PORT RYERSE
WIND POWER PROJECT
CONSTRUCTION PLAN REPORT

File No. 160960773
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Record of Revisions

Revision	Date	Description
0	November 2012	Submission to Municipalities and Aboriginal Communities
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Table of Contents

Table of Contents

Table of Contents

List of Tables

List of Appendices

1.0 Introduction

1.1 PROJECT OVERVIEW

Boralex Inc. (Boralex), in association with UDI Renewables Corporation (UDI), is proposing to develop the Port Ryerse Wind Power Project (the Project) east of the hamlet Port Ryerse in Norfolk County , Ontario, in response to the Government of Ontario's initiative to promote the development of renewable electricity in the province. The Project was awarded a Feed-In-Tariff (FIT) contract with the Ontario Power Authority (OPA) on February 25, 2011. Further information on the Project can be found on the Project-specific website at http://www.udi-canada.com. Boralex Inc. is a power producer whose core business is dedicated to the development and operation of renewable energy facilities. Further information on Boralex can be found at http://www.Boralex.com/en/.

The Renewable Energy Approval (REA) process for the Port Ryerse Project was originally initiated by UDI, with the assistance of M.K. Ince and Associates Ltd (MKI). Boralex is considering acquisition of the Project from UDI and retained Stantec Consulting Ltd. (Stantec) to complete the REA Application, as required under Ontario Regulation 359/09 - Renewable Energy Approvals under Part V.0.1 of the Act of the Environmental Protection Act (O. Reg. 359/09). According to subsection 6(3) of O. Reg. 359/09, the Project is classified as a Class 4 Wind Facility and will follow the requirements identified in O. Reg. 359/09 for such a facility.

The Project Study Area is generally bounded by i) Woolley and Gilbert Roads to the north; ii) Port Ryerse Road to the west; iii) Hay Creek to the east and iv) Avalon Lane to the south (**Appendix A, Figure 1**). The proposed Project Location includes all parts of the land in, on, or over which the Project is proposed. The Project Location (**Appendix A, Figure 2**), including all Project infrastructure, is sited on privately-owned lands, where landowners have entered into a lease agreement with Boralex/UDI. Permissions to access these properties have been obtained through verbal discussions with landowners, as a requirement of their signed agreements with Boralex /UDI.

Three wind turbine models were initially assessed as part of the REA process, the Siemens SWT 3.0 113, ENERCON E-92 2.35 MW and ENERCON E-82 E2 2.3MW; however one turbine model has been selected as the preferred alternative; the Siemens SWT 3.0 113.

The Project will include four Siemens SWT 3.0 113 wind turbine generators. The 3.0 MW turbines will be customized to a nameplate capacity of 2.5 MW for this Project. The total maximum installed nameplate capacity of all four turbines will not exceed 10 MW. Other basic components include step-up transformers located adjacent to the base of each turbine (step up voltage from approximately 0.69 kV to 27.6 kV), a 27.6 kV underground collector system, fibre optic data lines, a distribution substation, a permanent parking lot (if required), a meteorological tower and turbine access roads.

Temporary components during construction include laydown areas at the turbine locations and crane pads. No operations and maintenance building or transmission line is anticipated to be required for the Project. No Project components are located within municipal road Rights of Way (ROWs).

The 27.6 kV underground collector lines will transport the electricity generated from each turbine to the distribution substation located on private property east of Port Ryerse Road. Directional bore techniques will be used where the underground collector lines cross valleylands and watercourses. At the substation, a dip-pole connection will be made directly into the local distribution system.

1.2 REPORT REQUIREMENTS

The purpose of the Construction Plan Report is to provide the public, Aboriginal communities, municipalities, and regulatory agencies with an understanding of construction activities relating to the Project, including any environmental effects that may result from engaging in the Project.

The Construction Plan Report has been prepared in accordance with Item 1, Table 1 of O. Reg. 359/09 and the Ministry of the Environment's (MOE) "*Technical Guide to Renewable Energy Approvals"* (MOE, March 2012*)*. O. Reg. 359/09 sets out specific content requirements for the Construction Plan Report as provided in **Table 1.1**.

Table 1.1: Construction Plan Report Requirements: O. Reg. 359/09

Requirements	Completed	Section Reference
Set out a description of the following in respect of the renewable energy Project:		
Details of any construction or installation activities.	✓	Section 2.0
The location and timing of any construction or installation activities for the duration of the construction or installation.	✓	Sections 2.0 and Appendix A
Any negative environmental effects that may result from construction or installation activities.	✓	Section 3.0
Mitigation measures in respect of any negative environmental effects mentioned in paragraph 3.	✓	Section 3.0

2.0 Construction and Installation Activities

This section describes the construction and installation activities required for the Project.

2.1 PRE-CONSTRUCTION ACTIVITIES

Prior to construction, a registered Ontario Land Surveyor (or equivalent) will survey and stake access roads, electrical collector lines (underground), turbine locations, the distribution substation and laydown areas as appropriate. The Project Location includes the footprint of the facility components, plus any temporary work and storage locations (**Appendix A**). All construction and installation activities will be conducted within this designated area; this includes ensuring that construction vehicles and personnel stay within the marked areas. The Project's underground collector system would be entirely located on privately owned lands where landowners have entered into lease agreements with Boralex/UDI. The collector lines will transport the electricity generated to the distribution substation for connection into the local distribution network.

The Project Location generally consists of the following pre-construction areas:

- Turbine laydown area: will be approximately 1 ha in size and used around the base of each turbine for temporary storage of the turbine components, construction materials, assembly of the base and rotor (nacelle and blades), and foundation spoil (excavated soil from foundation area). Also within the laydown area will be the crane pad, which will be used to support heavy equipment such as large cranes during construction.
- Access roads: 6 m wide gravel road to Turbine 1, 11 m wide gravel roads to Turbines 2, 3 and 4 (access roads will include wider turning radii). During operations the 11 m wide access roads connecting Turbines 2, 3 and 4 will be reduced to the width of a common driveway.
- Parking lot: approximately 15 m x 15 m.
- Crane pad area: approximately 40 m x 22 m adjacent to each turbine location.
- Distribution substation property: approximately 30 m x 60 m.

Wherever possible, the construction area has been reduced or moved on a site-specific basis to avoid natural features and water bodies (**Appendix A**).

Limited vegetation removal in hedgerows will be required for the installation and/or construction of several Project components including access roads, turbines, the distribution substation, and underground collector lines/fibre optic cable as well as temporary Project components, such as laydown areas at each turbine location and crane pads. No vegetation removal will occur in significant natural features identified within the 120 m Zone of Investigation. Clearing is typically accomplished using equipment to fell, de-limb, and transport vegetation away from the site.

Heavy equipment is then used to remove stumps and remaining vegetation through a process called “grubbing.”

The existing topsoil will be stripped and removed from all construction areas. Where possible, topsoil will be stored for reuse at the site or removed based on landowner consultation. All measures will be undertaken to ensure topsoil does not mix with subsoil. Inspections will be required by qualified geotechnical personnel during topsoil stripping to ensure that all unsuitable materials are removed. Any soft or disturbed areas identified during site preparation or general construction activities would be removed and replaced with engineered fill approved by qualified geotechnical personnel. Surplus soil generated during construction will be removed from the site for disposal in an approved manner (**Section 3.8**).

Vegetation will only be cleared where absolutely necessary. Areas to be cleared must be clearly marked using flagging tape, fencing, spray paint, or other signage prior to beginning any clearing activities. If tree removal is required, trees will be felled into the area to be cleared to prevent damage to surrounding vegetation. Where possible, tree clearing will take place during winter months while the ground is frozen to reduce the potential for soil compaction and rutting and to avoid potential effects to nests of migratory birds. Final vegetation removal will take place immediately before construction begins to minimize soil exposure. If absolutely required, limited areas may be cleared in advance to facilitate the construction schedule provided that erosion control measures outlined in **Section 3.0** are undertaken to limit soil exposure and erosion.

It is recommended that tree clearing occur in winter, outside the core breeding season (May 15th to July 31st) for forest birds, to avoid disruption or destruction of nests. If tree clearing is required during the core breeding season, an ornithologist will undertake a nest survey prior to clearing to identify nesting birds. Identified nests will be provided with an appropriate clearing buffer as recommended by the ornithologist until breeding season has ended and young have fledged. To the extent possible, clearing activities will be limited and timed so that disturbance to wildlife breeding and breeding bird nesting is avoided.

Geotechnical work was completed to obtain general subsurface information within the Project Study Area. This information will be used to design/modify an appropriate style of foundation for each turbine and the distribution station.

2.2 PROJECT COMPONENT INSTALLATION

Following pre-construction activities, Project construction will commence including component installation and site restoration.

The Project will consist of four Siemens SWT 3.0 113 wind turbine generators. The 3.0 MW turbines will be customized to a nameplate capacity of 2.5 MW for this Project. The total maximum installed nameplate capacity of all four turbines will not exceed 10 MW. Other basic components include step-up transformers located adjacent to the base of each turbine (step up voltage from approximately 0.69 kV to 27.6 kV), a 27.6 kV underground collector system, fibre

optic data lines, a distribution substation, a permanent parking lot (if required), a meteorological tower and turbine access roads. Temporary components during construction include laydown areas at the turbine locations and crane pads.

2.2.1 Wind Turbine Generators

Turbine Foundations

Foundations are made of poured-in place concrete foundation. Foundation to be designed based on a site specific geotechnical assessment. Foundation designs could be either a gravitational spread type footing with or without piles. Piles may be required at some locations should soil conditions require piling. Gravitational spread type footings are octagonal in shape with an approximate diameter of 20 m (or 60 feet), and 3 m deep. Piles would be added to the foundation if necessary. The Project could also use a newer style of pile called Geopiles which would be implemented at the site. The area excavated for each turbine will be approximately 380 m^2.

An excavator and truck will be used to excavate the foundation, and no blasting is anticipated. Surface material will be stripped and stockpiled (topsoil separate from subsoil). Inspections will be required by qualified geotechnical engineering personnel during excavations to confirm that conditions are consistent with the requirements of the *Occupational Health and Safety Act*. Ready mix trucks will be used to transport the concrete from a commercial facility to the sites. Each excavation will take approximately two to three days, and foundation construction (formwork, rebar placement and concrete pour) is expected to be completed within 2 weeks; if a pile foundation is needed then additional time will be required. The foundation will then need to cure for approximately 28 days prior to erection of the turbine. The foundation itself will then be backfilled with approved imported backfill. Construction vehicles will stay on-site during foundation construction. If bedrock is encountered close to the surface it will be removed by mechanical digger to the necessary depth required for the foundation.

The concrete required for foundation construction will be provided via a commercial facility located in close proximity to the Project. Wash water from the cleaning of cement truck drums will be minimal. Disposal will be done in a manner compliant with regulatory requirements and acceptable to stakeholders.

Grounding for the wind turbine will be provided by a ground grid installed within and around the concrete foundation and connected to the reinforcing steel of the foundation, electrical grounding probes in the foundation and/or steel piles.

Turbine Assembly

The Project will include four wind turbine generators, each consisting of sectional steel towers, three blades, a nacelle, rotor hub and step-up transformer. The turbine tower base is approximately 4 m in diameter and will be anchored to the concrete foundation using large diameter anchor bolts.

The turbine towers will be assembled using a heavy-lift crawler crane. The nacelle arrives on-site pre-assembled and is lifted into place by the heavy-lift crane. The rotor is assembled on-site, and consists of the hub and three blades. The blades can either be lifted individually and fastened to the hub or assembled on the ground and mounted as a unit. The assembly and erection of the turbine takes approximately 3 to 5 days depending on wind conditions (cranes cannot operate in wind speeds greater than 8-9 m/s).

2.2.2 Electrical Infrastructure

A step-up transformer (with a footprint measuring approximately 2 m x 2 m) at the base of each turbine converts the power generated by the nacelle to a voltage compatible with the collector line system (27.6 kV). Underground collector lines connect directly to the step-up transformer.

Electrical Collector Lines

From each step-up transformer, 27.6 kV underground collector lines would carry the electricity generated by the turbines to the Project's distribution substation where a dip-pole connection will be made directly from an underground line into the local distribution system. Fibre optic data lines used for monitoring and control of each turbine will run with the collector lines. Where possible, underground collector lines have been incorporated into the design of the access roads to reduce the area required for construction and to minimize potential construction impacts; the cables would be installed immediately to one side of the access road, just off the gravelled surface. Approximately 2.41 km (2,410 m) of underground collection line would be installed as part of the Project. For underground collector line construction, a trench is ploughed and reel trucks dispense the cable, which would be installed by a backhoe or track mounted excavator at a depth of approximately 1 m. No blasting is anticipated for the installation of the underground collector lines. The cables would be bedded in sand and the trench would be backfilled with native soils or approved imported backfill. Warning tape would be installed along the whole length of the underground cables, approximately 300 mm above the cables.

