide to Reporting Spills and Discharges" (May 2007) will be adhered to. The types of spills that require reporting are defined in the *Ontario Environmental Protection Act* and O. Reg. 675/98 "Classification and Exemption of Spills and Reporting of Discharges." The MOE Spills Action Centre (SAC) phone number (1-800-268-6060) will be posted at appropriate locations in the Project Study Area.

In the case of an emergency reported directly by staff retained by the Proponent (e.g., subcontractors) that requires emergency responders, the Proponent will contact the 911 Operator upon discovery of the emergency, and the emergency response and communication plan will be initiated.

3.8 Non-Emergency Communications

Regulatory agencies, Municipality of Kincardine, Bruce County, local residents and Aboriginal communities will be notified through mailings of updates on Project activities and changes to procedures. Examples of non-emergency communications that will be communicated through mailings include:

When advanced notification of Project activities is feasible, letter communications will identify in detail the activity being carried out, anticipated schedule of the activity, and contact information for submitting any concerns and/or complaints. If notification is required after an unanticipated event, the letter will describe the event, mitigation strategies to prevent future occurrences, and contact information for submitting any concerns and/or complaints.

3.9 Receiving Communications from the Public

A mailing address will be established for Project operations staff to receive communications from the public, Aboriginal communities, regulatory agencies, Municipality of Kincardine and Bruce County. A notice will be mailed to all stakeholders prior to the start of construction and installation activities for the Project, which will provide information on how they will be notified by the Proponent of the following:

- How the Proponent can be contacted for information or to communicated concerns about the Project; and
- How the Proponent will handle communications received from the public, Aboriginal communities, regulatory agencies, Municipality of Kincardine and Bruce County.

An electronic communications database will be used to record information from calls and/or received mailings. In the case of complaints related to Project activities, the complainant will be asked to provide the following information:

- Name / Address / Phone number / e-mail address (if possible);
- Time and date of complaint;
- Location of problem;
- Details on the problem or complaint (including frequency); and,
- Any other details considered relevant to the complaint.

Following an appropriate amount of time for the Proponent to consider the complaint, the complainants will be provided with the following information:

- Actions that will be taken to remediate the cause of the complaint; and,
- Proposed actions to prevent similar occurrences in the future.

The district office of the MOE will be notified, in writing, of each complaint. This notification will include:

- All of the information recorded about the complaint (listed above);
- Wind direction at the time of the incident related to the complaint;
- Actions taken to remediate the cause of the complaint, and,
- Proposed actions to prevent similar occurrences in the future.

Records of all complaints, actions taken and communications with the MOE will be kept in the communications database. The Proponent is committed to establishing an ongoing dialogue with stakeholders, local community members, and Aboriginal communities throughout all phases of the proposed Project.

3.10 Closing

The Design and Operations Report has been completed to fulfill regulatory requirements as mandated by the provincial government for the development of the Project. This Report is consistent with the provisions of Ontario Regulation 359/09, as amended for a Class 4 Wind Facility as set out by the Green Energy and Green Economy Act, 2009. Significant adverse effects from the construction and installation, operational, and decommissioning activities to the environment will be minimized through careful facility layout planning, the application of appropriate mitigation measures, and adherence to all regulatory requirements.

ABORIGINAL REPORT SUMMARIES

Construction Plan Report Summary

4.0 CONSTRUCTION PLAN REPORT SUMMARY

The following summarizes the Construction Plan Report. Construction of the Project will include site preparation, assembling and installing wind turbines, collector lines, a substation, operations building, and roads. Potential environmental effects and mitigation measures associated with construction and installation activities are outlined in this section.

4.1 Construction Activities

4.1.1 Site Preparation

To prepare for construction, the boundaries of turbine sites will be surveyed and staked and any underground pipes, utilities or lines will be located and marked. Geotechnical studies will be completed to allow for detailed foundation designs. Access roads will be constructed to allow construction equipment to access the turbine sites for delivery of turbine parts.

Temporary laydown areas and crane pads will be created beside each turbine site and within construction disturbance areas. When equipment is delivered to the site, it will be stored on the laydown areas until the construction and assembly crews are ready to use it.

4.1.2 Equipment Installation

Each of the wind turbines will need a foundation made of concrete. Formwork and rebar will be installed to reinforce the wind turbine foundation. Most of the foundation will be underground, with the exception of the tower pedestal. Each foundation will require a large hole measuring 20 m in diameter and approximately 3 m deep. The turbine tower will then be anchored to the foundation by large bolts set in concrete.

The operations and maintenance facilities will have an approximate footprint of 3 acres and will accommodate offices, kitchen facilities, control facilities, storage space, maintenance work areas and a parking area.

Collector lines will carry the electricity from the pad-mounted transformers at each turbine location to the Project substation. The collector lines may be a combination of underground lines on private lands and overhead and/or underground lines on public road allowances. The collector substation brings together all of the electricity from the turbines to be fed into the Hydro One transmission system. The collectors will be buried underground at a depth of 1 m – 1.5 m where possible and, if above ground collector lines are required, they will be constructed on single monopole structures. Collector substation equipment will include isolation switch(es), circuit breaker(s), step-up power transformer(s), distribution switch-gear(s), capacitor banks, instrument transformers, grounding transformers, revenue metering, substation grounding and a control building. Substation grounding will follow the Canadian Electrical Code (CEC). An oil containment system designed for the main transformer(s) will be installed at the site to prevent soil contamination in the event of a leak.

4.1.3 Temporary Uses of Land

Construction and installation activities will utilize temporary storage and laydown areas adjacent to access roads, wind turbines, collector substation, and operations and maintenance building. Lands used for temporary storage and laydown areas will be converted from their current use prior to construction.

Table 4: Timing and Duration of Construction and Installation Activities

Construction and Installation Activity	Estimated Start Time[1]	Estimated Duration
Preliminary surveying	Spring 2013	2-3 months
Pre-construction surveys and geotechnical investigations	Spring 2013	3-4 months
Land clearing	Spring 2013	2 months
Access road construction	Spring 2013	5 months
Access road maintenance	Spring 2013	18 months
Temporary storage/laydown area construction	Spring 2013	6 months
Wind turbine foundation construction	Summer 2013	12 months
Installation of collector lines	Summer 2013	12 months
Installation of collector substation	Summer 2013	10 months
Installation of operations and maintenance facilities	Summer 2013	18 months
Installation of meteorological towers	Spring 2014	1 month
Wind turbine assembly and installation	Spring 2014	8 months
Wind turbine commissioning	Fall 2014	3 months
Clean-up and reclamation	Fall 2014	12 months

Note:
[1] The projected schedule is based on information known at the time of the completion of this Report. Modifications to the construction and installation schedule for the Project will be publicly available on the Project website: www.armowwind.com

4.1.4 Materials/Waste Generation and Transportation

- Packing frames for the wind turbine components and cabling spools will be returned to their respective vendors or will be recycled;
- Plastics from other containers and packaging will be disposed of through the local landfill and recycling facilities where appropriate;
- Construction materials and scrap metals (e.g., copper wiring and conductor) will be removed and sold to a local scrap metal dealer;
- Oils, fuel and lubricants used in maintenance and operation of construction equipment will be stored temporarily in accepted containment systems and will subsequently be removed by a licensed contractor;

- Concrete wash out of empty cement trucks will adhere to applicable regulations;
- Sanitary sewage collected in portable toilets and wash stations will be transported to an off-site facility by a licensed hauler;
- Small amounts of spoil material from borehole drilling during geotechnical surveys may be re-distributed on disturbed areas at respective drill sites;
- Topsoil and/or subsoil stripped from access roads and temporary storage/laydown areas may be re-used on-site, where feasible;
- If any grubbing of the site is required prior to construction activities, the grubbing materials (e.g., vegetation, branches, tree stumps) will remain on site and will be buried within disturbance areas;
- Any excess subsoil will be distributed to nearby participating farms to be used by the landowner at their discretion, and excess clean topsoil will be re-distributed to adjacent lands as appropriate;
- Disposal and recycling of materials and waste generated will require the use of flatbed trucks and large dump trucks that are capable of transporting heavy loads; and,
- Disposal and recycling of waste will occur throughout the construction and installation of the Project since there are no plans for long-term storage of waste in the Project Study Area.

