CONESTOGO WIND, LP

Conestogo Wind Energy Centre

Revised Project Description Report

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GENIVAR

Project No. MA-09-213-00

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1. Project Description Report

1.1 Proponent

The project has been developed by NextEra Energy Canada, ULC. The project will be owned and operated by Conestogo Wind LP, a wholly owned subsidiary of NextEra Energy Canada, ULC. The parent company of NextEra Energy Canada is NextEra Energy Resources, LLC, a global leader in wind energy generation with a current operating portfolio of over 9,000 wind turbines across North America. Wind farms currently owned and operated by NextEra Energy Canada include: Mount Copper, (54 MW) located in Murdochville, Quebec; and Pubnico Point, (30.6 MW) located near Yarmouth, Nova Scotia.

1.1.1 Project Contact

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1.2 Project Overview

NextEra Energy Canada is proposing a single Class 4 Wind Facility consisting of nine 2.3 MW wind turbines and one 2.22 MW turbine for a nameplate capacity of 22.92 MW in the area of Arthur, Ontario. This facility will convert wind energy into electricity to be fed into the Hydro One grid. The defined study area, presented as Figure 1 (Appendix A), covers approximately 2400 ha south of Arthur. The typical "footprint" of land used is approximately 0.6 hectares per turbine. The actual area occupied by turbines, roads, construction laydown area and transformer station for the Project is approximately 16.2 hectares in total. Most of the land in this area is rural farmland that is currently in active use growing crops such as beans, corn, and wheat and hay.

The proposed schedule is to have the units operating in summer 2012. Most of the land in this area is rural farmland that is currently in active use growing crops such as beans, corn, wheat and hay.

1.3 Project Location and Land Ownership

The project is located in Wellington County, west of Alma and south of Arthur in south-western Ontario on private lands with lease arrangements. The study area for the project is located in Mapleton Township, Wellington County. Figures 1 and 2 show the general area of the project. The area is generally bounded by:

- → Highway 6 to the north
- → Sideroad 18 to the east
- → Fourteenth Line to the south
- → Sideroad 16 to the west

The following coordinates (in UTM NAD 83, Zone 17N coordinate system) define the extremities of the Study Area for the project:

North-west (Sixteenth Line and Sideroad 16): Easting 532072 Northing 4850939

North-east (Sideroad 18 & Highway #6): Easting 538827 Northing 4851217

South-east (Sideroad 18 & Fourteenth Line): Easting 535618 Northing 4845818

South-west (Fourteenth Line and Sideroad 16): Easting 530734 Northing 4848555

The turbines will be located on privately owned farmland which has been optioned for the project. Some overhead electrical lines will be located in municipal road right of ways. The electrical substation will be located on privately owned land with lease arrangements.

1.3.1 Land Ownership and Parcel Description

The table below lists the legal description of the parcels which will be used for the proposed Conestogo Wind Energy Centre.

Ownership (Public or Private)	Parcel Description
Properties Located in Mapleton Township	
Private	CON 12 LOT 13
Private	CON 14 LOT 11
Private	CON 13 E PT LOT 13
Private	CON 13 LOT 3
Private	CON 13 LOT 12
Private	CON 12 PT LOTS 9,10
Private	CON 12 LOT 7
Private	CON 13 W PT LOT 14
Private	CON 15 S PT LOT 10
Private	CON 14 S PT LOT 4
Private	CON ABCR N PT LOT 9

1.4 Authorizations Required

It is anticipated that in addition to the Renewable Energy Approval (REA), the Conestogo Wind Energy Centre Project will need building permits from Mapleton Township. Permits from the Grand River Conservation Authority (GRCA) have been issued. A Land Use Proposal Submission Form will be filed with NAV Canada and an Aeronautical Obstruction Clearance Form will be filed with Transport Canada.

1.5 Description of Project Changes

In August of 2011, in response to public input, NextEra modified the December 2010 project location of the Conestogo Wind Farm. The proposed changes include the following:

1. Movement of access roads at turbines 7, 8 and 10;
2. Replacement of overhead collection line planned along 14th Line with an underground line across private land from turbine 9 to Sideroad 17 (near turbine 8); and,
3. Replacement of three sections of overhead transmission line along 16th Line and 12 Sideroad with underground line.
4. Relocation of meteorological tower near turbines 9 & 10.

The proposed changes outlined above are displayed in Figure 2,

1.6 Project Facility and Equipment

The major components of the projects are as follows:

→ Nine Siemens SWT 2.3-101 wind turbines

- → One Siemens SWT 2.22-101 wind turbines
- → Pad mount 690 V/ 34.5 kV step up transformers located at or near the base of each turbine
- → Buried 34.5 kV electrical collector system, and ancillaries
- → Buried and overhead 44 kV electrical lines
- → A transformer substation to connect to the Hydro One distribution system
- → Turbine access roads
- → Temporary staging areas for erection of wind turbines
- → 2 meteorological towers

1.6.1 Wind Turbines

The turbines will be located on leased farmlands (currently under option). The proposed turbines for the project are state-of-the-art 2.3 MW and 2.22 MW turbines supplied by Siemens AG. The turbines are 3-bladed, upwind, horizontal-axis wind turbines with a hub height of 80 meters, with a 101 meter rotor diameter. The overall height of the turbine, including the blade length will be approximately 129 meters.