Where there are crossings of watercourses, the underground collector lines would be installed by directional drilling. If site conditions require directional drilling to cross roads, streams, valleylands or other obstacles, lines may be installed in plastic conduits.

No transmission lines would be constructed for the Project.

Distribution Substation

The Project's distribution substation yard would be approximately 1800 m^2 (30 m x 60 m) in size and would be located on private property east of the intersection of Port Ryerse Road and Cookson Street (**Figure 2**). Construction of the substation would include excavation of the area for the electrical grounding grid system, concrete foundation placement of gravel. Substation structures would be installed on the foundation and electrically connected to the incoming and outgoing 27.6 kV underground collector line, where it would connect directly to the local distribution system via a dip pole. The substation site would house the disconnection switches

and breaker, control devices, and communication and metering systems required to support the operation of the substation. The area may also be used to temporarily act as a Project office site with one or two modular trailers.

2.2.3 Access Roads and Parking Lot

An estimated 560 m section of upgrade to an existing municipal road and 2.33 km of new access roads would be required to support construction and transportation vehicles and for use during the operation phase . There are two alternative 6 m wide access roads to Turbine 1. Final selection of one alternative will be based on discussions with Siemens (the turbine manufacturer). Access to Turbines 2, 3 and 4 would be achieved by upgrading a 560 m section of Avalon Lane which will connect to three Project access roads 11 m wide**.** The 11 m wide roads connecting Turbines 2, 3, and 4 will be reduced to the width of a common driveway once construction is completed. All roads will require wider turning radii for construction equipment. The access roads to Turbines 2, 3 and 4 have been designed to be of sufficient width to accommodate movement of the assembled crane between turbine locations during construction.

All new access roads will be sited in active agricultural fields. Access roads have been planned in consultation with the landowners, where possible, parallel property boundaries to reduce potential impacts to drainage systems, farm operations and agricultural lands. No temporary structures (such as culverts) and no direct impacts to on-site woodlots or vegetation are anticipated during access road construction. No blasting would be required for the access roads; excavation is expected to be above the water table at all times. It is anticipated that entrance permits will be obtained from Norfolk County for the access roads.

To construct the access roads limited vegetation would be removed (**Section 2.1**). The surface material will then be stripped and stockpiled (topsoil separate from subsoil). This stockpiled material will be reused on site as needed or removed based on landowner consultation. Prior to the placement of the granular base materials, a non-woven geotextile material would be laid down at the base of the excavation to separate the native clay sub-grade from the granular road base materials. The road base would consist of 450 millimetre (mm) of Granular B Type II overlain by 150 mm of granular A. The road base would be rolled to provide an even driving surface.

To avoid potential damage to the serviceability of the road structure, the finished sub-grade surface in the road alignment would be graded to provide positive drainage away from the road surface. Sub drains out-letting to the ditch lines would be installed and constructed in accordance with *Ontario Provincial Standard Drawing 206.050, Subdrain Pipe Connections and Outlet Details – Rural* (OPSD 206.050). In addition, the finished road surface would be crowned and graded to direct runoff water away from the roadway, similar to the finished surface of the underlying sub-grade.

The access road construction for each turbine takes about one week and uses one to two backhoes, several dump trucks and compaction equipment. Construction vehicles (backhoes and excavators) will stay on-site during road construction.

A 15 m x 15 m permanent parking lot (if required) off Avalon Lane, south of Gilbert Road will be used during construction/decommissioning and operation of the Project. Construction of the parking lot would follow the same steps and use the same material as the access roads construction. The parking lot will not be used as a laydown area. The parking lot may accommodate temporary facilities such as a construction trailer (alternative location may be adjacent to substation infrastructure), sanitary facilities (self-contained), health and safety/first aid facility, lunch facilities, training and site security. Additionally, the footprint of the parking lot will include adequate parking for employee, contractor and service vehicles (approximately 2-3 vehicles).

The new access roads and parking area will be built on private lands and will be privately maintained throughout the life of the Project for ongoing turbine monitoring and maintenance.

2.2.4 Stormwater Management System

As noted in **Section 2.2.3**, stormwater management features will be incorporated into the access roads and constructed in accordance with appropriate regulations and local municipal engineering guidelines. In addition, area drainage from the distribution substation will be accomplished through swales/ditches adjacent to the proposed access road that will collect and convey runoff from the substation area and the associated access road. The total drainage area associated with the substation and access road “hard” surfaces is less than 2 ha and therefore a “wet” water quality control pond (i.e. one containing a permanent pool) is inappropriate, as per the MOE *SWM Planning and Design Guidelines Manual* (2003). In addition to the conveyance of runoff, the swales will also provide water quality control, which is a suitable stormwater management practice for such an area according to the MOE guidelines.

2.2.5 Water Taking

A Geotechnical Investigation was undertaken for the Project (Stantec, 2012). The investigation determined that groundwater was found at depths ranging from 4.7 m to 11.1 m. Therefore given the depths to groundwater it is unlikely that groundwater will be encountered during the installation of turbine foundations, access roads, underground collector lines, fibre optic cable and distribution substation foundation. It was noted however that groundwater may be encountered in deeper excavations. Therefore, it is possible that some dewatering activities would be required (although a Permit to Take Water is not anticipated). Ultimately groundwater infiltration in open excavations is anticipated to be minimal; however the dewatering requirements will be determined by the Construction Contractor once the final design has been completed.

2.2.6 Meteorological Tower

A meteorological tower (met tower) was installed in 2009 on private property, east of Port Ryerse Road. This met tower has been used to identify the quality of the wind resource for the proposed Project. It may remain in operation during the construction and operation phases of the Project.

2.3 TEMPORARY USES OF LAND

Lands to be temporarily used during construction are laydown areas at the turbine locations and crane pads. If required by the Construction Contractor, a small portable trailer may be used as a construction office. This would generally be placed adjacent to the substation infrastructure (an alternative location may be the parking lot). Any temporary structures used during construction would not be serviced, and would be placed within the delineated construction work areas.

The land use prior to construction at all of these areas is agricultural. Following construction activities, all temporary work locations will be restored to pre-impact conditions. Restoration work will start following installation of each wind turbine and removal of all construction materials and equipment from each turbine site. This includes removal of the aggregate, granular and geotextile material from applicable areas (based on landowner preference). Restoration activities will follow the Site Restoration Plan outlined in the Decommissioning Plan Report, and include decompaction, if required and reseeding as necessary.

2.3.1 Turbine Locations

Turbine Laydown Areas

A turbine laydown area covering approximately 1 hectare in size will be required around each turbine for temporary storage of the turbine components, construction materials, crane pad and foundation spoil pile.

Turbine components would be delivered directly to the laydown areas for temporary storage until assembled.

Excavation and grading of the laydown areas (if required) will be determined on a site by site basis. Laydown areas would not be gravelled, and would be restored to pre-existing conditions at the end of the construction phase. Turbine laydown areas will be actively used throughout the construction phase, to varying degrees during all construction activities at the turbine.

Crane Pads

Temporary crane pads would be constructed at the same time as the access roads and would be adjacent to each turbine location, within the turbine laydown area. These pads will be capable of supporting the necessary cranes and equipment required for the installation of the wind turbines. The general crane pad area would be approximately 40 m x 22 m. The process

for crane pad construction includes; surface material will be stripped and stockpiled (topsoil separate from subsoil), and an aggregate base applied with a gravel surface. The excavated topsoil will be re-used on site as feasible or removed based on landowner consultation.

Once the turbine erection is complete, the crane pad areas will be rehabilitated to pre-existing conditions unless the landowner asks for the crane pads to remain. Perimeter surface hydrology will be maintained during crane pad construction.

2.3.2 Watercourse Crossings

Approximately 218 m of underground cabling are required to cross two watercourses between Turbines 1 and 2. The buried lines will be installed using directional drilling techniques in suitably sized plastic conduits at a sufficient depth below the watercourse to prevent any possibility of accidental damage due to dredging or over excavation. Signs indicating the presence and location of the cables will also be placed on either side of the watercourse.

All temporary crossings would comply with the Department of Fisheries and Oceans Canada (DFO's) Ontario Operation Statement '*Temporary Stream Crossings'* where possible. As works will likely be undertaken within a Regulated Area, permit approval will also be required from the Long Point Region Conservation Authority (LPRCA).

2.4 MATERIALS BROUGHT ON-SITE

An estimate of the quantities and types of materials to be transported on-site is provided below (see **Table 2.1**). All estimates will be confirmed and additional details provided upon hiring of the Construction Contractor.

In general, the Project's raw materials consist of standard building materials for construction including concrete, wood, geotextile, aggregate, wiring, cables and metal. Additional materials brought on-site include Project infrastructure described above such as turbines, surge arresters and grounding and control systems equipment.

Construction vehicles such as excavators, trucks for transport of turbine components, and cranes will also be brought on-site during construction and installation. To the extent possible these materials will be procured locally when available and in sufficient quality and quantity and at competitive prices. Boralex/UDI will follow the Ontario Feed-in Tariff Program requirements for minimum Ontario content, which promotes local procurement of materials.

Raw materials will be delivered to turbine laydown areas based on the delivery and construction schedule. If any materials require storage, they will be stored at turbine staging areas for the duration, dependent on the construction schedule. A detailed delivery and construction schedule will be created during detailed design.

Concrete requirements are estimated to be 400–550 m^3 of 30 (MPa) concrete per turbine foundation. The concrete required for turbine foundation construction will be provided via a commercial facility that is located in close proximity to the Project. Ready mix trucks will be used to transport the concrete to each turbine laydown area; there will be no water required for the mixing of concrete on-site. Steel reinforcement requirements are estimated to be 50-80 tonnes per turbine foundation.

Subsurface excavations will be required for turbine foundations, access roads, underground collector lines, and the distribution substation. Backfill required during construction, with the exception of aggregate, will utilize stockpiled material removed during the installation of below ground components – no additional fill from off-site sources is anticipated. Quantity is dependent on grading of site areas.

Gravel requirement estimates are provided in **Table 2.1**.

Table 2.1: Construction Gravel Requirements

Infrastructure	Gravel requirements
Access roads	9500 m^3 of Granular B
Road entrances	400 m^3 of Granular B
Turbine crane pads	1760 m^3 of Granular B
Distribution Substation location	900 m^3 of Granular B
Foundation excavation bottom	650 m^3 of Granular B

Note: values in the above table assume a depth of 0.5 m of Granular B. Values will be similar, but have not been finalized at this time. Following detailed design work on access roads, and discussions with the turbine contractor, updated amounts will be provided to the municipality.

Hazardous materials are limited to fuels and lubricants that will be on-site for use in equipment. These materials will be stored in appropriate storage containers during the construction phase by the Construction Contractor. Type and location of designated storage areas will be confirmed by the Construction Contractor prior to construction. The disposal of waste materials generated at the site or transported from the site is described in **Section 2.8**.

2.5 CONSTRUCTION EQUIPMENT USED

Heavy construction equipment will include the following:

- Heavy Lift Crawler Crane(s)
- Dump trucks
- Water trucks
- Backhoes
- Excavators
- Loaders
- Cable reel trucks
- Boom trucks
- Rollers
- Bulldozers
- Graders
- Concrete Trucks
- Smaller Cranes
- Flatbed trucks
- Auger trucks

Specifications for equipment, including size and weight, will be confirmed upon hiring of the Construction Contractor. The number of trips required is estimated in **Section 2.6**, and will be confirmed upon hiring of the Construction Contractor. Most of the heavy construction equipment will be brought into and out of the turbine siting areas via the access roads. Further information on transportation is provided in **Section 2.6**.

2.6 COMPONENT TRANSPORTATION

The Construction Contractor will implement a Traffic Management Plan to identify and deal with specific traffic planning issues including the management of traffic and the delivery of materials. The Traffic Management Plan will include details on the size and number of trucks, and the timeline and operational plan for transporting materials to the turbine sites (including the sequence of events, duration of activities, and timing with respect to season). The Traffic Management Plan may also include the use of signage, road closures, speed restrictions, truck lighting, load restrictions, and equipment inspections. The Traffic Management Plan will be developed during the detailed design phase, once the construction contracts have been awarded. Boralex/UDI will work with the County in development of the Traffic Management Plan.