4.2 Description of Potential Environmental Effects and Proposed Mitigation Measures

4.2.1 Air and Noise Emissions

4.2.1.1 Potential Effects

Operation of construction equipment, excavation activities, associated vehicular traffic, and temporary exposure of soil stockpiles has the potential to generate short-term localized dust emissions.

The noise levels associated with heavy machinery and construction activities may result in sensory disturbance to local residents and wildlife and, under exceptional circumstances, habitat alienation, displacement, or desertion.

4.2.1.2 Proposed Mitigation Measures

Air and noise emissions generated during the construction and installation of the Project will be minimized by the implementation of Best Management Practices (BMPs), which will help reduce the potential for fugitive dust generation and off-site movement, including:

- Implementing a speed limit that will lead to reduced disturbance of dust on paved and unpaved surfaces;
- Ensure proper operation and maintenance of vehicles and machinery to limit noise;

- Minimize vehicular traffic on exposed soils and stabilize high traffic areas with clean gravel surface layer or other suitable cover material;
- Minimize mud tracking be construction vehicles along access routes and areas outside of the immediate work site, and ensuring timely cleanup of any tracked mud, dirt, or debris;
- Applying dust suppressants to unpaved areas (i.e., unpaved roads, storage piles), which may include the use of water or a natural dust suppressant. The frequency of application will be determined based on climatic factors during the construction and installation of the Project;
- Re-vegetation of cleared areas, as soon as possible, and maintenance of vegetation to ensure growth;
- Scheduling excavations or activities involving the movement of soil and/or gravel on days with low wind;
- Implementing a complaint response program, whereby complaints received from the public are recorded and investigated;
- All vehicles and equipment will be operated in accordance with Municipality of Kincardine noise By-law No. 2008-076;
- Construction or installation activities that could create excessive noise will be restricted to hours outlined in Schedule B of By-Law No. 2008-076 unless otherwise approved by the Municipality;
- All construction equipment will be kept in good repair and will operate in accordance with local by-laws, MOE publication NPC-115 and manufacturer recommendations; and,
- An Environmental Compliance Monitor will be on-site for the duration of construction activities to ensure that environmental regulations are being adhered to by construction contractors.

4.2.2 Removal of Vegetation and Habitat

4.2.2.1 Potential Effects

- The majority of land within the Project Study Area consists of fields under active cultivation, there is limited anticipated destruction of native vegetation and habitat from construction and installation activities;
- Minor removal of upland and riparian vegetation may occur where watercourse or hedgerow crossings are required;
- Soil compaction, changes to soil properties and some loss of productivity due to mixing of subsoil in the surface soil horizons;
- Vegetation removal has the potential to result in habitat loss or fragmentation, which may affect wildlife corridors or movement;

- Woodlot areas could potentially represent locally important or valued ecosystems or vegetation, and there is a potential for rare, threatened or endangered species or their habitats to occur within the Project Study Area; and,
- Installation of underground collector lines and/or culverts through watercourses has the potential to disrupt fish habitat, cause erosion and sedimentation through disturbance to the shoreline and bed of water bodies, and destroy habitat through the removal of riparian (bank) vegetation and other habitat types that provide cover, shade and food.

4.2.2.2 Proposed Mitigation Measures

- Wherever possible, access roads and construction staging and turbine laydown areas will take advantage of existing road infrastructure to avoid loss of agricultural lands or destruction of vegetation;
- Construction activities occurring in close proximity to woodlots will use tree protection fencing or implement a tree preservation plan;
- Wildlife habitats within 30m of construction activities will be delineated to avoid disturbance or damage;
- As practical, vegetation removal will be done outside of identified breeding seasons for locally breeding bird species and construction activities within 30m of amphibian breeding habitat will avoid peak amphibian breeding season
- Vegetation removal will be done outside of identified breeding seasons for locally breeding bird species;
- In areas where significant compaction has occurred, subsoil will be ripped to alleviate compaction, and stripped subsoil and topsoil will be replaced;
- Soils will not be imported to the Project Study Area;
- Pre-existing soil conditions will be taken into account during redistribution of soils so that pre-disturbance soil characteristics are maintained to the extent possible;
- Geotechnical investigations will include representative soil quality sampling and analysis to establish soil profile baselines for the Project location;
- Wildlife and habitat records reviews and field surveys were undertaken to identify significant natural features to ensure that wherever possible, a 120 m setback between any significant features and the Project location was maintained;
- The Natural Heritage Assessment Report includes detailed environmental impact studies (EIS), which document predicted net effects to significant natural features and habitats for Project infrastructure located within 120 m as outlined by O. Reg. 359/09, as amended;
- Where vegetation must be removed to facilitate construction and installation activities, areas that are remediated will be monitored to ensure the survival of the reseeded or re-vegetated areas until such time that it is verified that the replanted vegetation is functionally established or has reached a free growing stage; and

- At watercourse crossings that may affect fish habitat provided by riparian vegetation, environmental monitoring requirements will be determined in consultation with the Saugeen Valley Conservation Authority (SVCA) and Fisheries and Oceans Canada (DFO), and adhered to by the Proponent.

4.2.3 Impacts to Water Resources and Water Bodies

4.2.3.1 Potential Effects

- Soil stockpiling, vegetation removal, excavation, soil compaction from machinery, and re-grading and contouring land could potentially changes surface drainage patterns (water quantity and flow paths) can negatively affect surface water quantity and quality, especially after storm events;
- Runoff from stockpiles of gravel and soil for temporary and permanent Project components may result in sedimentation of nearby lands and watercourses;
- Soil compaction from construction and installation equipment can reduce water infiltration and result in greater movement of water by overland flow;
- Soil compaction can thereby lead to increasing runoff to surface water bodies and potentially increasing sedimentation;
- Increased surface runoff can lead to higher stream flow which may result in downstream erosion and sedimentation;
- Reduced water infiltration due to soil compaction can also affect shallow groundwater recharge, potentially resulting in a measurable decline in local groundwater levels; and
- Decrease in bank stability, an increase in sediment runoff, and changes in the chemical properties and temperature of a water body.

4.2.3.2 Proposed Mitigation Measures

- Temporary stockpiles of gravel and topsoil will be covered with plastic sheeting, or other Best Management Practice methods wherever possible, to prevent erosion and runoff;
- Vegetation removal will be minimal, and will be avoided wherever possible adjacent to water bodies;
- If necessary, silt fencing will be used when construction and installation activities occur adjacent to watercourses and wetlands;
- Permanent gravelled surfaces (e.g., access roads) will be contoured for effective surface drainage;
- Where significant compaction has occurred at temporary locations subsoil will be ripped to reduce compaction;
- Areas with disturbed soil (e.g., trenching for underground collector lines) or areas that are re-graded with topsoil will be re-seeded to help stabilize the soil and prevent erosion;

- Following O. Reg. 359/09, as amended, a minimum setback of 30 m from the Project location to water bodies and watercourses was considered when establishing turbine and transformer locations;
- If required, crossings will comply with requirements of the Department of Fisheries and Oceans (DFO), *Navigable Waters Protection Act* and the Minor Works and Waters (*Navigable Waters Protection Act*) Order, where applicable;
- The SVCA will be consulted for activities proposed within their Regulated Area;
- To mitigate potential effects from any watercourse crossings, efforts will be made to design the entry and exit points and work areas for horizontal drilling operations (if required) so that they are outside of the natural feature. Other mitigation measures during watercourse crossings include maintaining a minimum 10 m no-work zone between the entry/exit point and the watercourse;
- Removal of riparian vegetation will be avoided, if possible, and silt fencing will be used adjacent to watercourses and wetlands to prevent run-off and sedimentation effects;
- All equipment refuelling and maintenance activities will occur in temporary storage/laydown areas and temporary workspaces along access routes in order to localize any potential fuel, oil/lubricant leakages or spills to areas away from water bodies and watercourses; and,
- Geotechnical investigations will include representative water quality sampling of groundwater and nearby surface waters to establish baselines.

