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NEXTERA ENERGY CANADA, ULC SUMMERHAVEN WIND ENERGY CENTRE APPLICATION FOR A RENEWABLE ENERGY APPROVAL

Water Assessment and Water Body Report

Submitted to:
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REPORT

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1.0 INTRODUCTION

This Water Assessment and Water Body Report (the Report) has been prepared to provide information to the public, Aboriginal communities, municipalities and local authorities regarding the proposed Summerhaven Wind Energy Centre (the Project). The Report is a required component of an Application for a Renewable Energy Approval (REA Application) under Ontario Regulation (O. Reg.) 359/09[1] made under the *Environmental Protection Act (EPA)*.

Table 1 summarizes information to be included in the Report based on Sections 29 to 31 and 39 to 40 of O. Reg. 359/09 and directs readers to the associated section(s) of this document.

Table 1: Water Assessment and Water Body Report requirements under O. Reg. 359/09

Requirement as per O. Reg. 359/09	Report section where information can be found
Records Review (Sections 29 and 30)	Section 2.0
Site Investigation (Sections 29 and 31)	Section 3.0
Comparison of results between the records review and site investigation (Section 31)	Section 4.0
Water Impact Assessment (Sections 39 and 40)	Section 5.0

Additional information about the Project can currently be found in the Construction Plan Report (Golder, 2011a), Design and Operations Report (Golder, 2011b), Decommissioning Plan Report (Golder, 2011c), and Project Description Report (Golder, 2011d). A description of the Site Plan design is provided in the Design and Operations Report. As it is broadly applicable to all of the REA Reports, and to avoid redundancy, the Site Plan diagram has been provided as a stand-alone document (the Site Plan Report).

Technical studies associated with the REA Application requirements were initiated in 2007 and extended into 2010. Additional information about the Project and results of technical studies and assessments of negative environmental effects are available in the following reports:

- Wind Turbine Specifications Report (Golder, 2011e);
- Natural Heritage Assessment Report (Golder, 2011f);
- Stage 1 Archaeological Assessment Report (Golder, 2010a);
- Heritage Assessment Report (Golder, 2010b);
- Noise Study Report (Golder, 2011g);
- Water Assessment and Water Body Report (this Report);
- Site Plan Report (Golder, 2011h); and
- Consultation Report (Golder, 2011i).

[1] As amended by O. Reg. 521/10 which came into force on January 1, 2011.

Stage 2, Stage 3 and Stage 4 Archaeological Assessment Reports are not required as part of the REA Application for this Project (Ministry of Energy and Infrastructure, 2010) and are typically not publically available documents due to the confidential nature of the content. Stage 2, Stage 3 and Stage 4 Archaeological Assessment Reports will however be made available to the Ministry of Tourism and Culture (MTC) for review and their issuance of a Comment Letter in advance of construction, and hard copies of this information will be provided to Aboriginal communities with an interest in the Project, as identified by the Director, and as agreed to by individual Aboriginal communities.

1.1 Project Summary

The Project consists of the site preparation, construction, operation, and decommissioning of a 59 turbine wind generating facility with a total installed nameplate capacity of 131.04 MW. The Project will be owned and operated by NextEra Energy Canada, ULC (NextEra Energy Canada) and will be located in the vicinity of Nanticoke, Haldimand County, Ontario (Figure 1, end of Report). The Project lifespan from obtaining the REA Approval to the end of Decommissioning is estimated to be 27 years.

Turbine towers will be constructed on a concrete foundation. Underground and overhead cables will interconnect individual turbines and eventually connect to the substation (see Site Plan Report). The operation of the wind turbines will be monitored remotely from a Project operations building located near the substation. Once tested and commissioned, the turbines will require scheduled visits for maintenance during the Operations Phase. Maintenance will include complete inspection of the turbine's components and the tower, functionality testing, replacement of worn parts, bolt tightening and lubrication of moving parts. Routine preventative maintenance activities will be completed as per manufacturer requirements.

The Project Area (Figure 1) encompasses approximately 22,583 ha of privately owned land parcels. Land use is predominantly cash-crop agriculture (i.e., farming for corn, soybeans, wheat), although some areas are pasture (predominantly for cattle) and several wooded areas are present. Selkirk Provincial Park and Haldimand Conservation Area are located along the shore of Lake Erie south of the Project Area. The Grand River runs northeast of the Project Area and an Imperial Oil refinery is directly southwest.

The location of the Project was predicated by interest expressed by local landowners. Haldimand County is also attractive for wind development due to its proximity to Lake Erie, which results in favourable wind conditions for wind power production.

2.0 RECORDS REVIEW

In accordance with O. Reg. 359/09, the following determinations were made for the purpose of this water assessment:

- If the Project Location is in a water body;
- If the Project is within 120 m of a seepage area, or the high water mark of a stream;
- If the Project Location is in, or within 120 m of the average annual high water mark of a lake (other than a lake trout lake that is at or above development capacity); and

- If the Project Location is in, or within 300 m of the average annual high water mark of a lake trout lake that is at or above development capacity.

O. Reg. 359/09 requires the search and analysis of the records that relate to water bodies and that are maintained by:

- the MNR;
- the Crown in right of Canada;
- a conservation authority (CA), if the project location is in the area of jurisdiction of the conservation authority;
- each local and upper-tier municipality in which any part of the project location is situated;
- the planning board of an area of jurisdiction of a planning board in which the project location is situated;
- the municipal planning authority of an area of jurisdiction of a municipal planning authority in which the project location is situated;
- the local roads board of a local roads area in which the project location is situated;
- the Local Services Board of a board area in which the project location is situated, and; and
- the Niagara Escarpment Commission, if the project location is in the area of the Niagara Escarpment Plan.

A records review of water features within the Project Area was completed by Golder. The records review involved obtaining and reviewing the following information sources:

- Ontario Ministry of Natural Resources (MNR). 2006. Inland Ontario Lakes Designated for Lake trout Management. Fish and Wildlife Branch. Peterborough, Ontario. May 2006;
- Distribution of Fish Species at Risk mapping, Long Point Region Conservation Authority (Map 2)
- Haldimand County Official Plan (Haldimand County, 2006) reviewed in July 2010;
- Long Point Region Conservation Authority Regulated Limit boundaries for O. Reg. 178/06 Long Point Region Conservation Authority: Regulation of development, interference with wetlands and alterations to shorelines and watercourses acquired in August 2009;
- Long Point Region Watershed Characterization Report 2008 Draft (Lake Erie Source Protection Region Technical Team, 2008)
- A request for records associated with waterbodies was made to the MNR by Golder in December 2009 for fisheries records in water bodies controlled by the MNR (i.e., cold water fish habitat); and
- Background documents, reports and maps related to the physical setting of the Project Area as referenced in this Report.

The records review determined that the Project Area is not within an area containing inland lake trout lakes. There is no separate planning board, local roads board or local services board for the Project area and all

municipal planning is undertaken by Haldimand County. The Project location also does not occur within a Niagara Escarpment Plan area.

At the records review level, the base GIS data layers used by Golder to discern water bodies were the 2008 Natural Resources and Values Information System (NRVIS) watercourse, water body, and wetland layers available from the MNR. Instances of a Project component occurring in, or within the 120 m of the NRVIS water layer were determined using GIS. A total of 243 instances of the Project Location overlapping or occurring within 120 m of the NRVIS water body layer were identified. Further examination of these mapped locations in conjunction with high resolution orthophotography suggested that many of the NRVIS watercourses were first order tributaries within active agricultural fields and the likelihood of many of these being present through a Site Investigation was low. Nevertheless, each case was advanced to the site investigation stage.

In addition to the above, Golder acquired Regulation Limit mapping for O. Reg. 178/06 Long Point Region Conservation Authority: Regulation of development, interference with wetlands and alterations to shorelines and watercourses from the Long Point Region Conservation Authority (LPRCA), and the Riverine Hazardlands mapping layers from Haldimand County. The hazard lands layer is shown on the Official Plan Land Use Schedules A, B, C and D of Haldimand County. Figures 2 and 3 depict both the NRVIS water layers and cases where the Project Location is within 120m of a NRVIS water layer. Figures 2 and 3 also indicate where the Project location overlaps with the LPRCA Regulation Limit. In cases where the Project Location or associated disturbance occurs within the Regulation Limit a permit under O. Reg. 178/06 will most likely be required by LPRCA. An application for works within the LPRCA Regulated Limit is currently being developed and will be submitted to LPRCA by NextEra Energy Canada or a consultant working on behalf of NextEra Energy Canada. The permit for works within the Regulation Limit is a separate legal requirement from the O. Reg. 359/09 Water Report and therefore only information that is coincidental to both reports is found herein.

2.1 Physical Setting

Nanticoke Creek is the largest water body in the Summerhaven Project Area and has a drainage area of 180 km^2 (Lake Erie Source Protection Region Technical Team, 2008). Nanticoke Creek drains into Lake Erie.