2.6.1 Turbine Delivery

Siemens (the turbine manufacturer) will be responsible for the transportation of all wind turbine components to the Project site. Siemens will develop a detailed Transportation Plan for delivery of the turbine components to the both turbine sites. Siemens will be responsible for securing the necessary transportation and safety permits (e.g., Ministry of Transportation (MTO)). In addition, the MTO will be consulted regarding the timing of the deliveries in terms of considering any planned road works on provincial highways when developing the Transportation Plan.

The turbines will be delivered directly to the turbine sites for assembly. Approximately 10 truckloads of turbine components will be transported to each turbine site (40 total). For public safety all nonconventional loads will have front and rear escort or “pilot” vehicles to accompany

the truck movement on public roads. The transport of construction related equipment will likely follow the same route to be used for component transportation to the site.

Along the component transportation route, intersections and roads may require road widening to accommodate the turning radius of the trucks carrying the tower, nacelle, and blades and roads may require structural upgrading/widening. Road widths must be a minimum of 6 m, and the clearance required on both sides of the road beyond the minimum 6 m road width is approximately 3 m. Where appropriate, the contractor or firm responsible will secure the necessary permits and approvals, and pay for any temporary or permanent road widening activities and structural upgrades within the County for transport of components to the Project Location. Various options are being considered for the transportation route; however access to the Project Location will be via Port Ryerse Road (for Turbine 1 only) and Avalon Lane for Turbines 2, 3 and 4.

Any upgrading of roads that may be required such as widening turning radii may include widening and improvement of the granular base to accommodate their intended use and such upgrades are not considered significant.

Siemens and Boralex/UDI will discuss responsibility for any structural enhancements to roads within the County, and once the full road requirements have been finalized, detailed plans including maintenance of the roads will be developed with the municipality as appropriate.

Although there are no formal requirements, the Project may provide notification of non-conventional load movements, including advertising in local newspapers. This notification will be provided in the interest of public safety, minimizing disruption, and good community relations.

2.6.2 Delivery of Other Project Materials

Approximately 50 to 70 concrete truck trips are required per turbine foundation, for a total of approximately 200 to 280 concrete truck trips. The crane supplier(s) will be responsible for the transportation of all cranes and related components to the Project. The heavy-lift crawler crane will be shipped in individual pieces, requiring individual transport, and then assembled on-site.

An estimated 90 conventional truck and trailer units will transport civil and electrical materials for the construction of roads, substation, electrical collection system and other supporting infrastructure, and will include such items as cabling, concrete reinforcement steel bar and foundation anchor bolts.

Gravel transport to the site for road construction will account for approximately 1300- 1800 deliveries.

2.7 TIMING AND OPERATIONAL PLANS

Construction activities are anticipated to begin mid-2014, depending on REA approval. The duration of key construction activities are provided in **Table 2.2** below. Timing requirements with respect to natural heritage features are provided in **Section 3.0**.

Table 2.2: Construction Activities – Projection and Estimated Schedule

Phase Details	Schedule
• Surveying	July 2014 – September 2014
• Delivery of construction materials, site preparation, construction of access roads, laydown areas and crane pads	September 2014 – October 2014
• Installation of wind turbine foundations	September 2014 – October 2014
• Wind turbine erection	October 2014 – November 2014
• Installation of electrical components	October 2014 – November 2014
• Reclamation of temporary work areas, final grading, topsoil replacement	October 2014 – November 2014
• Project Testing	October 2014 – November 2014
• Commercial Operation	November 2014

Note: Construction activities will take place during normal business hours. When construction is anticipated to be required outside of normal business hours, the timing will be discussed in advance with the County. In the event changes are required to the proposed construction schedule, updated construction schedules can be provided to the public through postings on the Project website (http://www.udi-canada.com). The construction schedule is based on current knowledge of process and timelines at the date of writing this report.

2.8 MATERIALS GENERATED AT, OR TRANSPORTED FROM, THE PROJECT LOCATION

During construction, waste material will be generated at, and transported from, the Project Location. Waste material produced by the Project is expected to consist of construction material (e.g. excess fill, soil, brush, scrap lumber and metal, banding, plastic wrap removed from palletized goods, equipment packaging, grease and oil, steel, etc.) and a small amount of domestic waste (i.e. garbage, recycling and organics).

Sanitary waste generated during the construction phase will be collected via portable toilets and wash stations supplied by a licensed third party who will be retained prior to the start of major construction activities. The licensed third party will be responsible for the transportation and disposal of all such waste according to regulatory requirements. The exact type of transportation and number of trips required will be determined and confirmed by the third party prior to construction of the Project.

Domestic waste (i.e., garbage, recycling, and organics) will be generated on-site by construction staff. Domestic waste disposal will be the responsibility of the Construction Contractor. The exact type of trucks and number of truck trips required to dispose of domestic waste will be determined and confirmed by the Construction Contractor prior to construction of the Project.

Hazardous materials to be used during the course of construction are limited to fuels and lubricants that will be on-site for use in equipment. These materials will be stored in appropriate storage containers during construction by the Construction Contractor. Designated storage unit type and area will be confirmed by the Construction Contractor prior to construction. The exact type of trucks and number of truck trips required to dispose of hazardous materials will be determined and confirmed by the Construction Contractor prior to construction of the Project.

The gravel and geotextile material that will be removed from temporary work areas will require disposal following construction of the Project. Disposal of this material is described in the Decommissioning Plan Report, and may include reuse of the granular material. This will require the use of large dump trucks that are capable of transporting heavy loads of excavated gravel. The exact type of truck and number of truck trips required will be determined and confirmed by the Construction Contractor prior to construction of the Project. The excavated soil removed for installation of infrastructure will be stockpiled and re-used on-site as feasible. If not feasible, the soil will be disposed of at an MOE-approved off-site facility to be determined by the Construction Contractor.

There will be no on-site disposal of waste during the construction of the Project.

3.0 Potential Effects and Mitigation Measures

3.1 GENERAL METHODOLOGY

O. Reg. 359/09 requires that any adverse environmental effects that may result from construction or installation activities be described. This section describes the potential effects, mitigation measures (if required) and net effects that may result from construction or installation activities including those effects that may occur within the 120 m Zone of Investigation.

Descriptions of the existing natural heritage, water, archaeological and heritage environments within the 120 m Zone of Investigation can be found within the Natural Heritage Assessment and Environmental Impact Study (NHA/EIS), Water Assessment and Water Body Report (WAWB), Stage 1 Archaeological Assessment (Stage 1 AA), Stage 2 and 3 Archaeological Assessments (Stage 2-3 AAs), and Heritage Assessment Report. These reports form part of the complete REA application package.

Description of potential effects and mitigation measures for specific features located within the setbacks specified by O. Reg. 359/09 are provided in the NHA/EIS, WAWB, Stage 1 AA, Stages 2-3 AAs, and Heritage Assessment Report.

The key performance objective for each of the potentially affected features is avoiding and/or minimizing potential effects (through the use of appropriate mitigation measures) throughout the construction phase of the Project. The proposed mitigation measures will assist in achieving this performance objective. Additional information related to specific performance objectives is detailed in the Construction Environmental Effects Monitoring Plan provided in Section 5.0.

3.2 CULTURAL HERITAGE AND ARCHAEOLOGICAL RESOURCES

3.2.1 Protected Properties and Cultural Heritage Resources

In accordance with O. Reg. 359/09, a Heritage Assessment Report was undertaken for the Project, and is included under separate cover as part of the REA application.

The Heritage Assessment Report determined that:

- There are no protected properties within the Project Study Area;
- 38 properties with potential built heritage resources are within the Study Area (7 of which are of cultural heritage value or interest); these will not be negatively impacted by the Project; and,
- 2 potential cultural heritage landscapes (Port Ryerse and Avalon Park Cottages) are within the Study Area (both of which are of cultural heritage value or interest); these will not be negatively impacted by the Project.

Potential Effects

As construction activities would not occur on the properties containing the built heritage resources and cultural heritage landscapes, no adverse effects on heritage resources are anticipated during construction.

The Heritage Assessment Report determined that the proposed Project infrastructure will not result in the direct or indirect obstruction of any significant views or vistas within, from, or of built or natural features associated with the built heritage resources or cultural heritage landscapes. Significant views and vistas are not heritage attributes of any of the seven properties with identified heritage resources. In addition, the visual links between Port Ryerse and Avalon Park Cottages and their respective landscape will not be disrupted by the Project, as all of the significant views and vistas are orientated to the south (i.e., towards Lake Erie) rather than to the north or east (i.e., towards the Project Location).

Mitigation Measures

No protected properties were identified within the Study Area; therefore no mitigation measures are required.

Given that no built heritage resources or cultural heritage landscapes are expected to experience Project-related impacts, no mitigation measures are required. The Heritage Assessment Report recommended that “the Port Ryerse Wind Power Project be released from further heritage concerns.

Net Effects

As construction activities will not occur on properties containing cultural heritage features, no adverse net effects on heritage resources are anticipated during the construction of the Project.

3.2.2 Archaeological Resources

In accordance with O. Reg. 359/09, Stage 1Archaeological Assessment (Stage 1AA) and Stage 2-3 Archaeological Assessments (Stage 2-3 AAs) were completed for the Project.

The results of the Stage 1 AA indicated that the Project Study Area comprised a mixture of areas of archaeological potential and areas of no archaeological potential. Given the potential for Pre-Contact and Euro-Canadian archaeological sites, a Stage 2 Archaeological Assessment was recommended for all areas of archaeological potential within the Project Location including the areas proposed for access roads, parking lot, collector lines, turbines and the distribution substation.

The Stage 2-3 AAs identified one Euro-Canadian artifact scatter with a small Pre-Contact lithic component and twenty-one Pre-Contact artifact scatters and isolated find spots. Of the 22 find spots recorded, 8 were found to be of further cultural heritage value or interest; however to avoid impacts to these eight sites the Project Location was modified. It was noted in the Stage 2-3 AAs that a partial Stage 3 archaeological investigation was conducted on a find spot that

had the potential to be impacted by the Project prior to Project modification. This assessment was ceased when the Project Location was modified to avoid any further impacts to the site.

As a result of the modifications to the Project design, none of the sites recommended for further work were located within the current Project Location. It was noted that two find spots are located within 20 m of the Project Location (i.e., a portion of each site's 20 m protective buffers falls within the Project Location). At both find spots, the 20 m buffer is interrupted by a permanently disturbed cultural form (i.e., private road and its associated embankment/ditch). Six find spots are located at least 70 m away from the Project Location.

Potential Effects

Potential impacts to undiscovered archaeological resources could occur if encountered during construction activities.

Mitigation Measures

The Stage 2-3 AAs recommended:

- Archaeological monitoring by a licensed archaeologist for all construction activities within 70 m of the site;
- Placing temporary barriers around six of the eight find spots located between 20 to 70 m away from the Project Location during construction. A licenced archaeologist should monitor these barriers to ensure that unintentional Project impacts do not occur;
- Of the six find spots within 70 m of the site, two find spots should be subjected to a site-specific Stage 3 archaeological investigation if any future developments are planned in their immediate vicinity, or if the Project Location is revised at a later date to include these areas; and,
- Construction monitoring of the find spot where a partial Stage 3 assessment was undertaken to ensure that unintentional Project impacts do not occur to the remainder of the site.

Should other archaeological or historical materials or features be found during construction, all work within the vicinity of the find will be suspended and a Ministry of Tourism, Culture and Sport archaeologist and appropriate Aboriginal communities will be contacted. In the event that human remains are encountered or suspected of being encountered before or during construction, all work will stop immediately. Notification will then be made to the Ontario Provincial Police or local police who will conduct a site investigation and contact the district coroner. The Ministry of Tourism, Culture and Sport, appropriate Aboriginal communities, and the Registrar of Cemeteries, Cemeteries Regulation Unit, Ministry of Small Business and Consumer Services will also be notified.

Net Effects

By following the procedures recommended above no adverse net effects on archaeological resources are anticipated during construction of the Project.

3.3 NATURAL HERITAGE RESOURCES

In accordance with O. Reg. 359/09, an NHA/EIS was undertaken for the Project. The following provides a summary of the potential effects and the associated mitigation measures as described in that report. In addition, potential effects and mitigation measures are identified for regulated features outside the Project Location, and unregulated natural features, which are therefore not considered in the NHA/EIS. Natural heritage resources within the 120 m Zone of Investigation are shown in **Appendix A, Figure 3**.