The nacelle at the top of the tower houses the generator, gearbox, bearings, couplings, rotor, and auxiliary equipment. The nacelle consists of a bedplate on which all of the electro-mechanical components are mounted surrounded by an enclosure. The nacelle is constructed of fibreglass, lined with sound-insulating foam, and is ventilated and the interior is illuminated with electric lights. The blades are constructed of fibreglass and epoxy resin. The tower is tubular steel, with a diameter of approximately 4.3 m at the base. An internal ladder is provided for maintenance access. Some of the wind turbines will have external lighting in accordance with the requirements of Transport Canada and Navigation Canada. For technical details please refer to the Wind Turbine Specifications Report.

1.6.2 Electrical System

The turbines will connect to the Hydro One distribution system. The power is generated at approximately 690 V voltage level at the turbine and will step up to a local 34.5 kV collection system through a pad-mounted transformer with anti-vandalism protection. The approximate dimensions of these transformers are 2.5 meters in length and width, and 2 meters high. The transformers are totally self-contained with no need for exterior fencing.

Buried cables will connect the wind turbines to the transformer substation. The buried cables will be three single conductor cables, with cross-linked polyethylene insulation, suitable for direct burial.
The electrical substation for the Project will be located west of Sideroad 17 south of Sixteenth Line. The substation will consist of a 34.5 kV/44 kV transformer and associated ancillary equipment. A 44 kV electrical line will be utilized to connect the transformer to the Hydro One distribution system. The 44 kV electrical line will be a combination of above ground (using standard poles within municipal road right-of-ways) and buried cable, see Figure 2. There are some existing Hydro-One and other utilities present in these road right-of-ways. In some cases, where the line is overhead, there will be some joint use poles with wind project electrical lines and Hydro One electrical lines. Typically, each pole is between 13 m and 17 m in height. The buried cables will be three single conductor cables, with cross-linked polyethylene insulation, suitable for direct burial.

1.6.3 Access Roads

On-site access roads to each turbine will be constructed to provide an access point to the properties for equipment during the construction phase. Following completion of the construction phase, the access roads will be used for maintenance access for the duration of the facility.

1.6.4 Communications and SCADA

It is proposed to provide SCADA functions for remote supervisory monitoring and control. This will include telephone communications lines leased from the local telephone provider for transfer trip (communication with Hydro One) and supervisory functions.

1.7 Renewable Energy Generation Facility Class

This project is classified as a Class 4 Wind Facility.

2. Project Activities

The project will be composed of the following general activities:

1. Land acquisition;
2. Planning and Resource Assessment
3. Permitting
4. Detailed Design
5. Construction
6. Operations
7. Decommissioning

Details on the Design and Operations phases are detailed in the "Design and Operations Report", details on the Construction Phase are detailed in the "Construction Plan Report" and details on the Decommissioning phase are detailed in the "Decommissioning Plan Report".

2.1 Construction Activities

2.1.1 Surveying and Geotechnical Study Activities

Surveys will be required to locate the turbines, crane pads, access roads, electrical lines and the substation. Crews will drive light trucks to reach sites primarily using existing roads. They will then walk the site for the surveying and mark the locations using stakes. For the wind farm site, the surveys will typically take 1 to 2 days per property.

Existing buried infrastructure located on public property will be located using the Ontario One Call service and buried infrastructure located on private property will be located by private contractors prior to construction or geotechnical sampling and updated throughout construction, as required.

Geotechnical sampling will also be required.

Any archaeological sites, as identified in the Archaeological Assessments undertaken (Appendix E), will be clearly marked off with signage and appropriate setbacks. All personnel working on or entering the construction area will be instructed to avoid these identified areas.

2.1.2 Roads and Land Clearing

No permanent paved roads will need to be constructed for the turbines. Municipal and provincial roads will be used for transportation of equipment to the construction sites. Minor modifications may be required to some of the existing roads (for example, widen the turning radius, upgrade culverts) for equipment transportation. Portions of Sideroad 17 between Sixteenth Line and Fourteenth Line will need to be upgraded. This will involve the widening of the road to 11 m wide. Any road damages will be repaired and any road improvements will be left in place.

On-site access to the turbines will require approximately 4 km of new access roads (see Figure 2). Following completion of the construction phase, the access roads will be used for maintenance activities (i.e., inspection of the turbines) at the turbines for the duration of the project. Typically these will be 11 m wide during the construction phase for access by the large cranes (with an additional 2 m clearance on each side for travel), and afterwards reduced to 6 m wide during the operating phase. The road length will be different for each turbine according to its location.

The construction of the road typically requires excavation of the top soil layer and addition of a layer of compacted material to a typical thickness of 300 to 600 mm (depending upon site specific geotechnical conditions). Clean granular material (typically "A" or "B" gravel) will be brought to the site on an as need basis and will not be stockpiled onsite. The topsoil will be kept and re-used on site. New culverts may be required to maintain drainage in ditches at junctions with roadways and these will be constructed sufficient to support the construction equipment and delivery trucks.

Temporary crane paths will also be constructed. These will be 11 m wide and constructed as the other roads described above. Once the construction activities have been completed, the granular base will be removed and distributed to the landowners, if desired, or removed from the site and disposed of in an approved and appropriate manner. The disturbed area will have the topsoil replaced from stockpiled material and will be reseeded in consultation with the landowner.

Equipment will include—at a minimum—trucks, graders, and bulldozers. The access road to each turbine will typically require one to three days of construction time.

2.1.3 Construction Laydown Area

A 10 acre fenced site will be constructed for the temporary storage of construction material (no turbine components). The location of this facility is shown in Figure 3. The topsoil at the Construction Laydown Area will be removed and approximately 600 mm of clean compacted crushed gravel will be imported on an as needed basis. The excavated topsoil will be re-used on site as feasible.

Equipment will include—at a minimum— cars, trucks, graders, and bulldozers.