4.2.4 Water Takings

Applicants submitting an REA Application do not require a Permit to Take Water (PTTW) from the MOE under the *Ontario Water Resources Act* and the Water Taking and Transfer Regulation (O. Reg. 387/04), as specified in Chapter 5 (*Guidance for preparing the Construction Plan Report*) of the Draft Technical Guide to Renewable Energy Approvals (MOE, 2012). However, wind turbine foundation dewatering activities will be guided by PTTW requirements, and may require an Environmental Compliance Approval from the Ministry of Environment (MOE).

4.2.4.1 Potential Effects

- If required, dewatering for wind turbine foundation construction has the potential to temporarily alter shallow groundwater flow to waterbodies, watercourses and wetlands;
- Release of pumped water from foundation dewatering to discharge areas can cause overland sediment transport to waterbodies, while discharge to waterbodies could introduce suspended sediments, re-suspend existing water body materials, and affect watercourse hydrology and water temperature near the point of discharge; and,
- Operation of the two wells to obtain water for dust suppression could potentially result in groundwater drawdown which could affect adjacent natural heritage features or private wells.

4.2.4.2 Proposed Mitigation Measures

Based on the desktop study conducted, there is low potential that the depth of wind turbine foundation excavations will intercept the water table (or saturated ground). It is unlikely that construction dewatering will be required to support foundation construction, other than for the purpose of managing direct precipitation within the excavation area.

At locations where groundwater is encountered or runoff accumulates during excavating for foundations and dewatering of excavations is required, the construction contractors will monitor and record the amount of water withdrawn on a daily basis. Should this amount be less than 50,000 L/day, then no further action is required. If it is expected that greater than 50,000 L/day will be withdrawn, then the following actions will be implemented:

- To control suspended sediment in the water, the inlet pump head will be surrounded with clear stone and filter fabric; and
- The water taker will regulate the discharge at such a rate that there is no flooding in the receiving water body or dissipate the discharge so that no soil erosion is caused that impacts the receiving waterbody

To determine appropriate locations and depths of the two wells, testing will be undertaken that also ensures that no significant effects on adjacent natural features or private wells will occur.

4.2.5 Spills

4.2.5.1 Potential Effects

Accidental spills have the potential to contaminate ground and surface water and soils in the Project Study Area.

4.2.5.2 Proposed Mitigation Measures

The following BMPs will be used to prevent contaminant discharge to the environment:

- Proper maintenance of vehicles and construction and installation equipment;
- Regular inspection of vehicles, equipment and the construction site to ensure BMPs and other mitigation measures are being used consistently and in the correct manner to reduce the likelihood of any spills;
- Conducting refuelling and maintenance in designated areas;
- Machinery and parking in designated areas;
- Spill kits onsite where equipment will be used;
- Maintenance of a supply of spill control materials (absorbent material, absorbent booms, etc.) in locations where construction equipment is maintained and used;
- Spill pads used under parked machinery and equipment if required;
- Proper training of workers for spill prevention and containment;

- Proper reporting of any spills;
- Regular review of the spill response plan by all construction workers;
- Removal of accumulated sediment from control measures (e.g., ponds, fencing, etc.) after construction and installation activities or after significant accumulation;
- Minimizing construction and installation activities during wet weather;
- In addition, an oil containment system will be installed at the collector substation to prevent soil contamination in the event of a leak; and,
- Any spills will be handled in accordance with the MOE's Spills and Discharges Reporting Protocol as required under Sections 15 and 92 of the Ontario *Environmental Protection Act*.

4.2.6 Cultural Heritage

4.2.6.1 Potential Effects

Archaeological resources have been identified in the Project Study Area, and there is potential for construction and installation activities to have negative effects on heritage buildings, structure or sites, archaeological resources, or cultural heritage landscapes if these areas are not avoided or preserved. Damage to archaeological resources could occur during construction excavation activities, should they be located in the area being excavated.

4.2.6.2 Proposed Mitigation Measures

A Heritage Assessment has also been conducted, including a desktop review of available heritage information and several site visits. If protected properties and/or cultural heritage resources were to be determined to have cultural heritage value or interest, a comprehensive Heritage Impact Assessment would be done for each individual instance. However, no such properties were identified. All details of any investigations are presented in the Heritage Assessment Report which was submitted to the MTCS for review and approval.

4.2.7 Local Roads and Traffic

4.2.7.1 Potential Effects

Transportation of equipment and heavy turbine components on local roads may result in damage to roads. During construction and installation activities there will be an increase in traffic as a result of these activities that may result in traffic congestion.

4.2.7.2 Proposed Mitigation Measures

- The implementation of transportation planning during construction and installation activities will minimize potential effects related to road damage and traffic congestion;

- If a traffic management plan is required by local governments (Municipality or County), such a plan will be prepared by the Proponent in consultation with local governments; and,
- A survey to determine the roads and travel routes within the Project Study Area that are capable of accommodating the oversized vehicles and heavy loads associated with construction and installation activities will be conducted in conjunction with the County and Municipality prior to the delivery of Project components and equipment.

4.2.8 Land Use and Resources and Infrastructure

4.2.8.1 Potential Effects

- Temporary loss of agricultural land during construction and installation activities as a result of temporary Project components; and
- There is a low likelihood that waste generated by the Project will cause any disruption to local residents or waste management facilities.

4.2.8.2 Proposed Mitigation Measures

- Restoration activities in the Project Study Area will occur immediately following the decommissioning of Project components;
- Restoration of agricultural land may involve de-compaction, establishing original soil horizons, soil types and nutrient content;
- Prior to commencing construction and installation activities, the Proponent will estimate the waste quantity and waste type expected to be generated; and,
- Non-hazardous waste, such as plastics, building materials, demolition debris and road gravel may be crushed (as required) and sold to private companies or recycling facilities for reuse where possible, or may be disposed of at the nearest local landfill licensed to receive these materials. Metals and other structural materials from dismantled Project components (e.g., collector substation, operations and maintenance buildings, wind turbine generators, collector lines) may be sold to a licensed scrap metal facility.

4.3 Closing

The Construction Plan Report has been completed to fulfill regulatory requirements as mandated by the provincial government for the development of the Project. This Report is consistent with the provisions of Ontario Regulation 359/09, as amended for a Class 4 Wind Facility as set out by the Green Energy and Green Economy Act, 2009. Significant adverse effects from the construction and installation, operational, and decommissioning activities to the environment have been minimized through careful facility layout planning, the application of appropriate mitigation measures, and adherence to all regulatory requirements.

ABORIGINAL REPORT SUMMARIES

Decommissioning Plan Report Summary

5.0 DECOMMISSIONING PLAN REPORT SUMMARY

5.1 Decommissioning of Project Components

The following section summarizes the Decommissioning Plan Report. The Project is anticipated to be in operation through 2034. After this time, a decision will be made by the Proponent to refurbish and extend the operational life of the Project or to decommission. Decommissioning of the Project will include deconstructing and removing wind turbines, power lines, buildings and other Project infrastructure. Roads will be required for heavy equipment and cranes used to dismantle the turbine and other components. Once the infrastructure has been removed, roads may be removed depending on agreements with specific land owners (some of whom may wish the roads left in place).

5.2 Decommissioning During Construction (Abandonment of Project)

In the event that construction and installation of the Project is halted and subsequently not completed for any reason, the Proponent will be responsible for removing any equipment or infrastructure that is already installed, and removing all construction waste.

