Final Project Description Report – Belle River Wind Project

Report

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Date:

May, 2015

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Appendix A. Legal Descriptions

Acronyms and Abbreviations

ANSI	Area of Natural and Scientific Interest
Belle River Wind	SP Belle River Wind LP
BMPs	Best management practices
CMOH	Chief Medical Officer of Health
dBA	Decibels
dbh	Diameter at breast height
EEMP	Environmental Effects Monitoring Plan
EIS	Environmental Impact Study
ELC	Ecological Land Classification
EMF	Electromagnetic Field
ERCA	Essex Region Conservation Authority
GHGs	Greenhouse gases
Hz	Hertz
Hydro One	Hydro One Networks Inc.
IESO	Independent Electricity System Operator
km	Kilometres
kV	Kilovolts
L/day	Litres per day
m	Metres
m^2	Metres squared
m/s	Metres per second
mm	Millimetres
MBCA	*Migratory Birds Convention Act*
MNRF	Ontario Ministry of Natural Resources and Forestry
MOECC	Ontario Ministry of the Environment and Climate Change
MTCS	Ontario Ministry of Tourism, Culture and Sport
MW	Megawatts
NHA	Natural Heritage Assessment
NRSI	Natural Resource Solutions Inc.
O. Reg.	Ontario Regulation
OEB	Ontario Energy Board
OGSR	Oil, Gas & Salt Resources
Pattern Development	Pattern Renewable Holdings Canada ULC
PDR	Project Description Report
Project	Belle River Wind Project
PSA	Project Study Area
PTTW	Permit to Take Water
REA	Renewable Energy Approval
Samsung Renewable Energy	Samsung Renewable Energy Inc.
SCADA	Supervisory Control and Data Acquisition
SFL	Sustainable Forest Licence
SRP	Spill Response Plan
SWH	Significant Wildlife Habitat
TSS	Total Suspended Solids
ZOI	Zone of Influence

1. Introduction

1.1 Name of Applicant

In May, 2009, the Government of Ontario passed the *Green Energy and Green Economy Act* and Ontario Regulation ("O. Reg.") 359/09, as amended. Under the amended O. Reg. 359/09, the Belle River Wind Project ("Project") will require a Renewable Energy Approval ("REA"). The REA integrates previous requirements under the *Environmental Assessment Act* with clear provincial rules and standards under the *Environmental Protection Act*.

The Belle River Wind Project is being proposed by SP Belle River Wind LP, by its general partner, SP Belle River Wind GP Inc. ("Belle River Wind"). Belle River Wind is a joint venture limited partnership owned by affiliates of Pattern Renewable Holdings Canada ULC ("Pattern Development") and Samsung Renewable Energy Inc. ("Samsung Renewable Energy").

The Project has been proposed in response to the Government of Ontario's plan to integrate more renewable energy into the province's power grid. This Project Description Report ("PDR") has been prepared in accordance with Item 10 of Table 1 in O. Reg. 359/09, as amended.

1.1.1 Summary of Project Description Report Requirements

The requirements for the PDR as defined under O. Reg. 359/09, as amended, and where those requirements are addressed in this report are provided in the following table (**Table 1-1**).

Table 1-1: Adherence to Project Description Report Requirements under O. Reg. 359/09, as Amended

Requirement	Completed	Corresponding Section
Description of any energy sources to be used to generate electricity at the renewable energy generation facility.	Yes	**Section 1.4**
Description of the facilities, equipment or technology that will be used to convert the renewable energy source or any other energy source to electricity.	Yes	**Section 2**
The class of the renewable energy generation facility.	Yes	**Section 1.4**
Description of the activities that will be engaged in as part of the renewable energy project.	Yes	**Section 3**
The nameplate capacity of the renewable energy generation facility.	Yes	**Section 1.4**
The ownership of the land on which the Project Location is to be situated.	Yes	**Section 1.3**
Description of any negative environmental effects that may result from engaging in the Project.	Yes	**Section 4**
An unbound, well-marked, legible and reproducible map that is an appropriate size to fit on a 215 millimetres (mm) by 280 mm page, showing the Project Location and the land within 300 metres (m) of the Project Location.	Yes	Provided as part of the REA package unbound from this report.

The Draft PDR was distributed to agencies, First Nation and Aboriginal Communities, the Town of Lakeshore and the County of Essex, and to the Director of the Environmental Approvals Access and Service Integration Branch of the Ontario Ministry of the Environment and Climate Change ("MOECC") on August 20, 2014. This distribution is in accordance with O. Reg. 359/09, as amended, and the *Technical Guide to Renewable Energy Approvals* (MOECC, 2013) which state that the Draft PDR must submitted to agencies, First Nation and Aboriginal Communities, the Town of Lakeshore and County of Essex at least 30 days in advance of the first public meeting. Concurrently, members of the public were sent notices to indicate the locations where the Draft PDR could be reviewed, both in person and on the Project's website.

This PDR, along with the rest of the draft REA reports, was provided to the Town of Lakeshore and County of Essex more than 90 days in advance of the second public meeting. First Nation and Aboriginal Communities, government agencies and the public were able to review copies of the report 60 days in advance of the second public meeting. These timelines align with the distribution requirements outlined in O. Reg. 359/09, as amended, and the *Technical Guide to Renewable Energy Approvals* (MOECC, 2013).

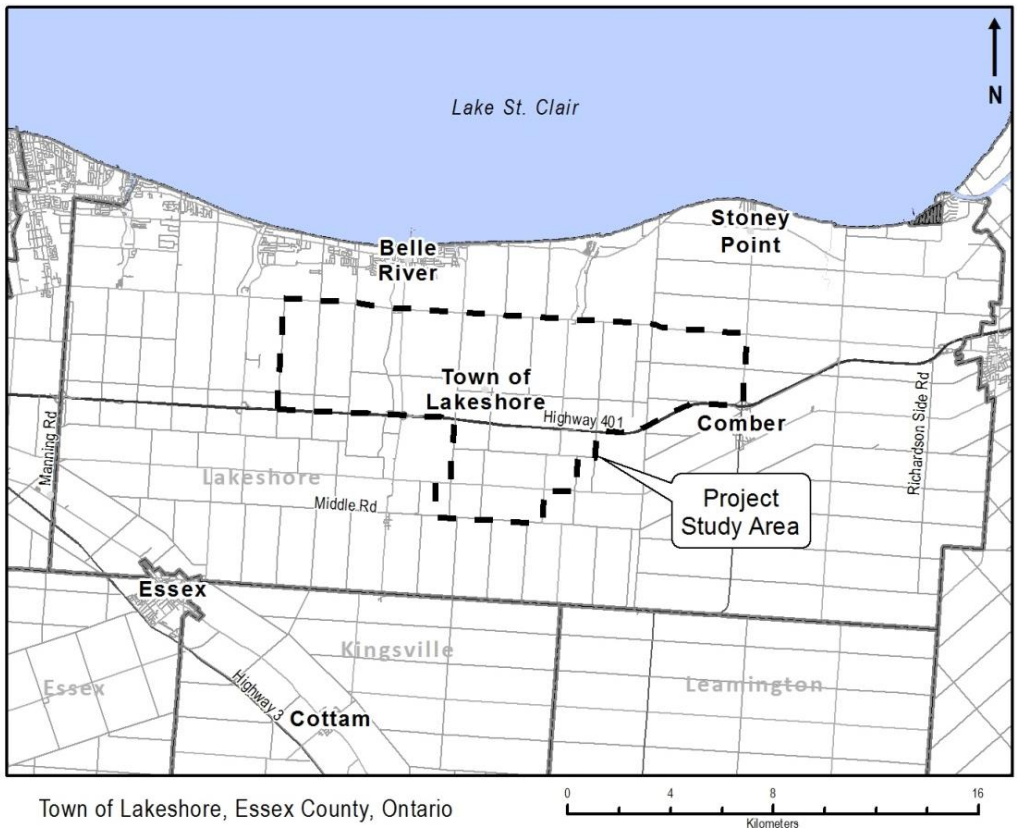
1.2 Project Location

Belle River Wind is proposing to develop a wind project in the Town of Lakeshore in the County of Essex, Ontario. The Project will be located on public and private lands south of the community of Belle River. The location of the Project was established based on interest expressed by local landowners, the availability of wind resources and availability of existing infrastructure for connection to the electrical grid.

According to O. Reg. 359/09, as amended, the Project Location is "a part of land and all or part of any building or structure in, on, or over which a person is engaging in or proposes to engage in the project and any air space in which a person is engaging in or proposes to engage in the project". As described therein, the Project Location boundary is the outer limit of where site preparation and construction activities will occur (i.e., disturbance areas described below) and where permanent infrastructure will be located, including the air space occupied by turbine blades.

The Project is generally bounded by County Road 42 to the north, Lakeshore Road 111 to the west, Highway 401 and South Middle Road to the south, and Comber Sideroad to the east. The area encompassed by these boundaries is referred to as the Project Study Area ("PSA"). **Figure 1-1**, below, shows a map of the PSA. To see the location of the Project within Ontario, please see **Figure 1-2**.

Figure 1-1: Project Study Area



The PSA covers approximately 22,200 acres[1] of land that the Town of Lakeshore's Official Plan (2010) and the Town of Lakeshore Zoning By-law (2014) identify as predominantly agricultural in use. The PSA also consists of fragmented areas of forest and riparian habitat associated with small creeks or farm drains. The Project is not situated on Crown land or within areas protected under provincial land use plans. The PSA represents the area being assessed as part of the REA process. The following co-ordinates define corners of the external boundaries of the PSA:

Longitude	Latitude
-82.769	42.277
-82.687	42.236
-82.645	42.2
-82.55	42.268

1.3 Belle River Land Ownership

The Project will be located primarily on privately owned land with some components (e.g., electrical collector lines) being placed along public right-of-ways. Legal descriptions of the land parcels to be used for the Project are provided in **Appendix A**.

1. *Metric units are used throughout REA documentation when describing the size of Project infrastructure, except in instances describing areas of land. When describing land size, acres (imperial) will be used rather than hectares (metric) because it is the measuring unit most commonly used by the local community. It is assumed that 1 hectare of land is equal to 2.47 acres of land.*

Figure 1-2: Study Area in Ontario

1.4 Description of Energy Source, Nameplate Capacity and Class of the Facility

The Project will use wind to generate energy through the use of commercial wind turbine technology. The proposed wind turbine technology for this Project is expected to be a Siemens SWT-3.2-113 turbine. With a total nameplate capacity of 100 megawatts ("MW"), the Project is categorized as a Class 4 wind facility and will be in compliance with the requirements outlined for such facilities.

Up to 49 turbine locations are currently being assessed for the Project. It is important to note that the total number of turbines will depend on the nominal rating of each turbine.

A summary of key Project information is presented in the table below.

Table 1-2: Summary of Key Project Information[2]

General	*Project Name:*	Belle River Wind Project
	Project Ownership and Operation:	SP Belle River Wind LP
	Project Lifespan (commercial operation):	20 Years
	Project Nameplate Capacity:	Up to 100 MW
Project Area *(as shown in **Figure 1-1**)*	*Location of Project:*	Privately-owned land and public road allowances in the Town of Lakeshore, County of Essex
	Total Project Study Area:	22,200 acres
	Total Area of Project Location (total disturbance area):	1,760 acres
Wind Turbine Generators	*Make and Model:*	Siemens SWT-3.2-113
	Total Number Permitted:	49 turbines
	Approximate Number Constructed:	44 turbines
	Nominal Turbine Power:	2.257 to 3.2 MW
	Number of Blades:	3
	Blade Length:	55 m
	Hub Height:	99.5 m
	Rotor Diameter:	113 m
	Cut-in Wind Speed:	3 to 5 metres per second ("m/s")
	Cut-out Wind Speed:	32 m/s
	Rated Wind Speed:	12 to 13 m/s
	Swept Area:	10,000 metres squared ("m^2")
	Foundation Dimensions:	25 m diameter
Access Roads	*Access Roads – Operations:* *(includes shoulder, travel width and ditch)*	49 kilometres ("km") x 8 to 12 m
	Access Roads – Construction (with shoulder):	49 km x 8 to 15 m
Collector Lines	*34.5 kilovolts ("kV") Collector Lines in Public Right-of-way:* *(total combined length of proposed underground and/or overhead)*	80 km x 2 to 6 m
	34.5 kV Collector Lines on Private Lands (underground):	49 km x 2 to 6 m
Transmission Line	*230 kV Transmission Line in Public Right-of-way or Private Lands:*	5 to 10 km x 2 to 6 m

2. Dimensions are near approximations.

Other Project Structures and Facilities	*Collector Substation:*	10 acres
	Operations and Maintenance Building:	7 acres
	Interconnection Station:	10 acres
	Meteorological Towers:	Up to 2
	Microwave Tower:	Up to 2
Temporary Land Use *(Construction Phase)*	*Construction Staging Areas:*	10 to 15 acres
	Wind Turbine Laydown Area (each turbine):	1.5 acres
	Crane Pads:	0.2 acres

1.5 Contact Information

Applicant:

As noted above, Belle River Wind is a joint venture limited partnership owned by affiliates of Pattern Development and Samsung Renewable Energy. The contacts for the Project are as follows:

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Project:

Project Email: *info@belleriverwind.com*
Project Website: *www.belleriverwind.com*

1.6 Other Approvals and Authorizations Required

1.6.1 Provincial Permits and Authorizations

Based on the requirements of the *Green Energy and Green Economy Act*, the Project may require provincial authorizations listed in the table below.

Table 1-3: Ontario Authorizations and Permits

Permit / Authorization	Administering Agency	Rationale
Renewable Energy Approval Application - Ontario Regulation 359/09	Ministry of the Environment and Climate Change	Electricity project approval
***Archaeological Clearance**	Ministry of Tourism, Culture and Sport	Archaeological and heritage resources
***Public Lands Act* work permit**	Ministry of Natural Resources and Forestry	Project may cross watercourses that are considered public lands
Notice of Activity for Newly Listed Species and Wind Facilities Operations	Ministry of Natural Resources and Forestry	Species-at-risk and their habitats that may be affected by construction or operation of the wind project
Fill, Construction & Alteration of Waterways Development, Interference with Wetlands and Alterations to Shorelines and Watercourses – Ontario Regulation 169/06	Conservation Authorities (Essex Region Conservation Authority)	Work within floodplains, water crossings, river or stream valleys, hazardous lands and within or adjacent to wetlands
Encroachment Permit	Ministry of Transportation	Crossing of provincial highways
Land-Use Permit	Ministry of Transportation	Project works undertaken within 180 m of a Ministry of Transportation controlled intersection
Commercial Access Permit	Ministry of Transportation	Ingress / egress from provincial highway
Change of Access & Heavy / Oversize Load Transportation Permit	Ministry of Transportation	Compliance with provincial highway traffic and road safety regulations
Special Vehicle Configuration Permit	Ministry of Transportation	Use of non-standard vehicles to transport large components
Notice of Project	Ministry of Labour	Notification to the Ministry of Labour before construction begins
Leave-to-Construct	Ontario Energy Board	Development of a high-voltage transmission facility
Generator's Licence	Ontario Energy Board	Generator Operation Permit
Transmitter Licence	Ontario Energy Board	Transmission of electrical power to interconnect with provincial grid
Customer Impact Assessment	Hydro One Networks Inc.	Evaluation of potential effects to existing electrical customers
System Impact Assessment	Independent Electricity System Operator	Potential effects of integrating the Project within provincial transmission system
Approval of Connection	Independent Electricity System Operator	Electrical interconnect with Independent Electricity System Operator regulated network
Connection Assessment	Independent Electricity System Operator	Integration of Project with Independent Electricity System Operator-controlled transmission system
Certificate of Inspection	Electrical Safety Authority	Ensure work complies with the Ontario Electrical Safety Code

*Note: * Permits covered under REA process.*

1.6.2 Municipal Permits and Authorizations

In addition to the provincial requirements listed in the table above, the Project will require a number of municipal permits and approvals. Although the list may not be exhaustive, **Table 1-4** lists a number of the permits and approvals that may be required from the County of Essex and Town of Lakeshore prior to construction.

Table 1-4: Municipal Authorizations and Permits

Permit / Authorization	Rationale
Entrance Permit	Ingress / egress from municipal roads
Drainage Permit	Required for crossings of municipal drains
Building Permit	Compliance with Ontario Building Code
Road Occupancy Permit	Required for work in municipal road allowances
Consent / Severance Application	Required if easements over private lands are required
Road Cut Permit	May be required for access roads off of county roads or works to county roads
Supporting Information / Plans for General Engineering To Support the Belle River Wind Project	Supporting information / plans that may be required by the Town of Lakeshore

1.6.3 Federal Permits and Authorizations

The project will require a number of permits and approvals from the federal government prior to construction. The following table lists federal authorizations and permits that may be required for the Project. These authorizations and permits will be determined through the REA process and will be obtained, if required. An environmental assessment under the *Canadian Environmental Assessment Act* is not anticipated to be required as wind projects are not on the list of designated projects under the Act (Government of Canada, 2013).

Table 1-5: Federal Authorizations and Permits

Permit Authorization	Administering Agency	Rationale
Aeronautical Obstruction Clearance	Transport Canada - Aviation Division	Required for turbine marking and lighting
Land-Use Clearance	NAV Canada	Required for aeronautical safety mapping and designation
Fisheries Act	Fisheries and Oceans Canada	Required if the Project causes serious harm to fish that are part of a commercial, recreational or First Nation and Aboriginal Community fishery, or that support such a fishery

Additional federal acts and regulations that do not require an authorization, but will be considered and adhered to, include the following:

- *Species at Risk Act*; and
- *Migratory Birds Convention Act* (“MBCA”).

2. Project Components and Ancillary Facilities

A description and listing of Project components and temporary Project components are outlined below in **Table 2-1** and **Table 2-2**, respectively.

Table 2-1: Description of Project Components

Component	Description
Wind Turbine Generators	• The Project will include commercial wind turbines, namely the Siemens SWT-3.2-113 turbine, with a nominal power of 2.257 to 3.2 MW. The wind turbine nacelle includes the electric generator, gearbox, wind direction and speed sensors and auxiliary equipment. These components are located at the top of a supporting tower and are connected to three blades and a hub via a main shaft.
Wind Turbine Foundation	• Each turbine tower is anticipated to have a concrete foundation up to 25 m wide and 2.5 m deep. The land base of each turbine foundation will be dependent on subsurface conditions determined during geotechnical investigations. Following geotechnical investigations it may be determined that pile type foundations may be suitable for certain locations.
Pad-mounted Transformers	• A pad-mounted transformer will be located immediately adjacent to each wind turbine. This transformer 'steps-up' the electricity generated by the wind turbine to a common electrical collector line voltage (34.5 kV).
Wind Turbine Access Roads	• During construction and operation of the proposed Project, roads are required in order to access wind turbine locations. Access roads will be constructed of native materials or engineered fill and are expected to be up to 15 m wide during construction in order to accommodate cranes and transportation equipment used to deliver wind turbine components. Following the construction phase, roads may be reduced in size, which would allow access to turbines and associated infrastructure for maintenance and repairs.
Collector Lines	• Collector lines carry the electricity from the pad-mounted transformers to the Project substation (described below). The collector lines will be 34.5 kV standard utility generator lines buried on private property, where possible, from the turbines to the public road allowance. Within the public road allowance, the electrical collector lines will remain underground. Where possible, underground electrical collector lines will be installed within the access road disturbance area in order to minimize the area of disturbed land. Underground electrical collector lines will be buried at a minimum depth of approximately 1.2 m. Farming practices will not be affected by the underground cabling due to the depth of the cables and location of the cable beneath the access roads. • If aboveground electrical collector lines are required, they will be constructed on hydro pole structures that are similar to existing electrical distribution lines in the PSA. • Where two or more underground collector lines must be connected together, a junction box will be installed either below or aboveground on public and/or private land. Junction boxes may contain equipment related to splices, junctions, cable splices and disconnect switches.
Collector Substation	• A collector substation is required to bring together all of the underground and aboveground electrical collector lines. The collected power will be transformed from the electrical collector line voltage (34.5 kV) to a transmission voltage (230 kV). • The collector substation will be constructed within a disturbance area of approximately 10 acres on a raised pad or a prepared base of engineered fill to a depth of approximately 2 m. The substation will comply with the noise requirements specified in O. Reg. 359/09, as amended. • Collector substation equipment will include an isolation switch(es), circuit breaker(s), step-up power transformer(s), distribution switch-gear(s), instrument transformers, capacitor banks, communication equipment, Supervisory Control and Data Acquisition ("SCADA") equipment, protection and control equipment, grounding transformers, revenue metering (conforming to Independent Electricity System Operator ("IESO") market rules), substation grounding and a control building. Substation grounding will follow the Ontario Electrical Safety Code. An oil containment system will be installed at the site to prevent soil contamination in the event of a leak.
Microwave Tower	• A microwave tower used for communication purposes may be constructed within the substation construction disturbance area and/or the interconnection station location. If required, the microwave tower may be up to 100 m tall and will likely be installed by a single crane; soil conditions will determine whether the tower will be steel-lattice or guyed.
Meteorological Towers	• Up to two meteorological towers, each, up to 100 m in height are proposed to be constructed and will consist of either a monopole or lattice structure depending on soil conditions. These meteorological towers may be constructed on a concrete foundation or they may be guyed. • Permanent meteorological towers are an operational requirement of the IESO for all electricity market participants (this includes all generators of electricity) and allow the IESO to operate the system in a reliable and safe manner. The use of meteorological data is crucial to the safe and efficient operation of a wind project as they aid in operational decisions including the wind speed at which a turbine 'cuts-in' / 'cuts-out' and provide warning in extreme weather conditions (e.g., icing conditions) to ensure turbine shutdown occurs in advance of an extreme weather event at the turbine location.

Table 2-1: Description of Project Components

Component	Description
Transmission Line and Interconnection Station (Connection to Electrical Grid)	• A 230 kV electrical transmission line will be built from the transformer substation to a connection point on the Hydro One Networks Inc. (“Hydro One”) transmission corridor. The transmission line will be buried and/or mounted on new poles or a combination thereof. The poles will be made of wood, concrete or steel. The line will be located on private property and/or within existing municipal road right-of-ways. The point of interconnection will require modifications to the existing transmission line and may include circuit breakers, isolation switches, transmission switchgear, instrumentation, grounding, metering equipment and other equipment typical of such systems. • The interconnection plan for any wind project is subject to study, design and engineering by the IESO which manages the province’s electricity grid, Hydro One which owns the transmission lines, the local hydro distribution company and the Ontario Energy Board (“OEB”), which regulates the industry through the Transmission System Code and the Distribution System Code.
Operations and Maintenance Building	• An operations and maintenance building will be constructed to accommodate offices, mess facilities, control facilities, storage space, maintenance work area and a parking area. It will be located within the same disturbance area as either the collector substation or interconnection station. • The operations and maintenance building will be constructed on a concrete foundation. An access road to the operations and maintenance building from a municipal road will be constructed to accommodate construction equipment and on-site traffic during the operation of the Project. • The operations and maintenance building will be powered by the local distribution company, with an on-site backup power supply. The power will be delivered via overhead poles installed adjacent to the access road and will terminate on a transformer pole adjacent to the operations and maintenance building. An underground cable will then connect the transformer pole to the building electrical service.