2.1.4 Turbine Site and Crane Pad Construction

Prior to construction, the construction area will need to be cleared and grubbed. In order to provide sufficient area for the lay-down of the wind turbine components and its assembly, a 101 m diameter area around the wind turbine must be cleared (see Figure 5) levelled and be accessible during the construction phase. The topsoil is typically removed and some engineered fill material may need to be added depending upon site specific geotechnical conditions. Where the site laydown areas are close to watercourses, erosion control measures will be used.

During clearing or excavation activities if any significant archaeological resources are found to be in conflict with the proposed facilities, then consideration will be given to modifying the location of the construction. This will be determined in consultation with the Ministry of Tourism and Culture, archaeologists and Aboriginal communities, where applicable.

Crane pads will be constructed at the same time as the road and will be adjacent to the turbine location. The crane pads will typically be 15 m x 35 m in size. The topsoil at the crane pad will be removed and approximately 600 mm of clean compacted crushed gravel will be imported on an as needed basis. The excavated topsoil will be re-used on site as feasible. Once the turbine erection is complete, the crane pad will be removed and will be restored to prior use.

Construction equipment typically includes trucks, graders, and bulldozers.

2.1.5 Delivery of Equipment

Equipment will be delivered by truck and trailer as needed throughout the construction phase and stored at temporary lay-down sites surrounding each turbine (see Figure 5). These deliveries will occur during

normal construction hours, typically 8 am to 5 pm and may include weekends. A traffic management plan will be developed using MTO Book 7 standards.

2.1.6 Turbine Foundations

A backhoe will be used to excavate an area approximately 3 m deep x 20 m x 20 m with the material being stockpiled for future backfilling. Stockpiled material will have topsoil and subsoil separated out and surplus excavated material will be removed from the site for disposal in an approved manner. The foundation, with an approximate footprint of 200 m^2, will be constructed using a wooden frame and poured concrete reinforced with steel rebar to provide strength. After construction the foundation will be backfilled using the stockpiled material and the surface will be landscaped for drainage. The only surface evidence of the foundation will be a small protrusion of concrete to which the tower is attached. Land will be able to be cultivated within a few meters of the turbine. An environmental monitor will be on-site during foundation excavation.

Typical construction equipment, on a per turbine basis, will include:

- Excavator for removing material;
- Flatbed trucks (4-6) for delivery of rebar, turbine mounting assembly and forms;
- Truck mounted crane or rough terrain forklift for unloading and placement of rebar and forms;
- Concrete trucks for delivery of concrete (30-40 loads);
- Construction trucks (3-4 vehicles with multiple visits); and
- Dozer, loader and trucks to backfill and compact foundation and remove surplus excavated materials.

2.1.7 Wind Turbine Assembly and Installation

Ten turbines are to be constructed, each with an 80 m hub height and 101 m rotor diameter. Turbine components will arrive on-site using flat bed and other trucks and will be temporarily stored on-site in the immediate vicinity of the base prior to assembly. Typically two cranes will be used to install the turbines. The larger crane is usually crawler type with a capacity of 400 tonnes or larger, and is used for the higher lifts. The nacelle, at approximately 82 tonnes, is the heaviest lift and the rotor, with a diameter of approximately 101 m, is the most challenging lift.

Clearing and grubbing will be required as described in section 2.2. The erection cranes and crew will follow the foundation crew and erect the wind turbines once the foundations are completed and the concrete has set. This will typically be in five lifts (three for the towers, one for the nacelle and one for the rotor) over a period of 2-3 days. The lower tower sections may be installed several days before the upper tower sections and the turbine to optimize installation sequence. The lower tower section will also include electrical and communications equipment. Total turbine assembly and installation will typically require 4-5 days at each turbine site. Fifteen to twenty people may be required at the site during the turbine installation; they will be transported using light duty vehicles.

The larger track mounted crane can move from turbine site to turbine site however it will need to be disassembled to move it across roadways and to move it to and from the project site.

Packing frames for the turbine components are returned to the turbine vendor. Following commissioning, the surrounding area will be returned to normal agricultural use.

2.1.8 Electrical Collector System

The electrical collector system will consist of pad mounted transformers and underground cabling for use on private property.

Pad mount transformers (690 to 34.5 kV): A concrete transformer pad will be installed at each turbine at the same time as the turbine base installation. The construction will consist of excavation, soil storage,

installation of buried electrical grounding grid, installation of the concrete pad, installation of the transformer, and electrical connections. Transformer installation and cabling between the turbine and transformer is expected to take three days per turbine. Flatbed trucks will be used to transport the equipment to site, and a truck-mounted crane will likely be used for the installation.

Underground Cabling: 34.5 kV power cables and fibre optics lines (for communications) will be direct buried from each turbine to the collection system. The excavated soil will be stored temporarily and then reused as backfill. Power conductors will be approximately 0.9 m below grade and the location will be marked. The requirements for the underground cabling have been discussed with the landowners and are acceptable to them. It is anticipated that 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.

2.1.9 Horizontal Directional Drilling

In the specific case noted in the Environmental Impact Assessment Report, an electrical cable will need to be installed using horizontal drilling to minimize impacts on the watercourses. Erosion control devices will be installed at the drill location and drill cuttings will be collected and removed from the site for disposal in an approved and appropriate manner.

An entrance and exit pit will be excavated on either side of the obstacle to be bored under. The directional drilling equipment is then set up at the entrance pit and a drill bit attached to rod segments which is advanced until it reaches the exit pit. A slurry of bentonite and/or polymer is mixed with water and is injected into the hole while drilling to help stabilize the bore hole and reduce friction. Once the drill bit has reached the exit pit the drill bit is removed and a “reamer” is attached and pulled back through the hole to enlarge the bore by 120-150%. The electrical cable will then be installed through the hole.