Under O. Reg. 359/09, Project infrastructure is prohibited within a Provincially Significant Wetland (PSW), and generation infrastructure (turbines and distribution station) are prohibited within 30 m of a watercourse. Setbacks are provided under the Regulation for other natural features, such as woodlands, significant wildlife habitat, etc.; development within 120 m of these areas requires further study under an Environmental Impact Study (EIS) to determine the magnitude of effects following mitigation.

3.3.1 Wetlands

No wetlands are found in the Project Location or within the 120 m Zone of Investigation/ Project Study Area. This includes provincially-significant, locally-significant, or other unevaluated wetlands. As no wetlands are present, no potential effects will occur and therefore no mitigation measures are necessary.

3.3.2 Areas of Natural and Scientific Interest

The Study Area does not contain any Earth Science or Life Science Areas of Natural and Scientific Interest (ANSIs). As no ANSIs are present, no potential effects will occur and therefore no mitigation measures are necessary.

3.3.3 Woodlands

Two significant woodlands (WO02 and WO03) are located within the 120 m Zone of Investigation. One significant woodland (WO02) occurs in the Project Location and contains Project infrastructure (i.e., underground collector lines cross woodland area).

Potential Effects

There will be no direct loss of woodland habitat in the Project Study Area as a result of the construction of the Project. In addition, there will be no clearing of trees in or near the features that could result in desiccation or drying.

Indirect impacts may include accidental damage to critical root zones and loss of trees or damage to limbs during construction. Other indirect impacts may occur due to dust, or sedimentation and erosion. During construction there will be increased traffic and the potential for accidental spills. Improper disposal of wastes (fluids, containers, cleaning materials) could also have a negative impact on features.

Mitigation Measures

The primary mitigation strategy is avoidance of the significant woodland through the use of directional drilling during installation of the underground collector lines.

For all significant natural features identified within the 120 m Zone of Investigation the following measures will be implemented:

- Clearly delineate work area using a barrier such as a silt fence to avoid accidental encroachment on the feature that would lead to damage of trees and root zones;
- Erect silt fencing to prevent sedimentation within critical root zones;
- Implement a sedimentation and erosion control plan;
- Stockpile materials >30 m from significant natural features. Where this is not possible stockpiles will be covered when not in use, especially during rain events or high wind events;
- Re-vegetate disturbed areas with fast growing native species as soon as construction activity within the disturbed areas is complete;
- Implement infiltration (i.e. minimize paved surfaces and design roads to promote infiltration) techniques to the maximum extent possible to avoid changes in soil moisture and compaction;
- All maintenance activities, vehicle refueling or washing and chemical storage will be located more than 30 m from significant natural features;
- Locate horizontal directional drill entry/exit pits at least 30 m from any significant natural feature;
- Collect drill cuttings as they are generated and place in a soil bin or bag for off-site disposal; and,
- Restore and re-vegetate entry/exit pits to pre-construction conditions as soon as possible after construction.

As appropriate and prior to construction the Project Location limits will be staked in the field. The Construction Contractor will ensure that no construction disturbance occurs beyond the staked limits and that edges of sensitive areas adjacent to the work areas are not disturbed. Regular monitoring of the limits of clearing will be employed to ensure the objective of minimal

disturbance. Should monitoring reveal that clearing is occurring beyond defined limits, mitigation action will be taken that could include rehabilitation of the disturbed area.

Mitigation measures related to dust and traffic are listed in **Sections 3.5.2** and **3.6.8** and to spills and wastes are listed in **Section 3.8**.

Net Effects

Provided that all mitigation measures are implemented, any indirect adverse net effects from construction activities are anticipated to be short-term in duration and intermittent.

3.3.4 Provincial Parks and Conservation Reserves

The Project Study Area does not contain any provincial parks or conservation reserves, nor is it adjacent to any such areas. As no provincial parks or conservations reserves are present, no potential effects will occur and therefore no mitigation measures are necessary.

3.3.5 Other Designated Natural Areas

The Study Area does not contain any other designated natural areas. As such no potential effects will occur and therefore no mitigation measures are necessary.

3.3.6 Significant Wildlife Habitat

The following significant wildlife habitats were identified within the 120 m Zone of Investigation:

- Landbird Migratory Stopover Area; and,
- Pignut Hickory Habitat.

Potential Effects

Wind turbines have been sited outside of landbird migratory stopover areas. Project components are sited outside of the habitat for Pignut Hickory. No direct impacts to landbird migratory stopover areas or pignut hickory habitat are anticipated as no encroachment into, or removal of, this habitat type is proposed.

Indirect impacts may include habitat avoidance/disturbance caused by noise and dust during construction.

Pre-construction surveys were performed for Bald Eagle Winter Perching Habitat in the fall/winter of 2012/2013 and non-significance was confirmed and approved by the MNR.

Mitigation

The following mitigation measures will be implemented to address the impacts mentioned above:

- Avoid where possible construction within 120 m of significant migratory landbird stopover habitat from April to May and August to October;
- Implement standard construction site best management practices to prevent fugitive dust generation and off site transport across the Project Location; and,
- Re-vegetate disturbed areas with fast growing native species as soon as construction activity within the disturbed areas is complete.

Mitigation measures related to dust and noise are listed in **Sections 3.5.2** and **3.5.3**, respectively.

Net Effects

Provided that all mitigation measures are implemented, any indirect adverse net effects due to dust or noise are anticipated to be short-term in duration and intermittent.

Post-construction disturbance and mortality monitoring would be conducted to verify effects predictions and additional operational mitigation would be implemented if unanticipated effects occur.

3.3.7 Generalized Significant Wildlife Habitat

In addition to the significant wildlife habitats identified in **Section 1.1.6**, the following Generalized Significant Wildlife Habitats were identified within the 120 m of Zone of Investigation; however not in the Project Location:

- Landbird Migratory Stopover Area;
- Woodland Area-Sensitive Bird Breeding Habitat;
- Woodland Raptor Nesting Habitat; and,
- Bat Maternity Colony.

Potential Effects

The potential effects from construction activities on the Generalized Significant Wildlife Habitats identified within the 120 m Zone of Investigation are as follows:

- Increased erosion and sedimentation into woodlands and other natural features in addition to soil compaction resulting from clearing, grubbing, grading, and topsoil removal for wind turbine erection, and construction of temporary work areas, access roads including permanent parking lot, underground collector lines and distribution substation.

- Disturbance and/or mortality to local wildlife as a result of noise and increased on-site human activity during wind turbine erection, and construction of temporary work areas, access roads including permanent parking lot, underground collector lines and distribution substation.

- Accidental damage to vegetation or removal of vegetation adjacent to the Project Location during wind turbine erection, and construction of temporary work areas, access roads including permanent parking lot, underground collector lines and distribution substation.

- Soil or water contamination resulting from accidental spills during wind turbine erection, and construction of temporary work areas, access roads including permanent parking lot, underground collector lines and distribution substation.

- Reduced stream flow rate and increased water temperature as a result of dewatering activities during wind turbine erection.

- Increase surface run-off and changes in surface water drainage as a result of installation of impervious surfaces during wind turbine erection and construction of temporary work areas and access roads including permanent parking lot.

Mitigation Measures

Detailed mitigation measures for Generalized Significant Wildlife Habitats are outlined in Table 10 of the NHA/EIS report.

Mitigation measures related to dust, noise, traffic and spills are listed in **Sections 3.5.2, 3.5.3, 3.6.8 and 3.8** respectively.

Net effects

Provided that all mitigation measures are implemented, any adverse net effects due to construction activities are anticipated to be short-term in duration and intermittent.

There is some potential for disturbance to local wildlife during construction of the Project as a result of noise and increased human activity, particularly increased traffic. Some limited mortality is possible; however potential long-term effects to local wildlife populations from this mortality and from barrier effects are anticipated to be minimal because of the temporary nature of the increased traffic and noise activities.

3.3.8 Significant Flora and Vegetation Communities

One provincially rare plant species, Pignut hickory (*Carya glabra*) was identified within the 120 m Zone of Investigation. This species was observed in a hedgerow approximately 63 m south of Turbine 3 constructable area during NHA/EIS site investigations. In Ontario, this species is ranked 'S3' indicating it is considered vulnerable (NHIC, 2010).

No rare vegetation communities were identified within the 120 m Zone of Investigation.

Potential Effects

Project components are sited outside of the habitat for Pignut Hickory. No direct impact to this species is anticipated as no removal of trees is proposed during construction.

Indirect impacts may include habitat avoidance/disturbance caused by noise and dust during construction.

Mitigation Measures

Mitigation measures that will be implemented for Pignut Hickory habitat is outlined in **Section 3.3.6**. Mitigation measures related to dust and noise are listed in **Sections 3.5.2** and **3.5.3**, respectively.

A health assessment survey of the Pignut Hickory tree identified within 120 m of an access road will be conducted pre-construction as well as for one year post-construction.

Net Effects

Provided that all mitigation measures are implemented, any indirect adverse net effects from construction activities are anticipated to be short-term in duration and intermittent.

Post-construction disturbance monitoring would be conducted to verify effects predictions and additional operational mitigation would be implemented if unanticipated effects occur.

3.3.9 Other Flora and Vegetation Communities

Within the 120 m Zone of Investigation, 65 species of vascular plants were recorded. Of that number, 53 species or 82% were native and 12 species or 18% were exotic. All of the native species are ranked S4 (apparently secure) - S5 (Secure in Ontario).

Potential Effects

Limited vegetation removal in hedgerows will be required for the installation and/or construction of Project components (including temporary work areas). No vegetation removal will occur in significant natural features identified within the 120 m Zone of Investigation.

Indirect effects to flora and vegetation communities will be in the form of dust emissions.

Mitigation Measures

Mitigation measures related to dust are listed in **Section 3.5.2**. The limits of construction activities will be staked prior to construction to ensure that no disturbance occurs outside of the Project Location boundary.

Net Effects

Provided that all mitigation measures are implemented, any indirect adverse net effects on other flora and vegetation communities from construction activities are anticipated to be short term in duration and intermittent.

3.4 WATER BODIES AND AQUATIC RESOURCES

3.4.1 Groundwater

Potential Effects

A geotechnical investigation was completed to obtain general subsurface information within the Project Study Area. The subsurface conditions encountered in the investigation generally consisted of the following:

- Vegetative ground surface cover with topsoil or mixed topsoil with underlying native soils (tilled material) was encountered at the ground surface, underlain by sandy silt till and layers of silt, silty clay and fine sand;
- Groundwater was recorded in the boreholes at depths ranging from 4.7 m to 11.1 m below grade; and,
- Bedrock was not encountered to the termination depths to boreholes advanced for this Project.

The investigation determined that given the depths to groundwater it is unlikely that groundwater will be encountered during the installation of turbine foundations, access roads, underground collector lines, fibre optic cable and distribution substation foundation. It was noted however that groundwater may be encountered in deeper excavations. Therefore, it is possible that some dewatering activities would be required (although a Permit to Take Water is not anticipated). Ultimately groundwater infiltration in open excavations is anticipated to be minimal; however the

dewatering requirements will be determined by the Construction Contractor once the final design has been completed.

MOE water well records indicate that 32 wells are located within the Study Area, 7 of which are located within the 120 m Zone of Investigation. It is not anticipated that the construction of the Project would adversely affect groundwater quality, quantity, or movement. Mapping indicates that one water well is located within the laydown area for Turbine 2. Boralex/UDI will undertake a ground-truth to confirm the location of this water well prior to construction.

Some materials, such as fuel, lubricating oils and other fluids associated with turbine construction, have the potential for discharge to the on-site environment through accidental spills.

It is not anticipated that the construction of the Project will adversely affect groundwater quality, quantity, or movement. See **Appendix A, Figure 2** for water well locations within the Project Study Area.

Mitigation Measures

If groundwater is encountered during excavations, good construction practices will be used, such as minimizing the length of time that the excavation is open and monitoring seepage into the excavation. Should pumping be required to dewater excavated areas, water will be directed into the nearest drain or spread across the construction area, and will be directed away from significant natural features. Appropriate energy dissipation techniques will be used to reduce the potential for erosion and sourcing. Discharge piping will be free of leaks and properly anchored to prevent bouncing and snaking during surging. The rate of discharge will be monitored to ensure no erosion or flooding occurs. If energy dissipation measures are found to be inadequate, the rate of dewatering will be reduced or ceased until satisfactory mitigation measures are in place.