To facilitate the construction of the proposed Project, a number of temporary construction components are required. These temporary components, described further in **Table 2-2** below, include crane pads, turbine laydown areas and a construction staging area.

Table 2-2: Description of Temporary Project Components

Component	Description
Crane Pads	• Crane pads will be constructed in tandem with wind turbine access roads. Crane pads will be located directly adjacent to wind turbine locations and within the associated construction disturbance area. The crane pad area will be approximately 0.2 acres, and will consist of a mixture of heavier granular material, native materials and engineered fill, as appropriate. • Crane pad areas will be restored following construction so that existing land uses can continue. As required for maintenance and decommissioning activities, crane pads may be reconstructed in the future.
Wind Turbine Laydown Areas	• Laydown areas adjacent to wind turbine locations will be incorporated into the disturbance area for each turbine. Each disturbance area is approximately 1.5 acres and will allow for temporary turbine component storage during construction. Temporary wind turbine laydown areas will be restored following construction activities so that agricultural activities can continue.
Construction Staging Area	• A temporary construction staging area will be located within the PSA. The construction staging area will consist of compacted surface material suitable for vehicular traffic. The depth of the material required will vary and will be dependent upon conditions encountered during the time of construction. The construction staging area will be approximately 10 to 15 acres in size and will primarily serve the following aspects of the Project construction: ▪ Construction equipment / toll storage and maintenance; ▪ Laydown areas for Project components; ▪ Location of Project construction offices; ▪ Parking areas for Project staff; ▪ Portable generators; ▪ Waste disposal containers; ▪ Self-contained temporary toilet facilities; and ▪ Water and rinsing facilities. • Following Project construction, the temporary construction staging area will be restored to pre-existing conditions so that previous land use can continue. Construction offices and temporary storage of Project equipment may also occur in pre-existing areas used for commercial and industrial purposes.

3. Project Activities

The following sections outline the anticipated activities for the pre-construction, construction, operations and decommissioning phases of the Project. Further information relating to Project activities will be provided in the Construction Plan Report, the Design and Operations Report and the Decommissioning Plan Report and will be submitted as part of the Project's REA Application.

3.1 Project Schedule

The schedule below outlines the anticipated timelines for the Project:

Table 3-1: Project Milestones

Project Milestone	Anticipated Date
Host Public Meeting #1	Fall, 2014
Complete Environmental Studies and Reporting	Winter, 2015
Host Public Meeting #2	Spring, 2015
Submit REA Application	Spring, 2015
Obtain Pre-Construction Permits	Winter, 2016
Start Construction	Summer/Fall, 2016
Commence Operations and Maintenance	Summer, 2017
Decommission Project	2037

3.2 Pre-Construction

During the pre-construction phase of the Project, the primary activities include the optioning of lands, preliminary engineering, geotechnical assessment and site surveys of the final turbine locations, procurement of turbine and substation equipment, and permitting and detailed design. Belle River Wind will continue to communicate and engage landowners in the development of the site plans for the Project.

The REA process is the primary approval requirement in the pre-construction phase of the Project. For the permits and authorizations listed in **Section 1.6**, Belle River Wind will work directly with the respective federal, provincial and municipal authorities to ensure all requirements are met. Belle River Wind will also continue to work closely with Project engineers, environmental and cultural specialists, as well as local landowners and First Nation and Aboriginal Communities throughout the development of the Project.

3.3 Construction

Construction of the Project is scheduled to begin in summer/fall 2016 and planned to be completed by the fall of 2017. For detailed information regarding construction and installation activities, please refer to the Construction Plan Report, provided under a separate cover. During site preparation and construction of the proposed Project, the following key activities will be undertaken:

- Preparation of temporary work areas, including clearing and grubbing of vegetation;
- Upgrading of existing access roads and the construction of new access roads;
- Site grading as necessary;
- Preparation and establishment of construction staging areas;

- Preparation of the collector substation laydown area;
- Delivery of construction vehicles and equipment;
- Excavation and installation of wind turbine foundations;
- Installation of crane pads and turbine laydown areas;
- Erection of wind turbines;
- Installation of pad-mounted transformers;
- Installation of electrical collector lines on private lands and/or in municipal road allowances;
- Construction of collector substation;
- Installation of microwave and meteorological towers;
- Installation of a transmission line and interconnection station on private lands and/or in municipal road allowances;
- Construction of operations and maintenance building; and
- Reclamation of construction laydown and staging areas.

3.4 Operations and Maintenance

Operation of the Project is expected to begin in 2017. The operational lifespan of the Project is approximately 20 years unless otherwise extended. The operation of the proposed Project will require up to 15 trained technical and administrative staff, including turbine maintenance technicians and a site supervisor. During the operation of the proposed Project, on-site activities will be limited primarily to scheduled maintenance of the Project components. For information regarding design and operations activities, refer to the Design and Operations Report.

During operations and maintenance of the proposed Project, the following key activities will be undertaken:

- Preventative and unplanned maintenance of Project components;
- Belle River Wind staff transport;
- Natural heritage field monitoring;
- Field monitoring to evaluate the performance of the Project components and to conduct investigations / field visits to follow-up with any complaints received by Belle River Wind;
- Meter calibrations;
- Remote operation of the wind turbines;
- Maintenance of electrical collector and transmission lines; and
- Grounds maintenance in the vicinity of Project components.

3.5 Decommissioning

If the Project is not extended past its current commercial operational life (20 years) the wind turbine structures will be removed to the base of the foundation and portions of the foundations will be excavated and backfilled with subsoil and topsoil to allow agricultural activities to continue. Access road removal will be dependent on the requirements and agreements in place with the individual landowner. Impacted lands will be restored to pre-construction state at the discretion of landowners. Decommissioning procedures will be similar, but in reverse order to those carried out in the construction phase. For further information regarding decommissioning activities, refer to the Decommissioning Plan Report.

Key decommissioning activities associated with the proposed Project include:

- Disassembly and removal of wind turbine infrastructure (hubs, nacelles, blades and towers);
- Removal of pad-mounted transformers;
- Reclamation of access roads (at the discretion of landowners);
- Removal of all electrical collector aboveground infrastructure (at the discretion of landowners). Where the underground collector lines come to the surface, the collector lines will be cut and excavated to a depth of approximately 1.2 m, below grade;
- Removal of overhead cables and transmission poles that are not shared with Hydro One or other utilities;
- Disconnection of the collector substation;
- Disassembly and removal of the collector substation, microwave and meteorological towers, and transmission and grid connection infrastructure (foundations will be removed to a depth of 1 m); and
- Disassembly and removal of the operations and maintenance building infrastructure (at the discretion of landowners).

3.6 Waste Generation

Materials brought to the Project during construction and installation will include equipment / component packaging, scraps, fuels and lubricants. Packing frames for the wind turbine components and cabling spools will be returned to their respective vendors or will be recycled. Plastics from other containers and packaging will be disposed of through the local landfill and recycling facilities, where appropriate. Construction materials and scrap metals (e.g., copper wiring and conductor) will be removed and sold to a local scrap metal dealer. Oils, fuel and lubricants used in maintenance and operation of construction equipment will be stored temporarily in accepted containment systems and will subsequently be removed by a licensed contractor. The licensed contractor will be required to dispose of these wastes through conventional waste-oil and hazardous waste disposal streams.

Waste will also be generated as a result of construction and installation activities. Concrete wash out of empty cement trucks will adhere to applicable regulations. Sanitary sewage collected in portable toilets and wash stations will be transported to an off-site facility by a licensed hauler. Small amounts of spoil material from borehole drilling during geotechnical surveys may be redistributed on disturbed areas at respective drill sites. Topsoil and/or subsoil stripped from access roads and temporary storage / laydown areas may be re-used on-site, where feasible, or otherwise removed to an appropriate location.

If any grubbing of the site is required prior to construction activities, the grubbing materials (e.g., vegetation, branches and tree stumps) will be removed or remain on-site and buried within disturbance areas. As required, stockpiles will be covered with plastic sheeting, tarps or following best management practices (“BMPs”) to prevent erosion and propagation of noxious weeds. During construction of the wind turbine foundation, collector substation and other infrastructure, excavated subsoil and topsoil will be stored in piles on-site at each temporary storage / laydown area until they are replaced during clean-up and reclamation activities. Any excess subsoil will be distributed with landowner input, and excess clean topsoil will be redistributed to adjacent lands as appropriate. If contaminated soil is encountered during the course of excavations, this soil will be disposed of in accordance with the current appropriate provincial legislation.

Disposal and recycling of materials and waste generated will require the use of flatbed and large dump trucks that are capable of transporting heavy loads. The type and number of truck trips necessary will be determined by the licensed construction contractor prior to the construction and installation of the Project. Disposal and recycling of waste will occur throughout the construction and installation of the Project since there are no plans for long-term storage of waste in the PSA.

The operation of a wind project does not generate a large amount of waste. Oil and filters used in gearboxes and hydraulic systems will need to be changed approximately once every five years, as per manufacturer specifications. Lubricants required for wind turbines include hydraulic oil, selected grease (main bearing, blade bearing, cardan shaft, yaw bearing and generator) and open gear grease (yaw-gear) and will be changed approximately two times per year. All surplus lubricating oils, grease, rags, batteries and filters will be removed and disposed of at an MOECC approved disposal and/or recycling facility according to provincial and municipal requirements. Household wastes (e.g., cardboard, plastics, etc.) generated at the operations and maintenance building will either be recycled or disposed of at a local facility. The estimated maximum daily quantity of waste generated will be approximately 20 gallons.

The amount of oil and grease stored on-site will depend on the availability of disposal vehicles, transportation schedules and the service cycle. Used oil will be stored in a designated area of the operations and maintenance building, and picked up by a certified contractor with the appropriate manifests in place. There will be no permanent storage of waste at any Project facility during operations.

The major components of the wind turbines (tower, nacelle and blades) are modular items that allow for ease of construction and disassembly of the wind turbines during replacement or decommissioning. Dismantled wind turbines have a high salvage value due to the steel and copper components. These components are easily recyclable and there is a ready market for scrap metals. Transformers and transmission lines are typically designed for a 50 year lifespan so these items could be refurbished and sold for re-use.

Based on the construction details for the Siemens wind turbines and associated tower and components, it is assumed that both the tower and nacelle will yield approximately 80 percent salvageable materials. Since the hub assembly and bedplate is manufactured steel, it is anticipated that the hub will yield 100 percent salvageable metallic materials. Copper salvage estimates were derived by assuming five percent of the total tower and nacelle weight consists of salvageable copper bearing materials. Since the rotor / blades are constructed of predominantly non-metallic materials (fiberglass reinforced epoxy and carbon fibres), no salvage for the rotor or blades is currently assumed.

It is assumed that 75 percent of the aggregate material from the decommissioning of the crane pads can be salvaged for future use as aggregate base course. The remaining materials would be viable for general fill on non-structural fill areas. The geotextile fabric cannot be salvaged.

3.7 Toxic / Hazardous Materials

Machinery used to dismantle and remove Project components will require the use of oils, fuels and lubricants. In addition, waste lubricants will be recovered during the dismantling of Project components, including the collector substation, wind turbine generators and operations and maintenance building. These materials will be disposed of through conventional waste-oil and hazardous waste disposal streams in a manner outlined by regulatory agencies, if required at the time of decommissioning.

Any overhead collector lines that are required for the Project will be constructed on a wooden monopole structure. Typically, these wooden pole structures utilize a chemical-treated exterior. Belle River Wind will discuss the recycling of wooden poles with a licensed facility, which would likely involve stripping the chemically-treated exterior, disposing of this chemically-infused wood in a landfill, and re-milling the remaining wood core for alternative end uses.

3.8 Air Emissions

During each phase of the Project, activities requiring the use of motorized vehicles (e.g., transportation of maintenance personnel to turbine sites) will have infrequent and short-term emissions of low levels of greenhouse gases ("GHGs") and other compounds. These emissions will be negligible compared to normal operation of motorized vehicles in the PSA. **Section 4.4** of this Report outlines potentially negative effects to air quality relating to the Project and identifies mitigation measures proposed.

Project noise emissions will adhere to the requirements of O. Reg. 359/09, as amended.

Project activities are not anticipated to generate any odour emissions.

3.9 Sewage

During site preparation and construction, portable toilets will be used and a licensed contractor responsible for waste removal will be engaged. As well, the operations and maintenance building for the Project will include washroom facilities that will be constructed and serviced in accordance with required regulations.

Potable water will be supplied by a well(s) or through the municipal water system and a septic bed will be constructed for the disposal of sewage. It is Belle River Wind's responsibility to ensure proper maintenance of the septic system. The operations and maintenance building, septic system and water supply will be constructed and operated in accordance with all applicable (e.g., municipal and provincial) standards.

3.10 Stormwater

To effectively manage runoff during the operation of the Project, drainage channels will be constructed adjacent to access roads, as required. The decision of where to construct drainage channels will be made during the detailed design stage of the proposed Project. Potential sources of sedimentation during the operation of the proposed Project will be limited to unpaved access roads. These access roads will be gravel-based with adjacent and appropriately sized drainage channels. No additional sedimentation control measures are anticipated to be required during operation since sedimentation from these roads is predicted to be lower than that from agricultural fields where the roads are constructed.

A graveled area around each wind turbine foundation will receive any precipitation runoff from wind turbine towers and allow for infiltration into the ground. Runoff from the tower section of wind turbine generators is expected to be negligible compared to the existing runoff within the PSA. As this does not represent a measureable difference in runoff, no additional Stormwater Management Plans are proposed.

The Project's operations and maintenance building (location described above) will have washroom facilities connected to a self-sufficient septic drain field, as deemed appropriate by the local building code, to be emptied and trucked to a sewage treatment facility, as required. No other component of the Project will generate any sewage or require any specific sewage management processes. Non-potable water will be provided by a well(s) and potable water brought in from off-site (e.g., water coolers, water bottles, etc.).

3.11 Water-taking Activities

Groundwater takings for the purposes of providing dry working conditions during turbine foundation construction, collection line installation, road construction, dust suppression and general maintenance activities may be required during construction of the Project. Any water taking conducted during the construction phase or the operations phase of the Project is subject to the REA application and as such does not require a separate Permit to Take Water ("PTTW").

A desktop hydrogeological assessment was completed for the purpose of providing a high level review of existing hydrogeological conditions within the PSA. The assessment identified potential groundwater taking needs of the Project during construction and operation, outlined potential effects of the Project on groundwater resources, and provided a mitigation strategy and contingency measures to negate any adverse effects. The following section provides an overview of the Hydrogeological Assessment and Effects Assessment Report for the Belle River Wind Project. For further details please refer to the Hydrogeological Assessment and Effects Assessment Report in **Appendix B** of the Design and Operations Report.

3.11.1 Temporary Water Takings during Construction

During the construction phase of the Project, water may be required to support turbine infrastructure construction (i.e., dust suppression and directional drilling fluids). Water demands for these purposes are expected to have peak volumes up to 40,000 L/day. Actual daily demands will vary and will typically be lower in volume than the estimated peak volume. As described in the Groundwater Supply Feasibility and Effects Desktop Assessment for the Project, found in **Appendix B** of the Design and Operations Report, the proposed source of water for general construction use is a groundwater supply well located at the site of the future operations and maintenance building.

A review of existing secondary source information provided by the Ontario Geological Survey and from local MOECC water well records indicates that groundwater takings for the purpose of turbine foundation construction is expected to be of relatively low volume, if any. The majority of the PSA is underlain by fine-textured glacial till and glaciolacustrine deposits that do not readily transmit groundwater. Therefore, turbine foundations excavated in this material are not anticipated to require significant dewatering during construction.

In the central portion of the PSA, in proximity to where the coarse-textured lacustrine beach sand is exposed at surface, higher groundwater taking requirements for turbine foundation construction are anticipated. Thus, there is limited potential for groundwater takings to exceed 50,000 L/day at a turbine site, but is dependent on the surficial material being excavated, the depth to groundwater, and other hydrogeological characteristics that may be determined during geotechnical analysis.

3.11.2 Long Term Water Takings during Operation

Groundwater takings during the operations phase of the Project may be required to provide a non-potable water source for regular personnel requirements of approximately 15 full-time employees and general operational maintenance at the operations and maintenance building. Water takings are expected to be approximately 4,500 L/day and are not expected to exceed 50,000 L/day.

4. Description of Potential Environmental Effects

The following section provides a summary of the potential environmental effects that may result from the construction, operations and decommissioning of the Project. The assessment of potential environmental effects has been completed in accordance with the requirements of O. Reg. 359/09, as amended, and the *Technical Guide to Renewable Energy Approvals* (MOECC, 2013). The description of environmental effects addresses the following environmental considerations:

- Cultural Heritage and Archaeology;
- Natural Heritage;
- Surface and Ground Water;
- Air, Odour, Dust;
- Noise;
- Local Interests, Land Use and Infrastructure;
- Public Health and Safety;
- Other Resources; and
- Areas Protected under Provincial Plans and Policies.

Each subsection provides a summary of existing conditions followed by an assessment of potential environmental effects, including preliminary mitigation measures, as a result of construction, operations and decommissioning of the Project.

For each potential effect, performance objectives were developed to describe a desired outcome of mitigation. Next, mitigation measures were proposed to achieve the performance objectives. Net effects, which are those effects that remain following the application of mitigation measures and monitoring commitments, were then assessed based on professional judgment as well as previous project experience. Where possible, the significance of adverse net effects has been described based on the following:

Magnitude ..... the size or degree of the effect compared against baseline conditions; and
Likelihood ..... the probability that the effect will occur.

Finally, where monitoring commitments have been identified, they are intended to verify that the mitigation measures achieve performance objectives. Should the monitoring during the construction and operation of the Project reveal that the mitigation measures are not achieving the intended results, the identified contingency measures will then be implemented.

4.1 Cultural Heritage and Archaeology

4.1.1 Existing Conditions

Stage 1 and 2 Archaeological Assessments (Golder Associates, 2014a and Golder Associates, 2015) were conducted to identify the presence of archaeological resources within the PSA and within the Project Location. The Stage 1 Archaeological Assessment consists of an initial desktop archaeological study within 1 km of the Project Location. The study determined that there are known archaeological resources within the PSA, in addition to properties with the potential to contain archaeological resources.

The Stage 2 archaeological assessment of the Project Location was conducted over 37 days from the spring to winter of 2014 (Golder Associates, 2015). The assessment was conducted in accordance with the 2011 *Standards and Guidelines for Consultant Archaeologists* (Ontario Ministry of Tourism, Culture and Sport (“MTCS”), 2011). This assessment involved a combination of the pedestrian survey and test pit survey methods across portions of the PSA that are proposed for the Project Location, including turbine locations, access roads, substations, collector and transmission lines, operations and maintenance building, meteorological and microwave towers, temporary staging areas, and ancillary equipment. In some cases, entire parcels of land under option were also assessed.

The Stage 2 archaeological assessment resulted in the identification of cultural material in 29 locations. Ten of the 29 archaeological locations identified within the PSA were determined to exhibit cultural heritage value or interest and, as such, have been recommended for Stage 3 site-specific archaeological assessment. Details on the recommendations for each archaeological site, as well as the rationale for the recommendation pertaining to each site, are contained in Section 5.0 of the Stage 2 Archaeological Assessment Report.

The Stage 1 Archaeological Assessment was submitted to the MTCS in the fall of 2014 and received approval on November 1, 2014. The Stage 2 Archaeological Assessments was submitted to the MTCS in the winter of 2015 for review and acceptance into the Ontario Public Register of Archaeological Reports.

A Heritage Impact Assessment (Golder Associates, 2014b) was completed to identify heritage resources including cultural heritage and cultural heritage landscapes of cultural heritage value or interest. All work was carried out in accordance with O. Reg. 359/09, as amended, and included assessing Project Location as well as adjacent lots to the Project Location. The Heritage Impact Assessment included research on the land use history of the PSA, cultural heritage features, cultural heritage landscapes and protected properties. The report includes an inventory of all cultural heritage features (dating to greater than 40 years) in the PSA, and an evaluation of these features according to O. Reg. 9/06 of the *Ontario Heritage Act* (Criteria for Determining Cultural Heritage Value or Interest) to determine their significance.

In relation to cultural heritage landscapes, Golder Associates concluded that the Project Location was determined to represent a single vernacular rural landscape (2014b). Evaluation according to O. Reg. 9/06 concluded that the vernacular rural landscape was not of cultural heritage interest or significance. Therefore, there are no cultural landscapes located at the Project Location that have been determined to have cultural heritage value or interest. As no cultural heritage value or interest was determined, there are no adverse impacts anticipated to the cultural heritage landscape and no further work is recommended.

The Golder Associates (2014b) report identified 19 structures (14 houses and five barns) greater than 40 years of age located on participating parcels within the Project Location. When applying the criteria set out in O. Reg. 9/06, nine of these structures (four houses and five barns) were determined to have cultural heritage value or interest. Following the evaluation of anticipated impacts (both direct and indirect) according to MTCS' *Ontario Heritage Toolkit: Heritage Resources in the Land Use Planning Process,* no anticipated impacts to these nine structures were identified. Therefore, no further work is recommended with regard to cultural heritage features.

4.1.2 Potential Effects, Mitigation Measures and Net Effects

Construction and Decommissioning

No effects to nine structures with cultural heritage value or interest are anticipated, as the Project Location was selected to avoid these features. Therefore, no mitigation measures or monitoring are proposed during construction or decommissioning phases.

Table 4-1 identifies potential effects on archaeological resources that might occur during the construction and decommissioning phases of the Project and identifies mitigation strategies and a monitoring plan.

Operation

No effects to archaeological resources are anticipated as a result of the operational phase of the Project, as all resources will either be avoided or removed as part of a Stage 3 and Stage 4 archaeological assessment prior to construction.

No effects to nine structures with cultural heritage value or interest are anticipated, as the Project Location was selected to avoid these features. Therefore, no mitigation measures or monitoring are proposed.