Typical equipment will include a directional drilling rig and 2-3 support trucks to carry drilling rods, drilling supplies and cable.

2.1.10 Substation

The electrical substation for the wind farm will be located on private property on the west side of Sideroad 17 south of Sixteenth Line. The substation equipment will include an isolation switch, a circuit breaker, a step-up power transformer (34.5 to 44 kV), switch gear, instrument transformers, grounding and metering equipment. It will be surrounded by a chain link fence with a locked gate to permit authorized entry and required signage. Substation grounding will meet the Ontario Electrical Safety Code. The substation area will be gravelled with clean material imported to the site on an as needed basis and sloped to facilitate drainage. A secondary containment system, consisting of a 0.25 m high concrete berm, will be installed around the transformer in the event of an oil leak to prevent any soil contamination.

During the construction of the substation, topsoil and sub-soils will be stripped and stockpiled separately. Stripped topsoil and sub-soil will be replaced in the temporary storage facility area and topsoil stripped from the substation area will be distributed on other project properties.

2.1.11 Electrical Transmission Line

A 44 kV line will be utilized to connect the transformer to the Hydro One and will be a combination of above ground (using standard poles within municipal road right-of-ways) and buried cable, see Figure 2. The proposed routing of the line is shown in Figure 2. Some portions of the system may be joint use poles (i.e. carrying electrical lines for the project as well as existing Hydro-One lines).

Installation of Poles: Holes are typically augured in the ground using a truck mounted auger device. The poles are then inserted using special cranes to a typical depth of 1 to 2 m below grade. The poles are then “dressed” (made ready to accept conductors) using a boom truck. Typically, one crew will install the poles and one crew will dress them. Twelve to sixteen poles can be installed and dressed in one day. Once the poles are in place and dressed, cables are strung in place using boom trucks and special cable reel trucks. In the case of shared lines, the new 34.5 kV lines will be first strung in place, and then the existing lines will be moved over by Hydro One. Finally, the existing poles are removed. Typically, there is minimal interruption to traffic during the installation of these lines.

Where the cable is to be buried the underground cabling: 34.5 kV power cables and fibre optics lines (for communications) will be direct buried. The excavated soil will be stored temporarily and then reused as backfill. Power conductors will be approximately 0.9 m below grade and the location will be marked. The requirements for the underground cabling are being discussed with the Township of Mapleton.

2.1.12 Permanent Meteorological Towers

Two permanent meteorological towers are proposed for the Conestogo Wind Energy Centre, with the locations shown in Figures 3 and 4. These will be a monopole structure 50 m in height. The tower will be erected using winches and secured with 4 guy wires tied off to anchors or a small monopole foundation. No significant soil or vegetation disturbance is anticipated.

2.1.13 Clean-up and Reclamation

Waste and debris generated during the construction activities will be collected and disposed of at an approved facility. All reasonable efforts will be made to minimize waste generated and to recycle materials, including returning packaging material to suppliers for reuse/recycling. During construction industry best practices for spill prevention will be utilized. In the unlikely event of a minor spill this will be cleaned up immediately and any impacted soils will be removed from site and disposed of at an approved and appropriate facility. At the conclusion of construction, vehicles and construction equipment will be removed from the site.

Stripped soil will be replaced and re-contoured in the construction areas and disturbed areas will be re-seeded, as appropriate. Erosion control equipment will be removed once inspections have determined that the threat of erosion has diminished to the original land use level or lower.

High voltage warning signs will be installed at the transformer substation and elsewhere, as appropriate.

2.1.14 Turbine Commissioning

Turbine commissioning will occur once the wind turbines and substation are fully installed and Hydro One is ready to accept grid interconnection. The commissioning activities will consist of testing and inspection of electrical, mechanical and communications systems.

A load bank system will be used in the commissioning of the turbine generators. This will consist of two (2) - 1500 kW generators which will be located temporarily at the substation. The generators will be used for approximately 1 week for 12 hours a day during the commissioning phase. As the generators will be leased and only on site for a short period of time, they will come with a mobile Certificate of Approval issued to the generator owner.

2.2 Operation Activities

2.2.1 General

The wind farm will require full time technical and administrative staff to maintain and operate the facility. It is expected that 2-3 full time workers will be required to keep the facility operating properly. The primary workers will be wind technicians who carry out maintenance on the turbines, along with a site supervisor.

The wind turbines should be operating when the wind speed is within the operating range for the turbine and there are no component malfunctions, the turbine will be in “Run” mode and generating electricity. Typically turbines generate electricity 65-75% of the time.

Each turbine has a comprehensive control system that monitors the subsystems within the turbine and the local wind conditions to determine whether the conditions are suitable for operation. If an event occurs which is considered to be outside the normal operating range of the turbine (such as low hydraulic pressures, unusual vibrations or high generator temperatures), the wind turbine will immediately take itself out of service and report the condition to the SCADA system. A communication line connects each turbine to the operations centre, which closely monitors and, as required, controls the operation of each turbine.

2.2.2 Use of Meteorological Data

The use of meteorological data is key to the safe and efficient operating of a wind farm. The Conestogo Wind Energy Centre is proposing to have 2 permanent meteorological towers providing real time data. This will be used to operate the turbines efficiently. Some operational decisions made using meteorological data include:

- → Cut-in wind speed at 3.5 m/s
- → Cut-out wind speed at 25 m/s
- → Turbine shut down during icing conditions
- → Turbine shut down during extreme weather events

2.2.3 Routine Turbine Maintenance

Routine preventative maintenance activities are scheduled at six-month intervals with specific maintenance tasks scheduled for each interval. Maintenance is done by removing the turbine from service and having 2-3 technicians climb the tower to carry out maintenance activities.