In the event that turbines are located within 100 m of undocumented private residential wells of participating landowners, the Construction Contractor may, at the landowner's request, monitor the quality and quantity of these wells over the course of construction for the individual turbine(s) to ensure there is no interruption in use of, or impact on, the water. In the event that well water quality or quantity is disturbed as a result of construction, Boralex/UDI will provide a temporary potable water supply until corrective measures are taken and will comply with MOE's *Guideline B-9: Resolution of Groundwater Interference Problems*.

In terms of accidental spills or releases to the environment, undesirable materials on-site are limited to fuel, lubricating oils, and other fluids associated with turbine construction. Large quantities of these materials will not be stored at the turbine sites and do not represent a significant potential adverse effect on the groundwater in the event of accidental spills. As per S.13 of the *Environmental Protection Act*, all spills that could potentially have an adverse environmental effect, are outside the normal course of events, or are in excess of the prescribed regulatory levels will be reported to the MOE's Spills Action Centre.

A Construction Emergency Response and Communications Plan will be developed by the Construction Contractor and/or Boralex/UDI and will include protocols for the proper handling of material spills and associated procedures to be undertaken in the event of a spill. See **Section 4.0** for more information on the Emergency Response and Communications Plan.

Net Effects

Some localized and temporary disturbance to groundwater may be possible during the excavation of the turbine foundations or installation of other Project components requiring excavation. However, it is anticipated any potential effects will be short term in nature and have little to no effect on groundwater flow conditions or adjacent private water wells.

3.4.2 Surface Water, Fish and Fish Habitat

In accordance with O. Reg. 359/09, a Water Assessment and Water Bodies Report was undertaken for the Project to determine the presence of water bodies as defined by O. Reg. 359/09 and associated setbacks. Three REA water bodies were identified within the Zone of Investigation. Two will be crossed by underground collector lines and one access road is located within 120 m of a water body (access road do not require water body crossings).

Potential Effects

Project construction activities include land clearing, grubbing, and grading. Potential impacts to watercourses located within the 120 m Zone of Investigation may include:

- Short-term increase in turbidity from runoff, sedimentation and soil erosion during construction;
- Loss of shade;
- Reduced bank stability;
- Reduced allochthonous inputs; and,
- Water quality and habitat disturbance effects to aquatic habitat.

Potential impacts to fish and fish habitat related to the installation of underground collector lines are as follows:

- Erosion and sedimentation from site disturbance and potential dewatering;
- Collapse of the punch or bore hold under the stream; and,
- Disturbing riparian vegetation can reduce shoreline cover, shade and food production areas.

Mitigation Measures

In some cases, Department of Fisheries and Oceans (DFO) Operational Statements may be used for construction activities in or near water (e.g. crossing watercourses with collector lines, etc.). When an Operational Statement is used, mitigation measures provided in the Operational Statement will protect fish habitat and no further review or approvals are required. Timing windows do not apply as no in-water work is proposed. As construction activities will likely occur within a Regulated Area permit approval from Long Point Region Conservation Authority (LPRCA) will also likely be required.

Erosion and sediment control measures will be implemented during all construction activities. The contractor will obtain adequate quantities of materials in order to control erosion and sediment deposition. Additional supplies will be maintained onsite in a readily accessible location for maintenance and contingency purposes. Required supplies may include silt fencing, straw bales, filter cloth, etc.

Barriers will be inspected regularly to ensure proper functioning and maintenance. Materials removed or stockpiled (e.g. excavated soil, backfill material, etc.) will be deposited and contained in a manner to ensure sediment does not enter a watercourse.

Even with properly installed erosion and siltation control measures, extreme runoff events could result in collapse of silt fencing, slope or trench failures and other problems which could lead to siltation of waterbodies. If siltation to a watercourse occurs, activities will cease immediately until the situation is rectified. The Construction Emergency Response and Communications Plan will contain procedures for spill contingency and response plans, spill response training, notification procedures, and necessary cleanup materials and equipment. As per s.13 of the *Environmental Protection Act*, all spills that could potentially have an adverse environmental effect, are outside the normal course of events, or are in excess of prescribed regulatory levels will be reported to the MOE's Spills Action Centre.

As appropriate, the Construction Contractor (or designate) would be on-site during installation of watercourse crossings to ensure compliance with specifications and site plans. In particular, the Construction Contractor would ensure that pre-construction preparation is completed prior to commencement of in-stream work and that bank, bed, and floodplains are restored to pre-existing conditions, as possible, following completion of the construction activities.

Net Effects

Given the minimal construction activity proposed within 120 m of the water bodies and the application of the above mitigation measures during construction that will ensure effects to surface water due to construction activities are minimized, any potential net effects are anticipated to be spatially and temporally limited.

3.5 AIR QUALITY AND ENVIRONMENTAL NOISE

3.5.1 Air Emissions

The MOE collects ambient air quality data at almost 40 monitoring sites across the province to determine the state of air quality. Monitoring stations record concentration levels of some or all of the six most common air pollutants: sulphur dioxide, ozone, nitrogen dioxide, total reduced sulphur compounds, carbon monoxide and fine particulate matter. In general, air quality in the vicinity of the Study Area is rated “good” during the winter months and “moderate” during the summer months. Brantford is the closest monitoring station to the Study Area (MOE, 2010b).

Potential Effects

During construction, minor localized air emissions will occur from operating heavy equipment and temporary operation of portable generators. Additionally, construction related traffic and various construction activities (e.g. excavation, grading, and exposed areas) have the potential to create short-term nuisance dust effects in the immediate vicinity of the Project.

Construction activities rely on the utilization of a wide range of mobile equipment, such as bulldozers, dump trucks, and cranes. The engine exhaust from these vehicles, especially from those operating on diesel fuel, represents a source of particulate and other emissions (e.g. sulphur dioxide, nitrogen oxide, volatile organic compounds, polycyclic aromatic hydrocarbons, and carbon dioxide) from the construction-site. Traffic delays also result in increased emissions from vehicles traveling slowly through construction zones. The delivery of materials such as concrete to construction-sites can also generate emissions, especially for sites that are relatively far from material manufacturers.

Mitigation Measures

To reduce emissions from equipment and vehicles, one or more of the following mitigation measures will be employed:

- Multi-passenger vehicles will be utilized to the extent practical;
- Company and construction personnel will avoid idling of vehicles when not necessary for construction activities;
- Equipment and vehicles will be turned off when not in use unless required for construction activities and/or effective operation;
- Equipment and vehicles will be maintained in good working order with functioning mufflers and emission control systems as available;
- All vehicles will be fitted with catalytic converters as required;
- All construction equipment and vehicles will meet the emissions requirements of the MOE and/or MTO;

- As appropriate, records of vehicle maintenance will be retained and made available for periodic review by the Construction Contractor; and,
- All vehicles identified through the monitoring program that fail to meet the minimum emission standards will be repaired immediately or replaced as soon as practicable.

A Construction Traffic Management Plan will be developed by the Construction Contractor and will include protocols for the management of traffic and for the delivery of materials to the construction site (see **Section 4.0**).

Net Effects

The application of the recommended mitigation measures during construction will limit air emissions to the work areas and limit the magnitude of combustion emissions. As a result, any adverse net effects to air quality from emissions are anticipated to be short-term in duration and highly localized.

3.5.2 Dust and Odour Emissions

Potential Effects

Construction related traffic and various construction activities (e.g. excavation, grading, soil stripping, and exposed areas) have the potential to create nuisance dust effects in the immediate vicinity of the Project Location. High winds during dry weather may erode and disperse loose soil material away from the construction area, which may be a nuisance to residential properties located in close proximity to the construction-sites. Storage piles exposed to wind can also be a source of fugitive dust emissions, as can various road surfaces such as unpaved roads. No odour emissions are anticipated during construction of the Project.

Mitigation Measures

To protect adjacent receptors from potential off-site dust concerns, the Construction Contractor is expected to implement good site practices during construction which may include:

- Maintaining equipment in good running condition and in compliance with regulatory requirements;
- Protecting stockpiles of friable material with a barrier or windscreen in the event of dry conditions and excessive dust;
- Dust suppression (e.g. water) of source areas; and,
- Covering loads of friable materials during transport.

A Construction Environmental Management Plan (see **Section 4.0**) will be developed by the Construction Contractor and will include protocols for dust emission control and for responding to community concerns.

Net Effects

The application of the recommended mitigation measures during construction will limit fugitive dust emissions to the work areas. As a result, any adverse net effects to air quality from dust emissions are anticipated to be short-term in duration and highly localized.

3.5.3 Environmental Noise

Potential Effects

During construction of the Project, noise will be generated by the operation of heavy equipment at each of the work areas and associated vehicular traffic on-site and on haul routes. The audible noise at receptors beyond the construction areas is expected to be a minor, short-term disruption.

Mitigation Measures

To minimize inconvenience brought on by noise during the construction phase of the Project, all engines associated with construction equipment will be equipped with mufflers and/or silencers in accordance with MOE and/or MTO guidelines and regulations and requirements of the Occupational Health and Safety Act. Noise levels arising from equipment will also be compliant with sound levels established by the MOE. To the greatest extent possible, construction activities that could create excessive noise will be restricted to regular construction hours and adhere to municipal noise by-law where applicable. If construction activities that cause excessive noise must be carried out outside of these time frames, adjacent residents will be notified in advance, as required. Sources of continuous noise, such as portable generator sets, will be shielded as appropriate or located so as to minimize disturbance to local residents.

Net Effects

Application of the recommended mitigation measures during construction will limit noise emissions to the general vicinity of the work areas. Intermittent noise could increase during construction hours at the work areas and/or along the haul route. Any adverse net effects due to noise are anticipated to be short-term in duration and intermittent.

3.6 LAND USE AND SOCIO-ECONOMIC RESOURCES

3.6.1 Areas Protected Under Provincial Plans and Policies

Potential Effects

No areas protected under specified Provincial Plans and Policies, (such as the Greenbelt Plan, Niagara Escarpment Plan, and the *Oak Ridges Moraine Act*) are located within the Project Location. No adverse effects are therefore anticipated to areas protected under Provincial Plans and Policies during construction of the Project.

Mitigation Measures

No potential effects will occur and therefore no mitigation measures are necessary.

Net Effects

No adverse net effects are expected as a result of the Project.

3.6.2 Existing Land Uses

Potential Effects

The predominant land use within the Study Area is agriculture. Norfolk County has designated lands in the Study Area as Agricultural. According to the County's Official Plan, the development of wind farms for electricity production to be sold to the provincial grid shall be permitted within this designation. Agricultural lands where Project infrastructure is located will be changed from present land use for the duration of the Project. During construction there could be a temporary increase in noise and dust levels around the work and haul areas resulting in a potential effects to adjacent land uses.

Mitigation Measures

Landowners will be compensated by Boralex/UDI for agricultural land that will be taken out of production during the lifespan of the Project through the Land Lease Agreements. Mitigation measures have been identified for dust and noise in **Sections 3.5.2** and **3.5.3**, respectively.

Net Effects

Although some disturbance to adjacent land uses is unavoidable during construction, it is expected to be short-term in duration, temporary, and minimized through the implementation of good site practices, transportation planning, and communication with the community. No significant adverse net effects are anticipated to existing land uses during construction of the Project.

3.6.3 Hazard Lands

Three hazard lands (valleylands) are located within the 120 m Zone of Investigation. Two of the hazard lands contain Project infrastructure (i.e., underground collector lines).

Potential Effects

No direct effects to hazard lands are anticipated during construction.

Indirect impacts may include accidental damage to critical root zones and loss of trees or damage to limbs during installation of underground lines. Where construction activities take place within hazard lands, there is potential for erosion of slopes.

Mitigation Measures

The primary mitigation strategy is avoidance of significant hazard lands through the use of directional drilling during installation of underground collector lines.

Mitigation measures related to significant natural features including erosion and sediment control measures are outlined in **Section 3.3.3.**

Net Effect

Provided that all mitigation measures are implemented, any indirect adverse net effects from construction activities are anticipated to be short-term in duration and intermittent.

3.6.4 Recreation Areas

Potential Effects

A section of the Ontario South Coast Scenic Route runs along the Project's western boundary. This route links several tourism, recreation, agriculture and natural heritage features and destinations along the Lake Erie shoreline and is travelled by local residents and tourists throughout the year. No recreational areas are located within the 120 m Zone of Investigation. Land designated as Resort Area along Long Point Bay (Lake Erie) is approximately 800 m outside (south) of the Project Location. During construction there will be a temporary increase in noise and dust levels around the work and haul areas resulting in potential effects to recreational activities.