Table 4-1: Mitigation Measures, Net Effects and Monitoring Plan Associated with Potential Effects to Cultural Heritage Resulting from Construction and Decommissioning

Potential Effects	Performance Objectives	Mitigation Measures	Net Effects	Monitoring Plan and Contingency Measures
Disturbance or Displacement of Archaeological Resources Identified at Ten Locations through Stage 2 Assessment Due to Construction of Project Infrastructure.	• Avoid disturbance / loss of archaeological sites.	• Avoid site: ▪ To avoid the sites, install a 20 m protective buffer zone (snow fence) for those sites located within the Project Location to clearly delineate their boundaries. If required, a licensed archaeologist must confirm and document the proper placing of the fencing. ▪ No ground alteration activities will take place inside of the 20 m protective zone. "No-go" instructions will be issued to all on-site personnel involved in day-to-day activities during construction. ▪ If construction activities are required within 70 m of a site, a 50 m construction monitoring buffering zone must be established surrounding the protective zone and a licensed archaeologist must be brought in to monitor construction activities within the monitoring area. • Where sites cannot be avoided, undertake a Stage 3 archaeological assessment (and Stage 4 where required) and submit the archaeological assessment report(s) to the MTCS for review and approval. • Following a Stage 4 assessment report, construction can proceed without any further documentation or monitoring.	• By implementing appropriate mitigation measure, no significant adverse effects on archaeological resources are anticipated during the construction, installation and decommissioning of the project. ▪ *Low likelihood and limited magnitude of effect as a result.*	**Monitoring:** • Archaeological monitoring by a licensed archaeologist is proposed during construction, installation and decommissioning activities should construction activities intrude into the 50 m construction monitoring zone. • Monitoring is intended to help avoid any potential effects resulting from construction, installation or decommissioning on any archaeological locations that have been recommended for a Stage 3 or 4 assessment. **Contingency Measures:** • Should previously undocumented archaeological resources be discovered, the licensed archaeologist that discovered the archaeological resources can cease alteration of the site immediately and engage a licensed consultant archaeologist in compliance with Section 48(1) of the *Ontario Heritage Act* (Government of Ontario 1990b). • Any person discovering or having knowledge of a burial site will immediately notify the police or coroner as noted in the *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002, c.33. • As deemed appropriate, First Nation and Aboriginal Communities will be contacted with regards to undocumented resources or knowledge relating to burial sites.

4.2 Natural Heritage

4.2.1 Existing Conditions

The Natural Heritage Assessment ("NHA") Records Review, Site Investigations and Evaluation of Significance and Environmental Impact Study ("EIS") Reports were completed in May 2015. All reporting has been completed in accordance with applicable natural heritage guidelines, including: *Natural Heritage Assessment Guide for Renewable Energy Projects, 2nd Edition* (Ontario Ministry of Natural Resources and Forestry ("MNRF"), 2012a), *Birds and Bird Habitats: Guidelines for Wind Power Projects* (MNRF, 2011a) and *Bats and Bat Habitats: Guidelines for Wind Power Projects* (MNRF, 2011b).

The following section outlines some of the existing conditions in the PSA.

4.2.1.1 Wetlands / Areas of Natural and Scientific Interest ("ANSIs") and Vegetation Communities

There are no provincial parks, conservation reserves, provincially significant life or earth science ANSIs or provincially significant wetlands evaluated by the MNRF within the boundaries of the PSA. Active agricultural lands dominate the PSA with limited natural habitats such as several isolated woodlands, unevaluated wetlands and meadows. Through the site investigation and evaluation of significance stages of the NHA, 25 woodlands and 12 wetlands were determined to be significant and carried forward to the EIS. Numerous Significant Wildlife Habitats ("SWHs") and generalized SWHs have been identified within these natural habitats and carried forward to the EIS as well.

4.2.1.2 Birds

Several candidate SWHs for birds have been identified and delineated within the PSA during the ecological land classification ("ELC") mapping exercise completed during the site investigation. After comparing site specific conditions to evaluation of significance criteria as outlined in the *Draft Significant Wildlife Habitat Ecoregion 7E Criterion Schedule* (MNRF, 2012b), one of these features, identified as a waterfowl stopover and staging area (terrestrial), has been determined to be generalized habitat. The significance of the remaining features still needs to be confirmed based on the evaluation of significance criteria as outlined in the *Draft Significant Wildlife Habitat Ecoregion 7E Criterion Schedule* (MNRF, 2012b). Evaluation of significance surveys that have been conducted or those proposed to be completed for the remaining bird SWH features are summarized in the table below.

Table 4-2: Evaluation of Significance Surveys for Bird Significant Wildlife Habitat Features

Bird Significant Wildlife Habitat	Type of Method	Survey Timing
Waterfowl Stopover and Staging Areas (Terrestrial)	Point count surveys were conducted at candidate terrestrial waterfowl stopover and staging areas.	Mid-March to mid-April, 2015
Raptor Wintering Area	Winter Raptor Surveys at candidate raptor wintering areas.	January and February, 2016
Marsh Bird Breeding Habitat	Point count surveys at candidate marsh bird breeding habitats.	April, May and June, 2015
Open County Bird Breeding Habitat	Point count surveys at open country bird breeding habitats.	June and July, 2015
Bird Species of Conservation Concern	Point count surveys at candidate Eastern Wood-Pewee (*Contopus virens*) and Wood Thrush (*Hylocichla mustelina*) habitats, respectively.	June and early July, 2015

For the purpose of this submission, most candidate SWHs were treated as significant and carried over to the EIS where potential effects and appropriate mitigation measure and compensation are identified. If the significance of the

SWH feature is confirmed based on the results of the evaluation of significance surveys, the mitigation measures described in the EIS will be applied to that feature.

4.2.1.3 Bats

One candidate significant Bat Maternity Colony feature (BMA-001) was identified through the site investigation as part of the NHA. The significance of this feature needs to be confirmed through evaluation of significance surveys based on the evaluation of significance criteria as outlined in the *Draft Significant Wildlife Habitat Ecoregion 7E Criterion Schedule* (MNRF, 2012b). Evaluation of significance surveys for BMA-001 include selection of monitoring sites and bat exit surveys, which are proposed to be completed in June, 2015. For the purpose of this submission, this candidate SWH was were treated as significant and carried over to the EIS where potential effects and appropriate mitigation measures and compensation are identified. If the significance of the SWH feature is confirmed based on the results of the evaluation of significance surveys, the mitigation measures described in the EIS will be applied to that feature.

Bat habitat assessment surveys were undertaken from August to December, 2014 for the Project as per the MNRF's *Bats and Bat Habitats: Guidelines for Wind Power Projects* (MNRF, 2011a) and in conjunction with any requirements of the REA NHA, and bat exit surveys will be completed in June, 2015. In addition, details of the post-construction monitoring will be provided in the Environmental Effects Monitoring Plan ("EEMP") to the MNRF.

4.2.2 Potential Effects, Mitigation Measures and Net Effects

The NHA EIS Report describes the potential effects, mitigation measures, and net effects of constructing, operating, and decommissioning the project on significant natural features. An EEMP describes the post-construction monitoring plan for bird and bat mortality and related mitigation and contingency measures, as well as post-construction monitoring requirements for potential operational effects to identify SWHs, in fulfillment of MNRF requirements. The findings of these reports are summarized below.

A Species At Risk report was submitted to MNRF on May 4, 2015. The report identifies the potential impacts and associated mitigation measures related to the following species: Barn Swallow, Eastern Foxsnake, Little Brown Myotis and Northern Myotis. A Notice of Activity is being prepared for wind turbine operations and a draft Operational Mitigation Plan will be circulated to MNRF following the REA submission.

Construction and Decommissioning

Table 4-3 describes the mitigation measures, residual effects and monitoring plan associated with potential effects to Generalized Candidate SWH and Natural Heritage Features resulting from construction and decommissioning.

Table 4-4 describes the mitigation measures, residual effects and monitoring plan associated with potential effects to Significant and Treated as Significant Wetlands, Woodlands, and Wildlife Habitat resulting from construction and decommissioning.

Operations

Table 4-5 identifies potential effects on natural heritage resources that could occur during the operations phase of the Project and identifies mitigation strategies and a monitoring plan.

Where monitoring determines that the mitigation measures are not working as anticipated, contingency measures are described to address any adverse effects.

Table 4-3: Mitigation Measures and Net Effects Associated with Potential Effects to Generalized Candidate Significant Wildlife Habitat and Natural Heritage Features Resulting from Construction and Decommissioning

Potential Effect	Performance Objectives	Mitigation Strategy	Net Effects
Increased Erosion and Sedimentation into Woodlands, Wetlands and Other Natural Features. **Soil Compaction.**	• Minimize direct impacts on vegetation communities and protect rare/ sensitive habitats. • Maintain vegetated buffers, particularly within riparian zones. • Minimize the impacts of sedimentation on nearby natural features.	• Develop and implement an Erosion and Sediment Control Plan. • Utilize erosion blankets, silt fencing, straw bales, etc. for construction activities within 30 m of a wetland, woodland, or water body. • Maintain erosion control measures for the duration of construction activities. • Suspend work if high runoff volume is noted or excessive sediment discharge occurs, as determined by an Environmental Monitor. • Implement and enforce speed limits for construction equipment and trucks. • Apply dust suppressants to unpaved areas when necessary to suppress dust, as determined by the Environmental Monitor. Application frequency will vary, but will be determined by site specific weather conditions, including recent precipitation, temperatures, and wind speed. Input from the construction team may also warrant an increased frequency of dust suppression. • Re-vegetate cleared areas as soon as reasonably possible. • Install wind fences, where determined to be necessary by the on-site Environmental Monitor. Installation of these fences will depend on site-specific conditions, including wind speeds, topography, land cover, and the extent of surrounding natural wind breaks. • Store any stockpiled material more than 30 m from a wetland, woodland, or water body. • Minimize vehicle traffic on exposed soils during site clearing, grubbing, grading and top soil removal. • For roadside collector routes, keep vegetation removal (if any) to a minimum and limited to the road right-of-way. • Locate all entry and exit pits (directional drilling) a sufficient distance from the edge of natural features (i.e., woodlands, wetlands) to maintain a vertical depth of at least 1.5 m at all times below the natural feature to protect the critical root zone. • Collect directional drill cuttings as they are generated and placed in a soil bin or bag for off-site disposal. • Restore and re-vegetate directional drill entry/exit pits to pre-construction conditions as soon as possible after construction. • Implement fugitive dust suppression techniques, such as water application to all inactive disturbed surface areas, unpaved roads, open storage piles, and work areas.	• Assuming the implementation of the planned mitigation measures, monitoring programs, and contingency plans (if necessary), there is unlikely to be any significant impacts to natural heritage features, including woodlands, wetlands, or SWHs (Natural Resource Solutions Inc. (“NRSI”), 2015a).
Disturbance and/or Mortality to Local Wildlife.	• Minimize impacts to migratory birds and their nests. • Limit potential wildlife road mortalities.	• Schedule all construction and decommissioning activities within 30 m of generalized significant wildlife habitats outside of the core breeding period for migratory birds (May 1st – July 31st), wherever possible, to limit disturbance to migratory birds, or their nests. • If construction and decommissioning activities within 30 m of generalized wildlife habitats will occur during the breeding bird season (May 1st-July 31st), a biologist will conduct nest searches, where natural vegetation will be removed, to ensure there will be no impact to breeding birds. • Schedule construction activities within 30 m of woodlands or wetlands to occur during daylight hours, wherever possible. • Clearly post construction speed limits. • Restore and re-vegetate entry and exit pits to pre-construction conditions as soon as possible after construction.	• Assuming the implementation of the planned mitigation measures, monitoring programs, and contingency plans (if necessary), there is unlikely to be any significant impacts to natural heritage features, including woodlands, wetlands, or SWHs (NRSI, 2015a).
Damage or Removal of Vegetation Adjacent to the Project Location.	• Minimize impacts to natural vegetation. • Re-vegetate areas as soon as possible.	• Where construction activity occurs within 30 m of a naturally vegetated feature (i.e., woodland, wetland, etc.), clearly delineate the construction area with protective fencing, such as silt fencing or other barrier, to avoid accidental damage to species to be retained. The Environmental Monitor may also consider substituting other demarcating types for fencing, such as staking and flagging, where it is determined that there is no apparent risk to nearby natural features. This could include situations where the natural feature is at a higher elevation than construction activity. • Document all trees (>10 cm diameter at breast height (“dbh”)) to be removed and retained within the disturbance area limit, prior to construction. • Prune damaged trees through implementation of proper arboricultural techniques.	• Assuming the implementation of the planned mitigation measures, monitoring programs, and contingency plans (if necessary), there is unlikely to be any significant impacts to natural heritage features, including woodlands, wetlands, or SWHs (NRSI, 2015a).
Soil or Water Contamination.	• Minimize impacts to natural features and wildlife habitats. • Avoid contamination of water or wetland features.	• Develop a Spill Response Plan (“SRP”) and train staff on appropriate procedures. • Keep emergency spill kits on site. • Develop a ‘frac-out’ contingency plan and train staff on appropriate procedures. • Keep contact information for the MOECC Spills Action Centre in a designated area on the construction site. • Locate vehicle washing, refueling stations, and chemical storage more than 30 m from natural features or water bodies. • Dispose of waste material by authorized and approved off-site vendors. • Use best practices to ensure directional drill depth is at an appropriate level below natural features (i.e., woodlands, wetlands, etc.) or water bodies to prevent ‘frac-out’. • Locate any directional drill entry and exit pits a sufficient distance from the edge of natural features (i.e., woodlands, wetlands, etc.) to maintain a vertical depth of at least 1.5 m at all times below the natural features to protect the critical root zone.	• Assuming the implementation of the planned mitigation measures, monitoring programs, and contingency plans (if necessary), there is unlikely to be any significant impacts to natural heritage features, including woodlands, wetlands, or SWHs (NRSI, 2015a).
Removal of Vegetation Within the Road Right-of-way.	• Minimize direct impacts on vegetation communities and protect rare/sensitive habitats. • Maintain vegetated buffers, particularly within riparian zones. • Minimize the impacts of sedimentation on nearby natural features.	• Develop and implement an Erosion and Sediment Control Plan. • Utilize erosion blankets, silt fencing, straw bales, etc. to delineate construction activities within 30 m of a wetland, woodland, or water body. • Depending on site-specific conditions, such as topography and surface water flow patterns, the Environmental Monitor may consider substituting other styles of fencing for silt fencing, when appropriate. • Maintain erosion control measures for the duration of construction activities. • Implement and enforce speed limits for construction equipment and trucks. • Apply dust suppressants to unpaved areas when necessary to suppress dust, as determined by the Environmental Monitor. Application frequency will vary, but will be determined by site-specific weather conditions, including recent precipitation, temperatures, and wind speeds. Input from the construction team may also warrant an increased frequency of dust suppression. • Re-vegetate cleared areas as soon as reasonably possible. • Install wind fences, where determined to be necessary by the on-site Environmental Monitor. Installation of these fences will depend on site-specific conditions, including wind speeds, topography, land cover, and the extent of surrounding natural wind breaks. • Store any stockpiled material more than 30 m from a wetland, woodland, or water body. • Minimize vehicle traffic on exposed soils, and limit heavy machinery traffic on sensitive slopes. • For roadside collector routes, keep vegetation removal (if any) to a minimum and limited to the road right-of-way. • Locate all entry and exit pits (directional drilling) a sufficient distance from the edge of natural features (i.e., woodlands, wetlands) to maintain a vertical depth of at least 1.5 m at all times below the natural features to protect the critical root zone. • Collect directional drill cuttings as they are generated and placed in a soil bin or bag for off-site disposal. • Restore and re-vegetate directional drill entry/exit pits to pre-construction conditions as soon as possible after construction.	• Assuming the implementation of the planned mitigation measures, monitoring programs, and contingency plans (if necessary), there is unlikely to be any significant impacts to natural heritage features, including woodlands, wetlands, or SWHs (NRSI, 2015a).

Potential Effect	Performance Objectives	Mitigation Strategy	Net Effects
Reduced Stream Flow Rate. **Increased Water Temperature.**	• Maintain ground and surface water conditions with those near pre-construction conditions.	• Control rate and timing of water pumping. • Control quantity and quality of stormwater discharge using BMPs. • Avoid direct discharge into wetlands or watercourses. • Restrict taking of water during periods of extreme low flow.	• Assuming the implementation of the planned mitigation measures, monitoring programs, and contingency plans (if necessary), there is unlikely to be any significant impacts to natural heritage features, including woodlands, wetlands, or SWHs (NRSI, 2015a).
Increase Surface Runoff. **Changes in Surface Water Drainage.**	• Limit disturbances to surface water drainage patterns.	• Maintain vegetative buffers around water bodies. • Control quantity and quality of stormwater discharge using BMPs. • Minimize grading activities to maintain existing drainage patterns as much as possible.	• Assuming the implementation of the planned mitigation measures, monitoring programs, and contingency plans (if necessary), there is unlikely to be any significant impacts to natural heritage features, including woodlands, wetlands, or SWHs (NRSI, 2015a).

Table 4-4: Mitigation Measures, Net Effects and Monitoring Plan Associated with Potential Effects to Significant Wetlands, Woodlands and Wildlife Habitat Resulting from Construction and Decommissioning

Potential Effect	Performance Objectives	Mitigation Strategy	Net Effects	Monitoring Plan and Contingency Measures
Accidental Vegetation Removal.	• Minimize direct impacts on vegetation communities and protect rare/sensitive habitats. • Minimize direct impacts to plant species of conservation concern. • Protect plant species of conservation concern habitat. • Minimize impacts on current species composition. • Reduce the potential spread of non-native or invasive species.	Common Mitigation • Clearly delineate work area using erosion fencing, or other barrier, to avoid accidental damage to species to be retained and habitat. • Depending on site-specific conditions, such as steep topography and the presence of direct, or regular, surface water flow, the Environmental Monitor may consider substituting other styles of fencing for erosion fencing, when appropriate. The Environmental Monitor(s) will be an independent contractor with experience providing environmental recommendations on a large-scale construction site. Significant Woodlands • Where construction is within 10 m of a significant woodland, erect erosion fencing to correspond to the disturbance area limits. • Place the erosion fencing as far away as possible from the significant woodland and no closer to the significant woodland than the drip-line. • No use of herbicides (project related activities only) within significant features or wildlife habitats. Plant species of Conservation Concern • Locate directional drilling entry and exit pits a sufficient distance from the edge of this habitat to maintain a vertical depth of at least 1.5 m at all times below the habitat to protect the critical root zone. • Directional drilling will be a minimum of 1.5 m below the surface of this habitat. • Document all trees (>10 cm dbh) to be removed and retained within 5 m of construction activities, prior to construction, for all habitats containing tree species of conservation concern. • Prune damaged trees through implementation of proper arboricultural techniques.	• Assuming the implementation of the planned mitigation measures, monitoring programs, and contingency plans (if necessary), there is unlikely to be any significant impacts to natural heritage features, including woodlands, wetlands, or SWHs (NRSI, 2015a).	**Monitoring:** Significant Woodlands • Undertake weekly monitoring of the drip-line of significant woodlands within 10 m of construction activities for the duration of the construction and decommissioning phases of this Project. • Undertake monthly monitoring of the drip-line to ensure the work area is clearly delineated and drip-line boundaries are respected when construction is anticipated to occur within 10 to 30 m of significant woodlands. Plant species of Conservation Concern • Conduct post-construction monitoring in years 1, 3, and 5 of operation. Surveys will be conducted at a time of year when the species can be identified to assess any potential changes in species populations or distribution. Full details of this monitoring will be provided in the EEMP. **Contingency Measures:** Significant Woodlands • Prune any tree limbs or roots that are accidentally damaged by construction activities using proper arboricultural techniques. • Accidental damage to trees, or unexpected vegetation removal, may require re-planting of similar, native species. If re-planting is required consult the MNRF to determine appropriate contingency measures, which may include a re-planting strategy. Plant species of Conservation Concern • Replace any plant species of conservation concern which are damaged or destroyed at a 1:1 ratio with plantings in the habitat. The success of any planted specimens will be monitored for two years after planting. • If any potential changes in species populations or distribution are noted during post-construction surveys, consult the MNRF to determine appropriate contingency measures, which may include re-establishing mitigation measures, habitat remediation, and/or seeding of permanently damaged areas.
Disturbance of Local Wildlife.	• Avoid direct impacts on breeding birds and their habitats. • Minimize impacts on species that are relatively inactive at night and not accustomed to nighttime disturbances. • Minimize impacts to amphibian breeding habitat and minimize amphibian mortality. • Minimize impacts to woodland/wetland integrity and diversity.	Common Mitigation • Avoid construction activities during the breeding bird period (May 1st – July 31st), wherever possible, to limit disturbance of local wildlife. • If construction activities must occur during the breeding bird period (May 1st – July 31st), a biologist will conduct nest searches, in areas where natural vegetation will be removed, to ensure there will be no impact to breeding birds. • Schedule construction activities within 30 m of significant woodlands to occur during daylight hours, wherever possible, to avoid excessive noise and/or light disturbances to wildlife. • If construction activities within 30 m of significant woodlands must occur outside of daylight hours, spotlights will be directed downward and/or away from the woodland to limit potential light disturbance to breeding birds. • Implement and enforce on-site speed limits. Significant Wetlands • No use of herbicides (project related activities only) within significant features or wildlife habitats. Amphibian Woodland Breeding Habitat • Avoid construction activities located within 30 m of significant amphibian woodland breeding habitats during the peak frog breeding season (April 15th – June 15th) wherever	• Assuming the implementation of the planned mitigation measures, monitoring programs, and contingency plans (if necessary), there is unlikely to be any significant impacts to natural heritage features, including woodlands, wetlands, or SWHs (NRSI, 2015a). • Given the short-term and temporary nature of increased traffic and the restriction of construction activities to daylight hours, risk of increased mortality during construction is considered low.	**Monitoring:** Significant Woodlands/Wetlands • No monitoring plan required. Amphibian Woodland Breeding Habitat • Conduct post-construction amphibian call surveys for one year following pre-construction survey methods to assess any potential changes in amphibian breeding populations or species distribution if deemed significant. Full details of this monitoring will be provided in the EEMP. • Undertake regular construction monitoring and routine inspections to ensure proper installation of erosion control measures and that proper fugitive dust control measures are in place. • Monitor sediment and erosion control measures, such as silt fence, check dams, and dust control measures daily in areas where work is taking place and prior to and after any storm events. • Monitor sediment and erosion control measures weekly in areas where active construction is not occurring until the construction phase is complete. • Correct silt fencing, or other applicable sediment and erosion control measures, that is not working properly. • Ensure an Environmental Monitor is present, as required, when active directional drilling is occurring.