Consumables such as the various lubricants used to keep the mechanical components operating and oil filters for gearboxes and hydraulic systems are used for routine maintenance tasks. Following all maintenance work on the turbine, the area is cleaned up. To ensure a safe operating environment, safe footing for all personnel and to minimize the risk of fire, turbines are kept very clean. All items left in the turbine are packed and secured. All surplus lubricants are removed and disposed of in a prescribed manner. All maintenance activities will adhere to the same spill prevention industry best practices undertaken during the construction phase.

2.2.4 Unplanned Turbine Maintenance

Modern wind turbines are very reliable and the major components are designed to operate for approximately twenty-five years. However, wind turbines are large and complex electromechanical devices with rotating equipment and many components. Component failures occasionally occur despite the high reliability of turbines in general. Technicians always service machines in pairs according to safety protocols and repairs can usually be carried out in a few hours.

Events involving the replacement of a major component such as a gearbox or rotor are not typical. If they do occur, the use of large equipment, sometimes as large as that used to install the turbines, is required.

It is possible that an access road, built for construction and returned to farmland when the construction phase is completed, would need to be rebuilt to carry out repairs to a damaged turbine. Typically only a small percentage of turbines would need to be accessed with large equipment during their operating life.

2.2.5 Electrical System

The collector lines and substation will require periodic preventative maintenance activities. Routine maintenance will include condition assessment and protective relay maintenance of the substation as well as vegetation control.

2.2.6 Stray (or Tingle) Voltage

The Conestogo Wind Energy Centre project will be connecting to the local distribution system, owned and operated by Hydro One Networks Inc. Stray voltage occurs when there is a voltage potential difference between grounded equipment and the customer neutral from the electrical distribution supply at a customer connection. When this Neutral to Earth Voltage (NEV) exists then there can be a voltage difference between ground at various locations on the customer's facilities due the currents flowing from the distribution system neutral to the ground. At a voltage difference above about 10 volts people may detect a tingle. Hydro One has a standard for how they will deal with stray or tingle voltage complaints. Rarely are these a health hazard and many things can be done by the supply utility (Hydro One) and the

customer to address the complaints. Livestock such as dairy cattle are sensitive to these small tingle voltages that are not a health hazard to humans. The local distribution company is responsible for addressing stray voltage concerns.

2.3 Decommissioning Activities

2.3.1 Procedures for Dismantling

If the facility is to be decommissioned and the turbine is to be removed at the end of its life, the impacts will be similar to the construction phase, but in reverse sequence. The potential environmental impacts and mitigation measures will be the same as those detailed in the Construction Plan Report, please refer to this report for details. The procedures will include:

1. The creation of temporary work areas. In order to provide sufficient area for the lay-down of the disassembled wind turbine components and loading onto trucks, and approximately 50 m x 50 m must be cleared, levelled and made accessible. The topsoil will be removed and some material may need to be added;
2. The creation of crane pads. The crane pads will typically be 15 m x 35 m in size. The topsoil at the crane pad will be removed and approximately 600 mm of compacted crushed gravel will be added. Once the turbine disassembly is complete, the gravel area around each turbine will be removed and the area will be restored to prior use using stockpiled topsoil;
3. The use of cranes to remove the blades & hub and tower segments;
4. The use of trucks for the removal of turbines, towers and associated equipment;
5. Foundations will be left in place. The top 1 m will be removed and replaced with clean fill and stockpiled topsoil. This will be contoured to allow cultivation in the case of agricultural lands;
6. Roads will be removed unless the landowner requests that they be left in place. Road bedding material will be removed and replaced with clean sub- and top-soil for reuse by the landowner for agricultural purposes. If requested by the landowner, the roads will be removed and the land will be contoured to maintain the current drainage patterns;
7. Decommissioning of electrical lines. Underground electrical lines will be cut, the ends buried to 1 m below grade, and left in place. These lines are inert and will have no negative impacts on the environment, soil and cultivation practices. Above ground lines and poles that are not shared with Hydro-One will be removed and the hydro pole holes will be filled with clean fill; and
8. The Substation will be demolished. These will be decommissioned in a manner appropriate to and in accordance with the standards of the day. All materials will be recycled, where possible, or disposed offsite at an approved and appropriate facility.

2.3.2 Land Restoration Activities

Once the equipment has been removed the land will be restored to its previous agricultural capacity. This will be accomplished by removing the foundations (or part of foundation), granular material from roadways and culverts, depending on the landowner preference. Agricultural capacity will be restored and the land re-contoured to maintain proper drainage. Preferentially, this will be accomplished using stockpiled subsoils and topsoil. If there is insufficient material onsite, topsoil and/or subsoil will be imported form a source acceptable to the landowner.

Although strict spill prevention procedures will be in place, there is the potential through the routine maintenance of the turbines, operation of the substation and/or decommissioning process for small spills of solvents or fuels. The soil conditions of the turbine areas will be surveyed to the standards of the day to determine if any impacts have occurred. Should soil impacts be noted, the impacted soils will be delineated, excavated and removed, to the standards of the day, from the site for disposal at an approved and appropriate facility. The removed soils will be replaced with stockpiled sub- and topsoil, if available. If none are available, clean fill and topsoil will be imported.