Table 5: Timing of Project Decommissioning Activities

Project Phase and Activity	Duration*
Decommissioning Planning and Permitting	
Planning and permitting	■ 1 year
Aboveground Structure Decommissioning	
Turbines including dismantling and removal	■ 5 months
Overhead collector system and transmission lines including dismantling and removal	■ 2 months
Transforming substation and switchyard area including dismantling and removal	■ 2 months
Operations building, including dismantling and removal	■ 2 months
Access roads including deactivation, road bed removal and land reclamation	■ 2 – 3 months
Meteorological towers including dismantling and removal	■ 3 weeks per tower
Watercourse crossings including removal and aquatic and riparian habitat reclamation	■ 1 – 2 weeks per crossing
Belowground Structure Decommissioning	
Turbine foundation removal (including concrete removal to operable depth for agriculture), transport and disposal of materials to suitable facility	■ 4 months
Underground collector lines will be terminated at connection points and removed to 1 m below surface	■ 2 months

*Note: Some decommissioning activities will be completed concurrently and the outlined durations are approximate

5.3 Project Components

Table 6: Project Decommissioning Activities for Aboveground and Underground Structures

Activity	Description
Turbine Dismantling and Removal	■ A crane pad and wind turbine laydown area will be constructed at each turbine location to accommodate the dismantling of the wind turbine generators. ■ Wind turbines will be dismantled into their component parts, including the hub, nacelle, blades, tower and pad-mounted transformers. ■ Before directing components to disposal or recycling facilities, efforts will be made to reuse equipment and salvage parts for existing wind farms with similar turbine technology. ■ Turbine components will be delivered to the appropriate landfill, scrap metal yard or industrial recycling areas by large truck and trailer combinations, requiring approximately 10 – 12 loads per turbine. The total number of loads may decrease substantially if the materials are considered to be scrap and can be reduced to a smaller than original size (e.g., cutting turbine blades into pieces).
Wind Turbine Foundations	■ Foundations, including any rebar or steel anchor bolts, will be removed to a depth of approximately 1 m below grade, so that agricultural activities can continue following soil restoration. ■ Excavated foundation areas will be backfilled with subsoil and topsoil to match the original soil horizons and elevation, and the area will be graded and contoured.
Pad Mounted Transformers	■ Pad mounted transformers will be detached from the base of each wind turbine generator and foundation by a small crane. ■ If possible, the pad mounted transformers from the Project will be recycled for future use.
Wind Turbine Access Roads	■ Following, decommissioning of select Project components, the granular base material and crushed gravel used to construct access roads will be removed from the site by dump truck and delivered to a final destination. ■ Culverts installed during construction and installation activities will also be removed if requested by landowners. Any removal of culverts will be completed in consultation with, and will received approval from the Saugeen Valley Conservation Authority (SVCA), Ministry of Natural Resources (MNR), the Municipality of Kincardine, and the Department of Fisheries and Oceans Canada (DFO), if required.
Overhead and Underground Collector Lines	■ Overhead cables and transmission poles that are not shared with Hydro One or other utilities will be removed. ■ At the connection points, where the underground collector lines come to the surface, the collector lines will be cut and excavated to a depth of approximately 1 m below grade.
Collector Substation and switchyard area	■ The substation and switchyard area facilities will be dismantled and removed in accordance with Provincial regulatory requirements at the time of decommissioning.
Operations Building	■ Appropriate use or disposal of the building will be determined at time of decommissioning through consultation with the Municipality of Kincardine and the landowner.

Activity	Description
Meteorological Towers	■ Unless otherwise requested by Bruce County, the Municipality of Kincardine or local aviation groups (and agreed to by the Proponent) to have them remain in place, the towers will be removed. ■ Once removed, they will be dismantled and components will be reused, recycled, or disposed of in the appropriate facilities. The concrete foundations will be removed completely or to approximately one metre, with soil and soil horizons replaced and reinstated. An annual seed mixture will be used to mitigate soil erosion.

5.4 Site Restoration of Lands Affected by the Facility

To the extent possible, restoration activities in the Project area will occur immediately following the decommissioning of Project components. The Proponent's objective is to restore the lands affected by the proposed facility to pre-disturbance conditions. As the majority of the Project Study Area is primarily comprised of agricultural fields, the following site restoration activities will consider:

- Original soil horizons, soil types and nutrient content;
- Potential for soil contamination occurring during the Project and need for soil contaminant testing;
- Erosion and sedimentation control strategy, and other Best Management Practices; and,
- Size and type of infrastructure being removed (magnitude of environmental effects).

In land areas disrupted by decommissioning activities that are not agricultural, re-vegetation will utilize native plant species or agronomic mixes acceptable to the SVCA or MNR. Re-vegetation success and potential for soil erosion may be affected by the timing (season) of planting; therefore, a cover crop or sheeting may be used temporarily to minimize the risk of erosion until appropriate weather conditions permit re-vegetation.

The only materials from Project components that will remain in the Project area following decommissioning activities will be the portion of wind turbine foundations approximately 1 m below grade, and underground collector lines approximately 1 m below grade. The remaining portions of wind turbine foundations and underground collector lines are not anticipated to have any negative environmental effects because they will be inert, contain no materials known to be harmful to the environment, and will be at a depth that will not interfere with agricultural activities.

5.4.1 Agricultural Lands

Where the Project location is situated in agricultural areas, lands will be restored to allow agricultural activities to continue.

- Agricultural lands that have been compacted will have the subsoil re-graded to maintain natural surface drainage patterns were possible;

- Where topsoil is required to ensure that land depth is consistent with surrounding areas it will be sourced as certified clean fill and will match the existing soil types as closely as possible; and,
- Any capped or damaged tile drains will be replaced by a licensed contractor to ensure appropriate drainage of the farmland.

5.4.2 Water Resources

- Decommissioning activities occurring in the vicinity of watercourses or aquatic habitat will be completed in consultation with the SVCA;
- Where landowners request the removal of culverts, the SVCA, MNR, and DFO will be consulted as required;
- Following the removal of any culverts, the banks and channel bed will be contoured to match the upstream and downstream grade;
- Native riparian vegetation will be planted to replace any riparian vegetation disturbed during decommissioning activities to prevent erosion and promote proper riparian function; and,
- Any underground watercourse crossings required for collector lines will remain in place after decommissioning activities in order to avoid disturbance to watercourses that would likely occur if collector lines were removed.

5.4.3 Spills

Accidental spills or releases of contaminants may occur during the refuelling, operation, or maintenance of decommissioning equipment.

- In the event that any ground or soils are contaminated, the impacted soils will be removed and disposed of at a Ministry of the Environment (MOE) approved facility; and,
- Removed soils will be replaced with fill that matches the existing soil types as closely as possible.

5.4.4 Cultural Heritage Resources

If any previously undocumented archaeological sites are encountered during the course of decommissioning activities, a licensed archaeologist will be retained to assess those sites and further mitigation results will be determined at that time. A review of available cultural heritage information and a site visit (if required) will be completed prior to the start of decommissioning activities to determine if any additional assessments are required. By following the appropriate mitigation measures, no significant adverse effects on protected properties or archaeological and heritage resources are anticipated during the decommissioning of the Project.

5.4.5 Waste Disposal

Waste generated from the project will be limited as the majority of materials, including components of wind turbine generators, may be reused. Expected waste materials include:

- Oils, fuels and lubricants;
- Transmission poles; and,
- Plastics, building materials, demolition debris (wood, metals, fiberglass).

These materials will be reused or recycled wherever possible. Wind turbines that are still in good condition after decommissioning will be carefully disassembled and sold for reuse.

5.5 Decommissioning Notification

Decommissioning notifications may be distributed in the form of published notices, letters, direct communication, or updates on the Project or Proponent website.

5.6 Closing

The Decommissioning Report has been completed to fulfill regulatory requirements as mandated by the provincial government for the development of the Project. This Report is consistent with the provisions of Ontario Regulation 359/09, as amended for a Class 4 Wind Facility as set out by the Green Energy and Green Economy Act, 2009. Significant adverse effects from the construction and installation, operational, and decommissioning activities to the environment have been minimized through careful facility layout planning, the application of appropriate mitigation measures, and adherence to all regulatory requirements.