Table 4-4: Mitigation Measures, Net Effects and Monitoring Plan Associated with Potential Effects to Significant Wetlands, Woodlands and Wildlife Habitat Resulting from Construction and Decommissioning

Potential Effect	Performance Objectives	Mitigation Strategy	Net Effects	Monitoring Plan and Contingency Measures
		possible, or install drift fencing (erosion fencing) to help control amphibian movements around construction activity. • Schedule construction activities to occur during daylight hours, wherever possible, to limit potential impacts from light, noise or vehicle interactions.		**Contingency Measures:** <u>Significant Woodlands/Wetlands</u> • No contingency plan required. <u>Amphibian Woodland Breeding Habitat</u> • If deficiencies in sediment and erosion control measures are noted, the Environmental Monitor will notify the contract administrator and recommend remedial actions, which may include re-establishing mitigation measures, habitat remediation, and/or seeding of permanently damaged areas. • If 'frac-out' occurs, immediately implement 'frac-out' contingency plan. • If sedimentation and erosion control measures fail and degradation of the habitat(s) occurs, consult the MNRF to determine appropriate contingency measures, which may include re-establishing mitigation measures, habitat remediation, and/or seeding of permanently damaged areas. • If fugitive dust control measures fail and degradation of the habitat(s) occurs, consult the MNRF to determine appropriate contingency measures, which may include re-establishing mitigation measures, habitat remediation, and/or seeding of permanently damaged areas. • In the event of a spill, notify the MOECC Spills Action Centre, immediately stop work and ensure all efforts are made to completely remediate affected areas, especially prior to rain events. • Given the short-term and temporary nature of increased traffic and the restriction of construction activities to daylight hours, wherever possible, risk of increased mortality during construction is considered low. • Restore vegetated buffers, including riparian zones, if accidentally damaged, as soon as possible. • If the results of the monitoring indicate a feature is no longer significant, the MNRF will be consulted to discuss the need (if any) for additional post-construction surveys.
Sedimentation and Erosion. **Habitat Degradation Caused by Sedimentation and Erosion.**	• Minimize impacts to natural features and associated wildlife habitats. • Minimize impacts to plant species of conservation concern. • Protect plant species of conservation concern habitat. • Maintain vegetated buffers, including riparian zones. • Avoid contamination of plant species of conservation concern habitat. • Minimize impacts to butterfly species of conservation concern habitat. • Minimize impacts to amphibian breeding habitat and minimize amphibian mortality. • Minimize impacts to woodland/wetland integrity and diversity. • Minimize impacts to raptor wintering areas • Avoid contamination of raptor wintering area habitat. • Minimize impacts to bat maternity colony habitats • Avoid contamination of bat maternity colony habitat. • Minimize impacts to marsh bird breeding habitat. • Avoid contamination of marsh bird breeding habitat. • Minimize impacts to open country bird breeding habitat. • Avoid contamination of open country bird breeding habitat. • Minimize impacts to bird species of conservation concern habitat. • Avoid contamination of bird species of conservation concern habitat.	<u>Common Mitigation</u> • Implement an Erosion and Sediment Control Plan. • Install, monitor, and maintain erosion and sediment control measures (i.e., silt fences) around the construction area, as identified within the Erosion and Sediment Control Plan. • Schedule grading to avoid times of high runoff volumes, wherever possible and suspend work if an excessive sediment discharge occurs, as determined by an Environmental Monitor, until mitigation measures have been established. • Locate all directional drill entry and exit pits a sufficient distance from the edge of these natural features to maintain a vertical depth of at least 1.5 m at all times below the natural features to protect the critical root zone. • Collect directional drill cuttings as they are generated and placed in a soil bin or bag for off-site disposal. • Restore and re-vegetate directional drill entry/exit pits to pre-construction conditions as soon as possible after construction. • Depending on site-specific conditions, such as steep topography and the presence of direct, or regular, surface water flow, the Environmental Monitor may consider substituting other styles of fencing for erosion fencing, when appropriate. <u>Significant Wetlands</u> • Erect erosion fencing to correspond to the construction disturbance area limits. • Place the erosion fencing as far away as possible from the significant wetland and no closer to the significant wetland than the drip-line. • Where the temporary construction area is proposed to be within 5 m of, but not overlapping, a significant wetland (excluding along existing municipal roads), design any permanent infrastructure (i.e., access roads) to be 5 m from the wetland edge and plant native vegetation in the 5 m buffer between the infrastructure and wetland edge. • Re-vegetate areas adjacent to the significant wetland as soon as possible. <u>Amphibian Breeding Habitat</u> • Schedule grading to avoid times of high runoff volumes, wherever possible and suspend work if an excessive sediment discharge occurs until mitigation measures have been established. • Locate all directional drilling entry and exit pits a sufficient distance from the edge of this natural feature to maintain a vertical depth of at least 1.5 m at all times below the natural feature to protect the critical root zone.	• Assuming the implementation of the planned mitigation measures, monitoring programs, and contingency plans (if necessary), there is unlikely to be any significant impacts to natural heritage features, including woodlands, wetlands, or SWHs (NRSI, 2015a).	**Monitoring:** <u>Common Monitoring</u> • Undertake regular construction monitoring and routine inspections to ensure proper installation of erosion control measures and that proper fugitive dust control measures are in place. • Monitor sediment and erosion control measures, such as silt fence, check dams, and dust control measures daily in areas where work is taking place and prior to and after any storm events. • Monitor sediment and erosion control measures weekly in areas where active construction is not occurring until the construction phase is complete. • Correct silt fencing, or other applicable sediment and erosion control measures, that is not working properly. • An Environmental Monitor will be present, as required, when active directional drilling is occurring. <u>Plant Species of Conservation Concern</u> • Conduct post-construction monitoring in years 1, 3, and 5 of operation following pre-construction survey methods. Surveys will be conducted at a time of year when the species can be identified to assess any potential changes in species populations or distribution. Full details of this monitoring will be provided in the EEMP. <u>Amphibian Breeding Habitat</u> • Conduct post-construction amphibian call surveys for one year following pre-construction survey methods to assess any potential changes in amphibian breeding populations or species distribution if deemed significant. Full details of this monitoring will be provided in the EEMP. • Ensure that an Environmental Monitor will be present at all times when active directional drilling is occurring. **Contingency Measures:** <u>Common Contingency</u> • If any potential changes in species population or distribution are noted during post-construction surveys, consult the MNRF to determine appropriate contingency measures, which may include re-establishing mitigation measures, habitat remediation, and/or seeding of permanently damaged areas. • If deficiencies in sediment and erosion control measures are noted, the Environmental Monitor will notify the contract administrator and recommend remedial actions.

Table 4-4: Mitigation Measures, Net Effects and Monitoring Plan Associated with Potential Effects to Significant Wetlands, Woodlands and Wildlife Habitat Resulting from Construction and Decommissioning

Potential Effect	Performance Objectives	Mitigation Strategy	Net Effects	Monitoring Plan and Contingency Measures
		• Collect directional drill cuttings as they are generated and placed in a soil bin or bag for off-site disposal. • Restore and re-vegetate directional drill entry/exit pits to pre-construction conditions as soon as possible after construction.		• If 'frac-out' occurs, immediately implement 'frac-out' contingency plan. • If sedimentation and erosion control measures fail and degradation of the natural feature occurs, consult the MNRF to determine appropriate contingency measures, which may include re-establishing mitigation measures, habitat remediation, and/or seeding of permanently damaged areas. • In the event of a spill, notify the MOECC Spills Action Centre, immediately stop work, and ensure all efforts are made to completely remediate affected areas, especially prior to rain events. • Restore vegetated buffers, including riparian zones, if accidentally damaged, as soon as possible. <u>Amphibian Breeding Habitat</u> • If 'frac-out' occurs, immediately implement 'frac-out' contingency plan. • If sedimentation and erosion control measures fail and degradation of the habitat(s) occurs, consult the MNRF to determine appropriate contingency measures, which may include re-establishing mitigation measures, habitat remediation, and/or seeding of permanently damaged areas. • If fugitive dust control measures fail and degradation of the habitat(s) occurs, consult the MNRF to determine appropriate contingency measures, which may include re-establishing mitigation measures, habitat remediation, and/or seeding of permanently damaged areas. • Given the short-term and temporary nature of increased traffic and the restriction of construction activities to daylight hours, risk of increased mortality during construction is considered low. • Restore vegetated buffers, including riparian zones, if accidentally damaged, as soon as possible. • If the results of the monitoring indicate a feature is no longer significant, consult the MNRF to discuss the need (if any) for additional post-construction surveys.
Fugitive Dust Emission. **Habitat Degradation Caused by Fugitive Dust Emission.**	• Minimize impacts to natural features and associated wildlife habitats. • Minimize impacts to plant species of conservation concern. • Protect plant species of conservation concern habitat. • Maintain vegetated buffers, including riparian zones. • Avoid contamination of plant species of conservation concern habitat. • Minimize impacts to amphibian breeding habitat and minimize amphibian mortality. • Minimize impacts to woodland/wetland integrity and diversity. • Minimize impacts to raptor wintering areas. • Avoid contamination of raptor wintering area habitat. • Minimize impacts to bat maternity colony habitats. • Avoid contamination of bat maternity colony habitat. • Minimize impacts to marsh bird breeding habitat. • Avoid contamination of marsh bird breeding habitat. • Minimize impacts to open country bird breeding habitat. • Avoid contamination of open country bird breeding habitat. • Minimize impacts to bird species of conservation concern habitat. • Avoid contamination of bird species of conservation concern habitat. • Minimize impacts to butterfly species of conservation concern habitat. • Avoid contamination of butterfly species of conservation concern habitat.	<u>Common Mitigation</u> • Implement and enforce speed limits for construction equipment and trucks. • Apply dust suppressants to unpaved areas when necessary to suppress dust, as determined by the Environmental Monitor. Application frequency will vary, but will be determined by site-specific weather conditions, including recent precipitation, temperatures, and wind speeds. Input from the construction team may also warrant an increased frequency of dust suppression. • Re-vegetate cleared areas as soon as reasonably possible. <u>Significant Wetlands</u> • Install wind fences, where determined to be necessary by the on-site Environmental Monitor. Installation of these fences will depend on site-specific conditions, including wind speeds, topography, land cover, and the extent of surrounding natural wind breaks. • Where the temporary construction area is proposed to be within 5 m of, but not overlapping, a wetland (excluding along existing municipal roads), place any permanent infrastructure (i.e., access roads) 5 m from the wetland edge and plant native vegetation in the 5 m buffer between the infrastructure and wetland edge. • Re-vegetate areas adjacent to the wetland as soon as possible.	• Assuming the implementation of the planned mitigation measures, monitoring programs, and contingency plans (if necessary), there is unlikely to be any significant impacts to natural heritage features, including woodlands, wetlands, or SWHs (NRSI, 2015a).	**Monitoring:** <u>Common Monitoring</u> • Undertake regular construction monitoring and routine inspections to ensure proper installation of erosion control measures and that proper fugitive dust control measures are in place. • Monitor sediment and erosion control measures, such as silt fences, check dams, and dust control measures daily in areas where work is taking place and prior to and after any storm events. • Monitor sediment and erosion control measures twice weekly in areas where active construction is not occurring until the construction phase is complete. • Correct silt fencing, or other applicable sediment and erosion control measures, that is not working properly. • Ensure an Environmental Monitor is present at all times when active directional drilling is occurring. • If fugitive dust control measures fail or negative impacts are observed, consult the MNRF on the appropriate action(s) to be taken. <u>Plant Species of Conservation Concern</u> • Conduct post-construction monitoring in years 1, 3, and 5 of operation following pre-construction survey methods. Surveys will be conducted at a time of year when the species can be identified to assess any potential changes in species populations or distribution. Full details of this monitoring will be provided in the EEMP. <u>Amphibian Breeding Habitat</u> • Conduct post-construction amphibian call surveys for one year following pre-construction survey methods to assess any potential changes in amphibian breeding populations or species distribution if deemed significant. Full details of this monitoring will be provided in the EEMP. • An Environmental Monitor will be present at all times when active directional drilling is occurring. **Contingency Measures:** <u>Common Contingency Measures</u> • If deficiencies in sediment and erosion control measures are noted, the Environmental Monitor will notify the contract administrator and recommend remedial actions. • If sedimentation and erosion control measures fail and degradation of the natural feature occurs, consult the MNRF to determine appropriate contingency measures, which may

Table 4-4: Mitigation Measures, Net Effects and Monitoring Plan Associated with Potential Effects to Significant Wetlands, Woodlands and Wildlife Habitat Resulting from Construction and Decommissioning

Potential Effect	Performance Objectives	Mitigation Strategy	Net Effects	Monitoring Plan and Contingency Measures
				include re-establishing mitigation measures, habitat remediation, and/or seeding of permanently damaged areas. • If 'frac-out' occurs, immediately implement 'frac-out' contingency plan. • If fugitive dust control measures fail and degradation of the natural feature occurs, consult the MNRF to determine appropriate contingency measures, which may include re-establishing mitigation measures, habitat remediation, and/or seeding of permanently damaged areas. • In the event of a spill, notify the MOECC Spills Action Centre, immediately stop work, and ensure all efforts are made to completely remediate affected areas, especially prior to rain events. • Restore vegetated buffers, including riparian zones, if accidentally damaged, as soon as possible. <u>Plant Species of Conservation Concern</u> • Restore vegetated buffers, including riparian zones, if accidentally damaged, as soon as possible. <u>Amphibian Breeding Habitat</u> • If 'frac-out' occurs, immediately implement 'frac-out' contingency plan. • If sedimentation and erosion control measures fail and degradation of the habitat(s) occurs, consult the MNRF to determine appropriate contingency measures, which may include re-establishing mitigation measures, habitat remediation, and/or seeding of permanently damaged areas. • If fugitive dust control measures fail and degradation of the habitat(s) occurs, consult the MNRF to determine appropriate contingency measures, which may include re-establishing mitigation measures, habitat remediation, and/or seeding of permanently damaged areas. • Given the short-term and temporary nature of increased traffic and the restriction of construction activities to daylight hours, risk of increased mortality during construction is considered low. • Restore vegetated buffers, including riparian zones, if accidentally damaged, as soon as possible. • If the results of the monitoring indicate a feature is no longer significant, the MNRF will be consulted to discuss the need (if any) for additional post-construction surveys.
Spills *(i.e., oil, gasoline, grease, etc.).* **Habitat Degradation Caused by Spills** *(i.e., oil, gasoline, grease, etc.).*	• Minimize impacts to natural features and associated wildlife habitats. • Maintain vegetated buffers, including riparian zones. • Minimize impacts to plant species of conservation concern. • Protect plant species of conservation concern habitat. • Maintain vegetated buffers, including riparian zones. • Avoid contamination of plant species of conservation concern habitat. • Minimize impacts to raptor wintering areas. • Avoid contamination of raptor wintering area habitat. • Minimize impacts to bat maternity colony habitat. • Avoid contamination of bat maternity colony habitat. • Minimize impacts to amphibian breeding habitat and minimize amphibian mortality. • Minimize impacts to woodland/wetland integrity and diversity. • Minimize impacts to marsh bird breeding habitat. • Avoid contamination of marsh bird breeding habitat. • Minimize impacts to open country bird breeding habitat. • Avoid contamination of open country bird breeding habitat. • Minimize impacts to bird species of conservation concern habitat.	<u>Common Mitigation</u> • Develop a SRP and train staff on appropriate procedures. • Develop a 'frac-out' contingency plan and train staff on appropriate procedures. • Keep emergency spill kits on site. • Keep contact information for the MOECC Spills Action Centre in all vehicles as well as posted in a designated area on the construction site. • Dispose of waste material by authorized and approved off-site vendors. • Store hazardous materials in designated areas. • Locate all maintenance activities, vehicle refueling or washing, as well as the storage of chemical and construction equipment more than 30 m from significant features. <u>Amphibian Breeding Habitat</u> • Develop a 'frac-out' contingency plan and train staff on appropriate procedures.	• Assuming the implementation of the planned mitigation measures, monitoring programs, and contingency plans (if necessary), there is unlikely to be any significant impacts to natural heritage features, including woodlands, wetlands, or SWHs (NRSI, 2015a).	**Monitoring:** <u>Common Monitoring</u> • Undertake regular construction monitoring and routine inspections to ensure proper installation of erosion control measures and that proper fugitive dust control measures are in place. • Monitor sediment and erosion control measures, such as silt fence, check dams, and dust control measures daily in areas where work is taking place and prior to and after any storm events. • Monitor sediment and erosion control measures weekly in areas where active construction is not occurring until the construction phase is complete. • Correct silt fencing, or other applicable sediment and erosion control measures, that is not working properly. • Conduct post-construction behaviour surveys of the habitat for three years following pre-construction survey methods to assess the potential project disturbance on all habitats deemed significant. Full details of this monitoring will be provided in the EEMP. • An Environmental Monitor will be present at all times when active directional drilling is occurring. <u>Butterfly Species of Conservation Concern</u> • Conduct one year of post-construction surveys of the habitat to assess the potential project disturbance on this habitat. Full details of this monitoring will be provided in the EEMP. <u>Plant Species of Conservation Concern</u> • Conduct post-construction monitoring in years 1, 3, and 5 of operation following pre-construction survey methods. Surveys will be conducted at a time of year when the species can be identified to assess any potential changes in species populations or distribution. Full details of this monitoring will be provided in the EEMP. <u>Amphibian Breeding Habitat</u> • Conduct post-construction amphibian call surveys for one year following pre-construction survey methods to assess any potential changes in amphibian breeding populations or

Table 4-4: Mitigation Measures, Net Effects and Monitoring Plan Associated with Potential Effects to Significant Wetlands, Woodlands and Wildlife Habitat Resulting from Construction and Decommissioning

Potential Effect	Performance Objectives	Mitigation Strategy	Net Effects	Monitoring Plan and Contingency Measures
	• Avoid contamination of bird species of conservation concern habitat. • Minimize impacts to woodland/wetland integrity and diversity. • Minimize impacts to butterfly species of conservation concern habitat. • Avoid contamination of butterfly species of conservation concern habitat.			species distribution if deemed significant. Full details of this monitoring will be provided in the EEMP. • An Environmental Monitor will be present at all times when active directional drilling is occurring. **Contingency Measures:** <u>Common Contingency</u> • If deficiencies in sediment and erosion control measures are noted, the Environmental Monitor will notify the contract administrator and recommend remedial actions. • If sedimentation and erosion control measures fail and degradation of the natural feature occurs, consult the MNRF to determine appropriate contingency measures, which may include re-establishing mitigation measures, habitat remediation, and/or seeding of permanently damaged areas. • If fugitive dust control measures fail and degradation of the natural feature occurs, consult the MNRF to determine appropriate contingency measures, which may include re-establishing mitigation measures, habitat remediation, and/or seeding of permanently damaged areas. • In the event of a spill, notify the MOECC Spills Action Centre, immediately stop work, and ensure all efforts are made to completely remediate affected areas, especially prior to rain events. • Restore vegetated buffers, including riparian zones, if accidentally damaged, as soon as possible. • If any potential changes in species population or distribution are noted during post-construction surveys, consult the MNRF to determine appropriate contingency measures, which may include re-establishing mitigation measures, habitat remediation, and/or seeding of permanently damaged areas. • If 'frac-out' occurs, immediately implement 'frac-out' contingency plan. <u>Amphibian Breeding Habitat</u> • If 'frac-out' occurs, immediately implement 'frac-out' contingency plan. • If sedimentation and erosion control measures fail and degradation of the habitat(s) occurs, consult the MNRF to determine appropriate contingency measures, which may include re-establishing mitigation measures, habitat remediation, and/or seeding of permanently damaged areas. • If fugitive dust control measures fail and degradation of the habitat(s) occurs, consult the MNRF to determine appropriate contingency measures, which may include re-establishing mitigation measures, habitat remediation, and/or seeding of permanently damaged areas. • Given the short-term and temporary nature of increased traffic and the restriction of construction activities to daylight hours, risk of increased mortality during construction is considered low. • Restore vegetated buffers, including riparian zones, if accidentally damaged, as soon as possible. • If the results of the monitoring indicate a feature is no longer significant, the MNRF will be consulted to discuss the need (if any) for additional post-construction surveys.
Changes in Soil Moisture and Compaction.	• Minimize impact to soil moisture regime and vegetation species composition.	<u>Common Mitigation</u> • Minimize the use of impervious surfaces where possible, such as utilizing and contouring permeable surface material (i.e., gravel) to increase infiltration, and reduce surface water runoff. • Minimize paved surfaces and design roads to promote infiltration. <u>Significant Woodlands</u> • Clearly delineate the drip-line and root zone of all trees within 10 m of construction activities with erosion fencing or similar barrier.	• Assuming the implementation of the planned mitigation measures, monitoring programs, and contingency plans (if necessary), there is unlikely to be any significant impacts to natural heritage features, including woodlands, wetlands, or SWH (NRSI, 2015a).	**Monitoring and Contingency Measures:** • No monitoring or contingency plan required.