Sandusk Creek is a smaller watershed with a drainage area of 158 km^2. It is situated entirely on the Haldimand Clay Plain which causes high runoff, minimal groundwater infiltration and low base flows. Sandusk Creek has a high number of tributaries. It drains directly into Lake Erie. The other main water body within the Project Area is Stoney Creek. Stoney Creek has a drainage area of 118 km^2. This small water body drains an area of Haldimand Clay Plain, resulting in high runoff and minimal groundwater infiltration. As a result, there is little to no base flow during the summer months (Lake Erie Source Protection Region Technical Team, 2008).

3.0 SITE INVESTIGATION

This section of the document provides a description of the site investigation requirements for water bodies in accordance with O. Reg. 359/09. The site investigation included an assessment of all NRVIS water features identified within 120 m of the Project Location during the Records Review and other unmapped water features meeting the O. Reg. 359/09 definition of a waterbody where these were observed. The purpose of the Water Assessment Site Investigation is to:

- Determine if the results of the records review were correct or require correction;
- Determine if the water body meets the definition of a water body under O. Reg. 359/09;
- Determine if additional water bodies exist; and
- Determine the boundaries of any water body identified from the Records Review or Site Investigation within 120 m of the Project Location and their distance from project components.

3.1 Methods

The Site Investigation surveys for water bodies were conducted by aquatic biologists and environmental technicians/ technologists with appropriate educational background and training. The site investigation included a site visit to each of the NRVIS water layers within 120 m of the Project location where the following were observed and recorded:

- Determination of whether a waterbody meeting the O. Reg. 359/09 definition was present;
- Where an REA waterbody was present measurements of watercourse physical characteristics including channel / bank width, bank height, wetted width, water depth);
- Where an REA waterbody was present, a visual characterization of the flow characteristics at the time of survey (permanent, intermittent, ephemeral, no flow);
- Where an REA waterbody was present, a visual characterization of potential fish habitat and aquatic ecological features (substrate, aquatic vegetation);
- Where an REA waterbody was present, fish observations made were recorded or where no fish were observed a determination of the likelihood of fish presence was made based on habitat quality and quantity observed at the time of survey;
- Riparian vegetation characteristics; and
- Representative photographs.

Upon completion of the site investigation completed field notes were reviewed for accuracy and completeness and scanned. Scanned copies were saved with the field name referring to the applicable unique Golder created waterbody identifier.

3.2 Site Investigation Results

Site investigations of water bodies were conducted from June 5, 2010 to September 10, 2010 concurrent with natural heritage studies. Dates, times, weather conditions and personnel completing the site investigations are summarized in Table 2 and copies of field data sheets are provided in Appendix B. In cases where the Project design was later revised, records for NRVIS waterbodies which were no longer within 120m of the Project Location were removed and archived. Conversely, where new locations within 120m of the Project location occurred, these were added after survey.

The site investigations confirmed the location of O. Reg. 359/09 water bodies within 120m of the Project Location. Based on the site investigation 243 NRVIS watercourses or waterbodies were surveyed. Of the 243 locations, there are 26 watercourses or water bodies within the 120m area of intersect with the Project Location based on the water body definition. The remaining 227 NRVIS watercourses within 120m of the Project Location are not water bodies by the O. Reg. 359/09 definition (see Appendix A). Those NRVIS watercourse or waterbody sections within 120m of the Project Location that are identified as O. Reg. 359/09 water bodies are illustrated with a blue dot on Figures 2 and 3, while those that do not meet the O. Reg. 359/09 definition of water bodies but are within 120 m of the Project Location are illustrated with a black dot.

Major drainages within the Project Area include Nanticoke Creek, Sandusk Creek and Stoney Creek. Water bodies in the general area typically have low to intermittent base flows, flashy runoff, turbid waters and warm temperatures.

The 26 O. Reg. 359/09 water bodies listed in Table 3 vary in width from 1 to 22 m, are dominated by sinuous to meandering channel morphology and at the time of survey possessed low to dry flow conditions. During the investigation fish were historically present or observed in 10 of the 26 watercourses, while an additional 12 watercourses were interpreted to contain fish habitat. Of the 26 water bodies identified, 22 will be crossed by a Project component or components while four, including one watercourse within 120m of a met tower, are situated within 120m and adjacent to Project location disturbance areas and could be indirectly affected.

Table 2: Summary of Site Investigations for candidate water features as identified on NRVIS base layer and other candidate waterbodies discovered in the field

Date	Points Surveyed	Time	Weather	Personnel
June 10, 2010	11 points	0830-1700	Temp 20ºC No precipitation	Derek Morningstar, Terrestrial Biologist Lasha Milne, Aquatic and Terrestrial Biologist Amber Sabourin, Environmental Intern Jenn Braun, Terrestrial Ecologist Jamie Weir, Fish and Wildlife Technologist Rick Baldwin, Fish and Wildlife Technologist Gary Pritchard, Fish and Wildlife Technologist Kurt Stamm, Senior Technologist Rachelle Clinch, Environmental Assessment Specialist Mark Katchouni, Environmental Intern
June 11, 2010	6 points	0930-1600	Temp 23ºC No precipitation	
June 14, 2010	6 points	~0900-1700	Temp 24ºC No precipitation	
June 16, 2010	3 points	1000-1830	Temp 25ºC No precipitation	
June 25, 2010	17 points	1200-2030	Temp 24ºC No precipitation	
June 28, 2010	25 points	0900-2030	Temp 26ºC Rain	
June 29, 2010	33 points	1000-2300	Temp 19ºC No precipitation	
June 30, 2010	27 points	0900-2100	Temp 20ºC No precipitation	
July 14, 2010	27 points	0900-1630	Temp 26ºC No precipitation	
July 15, 2010	28 points	0900-1830	Temp 30ºC No precipitation	
Aug 4, 2010	49 points	0600-1800	Temp 28ºC No precipitation	
Aug 5, 2010	55 points	0800-2100	Temp 28ºC No precipitation	
Aug 6, 2010	23 points	0730-1600	Temp 25ºC No precipitation	
Aug 11, 2010	17 points	0800-1400	Temp 30ºC No precipitation	
Aug 27, 2010	11 points	0830-1400	Temp 23ºC No precipitation	
Aug 30, 2010	10 points	0900-1730	Temp 30ºC No precipitation	
Aug 31, 2010	18 points	0900-2000	Temp 30ºC No precipitation	
Sept 10, 2010	31 points	0800-1845	Temp 20ºC No precipitation	

Table 3: Project components crossing or within 120 m of a water body.

Sample Point ID	Nearest Turbine(s)	Project component(s) within 120 m of water body	UTM of sample point (Zone 17 T)		Water body type based on flow condition at time of survey	Bankfull Width (m)	Channel Characteristics at Sample Point
			Easting	Northing			
7a	13, 14	crossed beneath by directional drilled underground cable between T13 and Turbine 14	573653	4746482	permanent	7	Meandering, stagnant watercourse
55	23	crossed beneath by directional drilled underground cable along existing road along Concession 5 Walpole; crossed by overhead crossing of transmission line northwest of turbine 23	580799	4747349	intermittent	1	Meandering watercourse with low flow velocities
70	59	access road and trenched underground cable within 120m	577340	4747295	permanent	10	Riffle/run/pool sequence observed, moderate flow, well-developed riparian habitat
78	27, 30, 62	Pond situated within 120 m of overhead cable along Concession 5 Rainham	587122	4746319	permanent	NA	Permanent pond, with trees and shrubs surrounding
86	18	crossed by overhead cable along Concession 5 Rainham	588516	4748031	intermittent	20	Meandering watercourse, no flow, riparian area is grass only
87	18	crossed by new access road culvert and beneath by directional drilled underground cable to Turbine 18	588570	4748345	permanent	4.5	Meandering, stagnant watercourse, small riparian zone consisting of sedge, rush, grass and willow
125c	SMT04	Within 120m of met tower	590629	4741851	intermittent	2.5	Meandering watercourse in primarily agricultural area with minimal flow.
141, 142	54	crossed by access road and	595129	4744439	intermittent	2	Meandering, low flow, poor

Sample Point ID	Nearest Turbine(s)	Project component(s) within 120 m of water body	UTM of sample point (Zone 17 T)		Water body type based on flow condition at time of survey	Bankfull Width (m)	Channel Characteristics at Sample Point
			Easting	Northing			
		trenched underground cable to Turbine 54 - undersized culvert already present to be improved, another portion of channel within 120m of Turbine 54					riparian conditions, non-native forbs and grasses, cultural wooded areas
143	45, 55	crossed by overhead cable along Regional Road 3	596512	4745147	intermittent	1.7	Meandering, dry/low flow, fair riparian conditions, reed canary, willows, 40% cover upstream, 80% cover downstream (willows, golden rod, bulrush, cattail)
150b	55, 56	crossed by new access road culvert and underground cable to Turbine 55 - small water crossing already present and replacement or improvements required	596673	4744207	intermittent	5	Meandering, low flow, herbaceous (reed canary, dogwood, willow)
158	3	crossed by new access road and underground cable to Turbine 3	574571	4748799	permanent	6	Meandering, dry/low flow, reed canary, ash, buckthorn, white Elm, milkweed, goldenrod, hawthorn
161a	5, 59	crossed beneath by directional drilled underground cable along Concession 6 Walpole	576843	4747821	permanent	>20	Meandering, low flow, fair riparian conditions, reed canary, arrowhead, ragweed
162b	5, 16	crossed beneath by directional drilled underground cable along Concession 6 Walpole	577528	4748015	permanent	12	Meandering, low flow, good riparian conditions, stinging nettle, willow, maple, ash
174b	61	crossed by overhead	578166	4746086	intermittent	5	Meandering, low flow, good