ABORIGINAL REPORT SUMMARIES

Archaeological Assessment Report Summary

6.0 ARCHAEOLOGICAL ASSESSMENT REPORT SUMMARY

A Stage 1 Archaeological Background Study was conducted the Project and submitted to the Ministry of Tourism and Culture and Sport for review. This Stage 1 study resulted in the conclusion that the potential for pre-contact Aboriginal and Euro-Canadian sites was deemed to be moderate to high. As a result, a Stage 2 Archaeological Assessment was recommended for portions of the Project.

The Stage 2 Archaeological Assessment was conducted between and focused on turbine sites, collector cable routes, access roads, construction roads, transmission lines, laydown areas and substations. The Stage 2 Assessment covered approximately 1,100 hectares (ha).

6.1 Archaeological Potential

The following factors were examined to determine the potential for archaeological resources in the Project Study Area:

- Topography, soil conditions and proximity to water sources;
- Known sites already in the area; and,
- Historical documentation.

6.1.1 Topography, Soil and Water Sources

The Project Study Area is relatively flat and was therefore suitable for settlement. The soils of the Study Area are poorly drained soils that are primarily clay. Some portions of the Project Study Area would have been suitable for pre-contact Aboriginal agriculture, although not ideal.

Numerous small creeks run through the Project Study Area and four watersheds feed into it. The Penetangore, Lake Fringe, and Lower Main Saugeen River watersheds all drain into Lake Huron while the Teeswater watershed drains into the Saugeen River. These watersheds contain a number of water sources from creeks to rivers, including:

- North Penetangore River;
- Kincardine Creek;
- Andrews Creek;
- Lorne Creek;
- Lower Saugeen River; and,
- Willow Creek.

6.1.2 Previously Known Archaeological Sites

An archaeological site represents the remains of past human use in an area. This could include a village, an ancient cemetery or something as small as one piece of a stone tool. Within the Project Study Area there are eight previously known archaeological sites. Five of the previously known sites are pre-contact Aboriginal sites and three are historic Euro-Canadian sites. The Project Study Area covers the historic geographic Townships of Bruce and Kincardine, now known as the Municipality of Kincardine and Bruce County. The early survey maps of Bruce Township do not reveal any notable First Nations' activity in the general vicinity though an early survey of Kincardine Township notes an “Indian Camp” in the general vicinity.

6.1.3 Historical Documentation

The Paleo-Indian time period featured caribou hunters, who used spears as their hunting tool. Southern Ontario had an Arctic-like environment during this period, and people lived in small groups and travelled frequently according to the season.

The Stage 2 Archaeological Assessment found 16 Pre-contact Aboriginal sites. They were all found to be campsites, which attests to the soil not being ideal for pre-contact aboriginal agriculture. The presence of campsites indicates the area was extensively utilized by pre-contact aboriginal peoples.

By the Archaic time period, the environment in Southern Ontario had changed to be similar to the way it is now. The early Archaic time period was characterized by slow population growth and a lifestyle similar to the Paleo-Indians. But by the late Archaic time period, the population was growing, communities started creating cemeteries, and bows started being used for hunting.

The Woodland time period saw the introduction of pottery and corn harvesting, and settlements had started becoming permanent year round. By the end of the woodland time period there were large villages based on agriculture longhouses and tribal warfare and displacement between bands.

The Project Study Area is within the historic geographic townships of Kincardine and Bruce. Bruce Township was incorporated into the current township of Kincardine. The Stage 2 Achaeological Assessment resulted in the identification of 20 historic Euro-Canadian sites.

Bruce Township was originally surveyed in 1851 using the 1000-acre section system. From this survey, one and a quarter mile square blocks were created, each containing ten 100-acre farms with the lots fronting onto concession road allowances. By 1880, historic structures included houses, cemeteries, churches, mills, shops and schools. The community of Eskdale was located within the historic township of Bruce, but it was never substantially developed as residents would travel to Tiverton and Glammis for necessities. The village of Tiverton straddled the historic township line between Bruce and Kincardine townships. Tiverton was incorporated into the current Municipality of Kincardine.

The survey of Kincardine Township was conducted in three phases, the Lake Range Lots in 1847, Durham Road and close concessions in 1848 and the remaining portion in 1850. By 1880 in addition to houses Kincardine Township had cemeteries, churches, mills, shops and schools. Within the historic Township of Kincardine was

the village of Armow, a portion of the community of Glammis, a portion of the village of Tiverton and a portion of the community of Kingarf.

6.2 Closing

In closing, of the 36 sites identified in the Stage 2 Archaeological Assessment, 12 are recommended for Stage 3 Archaeological Assessment to further evaluate the cultural heritage value or interest. However, since all sites recommended for Stage 3 Archaeological Assessment fall outside of the proposed turbine and infrastructure layout impact area, no Stage 3 field work is required in relation to the Project.

ABORIGINAL REPORT SUMMARIES

Cultural Heritage Assessment Report Summary

7.0 CULTURAL HERITAGE ASSESSMENT REPORT SUMMARY

This section summarizes the Heritage Assessment Report that describes the historical context, cultural heritage landscapes and heritage resources in the Project Study Area. Both Bruce County and the Municipality of Kincardine encourage the conservation of land, buildings and sites of historic, architectural and archaeological value.

A Heritage Assessment Report was completed based on:

- Historical research;
- Field surveys; and,
- Public consultation.

The Report provides a historic background of the Project Study Area and describes its historic resources. The resources are evaluated according to the criteria outlined in the Ontario Heritage Act (1990) and potential effects of the Project on cultural heritage resources, such as culturally important landscapes, are identified.

7.1 Early Settlement

The late 1840s marked the first era of Euro-Canadian settlement of Bruce County, which was initially focused along the eastern shore of Lake Huron and later continued along Durham Road. Development followed traditional patterns along transportation routes and included a diversity of lot sizes and land divisions, and large grants along Durham Road.

7.2 Cultural Heritage Landscapes

A cultural heritage landscape tells a story about an area's past. This includes natural landscapes, man-made or altered landscapes or lands that have evolved to have special religious, artistic, cultural or natural significance.

Cultural landscapes were evaluated by researching and describing the history of human occupation and how the landscapes of the Project Study Area have evolved over time. Three types of cultural heritage landscapes are represented within the Project Study Area:

- A vernacular rural landscape which tells the changing story of agricultural practices in the area;
- Swamp lands; and,
- A hydro corridor which is characteristic of the expansive power generation which occurs at the Bruce Power Generating Station.

7.3 Heritage Resources

A heritage resource is a building, structure, landscape or specific feature that is determined to have cultural heritage value, or is protected under the *Ontario Heritage Act*.

'Cultural heritage value or interest' within the Act refers to the cultural meaning of a site. The *Ontario Heritage Act* sets out specific criteria for determining cultural heritage value. A site may have cultural heritage value because it has artistic value or is a rare or representative example of a particular design style; it may be associated with an important person or event; or a site may be recognized as a landmark that defines the character of an area.

In the Project Study Area, a total of 46 houses and 37 barns were identified to be greater than 40 years old and thus carrying the potential for heritage value or interest.

7.4 Protected Sites

There are seven properties located within the Study Area that have been designated as protected sites under the *Ontario Heritage* Act. These include:

- McKellar Block, 52-56 Main Street, Tiverton;
- Baptist Church, 68 Main Street, Tiverton;
- Private Residence, 116 King Street, Tiverton;
- Private Residence, 140 King Street, Tiverton;
- Private Residence, 20 Wickham Street, Tiverton;
- Bruce Lodge No. 341, 94 King Street, Tiverton; and,
- School House (now private residence), Highway 21, Bruce Township.

None of the above sites are located on, adjacent to, or abutting the Project infrastructure.