Table 4-4: Mitigation Measures, Net Effects and Monitoring Plan Associated with Potential Effects to Significant Wetlands, Woodlands and Wildlife Habitat Resulting from Construction and Decommissioning

Potential Effect	Performance Objectives	Mitigation Strategy	Net Effects	Monitoring Plan and Contingency Measures
Accidental Vegetation Removal from Significant Woodlands *(Project Location is sited outside of Significant Woodlands – impact to vegetation is not anticipated).*	• Minimize direct impacts on vegetation communities and protect rare / sensitive habitats.	• Clearly delineate work area using erosion fencing, or other barrier, to avoid accidental damage to retained species. • Where construction is within 10 m of a significant woodland, erect erosion fencing to correspond to the disturbance area limits. • Place the erosion fencing as far away as possible from the significant woodland and no closer to the significant woodland than the drip-line. • Depending on site-specific conditions, such as steep topography and the presence of direct, or regular, surface water flow, the Environmental Monitor may consider substituting other styles of fencing for erosion fencing, when appropriate. The Environmental Monitor may also consider substituting other demarcating types for fencing, such as staking and flagging, where it is determined that there is no apparent risk to nearby natural features. This could include situations where the natural feature is at higher elevation than construction activity. • No use of herbicides (project related activities only) within significant features or wildlife habitats.	• Assuming the implementation of the planned mitigation measures, monitoring programs, and contingency plans (if necessary), there is unlikely to be any significant impacts to natural heritage features, including woodlands, wetlands, or SWHs (NRSI, 2015a).	**Monitoring:** • Undertake regular monitoring of the drip-line to ensure the work area is clearly delineated within 10 m of construction activities for the duration of the construction and decommissioning phases of this project. This monitoring will be conducted at a minimum frequency of once per week when construction is anticipated within 10 m of a significant woodland. • Undertake regular monitoring of the drip-line to ensure the work area is clearly delineated and drip-line boundaries are respected when construction is anticipated to occur within 10 to 30 m of significant woodlands, at a minimum frequency of once per month. **Contingency Measures:** • Prune any tree limbs or roots that are accidentally damaged by construction activities using proper arboricultural techniques. • Accidental damage to trees, or unexpected vegetation removal, may require re-planting of similar, native species. If re-planting is required, a re-planting strategy will be provided to the MNRF.
Reduced Flood Attenuation in Significant Wetlands.	• Minimize direct impacts on vegetation communities and protect rare/sensitive habitats. • Minimize impacts to hydrological connectivity. • Minimize impacts to water quality.	• Clearly delineate work area using erosion fencing, or other barrier, to avoid accidental damage to retained wetland vegetation and to avoid impacting hydrological connectivity. • Depending on site-specific conditions, such as steep topography and the presence of direct, or regular, surface water flow, the Environmental Monitor may consider substituting other styles of fencing for erosion fencing, when appropriate. • Re-vegetate cleared areas as soon as reasonably possible. • Where the temporary construction area is proposed to be within 5 m of, but not overlapping, a Significant Wetland (excluding along existing municipal roads), design any permanent infrastructure (i.e., access roads) to be 5 m from the wetland edge and plant native vegetation in the 5 m buffer between the infrastructure and wetland edge.	• Assuming the implementation of the planned mitigation measures, monitoring programs, and contingency plans (if necessary), there is unlikely to be any significant impacts to natural heritage features, including woodlands, wetlands, or SWHs (NRSI, 2015a).	**Monitoring:** • Undertake regular monitoring of the Significant Wetland to ensure proper erosion and sediment control measures, including fencing, are in place within 10 m of construction activities for the duration of the construction and decommissioning phases of the project. This monitoring will be conducted at a minimum frequency of once per week when construction is anticipated within 10 m of a significant wetland. • Undertake regular monitoring of the wetland to ensure proper erosion and sediment control measures, including fencing, are in place when construction is anticipated to occur within 10 to 30 m of significant wetlands, at a minimum frequency of once per month. Depending on the season and site-specific conditions, such as topography, surface water flow patterns, and the presence or absence of vegetative buffers, monitoring frequency will be increased at the discretion of the Environmental Monitor. **Contingency Measures**: • If sedimentation and erosion or fugitive dust control measures fail and degradation of the natural feature occurs, consult the MNRF to determine appropriate contingency measures, which may include re-establishing mitigation measures, habitat remediation, and/or seeding of permanently damaged areas. • If negative impacts such as reduced water quality, infiltration and/or groundwater discharge are observed, consult the MNRF to determine appropriate contingency measures.
Reduced Water Quality in Significant Wetlands.	• Minimize direct impacts on vegetation communities and protect rare/sensitive habitats. • Minimize impacts to hydrological connectivity. • Minimize impacts to water quality.	• Clearly delineate work area using erosion fencing, or other barrier, to avoid accidental damage to retained wetland vegetation and to avoid impacting water quality. • Depending on site-specific conditions, such as steep topography and the presence of direct, or regular, surface water flow, the Environmental Monitor may consider substituting other styles of fencing for erosion fencing, when appropriate. • Implement and enforce speed limits for construction equipment and trucks. • Apply dust suppressants to unpaved areas when necessary to suppress dust, as determined by the Environmental Monitor. Application frequency will vary, but will be determined by site-specific weather conditions, including recent precipitation, temperatures, and wind speeds. Input from the construction team may also warrant an increased frequency of dust suppression. • Re-vegetate areas adjacent to the wetland as soon as possible. • Install wind fences, where determined to be necessary by the on-site Environmental Monitor. Installation of these fences will depend on site-specific conditions, including wind speeds, topography, land cover, and the extent of surrounding natural wind breaks. • Where the temporary construction area is proposed to be within 5 m of, but not overlapping, a wetland (excluding along existing municipal roads), design any permanent infrastructure (i.e., access roads) to be 5 m from the wetland edge and plant native vegetation in the 5 m buffer between the infrastructure and wetland edge.	• Assuming the implementation of the planned mitigation measures, monitoring programs, and contingency plans (if necessary), there is unlikely to be any significant impacts to natural heritage features, including woodlands, wetlands, or SWHs (NRSI, 2015a).	**Monitoring:** • Undertake regular monitoring of the Significant Wetland to ensure proper erosion and sediment control measures, including fencing, are in place within 10 m of construction activities for the duration of the construction and decommissioning phases of the project. This monitoring will be conducted at a minimum frequency of once per week when construction is anticipated within 10 m of a significant wetland. • Undertake regular monitoring of the wetland to ensure proper erosion and sediment control measures, including fencing, are in place when construction is anticipated to occur within 10 to 30 m of a Significant Wetland, at a minimum frequency of once per month. Depending on the season and site-specific conditions, such as topography, surface water flow patterns, and the presence or absence of vegetative buffers, monitoring frequency will be increased at the discretion of the Environmental Monitor. **Contingency Measures:** • If sedimentation and erosion or fugitive dust control measures fail and degradation of the natural feature occurs, consult the MNRF to determine appropriate contingency measures, which may include re-establishing mitigation measures, habitat remediation, and/or seeding of permanently damaged areas. • If negative impacts such as reduced water quality, infiltration and/or groundwater discharge are observed, consult the MNRF to determine appropriate contingency measures.

Table 4-4: Mitigation Measures, Net Effects and Monitoring Plan Associated with Potential Effects to Significant Wetlands, Woodlands and Wildlife Habitat Resulting from Construction and Decommissioning

Potential Effect	Performance Objectives	Mitigation Strategy	Net Effects	Monitoring Plan and Contingency Measures
Reduced Infiltration and Groundwater Discharge in Significant Wetlands.	• Minimize direct impacts on vegetation communities and protect rare / sensitive habitats. • Minimize impacts to hydrological connectivity. • Minimize impacts to water quality.	• Minimize the use of impervious surfaces where possible, such as utilizing and contouring permeable surface material (i.e., gravel) to increase infiltration and reduce surface water runoff. For groundwater taking (if necessary): • Control rate and timing of water pumping. • Restrict taking of groundwater and surface water during extreme low flow time periods. • Control quantity and quality of stormwater discharge using BMPs, and avoid direct discharge into wetlands or watercourses.	• Assuming the implementation of the planned mitigation measures, monitoring programs, and contingency plans (if necessary), there is unlikely to be any significant impacts to natural heritage features, including woodlands, wetlands, or SWH (NRSI, 2015a).	**Monitoring:** • Undertake regular monitoring of the Significant Wetland to ensure proper erosion and sediment control measures, including fencing, are in place within 10 m of construction activities for the duration of the construction and decommissioning phases of the project. This monitoring will be conducted at a minimum frequency of once per week when construction is anticipated within 10 m of a Significant Wetland. • Undertake regular monitoring of the Significant Wetland to ensure proper erosion and sediment control measures, including fencing, are in place when construction is anticipated to occur within 10 to 30 m of a Significant Wetland, at a minimum frequency of once per month. Depending on the season and site-specific conditions, such as topography, surface water flow patterns, and the presence or absence of vegetative buffers, monitoring frequency will be increased at the discretion of the Environmental Monitor. **Contingency Measures:** • If sedimentation and erosion or fugitive dust control measures fail and degradation of the natural feature occurs, consult the MNRF to determine appropriate contingency measures, which may include re-establishing mitigation measures, habitat remediation, and/or seeding of permanently damaged areas. • If negative impacts such as reduced water quality, infiltration and/or groundwater discharge are observed, consult the MNRF to determine appropriate contingency measures.
Noise Disturbance / Avoidance Behaviour.	• Minimize disturbance / avoidance behavior of butterfly species of conservation concern. • Protect bat maternity colony habitat. • Minimize impacts to marsh bird breeding habitat and minimize marsh bird mortality. • Minimize impacts to wetland integrity and diversity. • Protect open country bird breeding habitat. • Minimize noise disturbance/avoidance behavior of bird species of conservation concern.	<u>Bat Maternity Colony</u> • Impacts are expected to be minimal, and temporary, in nature, and no specific mitigation measures have been determined necessary. • Schedule construction and regular (non-critical) maintenance activities to occur outside of the critical roosting period (June), unless specifically required in accordance with manufacturer specifications. <u>Marsh Bird Breeding habitat</u> • Schedule construction and regular (non-critical) maintenance activities to occur outside of the peak marsh bird breeding season (April – June), wherever possible. • If construction must occur during this peak breeding season, have a biologist present to confirm birds will not be affected by construction activities. <u>Open Country Breeding Bird Habitat</u> • Clearly delineate work area using erosion fencing, or other barrier, to avoid accidental damage to breeding habitat. • Depending on site-specific conditions, such as steep topography and the presence of direct, or regular, surface water flow, the Environmental Monitor may consider substituting other styles of fencing for erosion fencing, when appropriate. • Restore temporary construction areas, including crane paths and turbine pads, to pre-construction conditions as soon as possible. • Schedule construction activities to occur outside of the peak breeding bird season (May 1st – July 31st), wherever possible. • If construction must occur during the breeding bird period (May 1st – July 31st), have a biologist present to confirm no nests will be affected by construction. <u>Bird Species of Conservation Concern</u> • Schedule construction and regular (non-critical) maintenance activities located within 30 m of significant bird species of conservation concern habitat to occur outside of the peak breeding bird season (May 1st – July 31st), whenever possible. • If construction and maintenance must occur during the breeding bird period (May 1st – July 31st), have a biologist present to confirm birds will not be affected by construction or maintenance activities. <u>Butterfly Species of Conservation Concern</u> • Schedule construction and regular (non-critical) maintenance activities located within 30 m of significant butterfly species of conservation concern habitat to occur outside of the flight period for when this species is likely to be encountered (late June to early August), whenever possible. • If construction and maintenance must occur during the peak flight period, have a biologist present to confirm that this species will not be affected by construction or maintenance activities.	• Assuming the implementation of the planned mitigation measures, monitoring programs, and contingency plans (if necessary), there is unlikely to be any significant impacts to natural heritage features, including woodlands, wetlands, or SWHs (NRSI, 2015a).	**Monitoring:** <u>Marsh Bird Breeding habitat/Open Country Breeding Bird Habitat/Bird Species of Conservation Concern</u> • Conduct post-construction behaviour surveys of the habitat for three years following pre-construction survey methods to assess the potential project disturbance on all habitats deemed significant. Full details of this monitoring will be provided in the EEMP. <u>Bat Maternity Colony</u> • Conduct post-construction monitoring of this feature for three years after construction, following pre-construction methods, for all features deemed significant. Full details of this monitoring will be provided in the EEMP. • Conduct post-construction mortality monitoring at this facility for at least three years following MNRF guidelines (MNRF, 2011b). The turbine closest to this habitat (T19) will be included with the subsample of turbines monitored during post-construction mortality monitoring, if this habitat is confirmed to be significant. Full details of this monitoring will be provided within the EEMP. <u>Butterfly Species of Conservation Concern</u> • Conduct one year of post-construction surveys of the habitat to assess the potential project disturbance on this habitat. Full details of this monitoring will be provided in the EEMP. **Contingency Measures:** <u>Bat Maternity Colony</u> • If a permanent disturbance has been noted within this wildlife habitat, the MNRF will be contacted to determine whether additional mitigation measures will be needed. • If high bat mortality is observed at T19, discuss appropriate mitigation measures with the MNRF. <u>Marsh Bird Breeding habitat/ Open Country Breeding Bird Habitat</u> • If a permanent disturbance has been noted within this wildlife habitat, consult the MNRF to determine whether additional mitigation measures will be needed. <u>Bird Species of Conservation Concern</u> • If considerable, and consistent, disturbance impacts are noted, discuss appropriate mitigation measures directly with the MNRF. <u>Butterfly Species of Conservation Concern</u> • If the results of the monitoring indicate a feature is no longer significant, consult the MNRF to discuss the need (if any) for additional post-construction surveys.

Table 4-4: Mitigation Measures, Net Effects and Monitoring Plan Associated with Potential Effects to Significant Wetlands, Woodlands and Wildlife Habitat Resulting from Construction and Decommissioning

Potential Effect	Performance Objectives	Mitigation Strategy	Net Effects	Monitoring Plan and Contingency Measures
Accidental Loss of Habitat *(damage to vegetation, including root zones).*	• Minimize impacts to amphibian breeding habitat and minimize amphibian mortality. • Minimize impacts to woodland / wetland integrity and diversity. • Minimize impacts to bird species of conservation concern habitat. • Minimize direct impacts to butterfly species of conservation concern habitat. • Minimize impacts to marsh bird breeding habitat and minimize marsh bird mortality. • Minimize impacts to wetland integrity and diversity. • Protection of open country bird breeding habitat.	Common Mitigation • Clearly delineate work area using erosion fencing, or other barrier, to avoid accidental vegetation damage within amphibian breeding habitat. • Depending on site-specific conditions, such as topography and surface water flow patterns, the Environmental Monitor may consider substituting other styles of fencing for erosion fencing, when appropriate. • No use of herbicides (project related activities only) within significant features or wildlife habitats. • Directional drilling entry and exit pits will be located at a sufficient distance from the edge of the natural feature to maintain a vertical depth of at least 1.5 m at all times below the natural feature to protect the critical root zone. • Directional drilling will be a minimum of 1.5 m below the surface of this habitat. Amphibian Woodland Breeding • Avoid direct impacts to specific breeding habitat (i.e., vernal pools or other aquatic habitat), or to the immediately surrounding woodland habitat. Bird Species of Conservation Concern • Restore temporary construction areas to pre-construction conditions as soon as possible. Butterfly Species of Conservation Concern • Clearly delineate work area using erosion fencing, or other barrier, to avoid accidental damage to butterfly species of conservation concern habitat. • Restore temporary construction areas to pre-construction conditions as soon as possible.	• Assuming the implementation of the planned mitigation measures, monitoring programs, and contingency plans (if necessary), there is unlikely to be any significant impacts to natural heritage features, including woodlands, wetlands, or SWHs (NRSI, 2015a). • Given the short-term and temporary nature of increased traffic and the restriction of construction activities to daylight hours, risk of increased mortality during construction is considered low.	**Monitoring:** Amphibian Woodland Breeding • Conduct post-construction amphibian call surveys for one year following pre-construction survey methods to assess any potential changes in amphibian breeding populations or species distribution if deemed significant. Full details of this monitoring will be provided in the EEMP. • Undertake regular construction monitoring and routine inspections to ensure proper installation of erosion control measures and that proper fugitive dust control measures are in place. • Monitor sediment and erosion control measures, such as silt fence, check dams, and dust control measures daily in areas where work is taking place and prior to and after any storm events. • Monitor sediment and erosion control measures twice weekly in areas where active construction is not occurring until the construction phase is complete. • Correct silt fencing, or other applicable sediment and erosion control measures, that is not working properly. • An Environmental Monitor will be present, as required, when active directional drilling is occurring. Bird Species of Conservation Concern • Conduct post-construction behaviour surveys of this habitat for three years following pre-construction survey methods to assess the potential project disturbance on this habitat. Full details of this monitoring will be provided within the EEMP. Butterfly Species of Conservation Concern • Conduct one year of post-construction surveys of the habitat to assess the potential project disturbance on this habitat. Full details of this monitoring will be provided in the EEMP. Marsh Bird Breeding Habitat/Open Country Breeding Birds • Conduct post-construction monitoring of this feature for three years after construction, following pre-construction methods, for all features deemed significant. Full details of this monitoring will be provided within the EEMP. **Contingency Measures:** Amphibian Woodland Breeding • If deficiencies in sediment and erosion control measures are noted, the Environmental If deficiencies in sediment and erosion control measures are noted, the Environmental Monitor will notify the contract administrator and recommend remedial actions, which may include re-establishing mitigation measures, habitat remediation, and/or seeding of permanently damaged areas. • If 'frac-out' occurs, immediately implement 'frac-out' contingency plan. • If sedimentation and erosion control measures fail and degradation of the habitat(s) occurs, consult the MNRF to determine appropriate contingency measures, which may include re-establishing mitigation measures, habitat remediation, and/or seeding of permanently damaged areas. • If fugitive dust control measures fail and degradation of the habitat(s) occurs, consult the MNRF to determine appropriate contingency measures, which may include re-establishing mitigation measures, habitat remediation, and/or seeding of permanently damaged areas. • In the event of a spill, notify the MOECC Spills Action Centre, immediately stop work and ensure all efforts are made to completely remediate affected areas, especially prior to rain events. • Given the short-term and temporary nature of increased traffic and the restriction of construction activities to daylight hours, wherever possible, risk of increased mortality during construction is considered low. • Restore vegetated buffers, including riparian zones, if accidentally damaged, as soon as possible. • If the results of the monitoring indicate a feature is no longer significant, the MNRF will be consulted to discuss the need (if any) for additional post-construction surveys. Bird Species of Conservation Concern • Maintain bird species of conservation concern habitat quality and quantity within the project area, using baseline conditions as a minimum standard. Butterfly Species of Conservation Concern • Maintain butterfly species of conservation concern habitat within the project area in consultation with the MNRF, which may include restoring habitats with suitable host plants for butterfly species of conservation concern. Marsh Bird Breeding Habitat/Open Country Breeding Birds • If a permanent disturbance has been noted within this wildlife habitat, consult the MNRF to determine whether additional mitigation measures will be needed.

Table 4-4: Mitigation Measures, Net Effects and Monitoring Plan Associated with Potential Effects to Significant Wetlands, Woodlands and Wildlife Habitat Resulting from Construction and Decommissioning

Potential Effect	Performance Objectives	Mitigation Strategy	Net Effects	Monitoring Plan and Contingency Measures
Increased Species Competition to Plant Species of Conservation Concern through Introduction of Invasive Species.	• Minimize impacts to plant species of conservation concern. • Protect plant species of conservation concern habitat. • Maintain vegetated buffers, including riparian zones. • Avoid contamination of plant species of conservation concern habitat.	• Clearly delineate work area using erosion fencing, or other barrier, to minimize seed transfer into suitable habitat. • Depending on site-specific conditions, such as steep topography and the presence of direct, or regular, surface water flow, the Environmental Monitor may consider substituting other styles of fencing for erosion fencing, when appropriate. • Regularly clean vehicles and equipment. • Vehicle use will occur primarily on access roads and in agricultural habitats, where invasive and non-native vegetation species are less likely to be concentrated.	• Assuming the implementation of the planned mitigation measures, monitoring programs, and contingency plans (if necessary), there is unlikely to be any significant impacts to natural heritage features, including woodlands, wetlands, or SWHs (NRSI, 2015a).	**Monitoring:** • Conduct post-construction monitoring in years 1, 3, and 5 of operation following pre-construction survey methods. Surveys will be conducted at a time of year when the species can be identified to assess any potential changes in species populations or distribution. Full details of this monitoring will be provided in the EEMP. • Undertake regular construction monitoring and routine inspections to ensure proper installation of erosion control measures and that proper fugitive dust control measures are in place. • Monitor sediment and erosion control measures, such as silt fence, check dams, and dust control measures daily in areas where work is taking place and prior to and after any storm events. • Monitor sediment and erosion control measures weekly in areas where active construction is not occurring until the construction phase is complete. • Correct silt fencing, or other applicable sediment and erosion control measures, that is not working properly. • An Environmental Monitor will be present at all times when active directional drilling is occurring. **Contingency Measures:** • If any potential changes in species population or distribution are noted during post-construction surveys, consult the MNRF to determine appropriate contingency measures, which may include re-establishing mitigation measures, habitat remediation, and/or seeding of permanently damaged areas. • Restore vegetated buffers, including riparian zones, if accidentally damaged, as soon as possible. • If deficiencies in sediment and erosion control measures are noted, the Environmental Monitor will notify the contract administrator and recommend remedial actions, which may include re-establishing mitigation measures, habitat remediation, and/or seeding of permanently damaged areas. • If 'frac-out' occurs, immediately implement 'frac-out' contingency plan. • If sedimentation and erosion control measures fail and degradation of the habitat(s) occurs, consult the MNRF to determine appropriate contingency measures, which may include re-establishing mitigation measures, habitat remediation, and/or seeding of permanently damaged areas. • If fugitive dust control measures fail and degradation of the habitat(s) occurs, consult the MNRF to determine appropriate contingency measures, which may include re-establishing mitigation measures, habitat remediation, and/or seeding of permanently damaged areas. • In the event of a spill, notify the MOECC Spills Action Centre, immediately stop work and ensure all efforts are made to completely remediate affected areas, especially prior to rain events.
Accidental Damage to Raptor Wintering Area Habitat, Including Tree Limbs.	• Protect raptor wintering area habitat. • Limit disturbance to raptors overwintering within the project area.	• Clearly delineate work area using erosion fencing, or other barrier, to avoid accidental vegetation damage within significant raptor wintering areas. • No use of herbicides (project related activities only) within significant features or wildlife habitats.	• Assuming the implementation of the planned mitigation measures, monitoring programs, and contingency plans (if necessary), there is unlikely to be any significant impacts to natural heritage features, including woodlands, wetlands, or SWHs (NRSI, 2015a).	**Monitoring:** • Conduct post-construction surveys of this wildlife habitat for one year after construction, following pre-construction methods if the habitats are deemed significant. Full details of this monitoring will be provided in the EEMP. • If surveys indicate that there is an avoidance effect, consult with MNRF to determine the need for an additional two years of post-construction monitoring following pre-construction methods. **Contingency Measures:** • Consult MNRF to determine contingency measures.
Accidental Damage to Bat Maternity Colony Habitat, Including Tree Limbs *(Project locations are sited outside of habitats – vegetation removal is not anticipated).*	• Protection of bat maternity colony habitat.	• Clearly delineate work area using erosion fencing, or other barrier, to avoid accidental damage to potentially significant bat roosting trees. • Depending on site-specific conditions, such as topography and surface water flow patterns, the Environmental Monitor may consider substituting other styles of fencing for erosion fencing, when appropriate. • No use of herbicides (project related activities only) within significant features or wildlife habitats.	• Assuming the implementation of the planned mitigation measures, monitoring programs, and contingency plans (if necessary), there is unlikely to be any significant impacts to natural heritage features, including woodlands, wetlands, or SWHs (NRSI, 2015a).	**Monitoring:** • Conduct post-construction monitoring of this feature for three years after construction, following pre-construction methods, for all features deemed significant. Full details of this monitoring will be provided in the EEMP. • Conduct post-construction mortality monitoring at this facility for at least three years following MNRF guidelines (MNRF, 2011b). The turbine closest to this habitat (T19) will be included with the subsample of turbines monitored during post-construction mortality monitoring, if this habitat is confirmed to be significant. Full details of this monitoring will be provided within the EEMP. **Contingency Measures:** • If a permanent disturbance has been noted within this wildlife habitat, contact the MNRF to determine whether additional mitigation measures will be needed. • If high bat mortality is observed at T19, discuss appropriate mitigation measures with the MNRF.