Mitigation Measures

Mitigation measures related to dust, noise, and traffic are identified in **Sections 3.5.2, 3.5.3** and **3.6.8** respectively. Additional information is also provided in **Section 3.6.8**.

Net Effects

Noise, dust and traffic effects on recreational activities are anticipated to be short term and intermittent.

3.6.5 Agricultural Lands and Operations

Potential Effects

Soils

Agricultural soils will be disturbed as a result of construction. Activities during wet months or extended periods of heavy rainfall could have adverse impacts on agricultural lands. The movement of heavy machinery on wet soil may cause rutting, compaction, and mixing of topsoil and subsoil. These activities may break down soil structure and affect soil fertility thereby reducing soil productivity. When exposed, soils are more prone to erosion. The degree of

erosion is affected by the intensity and duration of rainfall and/or wind events, soil moisture, surface soil cover, slope, soil texture, structure, and organic matter content. Improperly salvaged topsoil can result in topsoil and subsoil mixing, compaction, rutting, and erosion. This can affect re-vegetation of the construction area and potentially decrease crop yields in the temporary work area.

Artificial Drainage

Construction could result in adverse effects to artificial drainage, including tiles being crushed or cut by machinery. Temporary or permanent disruption to water flow could result in soil erosion or crop loss on adjacent lands due to flooding.

Soybean Cyst Nematode

While its presence has not been confirmed in agricultural lands to be used during construction, the soybean cyst nematode (SCN) has been identified in the region. Once a field has been infested, there is significant potential for soybean crop loss, and there is no effective method of eradicating SCN. During construction requiring soil disturbance, equipment will be transported from field to field, and thus there is potential for transportation of SCN-contaminated soil to non-infested fields.

Mitigation Measures

Efforts have been made with the participating landowner to site Project infrastructure in such a way as to minimize disturbances to existing agricultural operations. Construction activities will be restricted to the delineated construction areas.

Soils

Where agriculturally productive lands are impacted by heavy rainfall events and wet soil conditions, Boralex/UDI will implement a wet soil shutdown practice; if conditions deteriorate to a situation where ruts under vehicles become deep enough to cause topsoil/subsoil mixing or create excessive compaction or make topsoil/subsoil separation too difficult, those activities will cease. Construction activities will continue when conditions improve and those soil qualities are protected. Boralex/UDI will retain a soil inspector to monitor the implementation of the wet soil shutdown and start-up, and to serve as a point of communication with landowners.

In areas where activity on agricultural land will be for temporary construction activities only, the Construction Contractor will monitor topsoil stripping to ensure that the correct depth of topsoil is removed and stockpiled in a manner that avoids mixing with subsoil material. Following construction, as appropriate, temporary workspaces will be graded and de-compacted (if required), the topsoil replaced, and the area left as close to pre-existing condition as possible.

Where there is potential for erosion or where erosion has already developed, silt fence and sediment logs (or appropriate substitutes) will be installed to reduce soil transport. The location

of such protection measures will be determined by the Construction Contractor. Topsoil salvage and/or replacement should be avoided during heavy precipitation or extremely windy conditions. Silt control fencing will be installed and maintained throughout construction and restoration until lands are fully stabilized.

Artificial Drainage

The location of artificial tile drainage and associated drains has been discussed with the landowners, and Project infrastructure has been moved accordingly to avoid impacts on tile systems. However, avoidance of all tile drains may not be possible. Some artificial tile drains may be severed or may require re-alignment due to the installation of the underground collector lines, and/or wind turbine tower foundation excavations. Should tile drains be severed or crushed during construction activities, locations will be recorded and flagged. If a main drain, header tile, or large diameter tile is severed, a temporary repair will be made to maintain field drainage and prevent flooding of the work area and adjacent lands. Severed tile drains that are not immediately repaired will be capped to prevent the entry of soil, debris, or rodents. If flooding of adjacent agricultural land occurs as a result of a severed tile and subsequent soils are damaged or crops are lost, the impacted area will be rehabilitated as soon as possible.

Where there is potential for damage during construction, the operation of the drains will be monitored during the construction phase, immediately after final clean up, and after the spring thaw the following year.

An agricultural tile drainage contractor will carry out any re-alignment works as well as repair tiles and/or drains that may experience construction related damage. To ensure the success of remediation measures, all persistent drainage problem sites will be monitored after repair. Disruption to drainage ditches, culverts, field entrances, and fences will be repaired appropriately.

Soybean Cyst Nematode

A pre-construction soil sampling program will be implemented to identify potential SCN infestation. The pre-construction program will include soil analysis for each agricultural row crop field to determine the extent of SCN infestation.

Any field identified to contain SCN will be recorded and the location provided to the Construction Contractor. Additionally, any imported topsoil will have a composite sample analyzed for SCN before it is used during construction. If SCN fields are identified, appropriate mitigation measures will be developed. Examples of mitigation measures may include washing stations for equipment, and/or restricted access to fields.

Net Effects

Disturbances to agricultural lands and operations are expected to be temporary and spatially limited. However, as appropriate, temporary construction areas will be rehabilitated following construction and restored to agricultural use.

3.6.6 Mineral, Aggregate, and Petroleum Resources

There are no lands designated for aggregate resource extraction, including licensed pits and quarries, within the Project Study Area.

Three (abandoned) and two (unknown status) petroleum wells are located within the 120 m Zone of Investigation. A draft Petroleum Resource Operations Report has been produced by MKI and submitted to MNR (June 21, 2012). This report addresses petroleum resources within 75 m of the Project Location.

Potential Effects

The Project will not require creation of a new pit or quarry to provide the required aggregate materials and as such a licence of permit under the *Aggregate Resources Act* will not be sought for the Project. A final location of the source of the required aggregate will be determined prior to construction; however it is planned that local sources will be used to the greatest extent possible.

The Petroleum Resource Operations Report (MKI, June 2012) concludes that well F005921 is the only petroleum resource site within 75 m of the Project Location that has not been decommissioned. The well is located 27 m south of the proposed Project distribution substation area. In an extreme case a fire or small spill at the petroleum well may occur. Such an event could delay construction activities. A spill could potentially contaminate the Project site.

Mitigation Measures

The Petroleum Resource Operations Report (MKI, June 2012) suggests that to mitigate for the possible risks identified above, provisions will be made to ensure the area between the Project infrastructure and petroleum well is sloped with the Project infrastructure located at a higher elevation. Access to the site and the construction activities will take place on the north side of the proposed Project infrastructure, farther from the petroleum well and at a higher elevation.

Final infrastructure alignments will be confirmed prior to construction based on consultation with the MNR's Petroleum Resources Branch and based on technical constraints that may be identified during detailed design and engineering. Underground locates would be conducted prior to construction given the potential for unrecorded and improperly decommissioned wells.

Mitigation measures related to spills are outlined in **Section 3.8.** The Emergency Response Plan (**Section 4.0**) will contain procedures for spill contingency and response plans, spill response training, notification procedures, and necessary cleanup materials and equipment. As

per S.13 of the *Environmental Protection Act*, all spills that could potentially have an adverse environmental effect, are outside the normal course of events, or are in excess of prescribed regulatory levels will be reported to the MOE's Spills Action Centre.

Net Effects

No adverse net effects are anticipated to mineral, aggregate or petroleum resources during construction of the Project.

3.6.7 Game and Fishery Resources

Potential Effects

The area is largely cleared for agriculture and there are no game or fishery resources that could be deemed inaccessible, therefore there is no potential for creating access to previously inaccessible areas.

Sensory disturbance to game species may occur during the construction phase due to noise. A certain level of sensory disturbance to wildlife in the Study Area already exists from ongoing agricultural, rural, and domestic activities.

Mitigation Measures

It is anticipated that those who participate in hunting, fishing, and other outdoor recreation will choose an alternate location for their recreation during construction. Mitigation measures related to noise are identified in **Section 3.5.3**.

Net Effects

Any adverse net effects on game and fishery resources due to construction noise are anticipated to be temporary and intermittent.

3.6.8 Local Traffic

Potential Effects

There is potential for a minimal increase in traffic during construction on municipal roads due to a commuting workforce, the transport of Project components, construction machinery, equipment and supplies, and the removal of excess materials and waste from the Project Location. In addition, transport of Project equipment and supplies will include carrying excess loads and large turbine components. Truck trips will be noticeably reduced after the access roads and foundations have been installed and the turbine components are on-site. The increase in traffic, including excess load traffic, may result in short-term, localized disturbance to traffic patterns, an increase in traffic volume, and potential creation of traffic safety hazards.

Mitigation Measures

The Construction Contractor will implement a Traffic Management Plan to identify and deal with specific traffic planning issues including the management of traffic and the delivery of materials (**Section 4.0**).

Net Effects

Truck traffic will increase on some roads during turbine and other component deliveries, but will be restricted to predetermined routes and times to the greatest extent possible. Road safety is not expected to be an issue during the construction phase; however, the potential for accidents along the haul routes and on-site cannot be totally avoided.

The effect of constructing the various Project components is anticipated to have a limited, short term effect on traffic during construction.

3.6.9 Local Economy

Potential Effects

Construction of the Project will result in indirect and induced employment, the majority of which is anticipated to be filled by local businesses. During construction, the actual number employed and the make-up of those employed will vary over time as the Project goes through the various construction phases. Indirect employment is jobs and income in other businesses/industries in the community that supply inputs to the Project and Project employees. Induced employment includes jobs and income changes occurring in other businesses/industries in the community from spending activities of directly and indirectly employed individuals.

To the extent possible, local hiring will be maximized during the construction period providing work for existing qualified tradespersons and labourers. Trades that could be provided locally may include heavy equipment operators, truck drivers, pipefitters, electricians, ironworkers, millwrights and carpenters.

Since it is likely that the labour force will be supplied through local and neighbouring communities, no special housing, healthcare or food facilities will be required as part of the Project construction activities.

While the increased number of personnel present in the area during construction will increase the demand for some goods and services from the local area (e.g. lodging, food, and banking), the demand is expected to be nominal and short-term. This demand will also generate local benefits to business and services from Project spending.

Potential disruption to use and enjoyment of businesses (if present) may occur in the area surrounding the Project Location during construction. Potential disruption to local residents could be caused by physical effects from traffic, noise (**Section 3.5.3**) and dust (**Section 3.5.2**).

Potential effects to agricultural lands and operations due to Project construction activities are discussed in **Section 3.6.5**.

Mitigation Measures

To the extent possible Boralex/UDI and/or the Construction Contractor will source required goods and services from local qualified suppliers where these items are available in sufficient quantity and at competitive prices.

The Construction Contractor will implement a Traffic Management Plan, as described in **Section 4.0**, to identify and deal with specific traffic planning issues including the management of traffic and the delivery of materials. The program may include the use of signage, road closures, speed restrictions, truck lighting, load restrictions, and equipment inspections.

Disruptions in the vicinity of local businesses will be largely due to an increase in traffic, and will be short term and are not expected to affect use of these businesses.

Section 3.6.5 describes the mitigation measures for reducing the impact of construction activities on agricultural operations.

Net Effects

A positive net effect is anticipated on the local economy during construction of the Project. The Project provides positive income, employment, and fiscal benefits to the local area. The County will receive ongoing property tax income from the Project and participating landowners will receive land lease payments. A nominal increase in municipal services is possible. Existing businesses within local communities could benefit from the demands of the Project workforce during construction.

Traffic effects will be temporary, of short duration, and cease upon completion of the construction of the Project.

3.7 EXISTING LOCAL INFRASTRUCTURE

3.7.1 Provincial, Municipal and Other Major Infrastructure

Potential Effects

There are no provincial highways within the Project Study Area. There is an existing local distribution easement that runs along the south-western Project boundary, to which the Project would connect.

Municipal infrastructure in the Study Area includes County roads designated as arterial roads (Cookson Street and King Street North part of County Road 57 Norfolk) and local roads (Port Ryerse Road, Gilbert Road, Hilltop Drive, Ralph Street North and Ralph Street South). Avalon Lane, a private road, runs south through the central portion of the Project Location and then east along Lake Erie shoreline. No Project components will be located within municipal road

(Rights of Way). Boralex/UDI will consult with the Norfolk County during the REA process, regarding any potential effects to municipal interests. Boralex/UDI is committed to working with the County to obtain all necessary permits, approvals, and agreements related to the Project.