7.5 Agriculture

Agricultural development in the Project Study Area is divided into 4 historical phases:

- Pioneer farming from the early 1800s;
- Specialized cash crops (wheat, oats and peas) from before 1880 to mid-1900s;
- Further specialization and the expansion of livestock throughout 20th century; and,
- Mixed-use agricultural (pastures, cash crops, woodlots) beginning mid 20th century carrying on to today.

Presently, much of the land continues to be used for agricultural purposes, devoted to cash crop agriculture and pasture for livestock.

7.6 Industry

The earliest industries in the Project Study Area were lumber trade and associated industries such as milling, in response to the needs of pioneers. The earliest mill was constructed in 1848. By 1851, Kincardine contained two operating saw mills, two saw mills under construction, an operating grist mill and two planned grist and saw mills. By 1861, there were 28 saw mills, 7 grist and flouring mills and one woollen mill; this was a testament to the rapid growth in the area.

Salt was discovered just north of Kincardine harbour in the 19th century. The industry supported by this discovery prospered throughout the 19th century and continued to operate into the 20th century. The last salt operation was closed prior to 1968.

Power generation is an important local industry beginning with the construction of the Douglas Point Nuclear Power Station in the 1960s, the first nuclear power plant constructed in Canada. This preceded the Bruce Nuclear Power Station, which was constructed and has been operating since 1969. Kincardine was also home to the first commercial wind power facility in Ontario, which began producing electricity in 2002. Today there are numerous wind turbines located within Kincardine.

7.7 Transportation

King's Highway 21 is one of the earliest roads through the region, originally known in Bruce County as the Saugeen and Goderich Road. Constructed in 1836 the road initially ran along Lake Huron for just 21 km from Bayfield to Goderich. It reached Bruce County in the late 1850s/early 1860s and was an essential route during settlement of the County. It would eventually connect the major communities of Huron County with the lakeshore communities of Bruce County. Today it is known as the Bluewater Highway and is known for its generally scenic landscapes.

7.8 Closing

In closing, the Heritage Assessment Report identified a total of 46 houses and 37 barns to be greater than 40 years old and thus carrying the potential for heritage value or interest. Of these structures, 37 houses and 30 barns were determined to have cultural heritage value or interest. However, there are no anticipated direct or indirect adverse impacts as a result of the Project and no further mitigation is recommended.

ABORIGINAL REPORT SUMMARIES

Natural Heritage Assessment Report Summary

8.0 NATURAL HERITAGE ASSESSMENT REPORT SUMMARY

This section summarizes the Natural Heritage Reports. Significant natural features may not be disturbed without completing an Environmental Impact Statement (EIS) that identifies and describes potential negative effects, mitigation measures, and outlines an environmental effects monitoring plan. Natural features were identified by using the methods of records review and site investigations. The natural features identified are wetlands, significant wildlife habitat, valleylands and woodlands. The significance of these natural features was then evaluated and an EIS was completed for all significant natural features.

8.1 Records Review

A records review involves finding, reviewing and summarizing existing information about natural heritage features that have boundaries within 120 m of the Project Location. Types of records reviewed relate to natural features and water bodies. Some key sources for information about the Project Study Area include:

- Ministry of Natural Resources;
- Environment Canada/Canadian Wildlife Service;
- Ministry of Northern Development, Mines and Forestry;
- Land Information Ontario;
- Saugeen Valley Conservation Authority;
- County of Bruce Official Plan; and,
- Natural Heritage Study for the Municipality of Kincardine.

8.2 Site Investigations

Site investigations include planning and undertaking field work, then compiling and reporting the results. This entails a physical investigation of the air, land and water within 120 m of the Project Location, and determines:

- If any additional natural features exist;
- If the mapped boundaries of natural features are correct;
- The distance between the Project and nearby natural features; and,
- The function, form and attributes of the natural features.

8.3 Evaluation of Significance

Using information from the records review and site investigation, observations were compared against Ministry of Natural Resources accepted standards, guidelines and literature to make an informed decision about the overall value, or significance, of each natural feature within 120 m of the Project Location. Natural feature attributes that contribute to the evaluation of significance include:

- Presence of species of conservation concern;
- Significance of wildlife habitat;
- Presence and significance of wetlands;
- Presence and significance of woodlands; and,
- Presence and significance of valleylands.

8.4 Wetlands

41 wetlands were identified within 120 m of the Project Location, each of which requires an Evaluation of Significance in order to determine whether they need to be carried forward to the EIS. The wetlands identified in the Project Study Area include individual wetlands as well as wetland complexes; they range in size from 0.3 ha to 8947 ha. None of these identified wetlands overlap with the Project Location but each will be treated as significant and appropriate mitigation measures will be applied as part of the EIS. Detailed mitigation measures have been identified in the EIS and include careful construction planning and best management practices, which will protect wetland plants and animals, and connections between surface water and groundwater.

8.5 Significant Wildlife Habitat

Broadly, the 4 categories of significant wildlife habitat identified within 120 m of the Project Location are:

- Seasonal concentration areas;
- Rare vegetation communities and specialized wildlife habitat;
- Habitat for species of conservation concern; and,
- Animal movement corridors.

There are 173 candidate significant wildlife habitats confirmed within 120 m of the proposed development activities of the Project Location. After comparing site specific conditions to provincially established significance criteria, 118 significant wildlife habitats were identified within 120 m of the Project Location. These wildlife habitats have either been confirmed or treated as significant. All habitats currently treated as significant will require pre-construction surveys to confirm their significance prior to the development of this facility.

Mitigation measures include:

- Restoring temporary disturbance areas;
- Sediment and erosion controls; and,
- Scheduling construction activities to lessen impacts.

8.6 Valleylands

A valleyland is defined as a natural area that occurs in a valley and has water flowing through or standing for some period of the year. Information on existing valleylands was obtained through site-specific field investigations, records reviews and agency consultation. Through detailed site investigations and comparing the findings of these investigations to provincially established significance criteria, 5 valleylands were considered significant. The valleylands within the Project Study Area range in size from 119 ha to 652 ha. The Project is proposed to overlap with the boundaries of 2 of these valleylands. They are located within agricultural fields and minimal vegetation removal is to be expected. Detailed mitigation measures have been identified in the EIS and include careful construction planning and best management practices, such as sediment and erosion controls and spill response plans.

8.7 Woodlands

There are 99 woodlands confirmed within 120 m of the proposed development activities of the Project Location. The size of these woodlands range in size from 2 hectares (ha) to 5093 ha. The Project is not proposed to be located in any of these woodlands. After comparing site specific conditions to provincially established significance criteria, 59 significant woodlands were identified within 120 m of the Project Location. Detailed mitigation measures have been identified in the EIS and include careful construction planning and best management practices, such as sediment and erosion controls and spill response plans.

8.8 Potential Effects and Mitigation Measures

Potential effects of the Project are expected to be minimal and ongoing environmental monitoring will take place to confirm this expectation. Temporary disturbance (e.g., noise) during construction is likely to have the largest impact.

All potential negative effects will be mitigated by following best management practices. Additional measures will include:

- Scheduling construction within significant wildlife habitats to avoid breeding season;
- Conducting nest surveys in significant wildlife habitats before construction; and,
- Post-construction monitoring to confirm predicted effects.

Assuming the implementation of the planned mitigation measures, monitoring programs and contingency plans (if necessary) there is unlikely to be any significant impacts to natural heritage features, including wetlands, significant wildlife habitat, valleylands or woodlands.

8.9 Closing

The Natural Heritage Assessment has been completed to fulfill regulatory requirements as mandated by the provincial government for the development of the Project. This Report is consistent with the provisions of *Ontario Regulation 359/09, as amended* for a Class 4 Wind Facility as set out by the *Green Energy and Green Economy Act, 2009*. Significant adverse effects from the construction and installation, operational, and decommissioning activities to the environment have been minimized through careful facility layout planning, the application of appropriate mitigation measures, and adherence to all regulatory requirements.