Table 4-4: Mitigation Measures, Net Effects and Monitoring Plan Associated with Potential Effects to Significant Wetlands, Woodlands and Wildlife Habitat Resulting from Construction and Decommissioning

Potential Effect	Performance Objectives	Mitigation Strategy	Net Effects	Monitoring Plan and Contingency Measures
Accidental Damage to Plant Species of Conservation Concern.	• Minimize direct impacts to plant species of conservation concern. • Protect plant species of conservation concern habitat. • Minimize impacts on current species composition. • Reduce the potential spread of non-native or invasive species.	• Clearly delineate work area using erosion fencing, or other barrier, to avoid accidental damage to species to be retained and habitat. • Depending on site-specific conditions, such as steep topography and the presence of direct, or regular, surface water flow, the Environmental Monitor may consider substituting other styles of fencing for erosion fencing, when appropriate. • Directional drilling entry and exit pits will be located a sufficient distance from the edge of the natural feature to maintain a vertical depth of at least 1.5 m at all times below the natural feature to protect the critical root zone. • Directional drilling will be a minimum of 1.5 m below the surface of this habitat. • No use of herbicides (project related activities only) within significant features or wildlife habitats. • Re-vegetate cleared areas as soon as reasonably possible.	• Assuming the implementation of the planned mitigation measures, monitoring programs, and contingency plans (if necessary), there is unlikely to be any significant impacts to natural heritage features, including woodlands, wetlands, or SWHs (NRSI, 2015a).	**Monitoring:** • Conduct post-construction monitoring in years 1, 3, and 5 of operation following pre-construction survey methods. Surveys will be conducted at a time of year when the species can be identified to assess any potential changes in species populations or distribution. Full details of this monitoring will be provided within the EEMP. **Contingency Measures:** • Replace any plant species of conservation concern which are damaged or destroyed at a 1:1 ratio with plantings in the habitat. The success of any planted specimens will be monitored for two years after planting. • If any potential changes in species populations or distribution are noted during post-construction surveys, consult the MNRF to determine appropriate contingency measures, which may include re-establishing mitigation measures, habitat remediation, and/or seeding of permanently damaged areas.

Table 4-5: Mitigation Measures, Net Effects and Monitoring Plan Associated with Potential Effects to Significant Wetlands, Woodlands and Wildlife Habitat Resulting from Operations

Potential Effect	Performance Objectives	Mitigation Strategy	Net Effects	Monitoring Plan and Contingency Measures
Avoidance of Habitat by Wildlife during Operations Phase.	• Protection of bat maternity colony habitat. • Protection of open country bird breeding habitat.	<u>Bat Maternity Colony</u> • Impacts are expected to be minimal, and temporary, in nature, and no specific mitigation measures have been determined necessary. • Schedule construction and regular (non-critical) maintenance activities to occur outside of the critical roosting period (June), unless specifically required in accordance with manufacturer specifications. <u>Open Country Bird Breeding Habitat</u> • Schedule regular (non-critical) maintenance activities located within 30 m of open country bird breeding habits to occur outside of the peak breeding bird season (May 1st-July 31st), if possible. • If regular maintenance must occur during the breeding bird period (May 1st – July 31st), have a biologist confirm that no nests will be impacted by maintenance activities.	• Assuming the implementation of the planned mitigation measures, monitoring programs, and contingency plans (if necessary), there is unlikely to be any significant impacts to natural heritage features, including woodlands, wetlands, or SWH (NRSI, 2015a).	**Monitoring:** <u>Bat Maternity Colony</u> • Conduct post-construction monitoring of this feature for three years after construction, following pre-construction methods, for all features deemed significant. Full details of this monitoring will be provided in the EEMP. • Conduct post-construction mortality monitoring at this facility for at least three years following MNRF guidelines (MNRF 2011b). The turbine closest to this habitat (T19) will be included with the subsample of turbines monitored during post-construction mortality monitoring, if this habitat is confirmed to be significant. Full details of this monitoring will be provided within the EEMP. **Contingency Measures:** <u>Bat Maternity Colony</u> • If a permanent disturbance has been noted within this wildlife habitat, contact the MNRF to determine whether additional mitigation measures will be needed. • If high bat mortality is observed at T19, discuss appropriate mitigation measures with the MNRF. <u>Open Country Bird Breeding Habitat</u> • If a permanent disturbance has been noted within this wildlife habitat, contact the MNRF to determine whether additional mitigation measures will be needed.
Direct Mortalities through Collisions with Operational Turbines.	• Minimize the mortality of bird species of conservation concern, butterfly species of conservation concern, raptors, open country birds, and bird species of conservation concern from collisions with operational turbines.	<u>Common Mitigation</u> • Develop post-construction monitoring plan in accordance with the Birds and Bird Habitat Guidelines (MNRF, 2011a). <u>Raptor Wintering Area</u> • Utilize a lighting scheme that will minimize risk to birds, while fulfilling Transport Canada requirements. <u>Butterfly Species of Conservation Concern</u> • Develop post-construction monitoring plan.	• Assuming the implementation of the planned mitigation measures, monitoring programs, and contingency plans (if necessary), there is unlikely to be any significant impacts to natural heritage features, including woodlands, wetlands, or SWH (NRSI, 2015a).	**Monitoring:** <u>Common Monitoring</u> • Conduct post-construction mortality monitoring at this facility for at least three years following MNRF guidelines (MNRF 2011a). Full details of this monitoring will be provided within the EEMP. <u>Butterfly Species of Conservation Concern</u> • Record any incidental butterfly species of conservation concern mortalities observed during the first three years of post-construction mortality monitoring occurring for birds and bats (MNRF, 2011a, MNRF, 2011b). Full details of this monitoring will be provided within the EEMP. **Contingency Measures:** <u>Butterfly Species of Conservation Concern</u> • If any mortality of a butterfly species of conservation concern is observed during the first three years of post-construction mortality monitoring occurring for birds and bats, MNRF will be informed of the occurrence.

4.3 Surface Water and Groundwater

4.3.1 Surface Water Existing Conditions

According to Section 1.1 of the O. Reg. 359/09, as amended, a water body is defined as:

> *"A lake, permanent stream, intermittent stream and a seepage area but does not include:*
> *a) grassed waterways;*
> *b) temporary channels for surface drainage, such as furrows or shallow channels that can be tilled and driven through;*
> *c) rock chutes and spillways;*
> *d) roadside ditches that do not contain a permanent or intermittent stream;*
> *e) temporary ponded areas that are normally farmed;*
> *f) dugout ponds; and*
> *g) artificial bodies of water intended for storage, treatment or recirculation of runoff from animal yards, manure storage facilities and sites and outdoor confinement areas."*

There are 38 water bodies as defined by O. Reg. 359/09, as amended, identified within 120 m of Project Location through site investigations, of which 33 water bodies are overlapping with Project Location. All of these water bodies are either permanent or intermittent watercourses and designated as warmwater and/or coolwater fisheries, which contain warmwater and/or coolwater baitfish species (NRSI, 2015b). Four aquatic species of conservation concern were identified through the records review as potentially occurring in the PSA. These include Grass Pickerel (*Esox americanus vermiculatus*), Longear Sunfish (*Lepomis megalotis*), Spotted Sucker (*Minytrema melanops)* and Ghost Shiner (*Notropis buchanani*).

All water body features were documented and assessed in the Water Body Assessment and Water Body Report in accordance with O. Reg. 359/09, as amended, and the *Technical Guide to Renewable Energy Approvals* (MOECC, 2013).

4.3.2 Groundwater Existing Conditions

As described in the *Technical Guide to Renewable Energy Approvals* (MOECC, 2013), an important environmental effect to consider is the potential for the Project to interfere with existing uses of a water resource.

The following section provides an overview of the Hydrogeological Assessment and Effects Assessment Report for the Belle River Wind Project. For further details please refer to the Hydrogeological Assessment and Effects Assessment Report in **Appendix B** of the Design and Operations Report.

4.3.1.1 Physiography and Topography

The PSA is located within the Essex Clay Plain physiographic region, a sub-region of the St. Clair Clay Plains physiographic region (Chapman and Putnam, 1984). The region is described as a low relief extensive clay plain that slopes gently to the north, toward Lake St. Clair. The prominent soil type within the region is Brookston clay loam, a dark-surfaced gleysolic soil that was developed under a swamp forest (Chapman and Putnam, 1984).

Currently, land use is dominated by general crop and livestock farming, which has been made possible by the installation of dredged ditches and tile underdrains to provide satisfactory moisture conditions within the imperfectly drained soils. Peat and muck accumulation, within areas of poorly drained soils, are also common within the region. Ground surface topography within the PSA is characterized as having low relief, with minor undulations near river valleys and shoreline of Lake St. Clair.

4.3.2.1 Geological Setting

Bedrock Geology

Thick successions of Middle Devonian aged Paleozoic sedimentary rocks subcrop beneath glacial cover across the PSA. The PSA is primarily underlain by limestone of the Dundee Formation. The Dundee Formation can be described as a brown and tan microcrystalline limestone with occasional sand grains and brown chert (Telford and Russell, 1981). The average thickness of the Dundee Formation is 35 to 40 m (Strynatka, S., *et al.*, 2007).

Overburden Geology

Bedrock within the PSA is overlain by thick overburden deposits consisting primarily of fine-textured glacial sediments. Published geological mapping obtained from the Geological Survey of Canada indicates that the PSA is underlain by approximately 28 to 44 m of overburden sediments consisting primarily of fine-textured glacial and proglacial deposits (Morris *and* Cousineau*,* 1994).

Groundwater Resources

Within the County of Essex, water for municipal supply is provided from surface water sources in the Great Lakes system. There are no municipal supply wells currently providing water to the region (Essex Region Conservation Authority (“ERCA”), 2012). Approximately 95 percent of the population within the County of Essex is served by municipal water. However, the remaining 5 percent depend on groundwater as the primary water supply for properties outside the municipally serviced areas (ERCA, 2012). See **Table 4-6** for a brief summary of recorded water well information in the PSA.

Table 4-6: Summary of MOECC Water Well Record Information

Primary Water Use	Number of Well Records	Well Depth (m)	Primary Well Type
Commercial/Industrial	4	31.1 to 47.9	2 overburden, 2 bedrock
Domestic	26	25.9 to 44.2	4 overburden, 22 bedrock
Irrigation/Livestock	33	19.5 to 64.6	8 overburden, 25 bedrock
Monitoring/Test Hole	13	5.2 to 7.6	13 unknown
Public	3	29.6 to 39.6	0 overburden, 3 bedrock
Not Used	7	30.2 to 65.2	0 overburden, 4 bedrock, 3 unknown
Unknown	19	3.2 to 61.6	3 overburden, 8 bedrock, 8 unknown

The location and depth of MOECC water well records gives some indication of the presence of viable groundwater resources within the PSA. Approximately 61 percent of the wells within the PSA obtain their source water from the bedrock aquifer. Only 16 percent of the MOECC water well records within the PSA were completed in overburden sediments. This gives further evidence that the overburden is considered a poor groundwater resource.

4.3.3 Potential Effects, Mitigation Measures and Net Effects

4.3.3.1 Surface Water

Construction and Decommissioning

Table 4-7 identifies potential effects on surface water resources that could occur during the construction and decommissioning phases of the Project and identifies mitigation strategies and a monitoring plan.

Operations

Table 4-8 identifies potential effects on surface water resources that could occur during the operations phase of the Project and identifies mitigation strategies and a monitoring plan.

Where monitoring determines that the mitigation measures are not working as anticipated, contingency measures are described to address any adverse effects.

Table 4-7: Mitigation Measures, Net Effects and Monitoring Plan Associated with Potential Effects to Surface Water Resulting from Construction and Decommissioning

Potential Effect	Performance Objectives	Mitigation Strategy	Net Effects	Monitoring Plan and Contingency Measures
Increased Erosion, Sedimentation, and Turbidity Resulting from Removal of Upland and Riparian Vegetation. **Excess Sediment Suspended and Carried Downstream by Stream Flow during the Installation and Removal of Temporary Structures.**	• Minimize erosion, sedimentation and turbidity. • Minimize transfer of sediment downstream via stream flow.	• Remove construction debris from the site and stabilize it to prevent it from entering the nearby water bodies. • Avoid construction during high volume rain events (20 mm in 24 hours) and significant snow melts/thaws, where possible, and resume once soils have stabilized to avoid risk of erosion, soil compaction or the potential for sediment release into nearby watercourses. • Avoid seasonally wet periods (i.e., spring) when conducting clearing, grubbing, and grading activities, where possible. Avoid construction during high volume rain events (20 mm in 24 hours) and significant snow melts / thaws where possible and resume once soils have stabilized to avoid risk of erosion, soil compaction or the potential for sediment release into nearby watercourses. • Develop a Flood Response Plan to deal with on-site flooding as to mitigate any possible effects to the aquatic environment. • Develop an Erosion and Sediment Control Plan to minimize the potential for construction related sediment release into nearby watercourses (Erosion and Sediment Control Plan Guideline), and prepare Erosion and Sediment Control Plan condition reports as part of the monitoring and maintenance plan. • Horizontal directional drilling should be executed at a minimum depth established by geotechnical studies to limit the potential impacts associated with the possibility of a frac-out. • Locate drilling entry/exit shafts at least 3 m from riparian vegetation or top of bank, whichever is greater, or at a distance otherwise agreed upon with regulatory agencies. • Develop and implement an emergency frac-out response plan including steps to contain, monitor and clean-up in response to the event.	• Increased flows to watercourses and associated streambed and / or bank erosion minimized through application of mitigation measures. ▪ *Low likelihood and limited magnitude of effects as there will only be short term dewatering (if required).* • Increased transfer of sediments downstream minimized through application of mitigation measures. ▪ *Low likelihood and limited magnitude of effects as a result.*	**Monitoring:** • Monitor on-site conditions (i.e., erosion and sediment control measures, spills, flooding). • Monitor meteorological conditions from Environment Canada during construction phase. • Monitor end point of dewatering discharge for water quality and erosion (if dewatering). • Monitor by-pass channel (if applicable). • Monitor aquatic habitat at drilling locations (if drilling). • Monitor surface water quality for general parameters (i.e., temperature, pH, dissolved oxygen, conductivity, Total Suspended Solids (“TSS”), turbidity). • Monitor water levels within water bodies during groundwater dewatering. • Monitor water levels of the water body to determine if dewatering activities are resulting in alteration of water levels within the water body. • Verify the success of all mitigation though groundwater quality sampling.
Increase in Impervious Surfaces and Increased Surface Runoff Resulting from Clearing of Forested Areas and Re-grading of Land. **Soil Compaction as a Result of Heavy Machinery and the Stockpiling of Heavy Materials (i.e., Soils) in the Project Study Area.**	• Minimize the increase of impervious surfaces and surface runoff. • Minimize soil compaction.	• Operate construction equipment (i.e., cranes, back hoes etc.), in a manner that minimizes disturbance to the banks of the watercourse and stays outside of the watercourse and bank area. • Restrict construction equipment to designated controlled vehicle access routes to minimize the potential for soil compaction.	• Increase in impervious surfaces and increased surface runoff minimized through application of mitigation measures. ▪ *Low likelihood and limited magnitude of effects as a result.* • Soil compaction and associated increase in runoff into watercourses minimized though application of mitigation measures. ▪ *Low likelihood and limited magnitude of effects as a result.*	
Serious Harm to Fish or Fish Habitat from Physical Changes to the Stream Channel, Streambed and Riparian Vegetation.	• Minimize alteration to the stream channel, streambed and riparian vegetation. • Minimize the alteration or removal of key aquatic habitat features. • Minimize the time of restricted fish passage.	• Implement riparian planting after construction as soon as weather permits, following reconstruction to stabilize watercourse channel banks and encourage rapid re-vegetation of disturbed soils to prevent collapse and erosion which, in turn, will minimize sedimentation, support fish habitat, and protect sensitive ecological functions that occur in water bodies. • If insufficient time is available in the growing season to establish vegetative cover, apply overwintering treatments such as erosion control blankets, fibre matting, rock (large, clean angular rocks) reinforcement/armoring or equivalent to contain the site over the winter period, and plant vegetative cover in the next growing season, followed by maintenance and inspection. • Develop fish habitat compensation measures, as required, should serious harm to fish habitat be anticipated. During surface water dewatering, collect and relocate fish to a suitable location, preferably downstream and away from the construction area prior to surface water dewatering. This should be executed by a qualified fisheries biologist.	• Harm to fish or fish habitat as a result of physical changes to stream channel and riparian vegetation minimized through application of mitigation measures. ▪ *Low likelihood and limited magnitude of effects riparian cover and adjacent watercourse.* • Alteration or removal of key aquatic habitat features minimized through application of mitigation measures. ▪ *Low likelihood and limited magnitude of effects as a result.* • Disruption of migration patterns minimized through application of mitigation measures. ▪ *Low likelihood and limited magnitude of effects as a result.*	
Minor, Isolated, Short Term Dewatering of Shallow Groundwater from Excavation Areas Required when Excavation Intercepts an Area of Shallow Groundwater Table Conditions.	• Minimize short term dewatering activities when possible.	• Prior to groundwater dewatering, evaluate anticipated discharge rates and estimated zone of influence (“ZOI”) in relation to the associated water bodies to ensure the volumes will not impact water body hydrologic function. • Where a water body is located within a groundwater dewatering ZOI, develop appropriate strategies for dewatering in consultation with regulatory agencies during the detailed design phase of the project.	• Effects related to short term dewatering minimized through application of mitigation measures. ▪ *Low likelihood and limited magnitude of effects as a result.*	
Temporary Disruption of Substrates / Habitat at Locations Where In-water Work is Required. **Completion of In-water Work Requiring In-stream Dewatering and the Construction of Temporary Dykes or Cofferdams.**	• Minimize disruption due to in-water works.	• Schedule construction activities near water to take place within the low flow period in the late summer months where possible to avoid or minimize impacts. • If in-water work is required (for culvert installation and or cabling installation), adhere to required timing windows confirmed through consultation with regulatory agencies, including the MNRF. In the event that this timing window cannot be met, consultation with MNRF will be undertaken. • Perform in-water work (if required) in the dry where possible. If this is not possible, short-term isolated dewatering will be required. Prior to dewatering, isolate the work area with the installation of a temporary water containment structure. The structure should form an impermeable enclosure, which also prevent escape of debris and sediment to the exterior water body. Construct a by-pass channel to maintain flow quantity through the watercourse and prevent from back flooding and ultimately overtopping the water containment structure.	• Temporary disruption of habitat associated with in-water works minimized through application of mitigation measures. ▪ *Moderate likelihood and magnitude of effect occurring due to number of watercourse crossings.*	

Table 4-7: Mitigation Measures, Net Effects and Monitoring Plan Associated with Potential Effects to Surface Water Resulting from Construction and Decommissioning

Potential Effect	Performance Objectives	Mitigation Strategy	Net Effects	Monitoring Plan and Contingency Measures
Water Contamination by Oils, Gasoline, Grease and Other Materials. **Contaminant Spills Due to the Proximity of Construction Vehicles and Machinery to Water Bodies.**	• Minimize soil contamination.	• Ensure machinery arrives on site in clean condition and is checked and maintained free of fluid leaks. Refuel, wash and service machinery a minimum of 30 m away from all water bodies and other drainage features to prevent any deleterious substances from entering a watercourse. • Store fuel and other construction related materials securely away from any drainage features and locate construction staging areas 30 m away from any water body. • Develop a SRP prior to commencement of construction to provide a detailed response system to deal with events such as the release of petroleum, oils and lubricants or other hazardous liquids and chemicals. Keep a spill kit on site at all times and train on-site workers in the use of this kit and the SRP. • Remove and dispose of any waste generated from the site appropriately off site according to municipal standards. • If discharging to a municipal storm sewer system, ensure that groundwater quality meets the objectives of the municipal storm sewer by-law prior to discharge. Obtain water quality samples prior to discharge to ensure the quality is suitable for discharge and will not result in an impact to the receiving watercourse.	• Soil / water contamination minimized through application of mitigation measures. ▪ *Low likelihood and limited magnitude of effects on surface water and groundwater as a result.*	**Monitoring:** • Monitor on-site conditions (i.e., erosion and sediment control measures, spills, flooding). • Monitor meteorological conditions from Environment Canada during Construction phase. • Identify changes to existing aquatic habitat during the pre-construction (to establish a baseline) and Construction Phases. • Monitor end point of dewatering discharge for water quality and erosion (if dewatering). • Monitor by-pass channel (if applicable). • Monitor aquatic habitat at drilling locations (if drilling). • Monitor surface water quality for general parameters (i.e., temperature, pH, dissolved oxygen, conductivity, TSS, turbidity). • Monitor water levels within water bodies during groundwater dewatering. • Monitor water levels of the water body to determine if dewatering activities are resulting in alteration of water levels within the water body. • Verify the success of all mitigation though groundwater quality sampling.

Table 4-8: Mitigation Measures, Net Effects and Monitoring Plan Associated with Potential Effects to Surface Water Resulting from Operations

Potential Effect	Performance Objective	Mitigation Strategy	Net Effects	Monitoring Plan and Contingency Measures
Vegetation Control and Increased Vehicle Access: • **Increased erosion, sedimentation and turbidity resulting from removal of upland and riparian vegetation during maintenance activities.** • **Water contamination by oils, gasoline and grease, which could result in a fish kill or serious harm to fish habitat.** • **Increase in surface runoff resulting from clearing of vegetation during maintenance activities.**	• Minimize erosion, sedimentation and turbidity resulting from clearing of vegetation. • Minimize water contamination. • Minimize surface water runoff resulting from clearing of vegetation.	• Develop an Erosion and Sediment Control Plan that will minimize the potential for construction related sediment release into nearby watercourses, and prepare Erosion and Sediment Control Plan condition reports as part of the monitoring and maintenance plan. • Store fuel and other maintenance related materials securely away from any drainage features. • Implement a SRP to provide a detailed response system to deal with events such as the release of petroleum, oils and lubricants or other hazardous liquids and chemicals. • Keep a spill kit on-site at all times and train on-site workers in the use of this kit and the SRP. • Restrict vehicles to designated controlled access routes to minimize the potential for soil compaction.	• Net effects are considered to be not significant if the appropriate mitigation measures are implemented. ▪ *Low likelihood and limited magnitude of effects on water bodies.*	**Monitoring:** • Monitor water levels within water bodies during groundwater dewatering: ▪ Pre-construction monitoring to characterize baseline levels ▪ Staff gauge readings daily during dewatering ▪ Continuous level loggers (logged in 1 hour increments and downloaded weekly) during active dewatering ▪ Monitor water levels post-construction until they return to baseline levels as described in the Water Level Response Plan. **Contingency Measures:** • In the event of a spill, all work will stop until the spill is cleaned up. • Notify MOECC's Spill Action Centre of any leaks or spills.