Sample Point ID	Nearest Turbine(s)	Project component(s) within 120 m of water body	UTM of sample point (Zone 17 T)		Water body type based on flow condition at time of survey	Bankfull Width (m)	Channel Characteristics at Sample Point
			Easting	Northing			
		transmission line south of turbine 61, within 120 m of Turbine 61 and Turbine 21					quality riparian conditions, wooded, fully shaded
184c	26, 58	crossed beneath by directional drilled underground cable along Concession 5 Walpole	585417	4748223	permanent	6	Straight, low flow, good quality riparian conditions, willow sp., herbaceous reed canary
185b	27, 62	crossed beneath by directional drilled underground cable along Concession 5 Rainham	586836	4747620	intermittent	22	Meandering, low flow, herbaceous, reed canary, willow, oak, manicured lawn
214	10, 11	crossed beneath by directional drilled underground cable along Concession 7 Rainham	587215	4750569	permanent	10	Meandering, low flow, good riparian conditions, willow, cattail, rushes, swamp milkweed
216	31, 32	crossed beneath by directional drilled underground cable along at Fisherville Road	590201	4745976	permanent	20	Mapped as Hemlock Creek. Meandering, low flow, reed canary grasses
262	60, 61, t-line	crossed by overhead transmission line at diagonal to Concession Road 4	577648	4745155	permanent	21.5	Sandusk Creek. Run, low flow, good upstream riparian conditions, well vegetated, 70% riparian shading, fair downstream with lower amounts of vegetation and area of grazed and eroded banks
286	30, 62	crossed by overhead cable at Concession 7 Rainham	591764	4748751	intermittent	3.25	Meandering, low flow, fair riparian conditions, full of narrow-leaved cattails, golf course downstream

Sample Point ID	Nearest Turbine(s)	Project component(s) within 120 m of water body	UTM of sample point (Zone 17 T)		Water body type based on flow condition at time of survey	Bankfull Width (m)	Channel Characteristics at Sample Point
			Easting	Northing			
287	19, 28	crossed by overhead cable at Concession 7 Rainham	591820	4748765	permanent	7	Meandering, low flow, fair riparian conditions, upstream well shaded (80%) by ash, buttonbush, cardinal flower, hawthorn
304	60, 61, t-line	crossed by overhead transmission line	577481	4745158	permanent	3	Meandering, low flow, poor riparian conditions, herbaceous, well grazed by cattle, very low cover
330	30, 62	crossed beneath by directional drilled underground cable at Concession 4 Rainham	587487	4746405	permanent	5.5	Straightened, low flow, 20% riparian cover from cattails, rushes and overhanging vegetation
331	30, 62	crossed beneath by directional drilled underground cable at Concession 4 Rainham	587537	4746405	permanent	>5	Meandering, dry, poor riparian conditions, 100% vegetated over with alfalfa field
347	25	crossed by crossed beneath by directional drilled underground cable north of Concession 4 Walpole	584469	4746558	Intermittent	<2	Meandering, low flow, unknown riparian conditions
361	58	Within 120m of turbine, 58 and associated access road and cable	584462	4748720	Permanent	>6	Straight, low flow, some pooling, good quality riparian conditions, willow sp., reed canary, mixed forest and swamp thicket.

4.0 COMPARISON BETWEEN RECORDS REVIEW AND SITE INVESTIGATION

The site investigations confirmed the location of all water bodies situated within 120 m from the Project Location including disturbance. During the records review a total of 243 water features based on NRVIS were identified and found to be within 120 m of Project components. However, 217 of these drainages are not considered water bodies under the REA definition. The remaining 26 are considered to be water bodies. A summary of the site investigation distinguishing water bodies and non- water bodies can be found in Appendix A, Table 1. This table also provides the rationale for excluding the NRVIS watercourses identified as not being water bodies.

One new waterbody, a pond at ID 178 was identified. No boundary modifications for sections within 120m of the Project location were necessary.

5.0 WATER IMPACT ASSESSMENT

A water impact assessment is required for the Project, in accordance with O. Reg. 359/09, because the Project is a Class 4 Wind Facility and some Project components are within 120 m of a water body (see Table 3). The following sections describe the potential environmental effects as a result of the Project during the Site Preparation and Construction, Operations and Decommissioning Phases of the Project; provide mitigation measures; and a monitoring plan.

Following Section 39(2) of O. Reg. 359/09, this section of the Report provides all of the information about how the environmental effects monitoring plan in the Design and Operations Report addresses any negative environmental effects outlined in Section 5.1 below. In addition, Section 5.3 below describes how the Construction Plan Report addresses any negative environmental effects of the Project on a water body.

5.1 Potential Environmental Effects

5.1.1 Surface Water Quantity

5.1.1.1 Site Preparation and Construction Phase

Activities associated with the Site Preparation and Construction Phase have the potential to affect runoff patterns by changing the existing surface cover associated with the construction of access roads and turbine foundations within the Project Area. The change in runoff, calculated using the change in surface types over the entire Project Area, is provided for each Project Phase in Table 4. During Site Preparation and Construction, there will be a predicted 0.34% change in runoff. Furthermore, activities such as the interconnection of turbines to the substation will only result in short-term changes to runoff patterns as the existing cover will be restored through reclamation after the underground cabling has been installed and the trenches filled and re-vegetated. Therefore, runoff during the Site Preparation and Construction Phase is negligible and does not warrant further analysis.

Table 4: Anticipated Change in Runoff under Existing and Proposed Conditions

Land Use	Existing (ha)	Site Preparation and Construction (ha)	Operations (ha)	Decommissioning (ha)	Runoff Coefficient
Forested	2022	2022	2022	2022	0.30
Open-Pasture-Grass-cultivated fields	20214	20107	20124	20184	0.35
Developed-Paved	235	265	265	235	0.87
Roads - Gravel	0	77	60.0	30	0.50
Lakes, Wetland	112	112	112	112	0.05
Total (ha)	22583	22583	22583	22583	
Weighted Runoff Coefficient	0.349	0.351	0.351	0.350	
Change in Runoff		0.34%	0.31%	0.06%	

5.1.1.2 Operations Phase

The estimated average increase in runoff as a result of the presence of access roads and turbine foundations across all lots is 0.31% relative to existing conditions (Table 4), which will not be measurable in receptors. Therefore the increase in runoff is negligible and does not warrant further assessment.

5.1.1.3 Decommissioning Phase

Activities associated with the Decommissioning Phase of the Project may result in changes to runoff patterns. Land use will return to pre-existing conditions, which in most instances is associated with agricultural field. Immediately after Decommissioning, access roads will be removed, at the landowner's request. For the purposes of the calculation of change in runoff, shown in Table 4, it was estimated that 50% of access roads will remain after the Project is decommissioned. Site grading will be required and soil may be exposed in the short-term while turbine foundations are removed. Land use will return to current conditions. Therefore, the change in runoff is expected to be negligible and does not warrant further consideration. This is confirmed in Table 4, which shows a 0.06% change in runoff from existing conditions.

5.1.2 Erosion and Sedimentation

5.1.2.1 Site Preparation and Construction Phase

The activities associated with the Site Preparation and Construction Phase have the potential to affect water quality by increasing overland sediment transport could increase suspended sediment contributions to water bodies. Many of the drainages under active agriculture are ploughed through and would currently receive overland flows and eroded soils. As it relates to the Project, these contributions can be the result of activities such as, but not limited to:

- Increased erosion in areas where vegetation has been removed;

- Erosion of stockpiles;
- Increased erosion in local areas where stormwater runoff flows increase because of the development of the site;
- Tracking of mud and soil onto local roads by construction equipment; and
- Movement of fine material from newly constructed gravel roads and construction areas.

The above activities may occur during the construction of access road crossings, at cable crossings, and for the two of the three instances of Project infrastructure being located adjacent to but not actually crossing a water body (Table 3) Erosion is not considered to be a potential environmental effect at crossing 125c which is within 120m of met tower SMT04.

The potential increases in sediment transport are generally highest during periods of heavy rainfall and snowmelt (spring freshet). During this time, routine inspections with supplementary mitigation will be employed as needed to reduce the potential effects of erosion and sedimentation (Section 5.2). During dry and frozen periods, there will be no runoff from the site; therefore, measurable effects on suspended sediment concentrations are not expected.