2.3.3 Waste Disposal

As discussed above, the waste generated by the installation, operation and decommissioning of the wind farm is minimal, and there are no toxic residues. Any wastes generated will be disposed of according to standards of the day with the emphasis of recycling materials whenever possible.

2.4 Emissions to the Environment

2.4.1 Air Emissions

No air emissions requiring approval will be generated from either the construction, operation or decommissioning phases. Some vehicular emission will be generated by heavy machinery during the construction and decommissioning phases however these will be minor in nature. During the commissioning of the load bank, leased generators will be used for a period of approximately 2 weeks (see section 2.1.14). These generators will operate under a mobile C of A obtained by the generator owners. There may also be some minor welding taking place on site which will result in some minor local air emissions. In order to minimize these air emissions the contractor will be required to minimize idling of equipment and, where feasible, welding will take place during the fabrication stage prior to arriving on site.

2.4.2 Liquid Waste

Only minimal amounts of liquid waste will be generated during the construction, operation and decommissioning phases. This liquid waste will be comprised mainly of sewage. As no staff will be onsite on a permanent basis and no operations building will be built, the liquid waste will be managed using portable toilet facilities. Any liquid waste generated will be disposed of offsite by a licensed contractor.

It is possible that small amounts of other liquid wastes such as grease, gearbox oil and/or paint may be generated during regular maintenance activities of the turbines. These wastes will be temporarily stored in spill proof containers with secondary containment until they can be removed from the site by a licensed contractor and disposed of at an approved and appropriate facility.

During decommissioning liquid waste will be limited to sewage, gearbox oil and potentially transformer oil. The transformer oil will be non-hazardous (no PCBs) and will be drained and recycled offsite by a licensed third party contractor and an approved and appropriated facility.

2.4.3 Solid Waste

Solid waste will be generated during the construction, operation and decommissioning phases. During the construction this will primarily be packing material, scrap metal and wiring and domestic type waste generated by the construction staff. The waste will be separated into recyclables (metals, wood, paper and plastics) and non-recyclables and disposed of by a licensed third party contractor and an approved and appropriated facility.

During the operational phase of the project solid waste generation will be minimal and will be generated during maintenance activities. The waste will be similar to construction waste and will be composed of packing material, scrap metal, wiring and some domestic type waste. The waste will be separated into recyclables (metals, wood, paper and plastics) and non-recyclables and disposed of be a licensed third party contractor and an approved and appropriated facility.

Decommissioning activities will potentially generate greater amounts of waste at the end of the project life. Wherever possible project equipment including turbines, towers and transformers will be sold or re-used on another site. Potential waste includes: turbines, electrical equipment, scrap metal (from the towers), wiring, fencing, concrete from the turbine base and gravel from the road construction. The waste generated during this phase will be separated into recyclable, non-recyclable and hazardous as per the regulations and industry best practices of the day. This would be disposed of by a licensed third party contractor and an approved and appropriated facility.

2.4.4 Hazardous Waste

It is not anticipated that any significant amounts of hazardous wastes will be generated and NextEra Energy Canada will attempt to procure non-hazardous alternatives whenever possible. Potential hazardous material will likely be limited to spent welding rods and used batteries. These items, if generated, will mainly be generated during the construction and decommissioning phases but some may be generated during the operational phase. No non-emergency vehicle maintenance will be permitted on the site and therefore no spent motor oil, anti-freeze or filters will be generated onsite. All hazardous wastes will be stored temporarily onsite in appropriate, clearly marked containers until the end of the construction or decommissioning phase and then disposed of by a licensed third party contractor and an approved and appropriated facility. Hazardous wastes generated during maintenance activities will be removed from the site at the conclusion of that particular activity and not be stored onsite.

2.4.5 Stormwater

The facility will be designed to maintain current drainage patterns and it is not anticipated that stormwater management facilities will be required. Upon the complete of construction activities the laydown areas will be removed and restored to the previous condition. Crane paths will be removed or reduced to the width access roads, from 11m wide to 6 m wide. The land not utilized for access roads will also be restored to its pre-construction condition.

2.4.6 Water Taking Activities

There will be no permanent operations building onsite and no water taking will be required. Should water be required onsite during the construction, operations or decommissioning, it will be imported to the site.

2.4.7 Dust

It is anticipated that some dust will be generated during construction and decommissioning activities. As disturbed land will be restored to its pre-construction condition it is not expected that dust will be generated during operation. During construction and decommissioning dust will be mainly generated by vehicle traffic over gravel roads and/or cleared areas. To minimize this vehicle speeds will be limited and other mitigation measures, such as wetting of roads and suspension of work during high winds, may be employed if deemed necessary.

3. Potential Environmental Effects

3.1 Heritage and Archaeological Resources

Construction of the Conestogo Wind Energy Centre will result in the installation of 10 turbines, one transformer sub-station, a temporary construction laydown yard and access roads and crane paths. As such, construction has the potential to disturb archaeological resources, should they exist on the site. A preliminary desktop (Stage 1) Archaeological study has been completed with the following major findings:

- There are no recorded archaeological sites in the subject area;
- There are no protected properties or heritage resources in the vicinity of the site; and
- The study area contains numerous watercourses and has a history of extensive agricultural use; therefore a Stage 2 field survey is recommended.

A field (Stage 2) archaeological survey is partially completed and will be fully completed on all lands to be disturbed prior to construction with the results presented in Appendix E. Two find sites, a pre-contact aboriginal find site and one historic period archaeological site were identified during the survey and the facility design was altered to avoid these sites. Further Stage 2 work on all un-assessed project lands which may be disturbed during construction as well as Stage 3 and Stage 4 as required, will be completed prior to project construction. Should any archaeological resources be found the facility may be

altered to avoid these sites or the find sites will be excavated in accordance with the Ministry of Culture Guidelines. After completion of these activities, the construction, operation and decommissioning of the proposed wind farm is not anticipated to have any impact on Heritage and Archaeological Resources.