4.3.3.2 Groundwater

Construction and Decommissioning

Table 4-9 identifies potential effects on groundwater resources that could occur during the construction and decommissioning phases of the Project and describes mitigation strategies and a monitoring plan.

Operations

Table 4-10 identifies potential effects on groundwater resources that could occur during the operations phase of the Project and describes mitigation strategies and a monitoring plan.

Where monitoring determines that the mitigation measures are not working as anticipated, contingency measures are described to address any adverse effects.

Table 4-9: Mitigation Measures, Net Effects and Monitoring Plan Associated with Potential Effects to Groundwater Resulting from Construction and Decommissioning

Potential Effect	Performance Objectives	Mitigation Strategy	Net Effects	Monitoring Plan and Contingency Measures
Temporary Reduction in Groundwater Flow to Natural Features (Water Bodies, Watercourses and Wetlands) During Groundwater Dewatering Activities Associated with Turbine Foundation Construction.	• Minimize reduction of groundwater contribution to near-by natural features.	• Direct dewatering discharge to the downgradient watercourse (following erosion and sediment control practices) to negate the potential that groundwater drawdown will decrease baseflow into streams and groundwater discharge into wetlands. • Limit duration of dewatering to as short a time frame as possible. • Implement groundwater cut-offs, where practical, to limit groundwater taking quantities.	• Reduction in groundwater quantity and quality minimized through application of mitigation measures. ▪ *Low likelihood and negligible magnitude of long term effects based on the amount of dewatering required and the duration of expected dewatering activities.*	**Monitoring and Contingency Measures:** • Should groundwater dewatering activities be expected to exceed 50,000 L/day, the following measures will be implemented: ▪ Inlet pump head shall be surrounded with clear stone and filter fabric. ▪ The discharge shall be regulated at such a rate that there is no flooding in the receiving water body and that no soil erosion is caused that impacts the receiving water body.
Temporary Reduction in Groundwater Quantity and Quality to Existing Groundwater Users (Private Water Wells) during Groundwater Dewatering Activities Associated with Turbine Foundation Construction.	• Minimize reduction of groundwater quantity and quality to existing groundwater users.	• Limit duration of dewatering to as short a time frame as possible. • Implement groundwater cut-offs, where practical, to limit groundwater taking quantities. • Maintain a setback of 120 m from known active residential groundwater supply wells (private water wells), where possible.	• Reduction in groundwater quantity and quality minimized through application of mitigation measures. ▪ *Low likelihood and negligible magnitude of long term effects based on the amount of dewatering required and the duration of expected dewatering activities.*	**Monitoring and Contingency Measures:** • Should groundwater dewatering activities exceed 50,000 L/day and a private water well becomes dry as a result of such activities, a temporary potable water supply will be provided to the property owner.
Contamination of Groundwater Resources Due to Accidental Spills or Releases of Contaminants (i.e., Fuel, Lubricating Oils and Other Fluids) during the Refuelling, Operation or Maintenance of Construction Equipment.	• Prevent contaminant discharge to the environment.	• Develop a SRP and train staff on procedures and protocols. • Refuel Project equipment and vehicles on spill collection pads and/or in designated areas. • Dispose of any waste material from construction activities by authorized and approved off-site vendors.	• Groundwater contamination minimized through application of mitigation measures. ▪ *Low likelihood and limited magnitude of effects on groundwater.*	**Monitoring:** • Routine inspections performed by the contractor of construction equipment for leaks and spills. **Contingency Measures:** • In the event of a spill all work will stop until the spill is cleaned up. • Notify MOECC's Spill Action Centre of any leaks or spills.

Table 4-10: Mitigation Measures, Net Effects and Monitoring Plan Associated with Potential Effects to Groundwater Resulting from Operations

Potential Effect	Performance Objective	Mitigation Strategy	Net Effects	Monitoring Plan and Contingency Measures
Contamination of Groundwater Resources Due to Accidental Spills or Releases of Contaminants (i.e., Fuel, Lubricating Oils and Other Fluids) during the Refuelling, Operation or Maintenance of Project Equipment.	• Prevent contaminant discharge to the environment.	• Develop a SRP and train staff on procedures and protocols. • Refuel Project equipment and vehicles on spill collection pads and/or in designated areas. • Dispose of any waste material from construction activities by authorized and approved off-site vendors.	• Groundwater contamination minimized through application of mitigation measures. ▪ *Low likelihood and limited magnitude of effects on groundwater.*	**Monitoring:** • Routine inspections performed by the contractor of construction equipment for leaks and spills. **Contingency Measures:** • In the event of a spill all work will stop until the spill is cleaned up. • Notify MOECC's Spill Action Centre of any leaks or spills.
Reduction in Groundwater Quantity from An Increase in Impervious Area Created by Turbine Foundations and Access Roads Resulting in Reduced Infiltration to Unconfined Aquifers (Coarse-Textured Lacustrine Deposit).	• Minimize the increase in impervious areas.	• Direct runoff from the constructed impervious surfaces to ground surface to prevent any decrease in infiltration and recharge. • Minimize vehicle and construction equipment traffic on exposed soils to avoid compaction and a reduction of water infiltration.	• Reduced infiltration near groundwater recharge areas minimized through application of mitigation measures. ▪ *Low likelihood and limited magnitude of effects based on surface area of turbine foundations and the primary land use of surrounding area.*	**Monitoring and Contingency Measures:** • No monitoring or contingency measures required.

4.4 Air, Odour and Dust

4.4.1 Existing Conditions

The PSA is dominated by areas of agricultural production and typical farm practices, which include the use of oversized machinery in fields as well as on rural, typically gravel, roadways. Periodic odours in rural areas from activities like the spreading of manure as well as increased dust particulate are considered to be normal nuisances associated with typical agricultural practices (Ontario Ministry of Agriculture, Food, and Rural Affairs, 2005).

4.4.2 Potential Effects, Mitigation Measures and Net Effects

Construction and Decommissioning

The Project activities associated with the site preparation and construction phase and the decommissioning phase will lead to emission products, including but not limited to GHGs (e.g., methane, and carbon dioxide), nitrogen dioxide, sulphur dioxide and suspended particles from vehicles and machinery operation. The emissions levels will fluctuate through the various construction and decommissioning related activities, with access road construction / reclamation, site grading, and preparation / reclamation of staging and laydown areas having the highest potential for emissions because of increased construction or decommissioning equipment activities during this time. In general these emissions will be temporary and localized.

No emissions of odours are anticipated during construction or decommissioning activities.

Table 4-11 identifies potential effects on air quality that could occur during the construction and decommissioning phases of the Project and identifies mitigation strategies and a monitoring plan.

Operations

During the operation of the Project, maintenance activities have the potential to cause infrequent, localized and short-term fugitive dust and emissions typical to the operation of motorized vehicles. These emissions are expected to be considerably lower in magnitude than during the construction and the decommissioning activities.
No emissions of odours are anticipated during operations.

Table 4-12 identifies potential effects on air quality that could occur during the operations phase of the Project and identifies mitigation strategies and a monitoring plan. Where monitoring determines that the mitigation measures are not working as anticipated, contingency measures are described to address any adverse effects.

Table 4-11: Mitigation Measures, Net Effects and Monitoring Plan Associated with Emissions to Air Resulting from Construction and Decommissioning

Potential Effect	Performance Objectives	Mitigation Strategy	Net Effects	Monitoring Plan and Contingency Measures
Fugitive Dust and Vehicle Emissions *(including GHGs).*	• No persistent dust films (observable build-up) on nearby properties or vegetation. • Limited release of air emissions.	• Implement a speed limit for construction equipment and trucks on access roads. • Apply dust suppressants (e.g., water or environmental friendly dust suppressants) to unpaved areas at an environmental acceptable rate to minimize the release of dust. • Re-vegetate cleared areas as soon as possible. • Install wind fences, as required. • Limit unnecessary idling of vehicles.	• Increased dust and air emissions minimized through application of mitigation measures. ▪ *High likelihood of effects occurring; however, any dust and air emissions are short-term and localized so the magnitude of such effects will be limited.*	**Monitoring:** • Monitor complaints through the Project operations staff contact number according to the Emergency Response and Communications Plan (see Design and Operations Report). **Contingency Measures:** • Review of proposed mitigation measures. • Review of speed limit on access roads.
Reduction in Surface Water Quality as a Result of Dust Emissions.	• No persistent dust films on adjacent water bodies; no measurable change in TSS.			

Table 4-12: Mitigation Measures, Net Effects and Monitoring Plan Associated with Emissions to Air Resulting from Operations

Potential Effect	Performance Objective	Mitigation Strategy	Net Effects	Monitoring Plan and Contingency Measures
Fugitive Dust and Vehicle Emissions (including GHGs).	• No persistent dust films (observable build-up) on nearby properties, vegetation, and water bodies. • Limited release of air emissions.	• Implement a speed limit on access roads. • Properly maintain all vehicles. • Direct project staff to limit the idling of engines where possible.	• Emissions of contaminants from maintenance vehicles minimized through application of mitigation measures. • Dust from vehicular traffic minimized through application of mitigation measures. ▪ *Low likelihood of occurring and limited magnitude due to limited volume of maintenance vehicles.*	**Monitoring:** • Monitor complaints through the Project operations staff contact number according to the Emergency Response and Communications Plan. If complaints are received by a Belle River Wind operations staff member then a visual inspection will be carried out. **Contingency Measures:** • Review of proposed mitigation measures. • Review of speed limit on access roads.

4.5 Noise

4.5.1 Existing Conditions

As mentioned in the above section, land use within the PSA is primarily agricultural and exposed to existing farm practices. These practices include the operation of large agricultural machinery at off hours as well as increased traffic in the region relating to the hauling and storage of crops. Periodic increased noise associated with regular farm operations is considered to be a normal nuisance associated with typical agricultural practices (Ontario Ministry of Agriculture, Food, and Rural Affairs, 2005).

4.5.2 Potential Effects, Mitigation Measures and Net Effects

Construction and Decommissioning

The operation of heavy construction vehicles and temporary generators could also result in nuisance noise at nearby residents or businesses. Noise will be highest during land clearing and other activities that involve significant levels of material handling (e.g., aggregate laydown for access road construction and preparation for the installation of underground collector lines).

Table 4-13 identifies potential effects from nuisance noise that could occur during the construction and decommissioning phases of the Project and identifies mitigation strategies and a monitoring plan.

Operations

The operation of wind turbine generators and the collector substation will generate noise that has the potential to affect local residents. **Table 4-14** identifies potential effects from noise that could occur during the operations phase of the Project and identifies mitigation strategies and a monitoring plan.

Table 4-13: Mitigation Measures, Net Effects and Monitoring Plan Associated with Noise Resulting from Construction and Decommissioning

Potential Effect	Performance Objectives	Mitigation Strategy	Net Effects	Monitoring Plan and Contingency Measures
Increased Noise Due to Construction Activity.	• Adherence to Town of Lakeshore noise by-law no. 106-2007.	• Schedule activities to comply with noise by-laws, where possible. • Ensure that construction equipment is frequently maintained and kept in good working condition. • Ensure that noise emissions from construction equipment not exceed guidelines specified in MOECC publication NPC-115 and manufacturer recommendations. • Implement construction speed limit on unpaved roads.	• High likelihood of increased noise during construction; however, the effect will be short-term, localized, and limited in magnitude.	**Monitoring:** • Monitor complaints through the Project operations staff contact number according to the Emergency Response and Communications Plan (see Design and Operations Report). **Contingency Measures:** • Repair equipment that is unable to meet noise standards. • If noise complaints are received, conduct an investigation to determine the source of the problem.

Table 4-14: Mitigation Measures, Net Effects and Monitoring Plan Associated with Noise Resulting from Operations

Potential Effect	Performance Objective	Mitigation Strategy	Net Effects	Monitoring Plan and Contingency Measures
Increased Noise Levels Experienced by Non-Participating Receptors Due To Turbine Operation.	• Noise at all non-participating noise receptors below 40 decibels (“dBA”).	Monitor and assess the need for repair of equipment, as required.	• Noise levels experienced by non-participating receptors (residents located on non-leased properties) due to turbine operation will comply with the applicable noise regulations and guidelines. ▪ *High likelihood but limited magnitude of effects as a result.*	**Monitoring:** • Monitor wind turbine generator performance remotely or from the operations and maintenance building. • Monitor complaints through the Project operations staff contact number according to the Emergency Response and Communications Plan. If complaints are received by a Belle River Wind operations staff member then an on-site inspection will be carried out. **Contingency Measures:** • Repair wind turbine generators that are unable to meet operational standards. • If noise complaints are received, conduct an investigation to determine the source of the problem.
Increased Noise Levels Experienced by Receptors (Residents Located on Non-Leased Properties) Due to Substation Operation.	• Noise at all non-participating noise receptors below 40 dBA.	• Monitor and assess the need for repair of equipment, as required.	• Noise levels experienced by non-participating receptors near the substation will be below applicable noise regulations and guidelines due to setback requirements and application of mitigation measures.	**Monitoring:** • Track all complaints and conduct follow-up monitoring (see Complaints Resolution Process in Emergency Response and Communications Plan). **Contingency Measures:** • Repair equipment that is unable to meet operational standards. • If noise complaints are received, conduct an investigation to determine the source of the problem.

4.6 Local Interests, Land Use and Infrastructure

4.6.1 Existing Conditions

Local interests, land uses and infrastructure were taken into consideration during the design phase of the Project. All turbines have been sited to meet or exceed MOECC's required setbacks.

Land Use

The Project is located within the Town of Lakeshore in the County of Essex. The Town of Lakeshore's Official Plan (2010) and Zoning By-laws (2014) show that land uses in the PSA are predominantly zoned for agricultural use. These operations are primarily cash crops (e.g., soybeans, corn and wheat) and livestock farming. Other land uses within the area include non-farm residential uses on separate lots created through severances for farm retirement lots, surplus farm dwelling lots and older estate lots that are scattered throughout the PSA in limited numbers.

Limited small-scale industrial, commercial and institutional type uses occur throughout the PSA with a majority of the Town's current industrial capacity being located along the County Road 22 corridor. Such uses might include small-scale manufacturing operations, farm-related businesses and contractor works yards. Only one record of site contamination within the PSA was found through a review of the MOECC's Records of Site Condition (MOECC, n.d.). No Project infrastructure is proposed on the parcel associated with this record as the closest Project component is 150 m away from the parcel.

Adjacent Properties

A Property Line Setback Assessment has been prepared to address Section 53 of O. Reg. 359/09, as amended, (see **Appendix D** of the Design and Operations Report). This section of the regulation requires the identification of any impacts to businesses, infrastructure, properties or land use activities resulting from a turbine location being proposed at a distance equal to or less than the hub height of the turbine (99.5 m) from an adjacent property line. Twenty-six (26) turbines were identified to require assessment due to their proximity to adjacent property lines. The Property Line Setback Assessment confirmed that adverse impacts to the adjacent parcels may include damage to field crops as a result of turbine failure. However, this potential impact already exists at a 99.5 m setback and is not increased by a setback reduction.

Local Airport

It was determined that the Windsor Airport is located 14.3 km away from the PSA and consultation with the Windsor Airport is ongoing. Belle River Wind received correspondence from the Windsor International Airport confirming that they did not anticipate any direct impact to their operations or facilities.

Telecommunication and Weather Towers

Belle River Wind has provided Project notices to telecommunication companies in the area to provide details on the Project. To date, Belle River Wind has not received any concerns from these companies.

An Environment Canada weather radar tower is located over 200 km from the PSA. The Project will not have any impact on the operations of the weather radar tower.

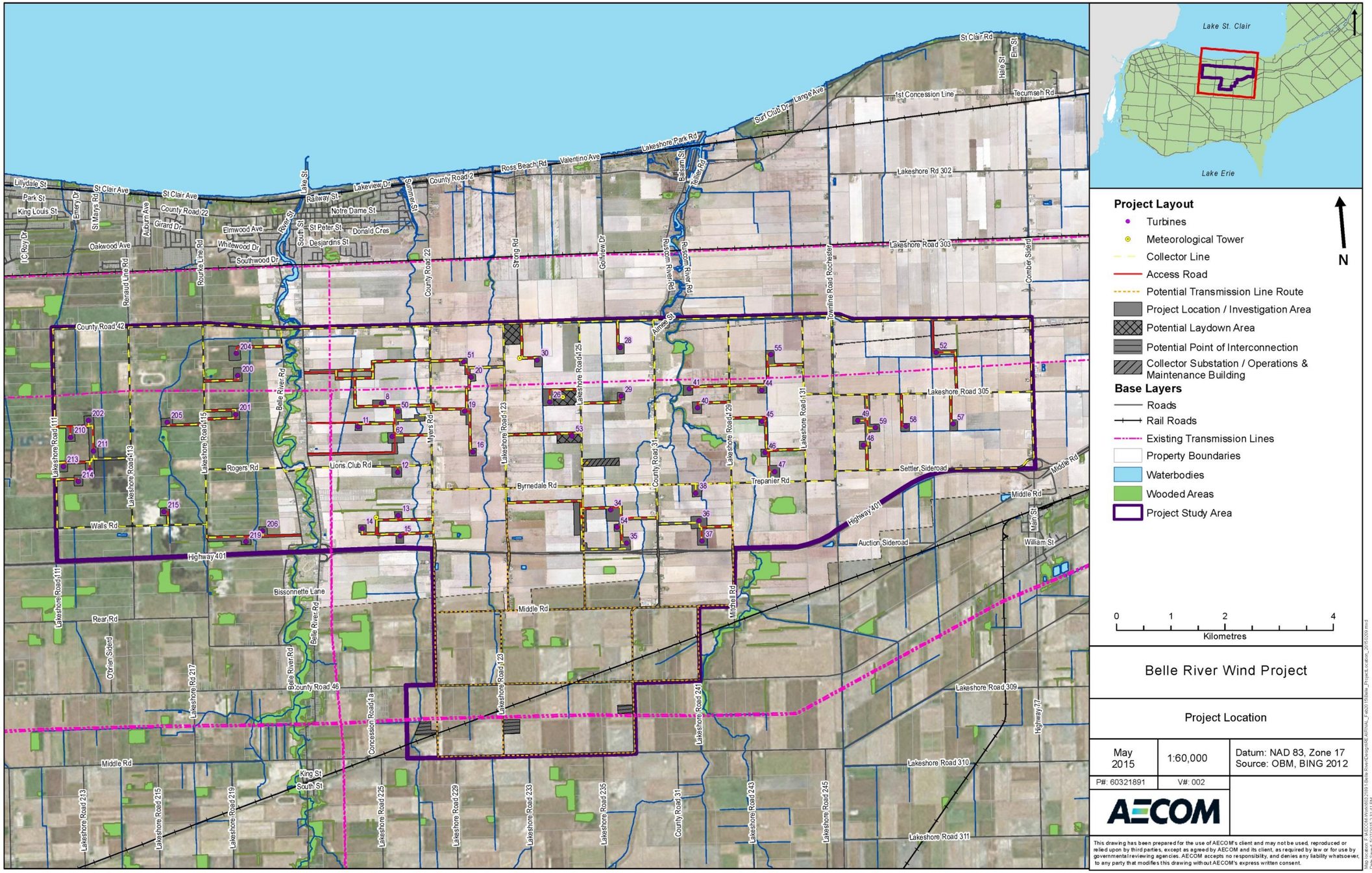
Conservation Areas

In the Town of Lakeshore there are three Conservation Areas all owned by the ERCA; none of the Conservation Areas are in the PSA.

Local Roads and Traffic

The Project Location map (**Figure 4-1**) displays existing local and provincial roads in proximity to the PSA. As part of the REA process, Belle River Wind consulted with the Town of Lakeshore and County of Essex to determine what effects the Project might have on local services and infrastructure.

Figure 4-1: Project Location



Local Schools

There are several schools outside the PSA including: Belle River District High School, Belle River Public School, St. John the Baptist Catholic School, École élémentaire Saint-Ambroise, St. Anne Catholic High School, Lakeshore Ontario Early Years Centre and Lakeshore Discovery Public School. These schools are not located within the PSA but were considered as part of the Noise Impact Assessment (refer to **Appendix C** of the Design and Operations Report).

First Nation and Aboriginal Community Interests

To ensure the First Nation and Aboriginal Community interests were considered, Belle River Wind submitted the appropriate documents to the MOECC in order to receive the First Nation and Aboriginal Communities Contact List. MOECC confirmed that the following communities may have an interest in the Project:

- Aamjiwnaang (Chippewas of Sarnia First Nation);
- Bkejwanong (Walpole Island) First Nation;
- Caldwell First Nation; and
- Oneida Nation of the Thames.

4.6.2 Potential Effects, Mitigation Measures and Net Effects

Construction and Decommissioning

There will be a temporary loss of agricultural land during construction and installation activities as a result of temporary Project components, including crane pads, turbine laydown areas and the construction staging areas. However, these areas will be small relative to the total land area within the PSA, and these lands will be returned to pre-existing land use after construction and installation activities are completed, unless otherwise agreed upon with the landowner. The construction of the Project will not result in the creation of access to previously inaccessible areas as the Project is located in areas already cleared for agricultural uses.

The road capacity and local traffic may also be affected during construction and decommissioning related activities. The delivery of construction equipment and Project infrastructure, and construction of new turbine access roads could result in a temporary increase in slower moving traffic volume on local roads. Construction and/or decommissioning related activities next to or in road easements could also result in temporary disruptions to the flow of traffic on some local roads. The changes in traffic volume are expected to be minimal and no appreciable change to traffic flow is anticipated as a result of the Project.

Table 4-15 identifies potential effects on land use and infrastructure including local roads that could occur during the construction and decommissioning phases of the Project and identifies mitigation strategies and a monitoring plan.