Though the removal of vegetation from agricultural fields and placement of roads may increase surface water runoff to Sandusk Creek, Gates Creek, Dry Creek, Stoney Creek and other unnamed drainages, the increase in runoff is considered to be negligible (Section 5.1.1) and is expected to have a minor effect on these water bodies. Construction across intermittent watercourse crossings will be timed to occur during dry conditions, to the extent possible. If not feasible, or in the case of permanent watercourses, isolated working conditions will be achieved by temporary dam installation and pumping following the crossing technique agreed to with the Long Point Region Conservation Authority (LPRCA). Protection of fish and fish habitat will be achieved by adhering to the timing windows agreed to in consultation with the LPRCA and the Department of Fisheries and Oceans (DFO).

Where underground or overhead cables are required to cross watercourses, the appropriate DFO Operational Statements for constructing access across the watercourse and installing the cable underground or overhead (DFO, 2009), as shown in the Site Plan Report, will be followed. The mitigation measures within the Operational Statements are explicit and will be sufficient to protect fish habitat, water quality and water quantity. A list of the DFO Operational Statements that may be applicable is provided below, noting that individual crossings may need to correspond only to a single Statement:

- Notification Form;
- Timing Windows;
- High Pressure Directional Drilling;
- Punch and Bore Crossings;
- Temporary Stream Crossings;
- Isolated or Dry Open-cut Stream Crossings; and

- Overhead Line Construction.

5.1.2.2 Operations Phase

At an operations level the following DFO statements may also apply to routine or unforeseen maintenance works that may need to be completed.

- Culvert Maintenance;
- Maintenance of Riparian Vegetation in Existing Rights of Way.

Environmental effects related to sedimentation and erosion during the Operations Phase of the Project would relate to either unexpected storm events or malfunctions or failure of drainage structures which could ultimately lead to sediment being transported overland or within drainage features to downstream receiving waters. The potential for failures will be addressed through routine monitoring which will be completed by the Operations crew.

5.1.2.3 Decommissioning Phase

Activities occurring within 120 m of a water feature associated with the Decommissioning Phase may contribute to increased erosion and sediment load to the local drainage ditches as a result of demolishing the switching stations and removing the access roads. These activities include, but are not limited to:

- Tracking of mud and soil onto local roads by dismantling equipment; and
- Exposed soil during re-grading of the site.

Mitigation measures will be employed at the time of Decommissioning to reduce the effects on erosion and sedimentation during this Phase. These mitigation measures are presented in Section 5.2. Not all access roads will have to be removed. Access roads that existed prior to the Project will not have to be removed, as well as access roads that are left in place at the request of the landowner.

5.1.3 Direct Disturbance to Water Features

5.1.3.1 Site Preparation and Construction Phase

Direct disturbance to watercourses may occur as a result of site preparation and construction activities such as vegetation removal along the edges of water features or compaction and stream bank disturbance attributed to heavy equipment. Within the channel boundaries, in situations where trenched cables will be installed, instream vegetation, channel morphology or disturbance to fish habitat or natural features may occur.

At the larger permanent water bodies, cables will either be overhead, which may require a minimal disturbance to riparian vegetation for pole installation, or will be bored under water bodies in accordance with Ontario Operational Statements that have been developed by DFO. High pressure directional drill crossings or punch and bore crossings do not require instream works to occur and therefore no direct impacts to fish or fish habitat are anticipated, unless a frac-out causing the release of directional drilling mud to enter the channel occurs. The

potential for a frac-out is discussed later in this document and will be mitigated for by following industry accepted practices for designing and implementing directional drilling and by employing an environmental monitor to oversee the drilling operations and monitoring water quality and quantity while drilling is occurring and implementation of mitigation measures during installation, site cleanup and reclamation phases of the drill program. The applicable DFO Operational Statements include:

- High Pressure Directional Drilling;
- Punch and Bore Crossings;
- Isolated or Dry Open-cut Stream Crossings; and
- Overhead Line Construction.

By adhering to these Operational Statements, no adverse affects on water bodies are anticipated from cable crossings, and no further consideration is required. Where Operational Statements will be followed, DFO and LPRCA will be identified using the DFO Notification form a minimum of ten days in advance of construction.

5.1.3.2 Operations Phase

No direct disturbance to water features is expected during the Operations Phase; therefore, no further consideration is warranted.

5.1.3.3 Decommissioning Phase

Following decommissioning of other components, roads will be removed and land restored to the pre-construction end land use as agreed to with individual landowners and in compliance with their REA and other permits. Road bedding material will be stripped and areas of compaction will have the subsoil ripped. Any removed/stored topsoil will be replaced and additional clean topsoil will be used to fill remaining areas. All disturbed areas will be graded and contoured for reuse by the landowner for agricultural purposes and will be reseeded with crops or other vegetation, if requested.

Culverts installed during construction and installation activities will also be removed, unless the landowner requests that they stay in place. If landowners request that culverts be removed, approval from the Department of Fisheries and Oceans Canada (DFO), LPRCA or the MNR would have to be obtained, where required. Following removal of the culverts, the land at the crossing location will be contoured to maintain current drainage patterns and riparian vegetation will be replanted with a mixture of species acceptable to LPRCA. The channel substrate and fish habitat will be created at the crossing location, consistent with DFO, MNR and LPRCA approvals.

The Decommissioning Phase is not anticipated to result in any directed disturbance to water bodies and as such, no further consideration is warranted.

5.1.4 Accidental Spills of Contaminants

5.1.4.1 Site Preparation and Construction Phase

Accidental spills of contaminants in or within 120 m of a water feature, including hydrocarbons (diesel fuel, oil, etc.) during the Site Preparation and Construction Phase are considered to be potential sources of contamination, which may affect water and sediment quality in Sandusk Creek, Gates Creek, Dry Creek, Stoney Creek and other unnamed drainages. Since the occurrence and location of the spills cannot be predicted, mitigation measures will be employed (Section 5.2).

5.1.4.2 Operations Phase

Accidental spills of contaminants are significantly lower during the Operations Phase since there is reduced vehicle traffic on the site. Refuelling facilities should not be required during the Operations Phase of the Project, although, there is low potential for leaks from vehicles and hydrocarbons entering the drainage ditches. Lubricating fluids required for the turbines will be stored in the turbine towers and in the event of a spill, would be contained within the turbine tower.

5.1.4.3 Decommissioning Phase

The occurrence of accidental spills of contaminants during the Decommissioning Phase of the Project would be a result of diesel fuel and oil used during the demolishing of the switching stations. Mitigation measures are presented in Section 5.2.2.

5.1.5 Water Takings

5.1.5.1 Site Preparation and Construction Phase

5.1.5.1.1 Stream Diversion if Discharge Amount Exceeds 50,000 L/day and Dam and Pump Technology is Used

Where required, stream diversion for the installation of watercourse crossings for access roads or other Project infrastructure has the potential to increase sediment run-off, decrease bank stability and cause changes in chemical properties and temperatures, which can negatively affect fish or their habitat (if present) including spawning and patterns of movement. The magnitude of effects is largely dependant on the characteristics of the watercourse, sensitivity of aquatic communities, crossing technique and the mitigation techniques employed.

5.1.5.1.2 Water Takings by Tanker for Dust Suppression and Equipment Washing

The withdrawal of surface water for construction activities such as dust suppression, equipment washing and land reclamation (e.g. hydroseeding) has the potential to reduce instantaneous streamflow of watercourses, with the magnitude and duration of these effects dependent on the amount of water being removed and the duration of the takings. Reduction in the instantaneous streamflow can result in the alteration of aquatic conditions which may negatively affect the local and downstream habitat and biota.

5.1.5.1.3 Turbine Foundation Dewatering

Where required, dewatering for turbine foundation construction has the potential to temporarily alter shallow groundwater flow to waterbodies, watercourses and wetlands. Although dewatering activities would only occur until foundations are completed (approximately 4 months) or until groundwater levels receded to a suitable depth, a measurable change in local well levels and groundwater flow in the immediate vicinity of excavations and potentially for a period of 7 months afterward (4 months of drawdown from dewatering plus 3 months of water level recovery) could occur.

Subsequent release of pumped water from foundation dewatering to discharge areas can cause overland sediment transport to waterbodies, while direct discharge to waterbodies could introduce suspended sediments, re-suspend bedload materials, and affect water course hydrology and water temperature near the point of discharge.

5.1.5.2 Operations Phase

No water takings are anticipated during Project operation.

5.1.5.3 Decommissioning Phase

Water takings may be required during Project decommissioning for the same activities as Project construction, excluding turbine foundation dewatering. The potential negative environmental effects for stream diversion if any watercourse crossings or associated infrastructure are to be removed are the same (refer to Section 5.1.5.1.1 above).

5.2 Mitigation Measures

Although the results presented in Table 4 demonstrate a negligible change in post-development runoff potential (relative to existing conditions), Best Management Practices (BMPs) will be implemented prior to and during construction to minimize potential erosion/sedimentation and associated effects to water quality, as identified in Section 3 of the Construction Plan Report. BMPs include good housekeeping, preventive maintenance, a spill prevention and control plan, erosion and sediment control measures, employee training, and record keeping and reporting.