3.2 Natural Heritage and Water Features

A desktop review and field inspection of natural features has been completed and the site has several natural and water features in the vicinity. These include residual woodlots along the rear of the lots, two creeks crossing the study area and several small pockets of wetlands. An evaluation of Significance within the *Records Review and Natural Heritage Evaluation Ontario Regulation 359/09* (Appendix B) and the *Water Report* (Appendix G) shows that there are 4 turbine locations (turbines 4, 7, 8 and 9) where the mapping indicates the location of roads and/or turbines may be within 120 m of a significant woodlot, significant wetland, watercourse or significant wildlife habitat. Environmental Impact Assessments were conducted and a summary can be found in the *Environmental Impact Assessment* Report with full details contained in the *Records Review and Natural Heritage Evaluation Ontario Regulation 359/09* (Appendix B) and the *Water Report* (Appendix G).

Field surveys identified a two Species at Risk, a Butternut Tree located in a residual woodlot and observations of Bobolinks were noted. As construction will maintain approximately a 99 m setback from this woodlot, (greater than the 20 m recommended by the MNR),no negative impacts are anticipated ion the butternut tree.

Avifaunal surveys conducted in 2007 and 2010 shows that very few Bobolinks were found near the turbine site locations (8 birds in 2007 and 4 birds in 2010). The closest Bobolink habitat to a turbine was about 300 metres and other suitable habitat was greater than 1500 metres from any of the turbines. Interviews with the landowners indicate that the crop types that attract Bobolinks will not be planted in the fields where the turbines will be placed. Hence, the Conestogo Wind Farm will not have an impact on local Bobolinks.

3.3 Air, Odour, Dust

The project is a Class 4 wind project and will not emit any air or odour emissions beyond those described in section 2.4.1. Some dust is expected to be created during construction and decommissioning. Further discussion of the potential effects and mitigation measures is included in section 2.4.7.

3.4 Noise

The project proposes installing 10 turbines and one transformer substation. Each of these will emit sound. Noise modeling in accordance with MOE standards has been completed and all standards have been adhered to. In addition, all turbines will be >550 m from the nearest non-participating noise receptor.

3.5 Land Use and Resources

The construction, operation and decommissioning of the proposed wind farm is not expected to affect land use and resources. According to the Ontario Oil, Gas & Salt Resources library there are no oil or gas wells in near the study area. There are no identified aggregate resources or landfills in the vicinity of the site. The surrounding properties consist of “agricultural” designation and any forest in the vicinity is on private land and not available for public use.

3.6 Provincial and Local Infrastructure

The construction, operation and decommissioning of the proposed wind farm is not expected to negatively affect provincial or local infrastructure. Some increase in local traffic will occur during construction and decommissioning activities. Consultations are underway with the local and regional municipalities to ensure that any disruptions and road impacts are minimal.

In order to install and decommission the turbines, some road improvements to a portion of Sideroad 17 between Sixteenth Line and Fourteenth Line will likely be required. This will likely consist of the widening of the road and the upgrading of 2 culverts which will be a net benefit to the local municipality.

3.7 Public Health and Safety

The construction, operation and decommissioning of the proposed wind farm is not expected to significantly affect public health and safety. The turbine locations will adhere to all setback requirements including those to preserve public safety including setbacks from roads, property lines and residences. All electrical equipment will be designed and installed in accordance with the Electrical Safety Authority standards and will be equipped with proper safety signage and the transformer substation will be surrounded by a fence to prevent public and large animal access. Some individuals may occasionally find the sound from wind turbines under certain operational conditions to be somewhat annoying.

3.8 Areas Protected under Provincial Plans and Policies

The project will not impact any lands under Provincial Plans and Policies. The site is not located in an area covered by: the *Greenbelt Act* or plan; The Oak Ridges Moraine Conservation Plan Area; The Niagara Escarpment Plan Area; or The Lake Simcoe Watershed Plan.

3.9 Other Potential Effects

Table 1 presents a summary of potential effects, potential mitigation strategies and any anticipated residual effects. A detailed Environmental Effects Monitoring Plan has been included in the Design & Operations Report which details how construction and operational activities will be monitored to ensure no residual effects are observed.

Project Activity	Potential Impacts	Mitigation Strategy	Residual Impacts
Construction Activities			
1.1 Construction Activities	Disturbances to wildlife & birds due to construction activities	○ Adherence to woodlot, wetland and watercourse setbacks ○ Minimal time required to complete activities	○ None Anticipated
	Clearing and grubbing and soil excavation for on-site access roads, crane pads and turbine	○ Site clearing and grubbing will be kept to a minimum area on-site by staking and marking off the areas that define limits of the work to be done ○ Excavated soil will be re-used on-site where feasible, or disposed of in a proper facility off-site ○ Cropland sites will be covered with stockpiled topsoil for reseeding during the following planting season with similar crops to previous year ○ Vegetation restoration at water crossings	○ None Anticipated
	Impacts to surface water features from construction of on-site access roads to the turbines	○ Adherence to setbacks ○ Project designed to eliminate any new surface water crossings ○ Work completed during the dry season ○ Completed permitting process with the GRCA ○ Proper sizing and installation of culverts ○ Have roads match land contours where possible ○ Stabilization of disturbed surfaces to prevent erosion ○ Installation of light duty sedimentation fencing installed around work area during construction ○ Horizontal Directional Drilling for the installation of electric cables under watercourses	○ None Anticipated