Transportation of excess loads and large turbine components may produce abnormal wear on local roads. There is potential for an increase in traffic during construction on County roads due to commuting workforce, the transport of Project components, equipment and supplies, and to remove excess materials and waste from the Project. In addition, transport of Project equipment and supplies will include carrying excess loads and large tower components (e.g. turbine components). Truck trips will be noticeably reduced after the access roads and foundations have been installed and the turbine components are on-site. The increase in traffic, including excess load traffic, may result in short-term, localized disturbance to traffic patterns, increase in traffic volume, potential creation of traffic safety hazards, and/or abnormal wear on the roads.

Mitigation Measures

The Construction Contractor will implement a Traffic Management Plan (**Section 4.0**) as described in **Section 2.6**. Detailed plans or agreements regarding maintenance and/or repairs of any local roads damaged during construction will be developed with the County.

Boralex/UDI will undertake consultation with the County regarding any necessary agreements related to wear on roads from transportation of Project materials in addition to obtaining the required permits for use of County roads.

Permits from the MTO may be required to facilitate the component transportation on provincial highways outside of the Project area. It is not anticipated that the additional traffic on the provincial highways will cause any significant traffic congestion.

Net Effects

Abnormal wear on roads is possible, though unlikely, following mitigation measures and potential upgrades that may be required to roads prior to transportation of Project components. Truck traffic will increase on some roads during turbine and other component deliveries; however this traffic will be restricted to predetermined routes and times to the greatest extent possible. Road safety is not expected to be an issue during the construction phase; however the potential for accidents along the haul routes and on-site cannot be totally avoided.

The effect of constructing the various Project components is anticipated to have a limited, short term effect on traffic during construction.

3.7.2 Utilities

Potential Effects

There is an existing local distribution easement that runs along the south-western Project boundary, to which the Project would connect. No other utilities are located within the Project area.

During construction of the Project there is the potential to interfere with local utilities. Boralex/UDI will undertake consultation with local utility providers, to ensure the location of all utilities (if any) are known and no potential effects will occur.

No potential effects are anticipated during construction of the Project to other provincial infrastructure. No potential effects are anticipated to other major infrastructure in the area during construction.

Mitigation Measures

Boralex/UDI will undertake consultation with local utility providers, to ensure the location of all utilities are known and no potential effects will occur.

Boralex/UDI will obtain all necessary permits and authorizations for connection into the local distribution line.

Net Effects

As a result of obtaining all necessary permits, no net effects are anticipated to local and provincial utilities.

3.7.3 Navigable Waters

No navigable waters are located within the 120 m Zone of Investigation. As such no potential effects will occur and therefore no mitigation measures are necessary.

3.8 WASTE MANAGEMENT AND CONTAMINATED LANDS

Potential Effects

Landfill Sites

No landfill sites are located within or near the 120 m Zone of Investigation. As such no potential effects will occur and no mitigation measures are necessary.

Contaminated Lands

The local area is predominately rural and agricultural in nature, dominated by agricultural fields. There exists a limited potential for finding contaminated sites; therefore the possibility of encountering such lands cannot be completely ruled out.

Waste Generation

Waste materials expected to be generated during construction are described in **Section 2.8**, and will be temporarily stored on-site and will require reuse, recycling, and/or disposal at an appropriate MOE-approved off-site facility. Improper disposal of waste material generated during construction may result in contamination to soil, groundwater, and/or surface water resources on and off the Project sites. Litter generated during construction may also become a nuisance to nearby residences if not appropriately contained and allowed to blow off the construction-site.

Spills

Some materials, such as fuel, lubricating oils and other fluids associated with construction, have the potential for discharge to the on-site environment through accidental spills.

Mitigation Measures

In the event that previously unknown contaminated soils, such as buried tanks, drums, oil residue or gaseous odour, are uncovered or suspected of being uncovered, construction will cease in that location until the source of the contamination is further investigated. In such an instance, Boralex/UDI will retain expert advice on assessing and developing a soil sampling, handling and remediation plan. All contaminated material will be managed in accordance with the applicable sections of the *Environmental Protection Act* and Regulation 347.

During construction, the Construction Contractor will implement a site-specific waste collection and disposal management plan, which may include site practices such as:

- systematic collection and separation of waste materials within weather-protected on-site storage areas;
- all waste materials and recycling will be transported off-site by private waste material collection contractors licensed with a Certificate of Approval – Waste Management System;
- contractors will be required to remove their excess materials from the site (e.g. extra cable, formwork, scrap metals, pallets, etc.);
- excess materials generated during the course of construction excavations of soil will be handled in accordance with the MOE's Protocol for the Management of Excess Materials in Road Construction and Maintenance;

- excess excavated soils may be reused elsewhere on the property with landowner permission;
- labelling and proper storage of hazardous and liquid wastes (e.g. used oil, drained hydraulic fluid, and used solvents) in a secure area that will ensure containment of the material in the event of a spill. As per s.13 of the *Environmental Protect Act*, all spills that could potentially have an adverse environmental effect, are outside the normal course of events, or are in excess of the prescribed regulatory levels will be reported to the MOE's Spills Action Centre;
- dumping or burying wastes within the Project sites will be prohibited;
- should contaminated soil be encountered during the course of excavations the contaminated material will be disposed of in accordance with the current appropriate provincial legislation, such as Ontario Regulation 347, the General – Waste Management Regulation;
- disposal of non-hazardous waste at a registered waste disposal site(s);
- if waste is classified as waste other than solid non-hazardous, a Generator Registration Number is required from the MOE and the generator will have obligations regarding manifesting of waste. Compliance with Schedule 4 of Regulation 347 is mandatory when determining waste category;
- implementation of an on-going waste management program consisting of reduction, reuse, and recycling of materials; and,
- disposal of sanitary wastes will be the responsibility of the contracted third party and they will ensure disposal in accordance with appropriate legislation, standards and policies.

Wash water from the cleaning of cement truck drums will be minimal. Disposal will be done in a manner compliant with regulatory requirements and acceptable to stakeholders.

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

Construction Waste Management Plans will be developed by the Construction Contractor and will include protocols for the reuse, recycling and/or disposal of solid, hazardous and sanitary waste. See **Section 4.0** for more information on the Construction Waste Management Plans.

Net Effects

With the application of the mitigation measures outlined above, no net effects are anticipated on-site during construction. In terms of waste disposal, it is possible that there will be a minor incremental effect on soil, groundwater, and surface water at the waste disposal site(s) depending on municipal on-site containment practices and quality of the landfill protection

mechanisms (e.g. use of geotextiles to contain leachate). It is assumed that licensed waste disposal sites are legally compliant.

3.9 PUBLIC HEALTH AND SAFETY

Potential Effects

Potential effects to public health and safety are largely in the form of increased construction related traffic (**Sections 3.6.8** and **3.7.1**), dust emissions (**Section 3.5.2**), construction noise (**Section 3.5.3**) and unauthorized access of the public to the work sites.

Mitigation Measures

Implementing transportation planning and safety measures during construction will minimize the potential for traffic related safety concerns. A detailed Traffic Management Plan and a detailed Health and Safety Plan (**Section 4.0**) will be prepared and implemented by the Construction Contractor.

An Emergency Response and Communications Plan will be developed in detail for the Project, including the construction phase, and is outlined in greater detail in the Design and Operations Report.

Mitigation measures for dust emissions and construction noise are provided in **Sections 3.5.2** and **3.5.3**, respectively.

Land access to the construction-site will be controlled through signage and restricted to authorized personnel only. The Construction Contractor will also employ good site safety practices during the construction phase. The detailed Health and Safety Plan referenced above will consider both public and occupational health and safety issues. This may include protecting the public from equipment and construction areas by posting warning signs, use of personal protective equipment, accident reporting, equipment operation, and confined space entry. Discussions will take place with local emergency services personnel and Boralex/UDI will participate in a training session for these workers.

Net Effects

With proper protection and mitigation measures, and adherence to Boralex/UDI safety policies and procedures, there is minimal increased or new risk to public health and safety from construction of the Project.

4.0 Construction Environmental Management Plan

Although not a requirement of O. Reg. 359/09, the Construction Contractor, with oversight from Boralex/UDI will prepare a Construction Environmental Management Plan (CEMP) prior to the initiation of any substantive on-site works. The CEMP will be the controlling plan for all construction activities, and will be designed to minimize potential adverse environmental effects, while enhancing the Project's benefits. The CEMP will be based on the environmental effects and mitigation measures identified in this report, and related reports to be submitted as part of the REA application. As part of the construction program, site practices and procedures will be implemented to further reduce the environmental effects identified in this report and supporting studies. These practices may include specifications regarding disposal of excavated material, sediment control, dust control, and soil compaction control. In addition, Boralex/UDI staff and contractors will be made aware of the environmental commitments contained in this report and supporting studies to ensure the commitments are implemented.

The Project CEMP will include procedures and plans based on regulatory requirements and accepted site practices and as appropriate will include the following plans:

- *Traffic Management Plan*: the Construction Contractor and/or the turbine manufacturer will develop and implement this plan, which will contain strategies governing movement of materials and personnel to, from, and within the workspace areas; management of connection points between access roads and public roads; transport of abnormal loads; control of any upgrading/modification roadworks; and/or dust and vehicle emission controls.

- *Hazardous Waste Management Plan: the Construction Contractor will develop* the procedures for proper identification, storage, handling, transport, and disposal of hazardous waste. In addition, the procedures will outline specific requirements for personnel training, emergency response, product review and approval, and record keeping.

- *Non-Hazardous Waste Management Plan: the Construction Contractor will develop* alternative procedures for the management and disposal of non-hazardous waste such as used lubricants, used drums, and general waste with specific provisions for reuse and recycling of waste materials.

- *Health and Safety Plan*: the Construction Contractor will prepare this plan considering both public and occupational health and safety issues. This may include protecting the public from equipment and construction areas by posting warning signs, use of personal protective equipment, accident reporting, equipment operation, and confined space entry.

- *Construction Plan*: Boralex/UDI will develop construction specifications that will form part of the construction contract. These specifications will detail the specific techniques and procedures to be followed to implement the mitigation recommendations contained in this report and supporting reports and studies.

- *Emergency Response and Communications Plan*: the Construction Contractor and/or Boralex/UDI will include a plan for the proper handling of material spills and associated procedures to be undertaken during a spill event. The plan will also specify containment and clean-up materials and their storage locations. The plan will include general procedures for personnel training. As appropriate, the plan may cover response actions to high winds, fire preparedness, evacuation procedures, and medical emergencies. The plan will include key contact information for emergency service providers, a description of the chain of communications and how information will be disseminated between Boralex/UDI and/or the Construction Contractor and the relevant responders.

- *Training Plan*: as appropriate, this will involve the training/informing of construction personnel on the unique features of the above plans prior to construction.

- *Communication Response Protocol*: Boralex/UDI will continue its pre-construction contact with Project stakeholders during construction and through the initial period of operation as long as this seems an effective two-way channel for communication. Boralex/UDI and/or the Construction Contractor may consider developing and implementing a Complaint Response Protocol for the construction phase to address any reasonable concern from the public. This protocol will provide a telephone number for contact at Boralex/UDI. Any telephone number provided to the public for reporting of complaints will be equipped with a voice message system. Boralex will endeavour to respond to messages within 48 hours. All reasonable commercial efforts will be made to take appropriate action as a result of actual concerns as soon as practicable. Should such a protocol be developed, Boralex/UDI will consider posting it on the Project website (http://www.udi-canada.com) and/or providing it directly to Norfolk County and the MOE.

5.0 Construction Environmental Effects Monitoring Plan

The Construction Contractor will be the primary party responsible for the implementation of construction environmental effects monitoring measures. Implementation of these measures will be undertaken in a manner that is consistent with Boralex's/UDI's standard environmental and engineering practices and in compliance with applicable municipal, provincial, and federal standards and guidelines. The following subsections outline the key monitoring activities to be implemented.

5.1 TERRESTRIAL HABITATS

Methodologies/Sampling Protocols

The majority of monitoring for terrestrial habitat impacts will occur post-construction, during the operational phase of the facility. Construction activities that have the potential to affect terrestrial flora and fauna include minimal vegetation clearing and disturbance, accidental spills and/or leaks, and waste disposal. Stringent monitoring of these activities is necessary to ensure terrestrial flora and fauna are protected.

Any required vegetation clearing activities will be conducted under constant observation and monitoring of the Construction Contractor to ensure that vegetation is cleared only from designated areas. Areas outside the designated construction-sites shall not be disturbed.

Monitoring will be required following the unlikely event of contamination from an accidental spill or leak. Contaminated soils will be removed and replaced as appropriate. All such activities will follow procedures outlined in the Emergency Response Plan for the CEMP (**Section 4.0**).