Sediment associated with construction activities is a main source of pollution for stormwater runoff from the Project site. Construction activities also generate pollutants from petroleum products (fuels and lubricants), solid wastes (trees, shrubs, wood, paper and scrap metals), garbage (food wrappings, cigarette packages, etc.), construction chemicals (paints and cleaners) and other pollutants such as concrete wash water.

The effects of stormwater pollutants will be mitigated through the use of source control BMPs to remove stormwater contaminants at their source. These source controls will include frequent collection and disposal of petroleum wastes, cleaning materials and site debris/garbage removal, each of which are effective in minimizing pollutant transport. Stormwater will be directed away from potential pollutant sources. Erosion and sediment control BMPs will be implemented to control soil erosion and to retain eroded soils onsite.

The following sections provide selected BMPs (limiting site effect, preventing erosion and sedimentation, and managing activities and sources) that will be applied for general water quality protection. These will be complemented with implementation of additional procedural, water management, erosion control and sediment control BMP's which are available in the Ministry of Transportation document *Environmental Guide for Erosion and Sediment Control During Construction of Highway Projects* (MTO 2007).

5.2.1 Clearing Limits

Some areas of the Project site with specific characteristics will not be cleared and graded, or these activities will be minimized. These areas include stream buffers, forested areas, wetlands, springs, highly erodible soils, steep slopes, and environmental areas. The water crossing locations selected have avoided these areas, where possible, though watercourse crossings using directional drilling are proposed adjacent to wetland features along the existing road corridor where these could not otherwise be avoided without being considered "in" the feature. Crossings that are within 120m of a wetland are discussed in the Natural Heritage Assessment Report, which has been reviewed by MNR with a confirmation letter provided. To protect adjacent properties and to reduce the area of soil exposed to construction, the limits of construction will be clearly marked before land-disturbing activities begin. Staked in high visibility plastic or wire fences, and Work Exclusion Zone will be created. At the directional drill crossings of the larger watercourses the minimum exclusion areas that will be10m from the outer extent of the LPRCA Regulation Limit boundary.

Trees that are to be preserved, as well as all sensitive areas and their buffers, will be clearly delineated, both in the field. In general, natural vegetation and native topsoil will be retained in an undisturbed state to the maximum extent possible.

Natural vegetation provides a buffer and stabilized area, which helps control erosion, protect water quality, enhance aesthetic benefits, and also minimize the amount of exposed bare soil.

A further discussion about delineation of no work zones and work exclusion areas is provided in the Construction Plan Report.

5.2.2 Construction Access

Construction access and activities creating new disturbance will primarily occur on unpaved areas. The erosion and sediment controls for access road construction are dependent upon adjacent land use, overland slope, watershed area, and drainage patterns. The specific BMPs related to construction access for the Project that will be employed will include:

- Stabilized construction entrance;
- Construction road/parking area stabilization that includes:
  - dust control;
  - culvert installation and protection;
  - mulching;

- preservation of existing vegetation;
- seeding; and
- silt fences.

As necessary, entrances adjacent to public/private roads will be gravelled/ stabilized/ compacted to minimize the tracking of soil onto the roads. New culverts, where these need to be installed in roadside ditches turning onto new access roads, will be undertaken in consultation with Haldimand County. Cleaning of heavy equipment wheels and tracks, street sweeping, and removal of soils clumps will be employed to reduce the potential for sediment from entering waterways as required. Exposed soils at disturbed areas will be stabilized with the appropriate BMPs as discussed in Section 5.2.4. Silt fences will be used on the downstream or down slope side of disturbed areas to minimize the transport of sediment laden stormwater from access road construction activities. Culvert inlet sediment traps will be installed in ditches at junctions with roads to maintain drainage as required.

5.2.3 Sediment Control

Although the change in stormwater runoff will be negligible within the Project Area, stormwater runoff from disturbed areas will be managed. In some instances, drainage water may need to be passed through an appropriate sediment control before leaving the construction site. The specific BMPs to be used for addressing sediment on this Project include silt fences and culvert inlet sediment traps. Other sediment and erosion control techniques, such as those outlined by MTO (2007) will be implemented where these techniques are expected to prove successful in further mitigating sedimentation.

Silt fences will be installed around staging areas and stockpiles/waste areas as deemed necessary, and on the downstream side of disturbed construction areas such as turbine sites, substation site, access road, trenching of underground electrical collector line, lay down and temporary storage areas to provide a temporary physical barrier to sediment and to reduce runoff velocities of overland volumes. Silt fences will either be machine sliced into the soil or installed by hand. Hand-installed silt fences will have the bottom edge buried to prevent the silt fence from being outflanked.

Culverts that will be installed to maintain drainage in ditches will be protected by a combination of culvert inlet sediment traps or straw bails to prevent unfiltered or untreated water from entering the drainage conveyance system.

5.2.4 Soil Stabilization

Soil stabilization is a source control measure that is designed to prevent soil particles from detaching and becoming transported in the stormwater runoff. Exposed soils can be stabilized with the application of effective BMPs to prevent erosion during construction and throughout the life of the Project. Soil stabilization BMPs protects the soil surface by covering and/or binding the soil particles.

The specific BMPs for soil stabilization that will be used on this Project include:

- Temporary and permanent seeding;
- Mulching;
- Nets and blankets;
- Plastic covering; and
- Dust control.

Disturbed areas will be graded and seeded, as appropriate, to match existing vegetation. These areas include turbine sites, trenching of underground electrical collector line, equipment lay down and temporary storage areas and access roads.

Mulching will be used on disturbed areas as needed. Mulching will be primarily used throughout the disturbed areas adjacent to excavations and on shallow slopes surrounding the site. Erosion blankets would be substituted for mulch on steep slopes (10 percent slope or greater) or wherever highly erosive conditions exist. Mulch or erosion blanket, where appropriate, will be applied prior to seeding. Mulch will be anchored with a mulching tiller or with an approved method.

Plastic covers will be used to cover exposed soil and sand stockpiled material areas. The covers will be placed over stockpiles prior to forecast storm events, and anchored to prevent damage by wind.

Dust control on exposed soil areas will be monitored. The contractor will sprinkle the construction sites with water to limit dust generation before dust becomes problematic.

5.2.5 Pollution Prevention Control

All pollutants, including hazardous material spill, waste materials and demolition debris that occur on site will be handled and disposed of in a manner that does not cause contamination of surface water. Good housekeeping and preventative measures will be taken to keep the site clean, well organized, and free of debris.

The implementation of the mitigation measures described below will preclude or minimize any potential negative environmental effects associated with spills of contaminants during all Phases of the Project. Any accidental spills will be dealt with immediately in accordance with the MOE's Spills and Discharges Reporting Protocol as required by the *Ontario Environmental Protection Act* (s. 92 and s. 15), as previously identified in the Construction Plan Report.

5.2.5.1 Pollutant Prevention and Control During Construction

BMPs will be implemented to control specific sources of pollutants as required during the construction period, as discussed below.

5.2.5.1.1 Good Housekeeping Practices

Good housekeeping practices are designed to maintain a clean and orderly work environment. It is often the most effective first step towards preventing pollution in surface water at a site. The following are some of the procedures that will be implemented as part of good housekeeping within the Project Area.

- Maintain up-to-date material inventory.
- Identify all hazards/chemicals present at the site.
- Keep all materials including hazardous products stored on-site in a neat, orderly manner and in their appropriate containers. If possible, keep products under a roof or other enclosure.
- Keep materials including hazardous products in their original containers and with the original manufacturer's label. Keep the original labels and material safety data for each of the materials as they contain important information.
- Whenever possible, use the entire product before disposing of the container and make an effort to store on-site only enough products required to complete the job. Disposal of any excess product shall be done in a manner that follows all manufacturers', federal, provincial and local recommended methods for proper disposal.
- Due to the minimal amount of hazardous materials being used in construction, it is anticipated that little, if any, hazardous waste will be generated at the construction site. Individual contractors will be responsible for removal of any hazardous waste (including oil) from the Project Area promptly upon generation.
- Hazardous wastes such as oil waste will not be allowed to accumulate at the construction site. Hazardous waste generated during construction activities will be disposed of off-site.
- During construction and operation of the Project, no waste materials will be treated, stored, reused, or disposed of at the Project site. These wastes including all construction/demolition wastes composed of building materials will be shipped to an off-site waste materials disposal location for disposal in accordance with applicable laws.
- Manufacturer's recommendations for proper use and disposal will be followed, and the site superintendent will be responsible inspection to ensure proper use and disposal of materials.
- Schedule routine cleanup operations.
- Train employees about good housekeeping practices.
- Display good housekeeping procedures at appropriate locations.

These procedures will reduce the potential for environmentally significant materials to come in contact with surface water.

5.2.5.1.2 Management Practices

The following is a list of potential sources of pollution and specific practices to reduce pollutant discharges as required from the materials or sources expected to be present during construction.