Project Activity	Potential Impacts	Mitigation Strategy	Residual Impacts
	Impacts to surface water features from construction of underground transmission line.	○ Implement an erosion and sediment control plan as noted in Section 1.2.1 of the Revised Environmental Impact Assessment Report. ○ Schedule grading to avoid times of high runoff volumes (spring and fall). ○ Store any stockpiled materials and refuelling materials away from the feature to prevent substances from inadvertently entering the feature. ○ Keep sediment and erosion control measures in place until disturbed areas have been stabilized.	○ None Anticipated
	Potential short term lane and/or road closures on local roads to provide room for trucks to deliver project components. Short term increase in truck traffic during construction period	○ Delivery of equipment will be coordinated with local traffic patterns ○ Traffic control plan will be developed	○ Minor traffic delay
	No known archaeological resources are present at proposed turbine or access road sites. However, during excavation archaeological resources may be discovered.	○ If archaeological resources are noted, the roads or turbine locations will be moved to avoid these ○ If practical, the resources will be removed and catalogued in accordance with Ontario Ministry of Culture guidelines	○ None Anticipated
	Fuel or transformer oil spill	○ Small quantities of lubricants are present in the turbine ○ Any leak or spills from trucks or machinery would be contained and site would be properly cleaned up and disposed of at registered disposal facilities ○ Transformers used in the project are silicone based and do not contain hydrocarbons ○ Refuelling of all vehicles and equipment will be done away from watercourses during construction and no re-fuelling on-site during operation phase	○ None Anticipated

Project Activity	Potential Impacts	Mitigation Strategy	Residual Impacts
	May experience annoyance with dust and/or noise	○ Dust suppression measures will be employed, as necessary ○ On site supervisor to address any noise complaints	○ Minor short-term annoyances
Operational Activities			
2.1 Wind Turbine Operation	Less than 1,000 square metres or 0.25 acres of farmland used for each turbine & on-site access road	○ Minimal amount of land used & minimized length of on-site access roads, most agricultural use interrupted only during construction	○ None Anticipated
	Reduction in aesthetic quality of landscape	○ Complaints Tracking ○ Adherence to noise setbacks will site turbines away from residents	○ None Anticipated
	Noise impacts on receptors (residents located on non-lease properties)	○ Adherence to noise setbacks ○ Noise modelling to predict sound levels ○ Repair equipment in a timely manner	○ Minor irritation to some residents ○ Some individuals may occasionally find the sound from wind turbines under certain operational conditions to be somewhat annoying
	Disturbances (including death) to wildlife & birds due to operation of turbines	○ Adherence to setbacks from woodlots and watercourses ○ Lighting in manner least likely to attract birds while maintaining regulatory compliance	○ Bird and bat mortality to be within industry standard
	Public health & safety (including electro-magnetic field issues and ice throw)	○ Suspend operations during icing conditions ○ Navigational lights as required by Transport Canada to prevent aircraft collisions ○ Adherence to turbine setbacks	○ None Anticipated
2.2 Turbine Maintenance Activities	Disturbance to wildlife & birds	○ Adherence to setbacks	○ None Anticipated
2.3 Avian and Bat Survey Activities	Disturbance to wildlife & birds	○ None Required	○ None Anticipated
2.4 Electrical Substation	Spill of transformer oil	○ Secondary containment systems ○ Proper disposal of waste materials	○ None Anticipated
Decommissioning Activities			
3.1 Removal of Equipment	Creation of local jobs	None	
3.2 Removal of Turbines & Ancillary electrical Equipment	Sensory disturbance (sound and visual presence)	○ Complaints Tracking ○ Short duration of construction	○ Minor short term annoyance
	Dust	○ Watering of exposed soils ○ Maximum speeds for construction vehicles	○ Minor short term annoyance

Project Activity	Potential Impacts	Mitigation Strategy	Residual Impacts
	Surficial disturbance	○ Re-grading of site & agricultural land use restored after equipment disturbances complete ○ Install erosion control measures	○ None Anticipated
3.3 Removal of Transformer	Sensory disturbance (sound and visual presence)	○ Complaints Tracking ○ Impacts from cranes & equipment usage & personnel present will be short term	○ Minor short term annoyance
	Dust	○ Watering of exposed soils ○ Maximum speeds	○ Minor short term annoyance
	Surficial disturbance	○ Re-grading of site & agricultural land use restored after equipment disturbances complete ○ Install erosion control measures	○ None Anticipated
3.4 Site Remediation	Spill of transformer oil	○ An oil containment system will be maintained during decommissioning to prevent soil contamination in the event of a leak ○ Proper disposal of waste materials	○ None Anticipated

Accidents and Malfunctions			
4.1 Accidents & Malfunctions	Land contamination from lubricant/transformer fluid leak or spill and lightning strikes on turbines	○ Small quantities of lubricants are present in the turbine ○ Any leak or spills from trucks or machinery would be contained and site would be properly cleaned up and disposed of at registered disposal facilities ○ Transformers used in the project are silicone based and do not contain hydrocarbons ○ Refuelling of all vehicles and equipment will be done away from watercourses during construction and no re-fuelling on-site during operation phase ○ Use of lightning protection equipment	○ None Anticipated
	Public safety	○ Set-back between turbines and residences, roads and property line ○ Siting on private property which restricts public access to turbines ○ Turbines conform to global wind energy standards ○ Fencing of the substation for security based on standard utility practices	○ None Anticipated