Operations

During the operation of the Project, the road capacity and local traffic could be affected if maintenance activities involve the replacement of a major wind turbine generator component (e.g., gear box or rotor), since specialized equipment (e.g., cranes) may be required. The delivery of specialized equipment could result in a temporary increase in slower moving traffic volumes on local roads. Any maintenance activities adjacent to or in road easements could also result in temporary disruptions to the flow of traffic on some local roads.

Table 4-16 identifies potential effects on local interests, land use and infrastructure that could occur during the operations phase of the Project and identifies mitigation strategies and a monitoring plan.

Table 4-15: Mitigation Measures, Net Effects and Monitoring Plan Associated with Potential Effects to Local Interests, Land Use and Infrastructure Resulting from Construction and Decommissioning

Potential Effect	Performance Objectives	Mitigation Strategy	Net Effects	Monitoring Plan and Contingency Measures
Reduction in Agricultural Land.	• No significant economic reduction in agricultural yields on lots containing Project infrastructure.	• Minimize length of access roads where possible. • Consult with landowners to design access roads to minimize impacts to existing land use. • Compensate landowners on Project Location as per land lease agreement.	• Minor reduction in usable agricultural land. ▪ *High likelihood of effect, however limited magnitude due to size of overall footprint within the entire PSA.*	**Monitoring and Contingency Measures:** • No monitoring or contingency measures required.
Damage to Local Infrastructure.	• Minimize damage to local infrastructure.	• Adhere to best practices regarding the operation of construction equipment and delivery of construction materials. • Undertake roads condition survey prior to construction and post-construction.	• Damage to local infrastructure minimized through application of mitigation measures. ▪ *Moderate likelihood and magnitude of effects occurring due to presence oversize loads during delivery of turbine components.*	**Monitoring:** • Monitor complaints through the Project operations staff contact number according to the Emergency Response and Communications Plan (see Design and Operations Report). **Contingency Measures:** • Return damaged infrastructure to original condition (or better) where appropriate.
Increased Congestion Due to Increase in Truck Traffic and Short-term Lane Closures on Local Roads during Delivery of Project Components.	• Minimize disturbances to local traffic patterns.	• Develop a traffic management plan for the construction phase and submit to the Town of Lakeshore and County of Essex prior to construction. • Conduct a survey in conjunction with the municipalities to determine if the roads and travel routes within the PSA are capable of accommodating the oversized vehicles and heavy loads prior to the delivery of Project components and equipment. • Notify the community in advance of construction delivery schedules and install signage to notify road users of construction activity, where appropriate.	• No significant adverse effects to local roads and traffic are anticipated during construction and installation activities following the implementation of a traffic management plan.	**Monitoring Plan:** • The construction contractor will regularly monitor and report to Belle River Wind on the implementation of the traffic management plan. **Contingency Measures:** • To the extent possible, use alternate component delivery routes.

Table 4-16: Mitigation Measures, Net Effects and Monitoring Plan Associated with Potential Effects to Local Interests, Land Use and Infrastructure Resulting from Operations

Potential Effect	Performance Objective	Mitigation Strategy	Net Effects	Monitoring Plan and Contingency Measures
Temporary Change in the Flow of Local Traffic Resulting from Maintenance Activities.	• Minimize disturbance to local traffic patterns.	• Obtain appropriate road occupancy and traffic permits from provincial and municipal agencies prior to undertaking maintenance activities, if required. • Notify the community about major Project maintenance activities.	• Changes in traffic flow during the operation of the PSA are expected to be limited to periods when major Project maintenance activities are required. ▪ *High likelihood of effect, however limited magnitude due to size of overall footprint within the entire PSA.*	**Monitoring:** • Monitor complaints through a Project operations staff contact number according to the Emergency Response and Communications Plan. **Contingency Measures:** • To the extent possible, use alternate maintenance equipment and/or component delivery routes.

4.7 Public Health and Safety

4.7.1 Existing Conditions

4.7.1.1 Stray Voltage

Belle River Wind will ensure that the electrical design conforms and complies with relevant electrical safety standards. Further, the Project collector lines are not anticipated to share poles with existing distribution lines, thereby reducing the instances of potential stray voltage generation. Hydro One has established procedures in place to address stray voltage for off-farm and on-farm sources. Refer to **Section 5** of the Design and Operations Report for more information regarding the emergency response and communications plan.

4.7.1.2 Structural Hazards

In the unlikely event of structural collapse or blade detachment, equipment will fall within a very small diameter due to the weight of the wind turbine components. Wind turbine siting for the proposed Project will meet (at a minimum) the setback distances from roads (blade length plus 10 m) and non-participating residences (550 m) as outlined in O. Reg. 359/09, as amended.

A Property Line Setback Assessment (**Appendix D** of the Design and Operations Report) was conducted in accordance with O. Reg 359/09, as amended, to identify the proposed turbines located within the hub height (99.5 m) of an adjacent property line. The Report concluded that no adverse impacts are anticipated as a result of the setback reductions.

4.7.1.3 Ice Throw

Ice throw and ice shed refer to situations where during specific weather conditions, ice may form on wind turbines and may be thrown or break loose and fall to the ground (Chief Medical Officer of Health (“CMOH”), 2010). Wind turbines for the proposed Project will be located on private property, and meet (at a minimum) the setback distances from non-participating residences (550 m) and roads (blade length plus 10 m) outlined in O. Reg. 359/09, as amended. During the operation of the Project, sensors located on the turbines will be able to detect ice build-up and turbines will be shut down during unsafe operating conditions.

4.7.1.4 Low Frequency Sound, Infrasound and Vibration

Wind turbines have the potential to emit low frequency sound, infrasound and vibration. Low frequency sound commonly refers to sound at frequencies between 20 and 200 Hertz (“Hz”); infrasound commonly refers to sound at frequencies below 20 Hz (i.e., below the threshold of human perception). Although generally considered inaudible, infrasound at high-enough sound pressure can be audible to some people (CMOH, 2010 and McCunney et al., 2014). The “Potential Heath Impacts of Wind Turbines Report” (CMOH, 2010) identified that infrasound and low frequency sound from modern wind turbines were found to be well below the level where known health effects occur (50 to 70 dB) in studies of wind turbine noise. McCunney et al. concluded that “infrasound and low-frequency sound do not present unique health risks” and “annoyance seems more strongly related to individual characteristics than noise from turbines” (2014, pp. 108).

4.7.1.5 Electric and Magnetic Fields

Concerns surrounding electromagnetic fields ("EMFs") have been raised during other REA consultation processes. EMFs are a combination of invisible electric and magnetic fields. They occur both naturally (e.g., light is a natural form of EMF) and as a result of human activity. Nearly all electrical and electronic devices emit some type of EMF (CMOH, 2010). The generation of electrical fields from underground electrical collector lines from the Project will be shielded by line insulation and the surrounding ground but will still generate magnetic fields. Associated magnetic fields will be similar to other buried distribution lines in Ontario. The "Potential Heath Impacts of Wind Turbines Report" (CMOH, 2010) indicates that "wind turbines are not considered a significant source of EMF exposure".

4.7.2 Potential Effects, Mitigation Measures and Net Effects

Construction and Decommissioning

Effects on public health and safety during construction have been described in **Section 4.4** (Air, Odour and Dust), **Section 4.5** (Noise), and **Section 4.6** (Local Interests, Land Use and Infrastructure).

Operations

To minimize or avoid effects on public health and safety, the turbines are sited according to setback distances outlined in O. Reg.359/09 and as described above.

Table 4-17 identifies potential effects on public health and safety that could occur during the operations phase of the Project and identifies mitigation strategies and a monitoring plan.

Table 4-17: Mitigation Measures, Net Effects and Monitoring Plan Associated with Potential Effects to Public Health and Safety Resulting from Operations

Potential Effect	Performance Objective	Mitigation Strategy	Net Effects	Monitoring Plan and Contingency Measures
Impacts on Public Health and Safety from Structural Hazards, and/or Ice Throw.	• No public health and safety incidents.	• Adhere to setback requirements to limit likelihood of any impacts.	• No impacts on public health and safety from structural hazards and/or ice throw due to setback requirements. ▪ *Very low likelihood and very limited magnitude of impacts (if any) on public health and safety due to setback requirements and based on existing wind farm operations.*	**Monitoring:** • Track all complaints and conduct follow-up monitoring (see Complaints Resolution Process in Emergency Response and Communications Plan). **Contingency Measures:** • Suspend operations during icing conditions to minimize the risk of ice shed.
Stray Voltage Effects to the Public and Livestock.	• No health and safety incidents associated with stray voltage.	• Build and maintain the Project as prescribed by the Distribution System Code and the Electrical Safety Authority to minimize the risk of stray voltage. • Ensure ongoing regular maintenance and monitoring of turbines. • Ensure that all electrical design conforms and complies with relevant electrical safety standards.	• Very low likelihood and very limited magnitude of impacts (if any) on public health and safety from stray voltage due to adherence to electrical safety standards.	**Monitoring:** • Track all complaints and conduct follow-up monitoring (see Complaints Resolution Process in Emergency Response and Communications Plan). **Contingency Measures:** • No contingency measures required.

4.8 Other Resources

4.8.1 Existing Conditions

A search for landfills, aggregate resources, forest resources and petroleum resources was undertaken based upon data from the municipality, MOECC and MNRF.

4.8.1.1 Landfills

MOECC's Landfill Inventory Management Ontario and Large Landfill Sites records (MOECC, 2014a and MOECC, 2014b) were used to confirm that there are no landfills within the PSA – the closest active landfill is approximately 19 km away and a closed landfill is west of the westernmost boundary of the PSA. Therefore, no effects on landfills are anticipated.

4.8.1.2 Aggregate Resources

Information from Land Information Ontario (MNRF, 2014a) was used to confirm that there are no authorized aggregate resources within the PSA – the closest aggregate resource being approximately 12 km away. Therefore, no effects on aggregate resources are anticipated. 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.

4.8.1.3 Forest Resources

Based on the MNRF's Sustainable Forest Licences ("SFL") database (MNRF, 2014b), there are no SFLs within the PSA. Therefore, no effects on forest resources are anticipated.

4.8.1.4 Petroleum Resources

Based on MNRF's Oil, Gas & Salt Resources ("OGSR") library (OGSR, 2011), there are 13 petroleum wells within 75 m of the Project Location. Three natural gas pipelines also intersect the PSA. An assessment of petroleum resources is being conducted to determine the effects of the Project on these resources. The results of this assessment will be documented in a Petroleum Resources Report.

4.9 Areas Protected under Provincial Plans and Policies

The REA requires a determination as to whether the Project is being proposed in any of the following protected or plan areas:

- Protected Countryside or Natural Heritage Systems in the Greenbelt Plan;
- Oak Ridges Moraine Conservation Plan Areas;
- Niagara Escarpment Plan Area; or
- Lake Simcoe Watershed Plan Area.

The Belle River Wind Project is not proposed in an area within the jurisdiction of the plans noted above. As such, there will be no effects on these areas as a result of the Project.

5. Summary and Conclusions

Field work and data collection were undertaken to determine the potential effects of this Project during the construction and operations / maintenance phases. Mitigation measures to manage these potential effects have been identified and monitoring and contingency plans proposed to ensure effects are minimized.

Significant adverse effects have been avoided through careful site selection, facility layout planning and strict adherence to all regulatory requirements. All turbines, access roads, and ancillary facilities have been sited with landowner consultation to minimize the impact to current agricultural operations.

The overall conclusion is that this Project can be constructed, installed, operated, and decommissioned without any significant adverse net effects to the environment. Post-construction monitoring, including effects on wildlife such as birds and bats, will be undertaken to confirm this conclusion.

6. References

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Appendix A

Legal Descriptions

Appendix A. Legal Descriptions

E1/2 LT 14 CON 3 ROCHESTER; S/T R592569; LAKESHORE
LT 14 CON 3 WBR MAIDSTONE; LAKESHORE
PART E1/2 LOT 15 CON 2 ROCHESTER AS IN R1217577 EXCEPT PART 1 12R17023, PART 1 12R22436; LAKESHORE S/T R584083
PART LOT 11 CON 1 EBR ROCHESTER AS IN R1089257 EXCEPT PART 1 PL 12R18826, PARTS 1 & 2 PL 12R22701; LAKESHORE T/W R1089257
PART LOT 13 CON 2 ROCHESTER AS IN R730219; S/T RO12904 (SECONDLY); LAKESHORE SAVE & EXCEPT PT 1, PL 12R21570
PART LOT 13 CON 2 ROCHESTER AS IN R848747, R401246, R351846; LAKESHORE EXCEPT PARTS 1 & 2 PL 12R22923
PART LOT 13 CON 2 ROCHESTER AS IN R848748; LAKESHORE EXCEPT PART 1 PL 12R8261, PARTS 3,4 & 5 PL 12R22923
PART LOT 14 CON 2 ROCHESTER DESIGNATED AS PART 4 PL 12R22929; LAKESHORE
PART LOT 14 CON 2 ROCHESTER DESIGNATED AS PARTS 2 & 3 PL 12R22929; LAKESHORE S/T EASE AS IN R1353479; S/T EASEMENT OVER PT 2 PLAN 12R-23488 AS IN CE361014
PART LOT 16 CON 1 WBR MAIDSTONE DESIGNATED AS PART 1 PL 12R25133 TOWN OF LAKESHORE
PT LT 10 CON 1 EBR ROCHESTER AS IN R1461594 EXCEPT PT 1, 2 12R10422 S/T RESERVATIONS IN R1461594; LAKESHORE
PT LT 10 CON 1 EBR ROCHESTER AS IN R907237 E OF 12R731; LAKESHORE
PT LT 10 CON 1 EBR ROCHESTER AS IN R907237 W OF 12R731; LAKESHORE
PT LT 10 CON 1 WBR MAIDSTONE AS IN R1449854; LAKESHORE
PT LT 11 CON 1 EBR ROCHESTER AS IN R1089257 (SECONDLY) T/W R1089257; LAKESHORE
PT LT 11 CON 1 EBR ROCHESTER AS IN R1461598 S/T RESERVATIONS IN R1461598; S/T R596304; LAKESHORE
PT LT 11 CON 1 EBR ROCHESTER AS IN R239932 (FIRSTLY) E OF 12R732; TOGETHER WITH AN EASEMENT OVER PT 4 PL 12R732 AS IN R576151 TOWN OF LAKESHORE
PT LT 12 CON 1 EBR ROCHESTER AS IN R1438396 (FIRSTLY & SECONDLY) E OF 12R732 SURFACE RIGHTS ONLY; S/T INTEREST IN R1440664 S/T R1320371; S/T R584082, R592404; LAKESHORE
PT LT 12 CON 1 EBR ROCHESTER PT 2 12R2193 EXCEPT PT 1 12R10423 & PT 2 12R9385 T/W R974837; LAKESHORE
PT LT 12 CON 1 EBR ROCHESTER PT 4 TO 6 12R2193 T/W R974837; S/T R593850, R612857; LAKESHORE
PT LT 12 CON 3 ROCHESTER; PT W1/2 LT 13 CON 3 ROCHESTER AS IN R1368028 EXCEPT PT 1, 3 12R15742 * & R1463262; LAKESHORE; * EXCEPTION ADDED 2004/03/18 BY LAND REGISTRAR #99
PT LT 12 CON 4 ROCHESTER PT 2 12R4441 *EXCEPT PT 3, 12R6163; LAKESHORE; *AMENDED 2003/04/09 BY LAND REGISTRAR #7
PT LT 12 CON 4 ROCHESTER PT 3 12R6163; LAKESHORE
PT LT 13 CON 1 EBR ROCHESTER AS IN R1427353; LAKESHORE
PT LT 13 CON 3 WBR MAIDSTONE PT 1 12R5072, LAKESHORE AMENDED 2003/06/12 BY LO.
PT LT 13 CON 6 ROCHESTER PT 2, 3, 4 12R12185; S/T RO12896; LAKESHORE
PT LT 13-14 CON 2 WBR MAIDSTONE PT 3 12R6819, PT 4 12R11616; LAKESHORE
PT LT 13-14 CON 6 ROCHESTER AS IN R1471426 EXCEPT PT 1 12R10522; S/T RO12948; LAKESHORE
PT LT 14 CON 2 ROCHESTER DESIGNATED AS PT 1 12R22929 EXCEPT PT 1 12R23488; LAKESHORE; T/W OVER PT 2 PLAN 12R-23488 AS IN CE361014
PT LT 14 CON 4 ROCHESTER AS IN R363445 EXCEPT PT 1 12R8827; S/T R586339 SUBJECT TO AN EASEMENT IN GROSS OVER PTS 1 TO 6 INCL. PL 12R22393 AS IN CE232871 TOWN OF LAKESHORE
PT LT 15 CON 1 EBR DESIGNATED AS PT 1, PL 12R23519; LAKESHORE; S/T EASE OVER PT 1, PL 12R23519 AS IN CE336089
PT LT 15 CON 1 WBR MAIDSTONE AS IN R1076965 EXCEPT PT 1 12R10064 & PT 1 12R16024; LAKESHORE
PT LT 15 CON 3 ROCHESTER PT 2 12R17403; LAKESHORE
PT LT 15 CON 3 WBR MAIDSTONE PT 2 12R16047; LAKESHORE
PT LT 15 CON 3 WBR MAIDSTONE PTS 1, 6, 8, 12R16047; S/T R586347; LAKESHORE
PT LT 15 CON 6 ROCHESTER AS IN R1497330; LAKESHORE
PT LT 15-16 CON 1 EBR AS IN R197582, R304908 EXCEPT THE EASEMENT THEREIN, R329068 E OF 12R745, SAVE AND EXCEPT PT 7 ON PL 12R21271; LAKESHORE
PT LT 16 CON 1 EBR ROCHESTER AS IN R1285388; LAKESHORE
PT LT 16 CON 1 WBR MAIDSTONE PT 1 12R18794; LAKESHORE
PT LT 16 CON 2 WBR MAIDSTONE AS IN R200729; LAKESHORE
PT LT 16 CON 6 ROCHESTER AS IN R1337250; LAKESHORE
PT LT 16 CON 6 ROCHESTER AS IN R557326; LAKESHORE
PT LT 17 CON 3 ROCHESTER AS IN R1246715 EXCEPT PT 1, 2 12R13032; LAKESHORE
PT LT 17 CON 3 ROCHESTER; PT E1/2 LT 18 CON 3 ROCHESTER PT 1 12R2857; LAKESHORE
PT LT 17 CON 4 ROCHESTER AS IN R1019681; LAKESHORE
PT LT 17 CON 5 AS IN R923219, EXCEPT R06037, EXCEPT PT 1 PL 12R22440; LAKESHORE T/W R923219
PT LT 17-18 CON 4 ROCHESTER AS IN R1497325; LAKESHORE
PT LT 18 CON 4 ROCHESTER AS IN R1263596 EXCEPT PT 1 12R9723, PT 2 12R13292 S/T INTEREST IN R1263596; S/T SPOUSAL

INTEREST IN R994847; LAKESHORE
PT LT 18 CON 5 AS IN R895456 EXCEPT PT 1 ON PL 12R22734; LAKESHORE
PT LT 18 CON 5 ROCHESTER AS IN R1279878; LAKESHORE
PT LT 2 CON 5 TILBURY PT 1 12R6541; LAKESHORE
PT LT 3 CON 5 TILBURY AS IN R561792 EXCEPT PT 1 & 2, 12 R19517; LAKESHORE
PT LT 4 CON 5 TILBURY AS IN R1397214; LAKESHORE
PT LT 7 CON 1 WBR MAIDSTONE AS IN MB17670 W OF WEST BELLE RIVER ROAD; LAKESHORE
PT LT 7-8 CON 1 EBR ROCHESTER AS IN R1064568 EXCEPT PT 1 12R1620 AND PT 1, 2 12R12421 S/T DEBTS IN R526733 & R592793; LAKESHORE; T/W EASE OVER PT 2, PL 12R23010 AS IN CE297749
PT LT 8 CON 1 EBR ROCHESTER AS IN R1231949 S/T SPOUSAL INTEREST IN R1126529; S/T RO13985; S/T EXECUTION 94-00951, IF ENFORCEABLE SUBJECT TO AN EASEMENT IN GROSS OVER PTS 7 TO 15 INCL. PL 12R20292 AS IN CE36803 TOWN OF LAKESHORE
PT LT 8 CON 1 WBR MAIDSTONE PT 2 12R5407 EXCEPT PT 1 & 2 12R15099; LAKESHORE
PT LT 9 CON 1 EBR ROCHESTER AS IN R1460886 EXCEPT THE EASEMENT THEREIN; LAKESHORE
PT LT 9-10 CON 1 EBR ROCHESTER AS IN R1319795; S/T INTEREST IN R1540773; S/T R1379149; LAKESHORE
PT LT 9-12 CON 1 EBR ROCHESTER AS IN R217807, PT 1 TO 6 12R731, PT 1 TO 6 12R732, PT A, B 12R1992, PT 2, 3 12R725 EXCEPT PT 2 12R6799 S/T R579364, R578087, R578085, R573382, R576151, R628186, R576149, R573380, R217807 S/T INTEREST IN R576149, R576151, R5
PT N1/2 LT 1 CON 5 TILBURY; S1/2 LT 1 CON 5 TILBURY AS IN R1379710; LAKESHORE
PT N1/2 LT 10 CON SMR ROCHESTER AS IN R978316; S/T DEBTS IN R978316; S/T RESERVATIONS IN R978316; S/T RO14393; LAKESHORE
PT N1/2 LT 14 CON 5 ROCHESTER PT 2 12R8226; S/T RESERVATIONS IN R1296073; LAKESHORE
PT N1/2 LT 16 CON 4 ROCHESTER AS IN R993927 SUBJECT TO AN EASEMENT IN GROSS OVER PTS 17, 18 PL 12R22393 AS IN CE237659 TOWN OF LAKESHORE
PT N1/2 LT 4 CON 4 TILBURY AS IN R446563 EXCEPT R1463262, PT 1 12R15952; PT S1/2 LT 4 CON 4 TILBURY AS IN R257694 EXCEPT PT 1 12R10413; LAKESHORE
PT S1/2 LT 14 CON 5 ROCHESTER AS IN R1497331 (FIRSTLY); S/T RESERVATION R1497331; LAKESHORE
PT S1/2 LT 4 CON SMR ROCHESTER BEING PTS 4,5,6 AND 7 ON PL 12R25343;S/T AN EASEMENT OVER PT 5 ON PL 12R25343 AS IN R524109; S/T AN EASEMENT OVER PT 7 ON PL 12R25343 AS IN CE513916 TOWN OF LAKESHORE
PT S1/2 LT 7 CON SMR ROCHESTER AS IN R1404707; LAKESHORE