A. Vehicles, construction equipment, and/or petroleum product storage/dispensing

- Vehicle fuel will be utilized by contractors and any other personnel accessing the site via vehicle and/or utilizing fuel driven equipment. The amount of fuel used in each vehicle will be commensurate for the type of work being performed and within requirements for the specific equipment operated. Excessive amounts of fuel will not be stored on any vehicle and where fuel is being transported it will be contained in approved storage vessels.
- There will be temporary on-site fuel storage for the construction vehicles. All temporary fuel storage will be located at the construction field offices and temporary storage area and will be equipped with secondary containment.
- Equipment fuelling will only be done by fuel delivery trucks, which come on-site to fuel the construction vehicles and then leave. All vehicles, construction equipment including generators/welders/pumps, and petroleum product storage/dispensing areas will be inspected regularly to detect any leaks or spills, and to identify maintenance needs to prevent leaks or spills. Any fuel or oil leaks associated with the respective equipment will be immediately repaired and the construction contractor will be notified to evaluate the situation.
- Routine equipment maintenance will be undertaken only in qualified facilities. i.e., service trucks, construction equipment, etc. will receive maintenance in qualified repair shops). If an emergency repair on site is required because of the equipment being too large to tow to another location, , spill prevention measures such as drip pans will be used, and temporary plastic will be placed beneath and, if raining, over the vehicle.
- Contaminated surfaces will be cleaned immediately following any discharge or spill incident in accordance with the MOE's Spills and Discharges Reporting Protocol.
- External washing of trucks and other construction vehicles will be limited to a defined area of the site. Runoff from such areas will be contained and waste properly disposed. No engine degreasing will be allowed on-site.
- Containment berm or other secondary containment devices around fuel storage, equipment maintenance areas, and chemical storage areas may be installed, where appropriate, for potential hazardous material spills, and storage areas shall be monitor.

B. Wastes from Concrete works

Measures to mitigate effects of waste from concrete works on surface water as required would include the following:

- Proper disposal or recycling of any excess cement, or other materials at the end of construction.
- Containment of concrete mix/transport truck washdown or washout to prevent contamination of surface or groundwater, preferably by recycling into the concrete mixing operation if possible. Excessive volumes of

truck washout will not be placed into any single foundation pit. Washing trucks into pits that have permeable soils and/or shallow groundwater will be avoided. Procedures will be in place for spill response in accordance with MOE's Spills and Discharges Reporting Protocol. Cement truck washout will be in an identified and marked area, and a spill kit capable of capturing, containing or treating accidental discharge of concrete materials on ground and surface waters will be available and at hand in case of a spill.

- Excess concrete will be disposed of in specific locations, such as within the turbine foundation excavations (unless restricted by applicable specifications/requirements for foundation preparation). Concrete will not be disposed of into a watercourse or stormwater drainage system
- Although the change in runoff is negligible within the Project Area, containment of runoff from the site, as required, using low-permeability berms (concrete, asphalt cement and compacted clay till) for runoff control and lined ponds for runoff storage, will prevent any run-on of surface water from off-site.
- Construction of continuous interior berms around batch plant equipment including mixing equipment, silos, concrete drop points, conveyor belts, admixture tanks, etc. to facilitate proper containment and cleanup of releases. Where applicable and appropriate, rollover or flip top curb or dikes will be placed at ingress and egress points.

C. Paints and cleaning solvents

Excess paints and solvents will not be discharged into watercourses. The manufacturer's instruction, federal and provincial regulations will be referred to for the proper disposal from the site.

D. Solid and construction wastes

All trash and construction debris will be deposited into a dumpster that will be emptied as necessary. No construction waste materials will be buried on site. The dumpsters will be put in a location where the contact with watercourses is minimized.

E. Sanitary sewage

Portable toilets will be provided for proper disposal of sanitary sewage. Waste will be collected and disposed in compliance with local, provincial and federal regulations.

5.2.5.2 Pollutant Prevention and Control during Operation

It is not anticipated that a significant amount of hazardous or non-hazardous waste will be generated during the normal operation of the Project. Maintenance technicians or contractors will be responsible for removal of any hazardous waste (including oil) from the site promptly upon generation. Hazardous or oil waste will not be allowed to accumulate at the Project site. Hazardous waste generated during routine maintenance activities or repairs will be disposed of at approved off-site locations. The following spill prevention and response actions in accordance with MOE's Spills and Discharges Reporting Protocol will be implemented during the Project Operations Phase:

A. Facility Oil Storage Containers

The types of petroleum products used at this facility include:

- Hydraulic oil;

- Gearbox oil;
- Lubricants;
- Coolants; and
- Transformer oil (mineral oil).

All equipment containing oil that has the potential to discharge to watercourses will have secondary containment installed or other appropriate prevention measures in place, as required. Each of the secondary containment systems described below will be sufficiently impervious to oil and would be capable of preventing a discharge from reaching watercourses.

- **Wind Turbine Generators:** The Wind Turbine Generators (WTG's) are located on a high tower and enclosed in a covering known as a nacelle. The nacelle is a seamless enclosed unit that is connected to the turbine tower. Any spill during operation of the mechanical equipment would take place inside the nacelle. If there is a spill inside the tower, the spill will be contained within the tower because the bottom of the tower is sealed and the door is a minimum of six inches from the ground. In the event of a spill, the spilled material should be drained from the nacelle and/or collected with absorbents. The spilled material and absorbents will be containerized and sent off-site for disposal.
- **Pad Mount Transformers and Grounding Transformers:** Since each transformer contains 420 gallons of a standard petroleum-based mineral oil, containment is not required. The transformer is completely sealed and there will be no need to change the oil. If a small spill occurs, the spill will likely be contained in the gravel/rock base that surrounds the pad on which the transformers are located. Absorbents maintained on-site are available to stop or slow down the flow of the discharge. In the event of a release of oil from a transformer, an environmental response contractor will be directed to excavate any contaminated soil surrounding the transformer.
- **Substation Transformer:** The substation transformer containment system is composed of concrete curbing and flooring with all joints sealed around the perimeter of the transformer. The substation transformer containment system has sufficient volume for the oil in the transformer plus sufficient freeboard. Rainfall, which accumulates in the containment structure surrounding the transformer, will be drained to recover containment volume. Prior to releasing the stormwater, the water will be examined for any traces of oil. If the water is found to be free of oil and sheen then the drainage valve will be opened and monitored during the entire discharge. In case of a spill, the spill response contractor will provide cleanup. After the containment structure is emptied, the drain valve will be closed.

B. Prevention and Detection Measures

Along with the secondary containment systems described in Section A, the following devices also serve to prevent and detect discharges at the facility.

- All of the WTGs are equipped with sensors to automatically detect a loss in fluid pressure and/or an increase in fluid temperature, which enables them to be shut down in case of a fluid leak.
- The WTG hydraulic fluids will also be checked on a regular basis by operations staff to verify that the equipment is operating properly and is not leaking fluids.

- The substation transformer is equipped with oil level sensors that detect any sudden drop in oil levels, which would send an alarm to the central computer system.
- The transformer is also equipped with release valves that trip when internal pressure becomes too great, potentially preventing a catastrophic failure of the transformer.

C. Site Security

During operation, general security provisions at the site will include fencing and gates installed to keep the general public out of the substation and switchyard area. Turbine towers and turbine transformers will be secured and locked.

D. Inspections and Records

Visual inspections of secondary containment areas and electrical equipment will be conducted as required by the manufacturer as part of the regular facility inspection program. These inspections will follow the written guidelines and will be documented. During inspections, personnel will observe oil-containing equipment for any visible signs of deterioration, the integrity of the secondary containment systems and leaks that might cause a spill and accumulation of oil. Visible oil leaks will be promptly repaired. If the leak is not repairable, the contents will be transferred to a drum.

E. Training

A program will be developed for personnel that will be responsible for handing transformer oil. The training will include the following topics:

- Operation and maintenance of equipment to prevent discharges;
- Applicable pollution control laws, rules, and regulations;
- General facility operations; and
- The contents of the facility spill prevention and control plan.

Spill prevention and control briefings will also be held annually to assure adequate understanding of the prevention and control plan, to provide a description of any known spill, failures, any malfunctioning components, and any recently developed precautionary measures. Appropriate personnel will also be properly instructed in the operation and maintenance of all equipment to prevent oil spills.

Records of training will be maintained and include subject matter and names of personnel in attendance.

5.2.6 Best Management Practices Maintenance

All temporary and permanent erosion and sediment control BMPs will be maintained and repaired as needed to ensure continued performance of their intended function. Maintenance and repair will be conducted in accordance with each particular BMP specifications. All temporary erosion and sediment control BMPs will be removed after the final site stabilization is achieved or after the temporary BMPs are no longer needed. Trapped sediment will be removed or stabilized on-site. Disturbed soil resulting from removal of BMPs or vegetation will be permanently stabilized.