ABORIGINAL REPORT SUMMARIES

Noise Impact Assessment Report Summary

9.0 NOISE IMPACT ASSESSMENT REPORT SUMMARY

The following summarizes the information outlined in the Noise Impact Assessment. It provides an overview of how noise receptors are defined in the MOE Noise Guidelines, the noise modelling that was conducted for the Project as well as the results of this modelling, and lastly what the predicted cumulative effects will be.

9.1 Noise Receptors

Noise receptors are defined in *O. Reg. 359/09, as amended* as, “the centre of a building or structure that contains one or more dwellings” or “buildings used for an institutional purpose including an educational facility, day nursery, health care facility, community centre or place of worship”.

All Points of Reception (PoR), as defined by MOE Noise Guidelines (MOE, October 2008. Noise Guidelines for Wind Farms, Interpretation for applying MOE NPC Publications to Wind Power Generation Facilities), were considered in the Noise Impact Assessment. The guidelines generally define a PoR as a house, campground, church, school or other sensitive building that is not located on the same premises as the wind farm, including its turbines and ancillary structures. PoRs can also include locations on vacant lots that have residences as a permitted use; in this case a Vacant Lot Receptor (VLR) was placed on such lots in a location consistent with the building pattern in the area.

9.2 Noise Modeling

Noise modelling was used in the development of the final layout for the Project and ensure that noise levels meet the *Ministry of the Environment Noise Guidelines for Wind Farms* at all PoRs. The process followed the following four steps:

1) **Identify PoRs**: Identify PoRs within 1,500 m of any turbine or substation. PoRs were identified using available aerial imagery and validated in the field.

2) **Determine Project Details**: Obtain the turbine specifications from the manufacturer. A wind turbine manufacturer provides a specific noise performance level for their turbine. The sound a turbine makes depends on several factors including wind speed as well as the specific design and model of the wind turbine.

3) **Model the Noise Levels**: Incorporate the turbine and substation locations and sound power levels into a noise model to predict overall noise levels at each PoR.

4) **Adjust the Layout**: Turbine locations are often moved around several times during modelling to minimize noise levels at identified receptors. The final layout cannot be decided until we can ensure that, in addition to other Project constraints that noise levels at all PoRs are in compliance with MOE Noise Guidelines.

9.3 Results

There are a total of 397 PoRs located within a radius 1,500 m of a wind turbine or the substation, among which 147 are VLRs and 250 are dwellings or other sensitive receptors such as churches, cemeteries and schools. There are 36 dwellings and two VLRs considered as Participating Receptors.

All receptors within 2000 m of Project infrastructure are compliant with MOE Noise Guidelines.

9.4 Cumulative Impacts

All other planned wind projects within 5 km of the Project must be considered in the Noise Study Assessment Report, in accordance with O. Reg. 359/09, as amended.

The Project is located within a region of high wind farm development activity.

Three wind farms (including some or all of their components) are located within 5 km of the Project. These facilities include:

- Enbridge Wind Farm (Enbridge Ontario Wind Power LP, 155 turbines were considered but only 110 were built);
- Cruickshank Wind Farm (Enbridge Ontario Wind Power, LP, 5 turbines); and
- Ripley Wind Farm (Suncor Energy Products Inc., only the substation is located within 5 km of the Project).

The cumulative impacts of these facilities were considered in the Noise Impact Assessment. All PoRs for the Project are in compliance with MOE Noise Guidelines.

9.5 Closing

The Noise Impact Assessment has been completed to fulfill regulatory requirements as mandated by the provincial government for the development of the Project. This Report is consistent with the provisions of *Ontario Regulation 359/09, as amended* for a Class 4 Wind Facility as set out by the *Green Energy and Green Economy Act, 2009*.

The noise modeling has concluded that the Project is compliant with the MOE noise limits at all PoRs and Vacant Lot Receptors within 1,500 m of the Project's noise sources, for wind speeds of 6, 7, 8, 9 and 10 m/s.

ABORIGINAL REPORT SUMMARIES

Wind Turbine Specifications Report Summary

10.0 WIND TURBINE SPECIFICATIONS REPORT SUMMARY

10.1 Proposed Wind Turbines

To generate the total installed nameplate capacity of up to 180 MW the Project will utilize the Siemens SWT-2.3-101 wind turbine generator. The Siemens SWT-2.3-101 wind turbine model is especially suited to areas with low to medium wind speeds and offers support for grid connections in all major markets

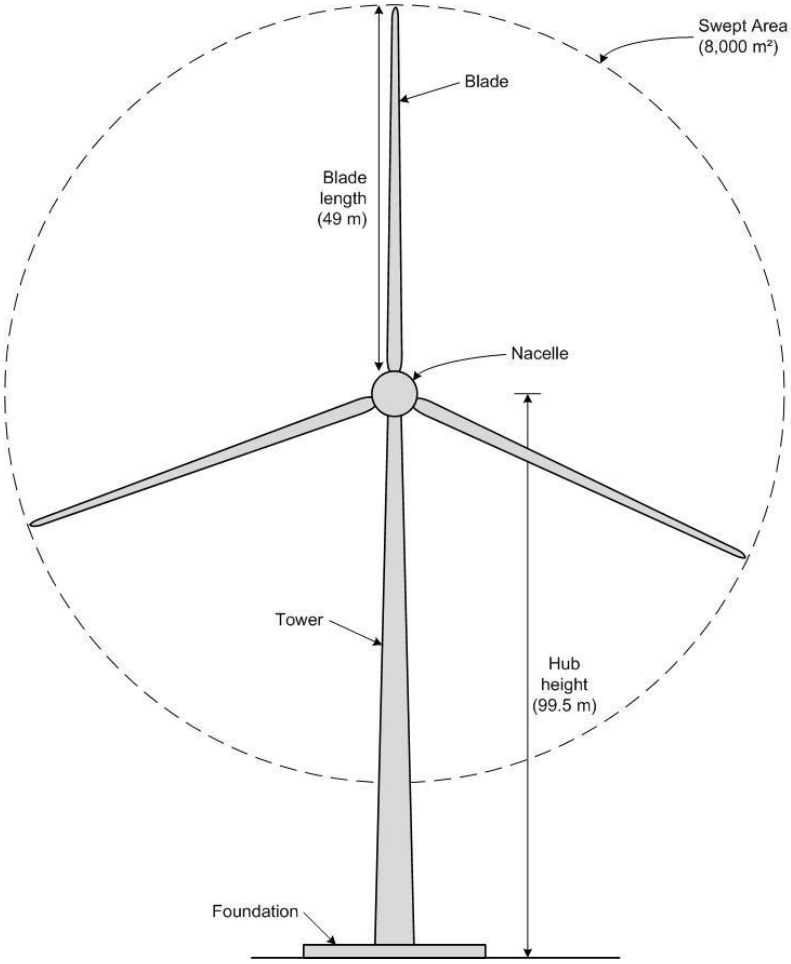

Figure 1: Basic Wind Turbine Generator Specifications

10.2 Turbine Components

10.2.1 Turbine Blades

As shown on Figure 1, the Siemens 101 model has three 49 metre (m) long blades attached to a hub that sits at a height of 99.5 m. The turbine blades will cover a total swept area of 8,000 square-metres (m^2).

10.2.2 Lightning Protection

The turbine is equipped with lightning protection features to protect it from the effects of direct and nearby lightning storms. All components are grounded and the tower acts as a conductor from the nacelle to the earth.

10.2.3 Nacelle

The nacelle houses the turbine and gearbox. It is climate controlled and constructed from steel and fibreglass.

10.2.4 Tower

Standing approximately 100 m high, the turbine will stand as tall as a 30 story building.

10.2.5 Foundation

Geotechnical studies will be conducted at each turbine location. The foundations will be approximately 290 m2 (17 m by 17 m) and are made of rebar and formwork filled with cast in place concrete. Foundations typically extend to a depth of 3 m or less and only a small portion of the foundation will be visible after the foundation is backfilled with earth.