As appropriate, records of waste generation and hauling will be maintained. Where a third party's activities are identified as non-compliant or insufficient, the Construction Contractor will seek out an alternative recycling or disposal solution.

Performance Objectives/Additional Actions

Provided mitigation measures outlined in **Section 3.0** are implemented, and monitoring as outlined above occurs, it is anticipated that environmental disturbance will have been contained and that no additional monitoring actions will be required during construction.

5.2 GROUNDWATER

Methodologies/Sampling Protocols

The presence of recently drilled or non-documented water wells will be investigated with participating landowners. In the event that turbines are located within 100 m of private

residential wells of participating landowners, the Construction Contractor may, at the landowner's request, hire a third-party company to undertake monitoring of the quality and quantity of these wells over the course of construction.

Performance Objectives/Additional Actions

In the event that well water quality or quantity is disturbed as a result of construction, as determined by monitoring, Boralex/UDI will provide a temporary potable water supply until corrective measures are taken and will comply with MOE's *Guideline B-9: Resolution of Groundwater Interference Problems*. .

5.3 AQUATIC HABITATS

Methodologies/Sampling Protocols

As appropriate, a Construction Contractor representative will be on-site during installation of Project components that could potentially affect aquatic habitats to ensure compliance with specifications, site plans and permits. In particular, the Construction Contractor will ensure that pre-construction preparation is completed prior to commencement of in-stream work (if required). The Construction Contractor will monitor weather forecasts prior to work near aquatic habitats.

Performance Objectives/Additional Actions

The Construction Contractor will ensure that floodplain conditions are restored to pre-construction conditions, as possible, following completion of the construction activities.

Environmental inspection following spring run-off the year after construction (first year of operations) may also be considered to ensure surface drainage has been maintained. In the event that adverse effects are noted, appropriate remedial measures will be completed as necessary (i.e. such as site rehabilitation and revegetation) and additional follow-up monitoring conducted as appropriate, under the direction of an environmental advisor.

5.4 AGRICULTURAL LANDS

Methodologies/Sampling Protocols

For a period of one year after restoration of temporary work areas on agricultural lands, potential soil problem areas including subsidence, soil erosion and/or stoniness will be visually monitored in collaboration with the landowner. Monitoring of the above mentioned soil issues is usually conducted during the spring, the year after construction, so that the area has had a chance to over-winter. These issues are usually identified during a site visit once the soil is dry enough to traverse by foot, but before the landowner has been on the fields to cultivate and seed for next year's crop.

Performance Objectives/Additional Actions

If adverse impacts are noted during the above post-construction monitoring, appropriate remediation measures will be developed as per agreements with the landowner. These mitigation measures may include, but are not limited to, soil re-grading or importation to correct the effects of subsidence, re-grade or import soil to mitigate soil erosion issues, and surface pick excess stones as required. Boralex/UDI will be responsible for the implementation of all necessary mitigation measures. Additional follow-up monitoring will be conducted, until adverse impacts are no longer evident.

5.5 PUBLIC ROADS

Methodologies/Sampling Protocols

If required, improvements to local roads will be made prior to the delivery of Project components. Local roads will be restored to their pre-construction conditions to the satisfaction of local authorities as applicable to the agreements with the County. Some local roads requiring structural enhancement/upgrades may be left in their upgraded form if requested by the County. For a period of one year after construction (first year of operations), roads will be monitored following a heavy rain event and following spring runoff, as defined by applicable agreements, to ensure no erosion, bank slumpage, road subsidence or major rutting has occurred as a result of construction activities. As appropriate, affected roadside ditches and drains will be repaired if required and monitored to ensure that they are functioning properly.

Performance Objectives/Additional Actions

If adverse impacts are noted during the above post-construction monitoring, appropriate remediation measures will be developed as per applicable agreements. As appropriate, affected road substrate will be repaired and roadside ditches and drains will be revegetated. Additional follow-up monitoring will be conducted, as per applicable agreements, until adverse impacts are no longer evident.

5.6 AIR QUALITY AND DUST

Methodologies/Sampling Protocols

As appropriate, records of vehicle maintenance will be retained and made available for periodic review by the Construction Contractor. All vehicles identified through the monitoring program that fail to meet the minimum emission standards will be repaired immediately or replaced as soon as practicable from the construction area.

The Construction Contractor will monitor to ensure that temporary topsoil storage piles are stabilized with appropriate means.

Performance Objectives/Additional Actions

Provided mitigation measures outlined in **Section 3.0** are implemented, and monitoring as outlined above occurs, it is anticipated that environmental disturbance will have been contained and that no additional monitoring actions will be required.

6.0 Closure

This Construction Plan Report for the Port Ryerse Wind Power Project has been prepared by Stantec for Boralex/UDI in accordance with Item 1, Table 1 of Ontario Regulation 359/09, and the guidance document "*Technical Guide to Renewable Energy Approvals"* (MOE, March 2012).

This report has been prepared by Stantec for the sole benefit of Boralex/UDI, and may not be used by any third party without the express written consent of Boralex/UDI. The data presented in this report are in accordance with Stantec's understanding of the Project as it was presented at the time of reporting.

Respectfully submitted,

STANTEC CONSULTING LTD.

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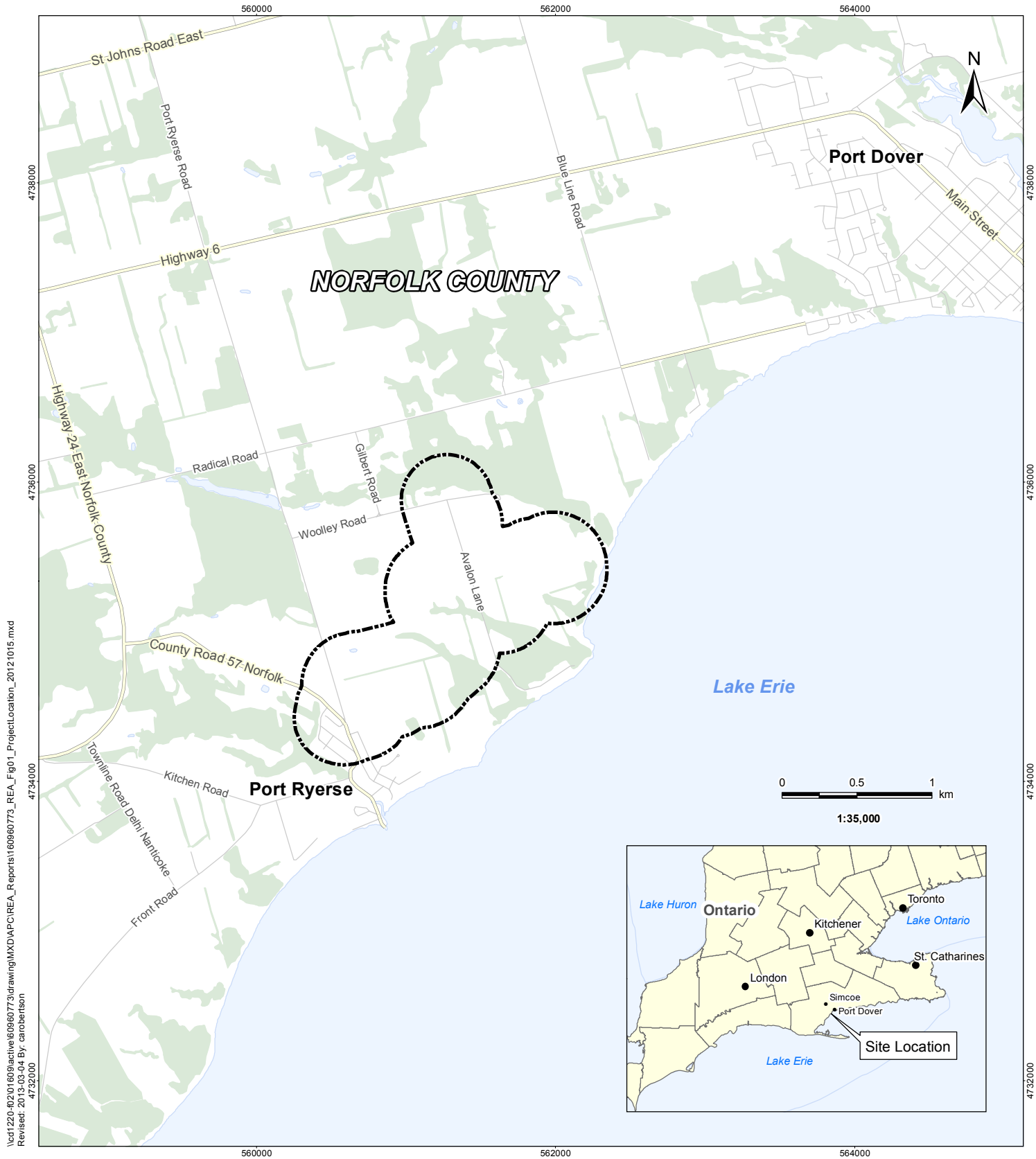
Appendix A

Figures



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Revised: 2013-03-04 By: carobertson

March 2013
160960773

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Legend

- Study Area
- Major Road
- Local Road
- Wooded Area
- Waterbody

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2012.

Client/Project
Boralex/ UDI
Port Ryerse Wind Farm
Port Ryerse, Ontario

Figure No.
1

Title
Project Location

560000 561000 562000

4736000

4735000

Radical Road
Gilbert Road
Woolley Road
Port Ryerse Road
Avalon Lane
County Road 57 Norfolk
Cookson Street
Ralph Street North
Young Creek Road
King Street North
Hillcrest Drive
Ralph Street South
Port Ryerse

T1
T2
T3
T4

N

Lake Erie

0 100 200 m
1:8,500

Legend

- Participating Properties Boundary
- Zone of Investigation (120 m)
- Zone of Investigation (300 m)

Proposed Project Components

- Proposed Turbine
- MET Tower
- Bladeswept Area / Rotor Diameter (113 m)
- Proposed Access Road
- Turning Radius
- Proposed Collector Line
- Component Laydown Area and Crane Pad
- Substation/ Distribution
- Proposed Permanent Site Parking Lot

Existing Features

- Water Well Record (MOE)
- Contour Line (5m Intervals)
- Major Road
- Local Road
- Hazard Lands
- Watercourse
- Waterbody
- Wooded Area

Noise Receptors

- Participating
- Non-Participating, Occupied
- Non-Participating, Vacant

Petroleum Wells

- Abandoned Well
- Active Well
- Status Unknown

Setbacks

- Property Line Setback (99.5m)
- Road Setback (65.5m)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2012.
3. Orthographic Imagery Source: © First Base Solutions, 2011. Imagery taken in Spring 2010.

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March 2013
160960773

Client/Project
Boralex/ UDI
Port Ryerse Wind Farm
Port Ryerse, Ontario

Figure No.
2

Title
Socio-Economic Features

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Revised: 2013-03-06 By: dharvey

561000 562000

4736000 4735000 4734000

N

WO03

98 m

57 m

Gilbert Road

Woolley Road

Avalon Lane

T4

9 m

16 m

T2

T3

SCS01

WO02

Port Ryerse Road

WO02

LBMS01

T1

County Road 57/ Norfolk

Cookson Street

Ryerson Street

Ralph Street North

Port Ryerse

Youngs Creek Road

King Street North

Hilltop Drive

Ralph Shea Street South

King Street North

Pond Road

Lake Erie

0 100 200 m

1:8,000

561000 562000

4736000 4735000 4734000

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Revised: 2013-03-12 By: dharvey

Legend

- Participating Properties Boundary
- Zone of Investigation (120 m)
- Zone of Investigation (300 m)
- Proposed Turbine
- MET Tower
- Bladeswept Area / Rotor Diameter (113 m)
- Proposed Access Road
- Turning Radius
- Proposed Collector Line
- Component Laydown Area and Crane Pad
- Substation/ Distribution
- Proposed Permanent Site Parking Lot
- Major Road
- Local Road
- Watercourse
- Waterbody
- Significant Woodland

Natural Features

- Pignut Hickory Candidate
- Significant Landbird Migratory Stopover Area (LBMS)
- Significant Pignut Hickory Habitat (SCS)
- Distances Between Features and Project Components On This Map Are Described In Detail In Table 3.9 In The NHA/ EIS
- REA Water Body

Setbacks

- REA Water Body Setback (30m)

Notes

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   Imagery taken in Spring 2010.

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Client/Project
Boralex/ UDI
Port Ryerse Wind Farm
Port Ryerse, Ontario

Figure No.
3

Title
Significant Natural Features & Water Bodies