5.2.7 Water Takings

5.2.7.1 Stream Diversion if Discharge Amount Exceeds 50,000 LPD and Dam and Pump Technology is Used

The water taker will regulate the discharge at such a rate that there is no flooding in the downstream area and no soil erosion, or stream channel scouring is caused at the point of discharge. The water taker will use a discharge diffuser or other energy dissipation device, if necessary, to mitigate flows which physically alter the stream channel or banks.

Siltation control measures will be installed at both the taking location upstream of the construction site and (if necessary) the discharge site and will be sufficient for the volumes pumped. All measures will be taken to properly maintain these control devices throughout the construction period.

5.2.7.2 Water Takings by Tanker for Dust Suppression and Equipment Washing

Notwithstanding the authorized rate of taking, this approval limits the taking of water at the specified location for up to 10% of the instantaneous streamflow present on the day or days of taking. The authorized taking rate may therefore have to be adjusted downward to remain within this 10% maximum.

Prior to taking water from these locations, the water taker will contact the Long Point Region Conservation Authority to determine if any low water conditions have been declared and are in effect for these water bodies. The Permit Holder will not take water from this location if a Level 2 or Level 3 low water condition has been declared.

This Permit does not allow for nor support any modification to the existing stream channel by excavation or damming.

5.2.7.3 Turbine Foundation Dewatering

A review of the hydrogeological characteristics of the proposed locations, as presented in a geotechnical investigation carried out at the site (AMEC, 2011) was undertaken to anticipate dewatering requirements. Based on this information, the anticipated depths of excavation for shallow spread footings range from 1.5 to 5.5 m below ground surface (see Table 2 of AMEC, 2011). In approximately nine locations, the depth of the excavation may be below the water table and groundwater inflows may occur. However, the local sediments are dominated by clay materials and the anticipated rate of groundwater inflow is expected to be small. At other locations, some minor dewatering may also be required to remove precipitation, runoff or snow melt in the excavations which may accumulate where the tight clay materials will prevent rapid drainage of water into the soils.

To maintain dry working conditions, water will be removed from the excavations through sumps and will be discharged and returned to the environment close to the excavation. It is understood that dewatering of excavations at each location would be required for a period of three weeks or less.

At locations where groundwater is encountered or runoff accumulates during excavating for foundations and dewatering of excavations is required, the construction contractors will monitor and record the amount of water

withdrawn on a daily basis. Should this amount be less than 50,000 L/day, then no further action need be taken. If it is expected that greater than 50,000 L/day will be withdrawn, then the following actions will be implemented:

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

5.3 Construction Plan Report

The Construction Plan Report indicates that there are potential negative environmental effects on surface water associated with erosion, sedimentation and accidental spills of contaminants. The net effect on any of the drainage ditches will be minimal after the implementation of mitigation and management practices. The Construction Plan Report indicates the following management options:

- Minimal vegetation cutting or clearing will occur within any identified significant natural feature;
- Construction activities occurring in close proximity to woodlots will use tree protection fencing and setbacks from the drip line of trees to avoid disturbance or damage to root structures;
- Removal of riparian vegetation will be avoided, if possible;
- Silt fencing will be used adjacent to watercourses and wetlands to prevent run-off and sedimentation effects;
- Proper maintenance of vehicles and construction equipment;
- Regular inspection of vehicles and the construction site to ensure BMPs and other mitigation measures are being used consistently and in the correct manner to reduce the likelihood of any spills;
- Conducting refuelling and maintenance in designated areas;
- Maintenance of a supply of spill control materials (absorbent material, absorbent booms, etc.) in locations where construction equipment is maintained and used;
- Proper training of workers for spill prevention and containment;
- Regular review of the spill response plan by all construction workers;
- Removal of accumulated sediment from control measures (ponds, fencing, etc.) at completion of Construction and Installation activities or after significant accumulation; and
- Minimizing construction during wet weather.

The appropriate mitigation measures will be decided on at the time of construction.

5.4 Monitoring Plan

The following sections provide a description of the activities that will be undertaken to monitor the effects of erosion/sedimentation and accidental spills of contaminants on water quality.

5.4.1 Erosion and Sedimentation

The potential negative environmental effects associated with erosion and sedimentation during Construction and Decommissioning Phases of the Project are described in Section 5.1.2. In order to monitor these effects, regular visual assessment of the drainage ditches within 120 m of Project components will be conducted during these Phases. Additionally, regular visual assessment of the employed mitigation measures (i.e., silt fencing, plastic sheeting) will be undertaken to ensure that the measures are installed properly or if maintenance is required. If an increase in in-stream sediment is observed, water samples will be taken to confirm this observation.

5.4.2 Accidental Spills of Contaminants

The potential negative environmental effects associated with accidental spills of contaminants during all Phases of the Project are described in Section 5.1.4. If an accidental spill or oily film is identified in a watercourse, it will be dealt with immediately in accordance with the MOE's Spills and Discharges Reporting Protocol as required by the *Ontario Environmental Protection Act* (s. 92 and s. 15). In the case of larger spills with a risk of contamination in downstream areas, and investigation including water samples will be taken to measure VOCs and PAHs. Contingency measures such as immediate containment and remediation of the contaminated area, removing/replacing leaking/malfunctioning equipment and relocating construction and refuelling equipment away from the affected drainage ditch will be undertaken.

5.4.3 Directional Drill and Punch/Bore Crossings

To mitigate potential effects from directional drilling and punch and bore crossings, all applicable DFO Operational Statements will be followed. In addition, efforts have been made to design the entry and exit points and work areas for the drilling operations such that they are kept outside of the natural feature and that a minimum 10 m no-work zone and buffer area between the entry/exit point and the natural feature boundary is maintained.

5.4.4 Water Takings

The potential negative environmental effects associated with water takings during Construction and Decommissioning Phases of the Project are described in Section 5.1.5. In order to monitor these effects, discharge will be sampled each day that water is discharged and analyzed for total suspended solids (TSS). In the event that sampling results show that TSS in the discharge water exceeds 25 mg/L, the construction contractor will implement appropriate contingency measures, such as utilizing a settling tank, geosock or similar device, to mitigate these impacts.

6.0 FISHERIES ACT REVIEW

Site preparation and construction, operations and decommissioning of the Project are not expected to have negative effects on the water features located within the Project Area. However, where improvements or construction of new water crossings are necessary, and where harmful alteration, disruption or destruction (HADD) of fish habitat may occur, authorization from the Minister of Fisheries and Oceans Canada may be necessary. A conservative approach was used in the REA submission to mitigate, to the extent practical, all potential effects on fish and fish habitat within all watercourses to be affected. Through the *Fisheries Act*, DFO has developed a series of Ontario Operational Statements that relate to watercourse crossing activities in Ontario, as discussed earlier in this document.

If the designated works meet the criteria outlined in the Operational Statements, it is not necessary for the proponent to under go a Fish and Fish Habitat review and provision of a Notification form to DFO a minimum of 10 days prior to construction is required. If a crossing is not covered by an Operational Statement, then a formal crossing plan must be submitted for a case-specific review under the *Fisheries Act*. NextEra Wind Energy Canada met with the Long Point Conservation Authority to determine any necessary approvals that would be administered by the Conservation Authority on behalf of DFO. The Long Point Conservation Authority has a level II agreement with DFO which confers the following responsibilities to the conservation authority:

- The local Conservation Authority conducts the initial review of the Project to identify any effects to fish and fish habitat. If there are potential effects to fish and fish habitat, the Project is forwarded to the local DFO office for further review.
- In addition to the above, the Conservation Authority determines how the proponent can mitigate any potential effects to fish and fish habitat. If effects to fish and fish habitat can be mitigated, then the Conservation Authority issues a letter of advice. If effects to fish and fish habitat cannot be fully mitigated, the Project is forwarded to the local DFO office for further review.
- Based on the current design it is not anticipated that an Authorization would be required, however if this is necessary then an Authorization would have to be obtained prior to construction through DFO, in conjunction with LPRCA.

7.0 CONCLUSION

Overall, the site investigations completed between June 5^{h} and September 10, 2010, confirmed the information documented during the records review. According to the definition of a water body outlined in O. Reg. 359/09, only 26 of the 243 are considered to be water bodies and were assessed. No significant residual effects are expected on water bodies within the Project Area, subject to recommended mitigation measures being followed and appropriate approvals being received, as necessary. Additional complementary mitigation measures have been previously identified in other reports, including the Natural Heritage Assessment Report.