10.2.6 Producing Electricity

Each turbine has a maximum capacity to produce 2.3 megawatts (MW) of electricity; however, wind turbines do not spin constantly. They are designed to produce electricity within a specific range of wind speeds.

The ‘cut-in wind speed’ is the minimum amount of wind needed for the turbines to start producing electricity while the ‘cut-out wind speed’ is the maximum amount of wind the turbines can handle while they are operating. The turbines used in the Project have a cut-in wind speed of approximately 3 m/s or 11 km/h and a cut-out speed of 25 m/s or 90 km/h. If the wind speeds are greater than 90 km/h the turbines will automatically shut themselves down so they do not get damaged.

The rated wind speed of the turbines is 12 – 13 m/s or 45 km/h. This is the wind speed at which the wind turbines generate the highest amount of electricity. The wind turbines that will be used for the Project have a maximum broadband sound power level of 106.0 decibels (dBA) while in use.

10.3 Closing

The *Wind Turbine Specifications Report* has been completed to fulfill regulatory requirements as mandated by the provincial government for the development of the Project. This Report is consistent with the provisions of *Ontario Regulation 359/09, as amended* for a Class 4 Wind Facility as set out by the *Green Energy and Green Economy Act, 2009*. Significant adverse effects from the construction and installation, operational, and decommissioning activities to the environment have been avoided through careful facility layout planning, the application of appropriate mitigation measures, and adherence to all regulatory requirements.

11.0 REPORT VIEWING LOCATIONS

The Reports summarized in this document can be found at the following locations as of September 3, 2012. The draft reports will be provided to Aboriginal Communities on August 31, 2012.

Bruce County Clerks Office
30 Park Road
Walkerton, ON

Kincardine Clerks Office
1475 Con 5, RR5
Kincardine, ON

Kincardine Library
727 Queen Street
Kincardine, ON

Saugeen Ojibway Nation
35 Lakeshore Road
Southampton, ON

Tiverton Library
56 King Street
Tiverton, ON

Historic Saugeen Métis Band Office
204 High Street
Southampton, ON

Chippewas of Nawash Unceded First Nation
135 Lakeshore Blvd., RR 5
Wiarton, ON

Saugeen First Nation
6493 Highway 21
Southampton, ON

Great Lakes Métis Council
380 9th Street East
Owen Sound, ON

Métis Nation of Ontario
355 Cranson Crescent
Midland, ON

The reports summarized in this Report will also be made available on September 3, 2012 at www.armowwind.com under “project documents”.

To learn more about the Project or to provide feedback:

Website: http://www.armowwind.com

Phone: 519-672-3006

Email: info@armowwind.com

Report Signature Page

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KM/IC/AC/gf

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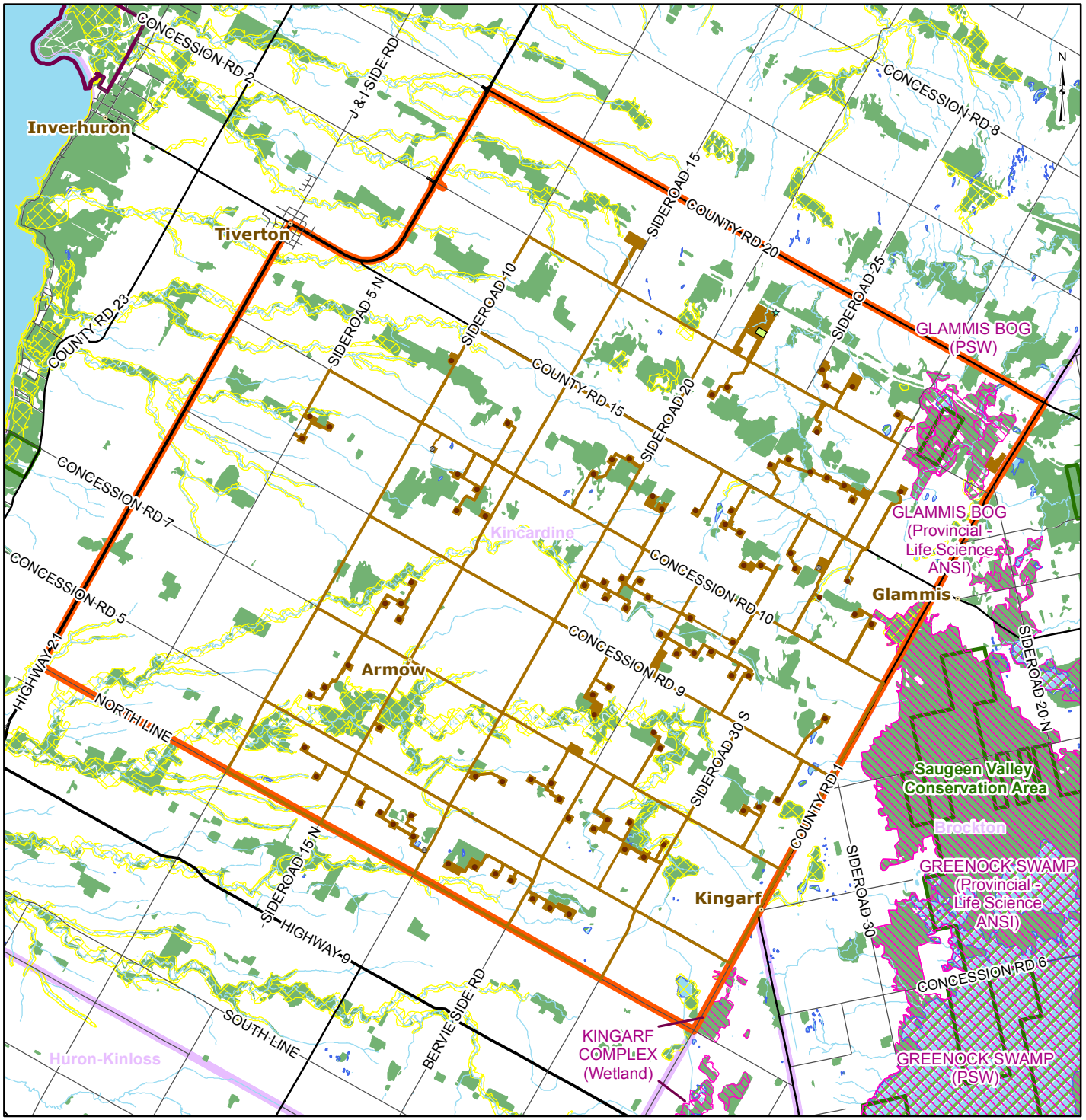
FIGURE 2

Project Location



LEGEND

- Turbine
- MET Tower
- Point Of Interconnect (POI)
- Community
- Railway
- Highway
- Major Road
- Local Road
- Watercourse
- Project Study Area
- Project Location
- Substation
- Provincial Park
- Conservation Area
- Natural Feature
- Kincardine Hazard Land
- Wetland
- Waterbody
- Wooded Area
- Municipal Boundary

NOTES:

All potential project collector routes are shown on this figure, final design will likely reduce overall footprint.

REFERENCE

1. Base Data - MNR LIO, obtained 2009
2. Natural Features compiled by Golder from NRVIS base data, NHIC Natural Areas and MNR Wetland and ANSI data, obtained 2010
3. Hazard Lands - Bruce County, obtained 2010

Produced by Golder Associates Ltd under licence from Ontario Ministry of Natural Resources, © Queens Printer 2010
Projection: UTM Datum: NAD 83 Coordinate System: UTM Zone 17

0 0.75 1.5 3 4.5 6

SCALE 1:110,000 KILOMETRES

PROJECT

ARMOW WIND PROJECT

TITLE

PROJECT LOCATION

Golder Associates
Mississauga, Ontario

PROJECT NO. 11-1151-0247			SCALE AS SHOWN	REV.
DESIGN	ME	23 Jul. 2012		
GIS	ME	15 Nov. 2012		
CHECK	KM	15 Nov. 2012		
REVIEW	IC	15 Nov. 2012		

FIGURE: 2

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