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FIGURE 1

Project Area

FIGURE 2

Water Assessment Features East

FIGURE 3

Water Assessment Features West

APPENDIX A

Drainage Features and Identified Waterbodies

Table 1: Drainage Features and Identified Water Bodies within 120 m of the Project Location

Location ID	Nearest Turbine	Project Component(s) within 120 m of Drainage Feature	UTM Easting	UTM Northing	Distance to disturbance (m)	Meets O. Reg. 359/09 definition of "water body"	If not a water body, reason	Within Haldimand County OP Riverine Hazardland (Valleyland)?
Drainage features that ARE water bodies								
7a	13, 14	crossed beneath by directional drilled underground cable between T13 and Turbine 14	573653	4746482	0	Y		Y
55	23	crossed by overhead cable at Concession 5 Walpole	580799	4747349	0	Y		Y
70	T59	within 120m of access road and underground cable at T59	577340	4747295	0	Y		
78	27, 30, T62	within 120 m of overhead cable at Concession 5 Rainham	587122	4746319	58	Y		
86	18	crossed by overhead cable at Concession 5 Rainham	588516	4748031	0	Y		
87	18	crossed by access road and underground cable to T18	588570	4748345	0	Y		
125c	50	within 120 m of meteorological tower SMT04	590629	4741851	15	Y		
141/142	54	crossed by access road and underground cable to T54 - small land crossing already present	595319	4744185	0	Y		
143	45, 55	crossed by overhead cable at Regional Road 3	596512	4745147	0	Y		
150b	55, 56	crossed by access road and underground cable to T55 - small land crossing already present	596673	4744207	0	Y		
158	3	crossed by access road and underground cable to T3	574571	4748799	0	Y		Y
161a	5, T59	crossed by crossed beneath by directional drilled underground cable along Concession 6 Walpole	576843	4747821	0	Y		Y
162b	5, 16	crossed beneath by directional drilled underground cable along Concession 6 Walpole	577528	4748015	0	Y		
174b	T61	crossed by overhead transmission line, within 120 m of T61 and substation	578166	4746086	0	Y		
184c	26, T58	crossed beneath by directional drilled underground cable along Concession 5 Walpole	585417	4748223	0	Y		Y
185b	27, T62	crossed by overhead cable at Concession 5 Rainham	586836	4747620	0	Y		Y
214	10, 11	crossed beneath by directional drilled underground cable along Concession 7 Rainham	587215	4750569	0	Y		
216	31, 32	crossed beneath by directional drilled underground cable Fisherville Road	590201	4745976	0	Y		Y
262	T60, T61, t-line	crossed by overhead transmission line	577648	4745155	0	Y		Y
286	19, 28	crossed by overhead cable at Concession 7 Rainham	591764	4748751	0	Y		
287	19, 28	crossed by overhead cable at Concession 7 Rainham	591820	4748765	0	Y		
304	T60, T61, t-line	crossed by overhead transmission line	577481	4745158	0	Y		Y
330	30, T61	crossed beneath by directional drilled underground cable at	587487	4746405	0	Y		Y

Location ID	Nearest Turbine	Project Component(s) within 120 m of Drainage Feature	UTM Easting	UTM Northing	Distance to disturbance (m)	Meets O. Reg. 359/09 definition of "water body"	If not a water body, reason	Within Haldimand County OP Riverine Hazardland (Valleyland)?
		Concession 4 Rainham						
331	30, T61	crossed beneath by directional drilled underground cable at Concession 4 Rainham	587537	4746405	0	Y		Y
347	25	crossed beneath by directional drilled underground cable north of Concession 4 Walpole	584469	4746558	0	Y		
361	58	Within 120m of turbine, 58 and associated access road and cable	584462	4748720	25	Y		Y
Drainage features that are NOT water bodies								
4	2, 14	crossed by underground cable and access	573970	4746943		N	ploughed	
5	14	crossed by underground cable and access	574059	4746632		N	ploughed	
6	14	within 120 m of T14	574210	4746375		N	ploughed	
11	12, 13	within 120 m of underground cable and access	572729	4746313		N	ploughed	
12a	4	crossed by overhead cable at Concession 6 Walpole	576044	4747791		N	ploughed	
12b	4	crossed by underground cable and access	575894	4748064		N	ploughed	
13	15	crossed by underground cable and access	576054	4747459		N	ploughed	
16	1, 5	within 120 m of underground cable and access	576491	4749173		N	ploughed	
18	1	within 120 m of T1	576061	4749951		N	ploughed	
20a	5	crossed by underground cable and access	577096	4748021		N	ploughed	
21	5	crossed by underground cable and access	577003	4748383		N	ploughed	
22	5	within 120 m of underground cable and access	576880	4748424		N	ploughed	
23	8	crossed by underground cable and access	581340	4749502		N	ploughed	
24	8	crossed by underground cable and access	581036	4749413		N	ploughed	
25	8	within 120 m of underground cable and access	580967	4749203		N	ploughed	
26a	8	crossed by underground cable and access	580516	4749324		N	ploughed	
27	7, 8	crossed by underground cable and access	580287	4749281		N	ploughed	
28	7	crossed by underground cable and access	579984	4749215		N	ploughed	
30	7, T57	crossed by underground cable and access	579463	4749068		N	ploughed	
32	T57	within 120 m of underground cable and access	579151	4748810		N	ploughed	
35	6	within 120 m of T6	578527	4748923		N	ploughed	
36	6	within 120 m of T6	578522	4748790		N	ploughed	
40	26	within 120 m T26	584901	4747179		N	ploughed	
41	26	crossed by underground cable and access	584508	4747311		N	ploughed	
45	25	crossed by underground cable and access	584089	4747273		N	grassed and functions as drainage ditch	
46b	24, 25	crossed by underground cable and access	583644	4747139		N	ploughed	
48	24	crossed by underground cable and access	583165	4747197		N	ploughed	
50	17, 24	crossed by underground cable and access	582793	4747433		N	ploughed	
52	17	crossed by underground cable and access	582666	4747802		N	ploughed	
52b	17	within 120 m of meteorological Tower FPMT03	582883	4748108		N	ploughed	

Location ID	Nearest Turbine	Project Component(s) within 120 m of Drainage Feature	UTM Easting	UTM Northing	Distance to disturbance (m)	Meets O. Reg. 359/09 definition of "water body"	If not a water body, reason	Within Haldimand County OP Riverine Hazardland (Valleyland)?
55c	23	within 120 m of overhead cable at Concession 5 Walpole	580513	4747205		N	man-made	
55d	23	crossed by overhead cable at Concession 5 Walpole	580378	4747173		N	ploughed	
56	23	crossed by underground cable and access	580992	4746946		N	ploughed	
57	22	within 120 m of overhead cable	579535	4747079		N	ploughed / grassed	
57b	22	within 120 m of overhead cable	579458	4747104		N	man-made	
58	22	crossed by underground cable and access	579574	4746966		N	ploughed	
59	22	crossed by underground cable and access	579604	4746834		N	ploughed	
60	22	crossed by underground cable and access	579607	4746672		N	ploughed	
61	22	crossed by underground cable and access	579644	4746543		N	ploughed	
62	22	crossed by underground cable and access	579670	4746469		N	ploughed	
68a	16	within 120 m of underground cable and access	577832	4747245		N	ploughed	
71	T59	within 120 m of T T59	577056	4747106		N	ploughed	
74b	30	within 120 m of underground cable and access	587461	4746023		N	ploughed	
75	30	within 120 m of underground cable and access	587344	4746101		N	ploughed	
76	30	crossed by underground cable and access	587314	4746202		N	ploughed	
77	27, 30, T62	crossed by underground cable and access	587288	4746309		N	ploughed	
79	27, T62	crossed by underground cable and access	587168	4746504		N	ploughed	
80	27, T62	crossed by underground cable and access	587145	4746584		N	ploughed	
81	27, T62	crossed by underground cable and access	587090	4746747		N	ploughed	
82a	27, T62	crossed by underground cable and access	587050	4746891		N	ploughed	
82b	27, T62	within 120 m of T62	587357	4746899		N	ploughed	
84b	T62	crossed by T62	587249	4747055		N	ploughed	
84c	T62	within 120 m of underground cable and access	587295	4747140		N	ploughed	
90	9	crossed by underground cable and access	585916	4749804		N	grassed	
92a	19	crossed by underground cable and access	590795	4749296		N	ploughed	
94	28	crossed by underground cable and access	591075	4748294		N	ploughed	
96a	33	crossed by overhead cable at Concession 4 Rainham	594476	4747945		N	ploughed	
98b	31	within 120 m of overhead cable at Concession 4 Rainham	589498	4746801		N	ploughed / grassed	
99	31	crossed by underground cable and access	589610	4746317		N	ploughed	
99b	31	crossed by underground cable and access	589558	4746519		N		
100	31	crossed by underground cable and access	589642	4746135		N	ploughed / grassed	
101	34	within 120 m of overhead cable of Concession 4 Rainham	588353	4744507		N	ploughed	
102a	34	crossed underground cable and access at T34	588445	4744313		N	ploughed	
103a/b	35	within 120 m of T35	588480	4744042		N	ploughed	
103d	35	within 120 m of T35	588523	4743890		N	ploughed	
104a	36	within 120 m of T36	589122	4744266		N	ploughed	
105c	37	crossed by underground cable and access of T37	589987	4744055		N	ploughed	

Location ID	Nearest Turbine	Project Component(s) within 120 m of Drainage Feature	UTM Easting	UTM Northing	Distance to disturbance (m)	Meets O. Reg. 359/09 definition of "water body"	If not a water body, reason	Within Haldimand County OP Riverine Hazardland (Valleyland)?
105d	37	crossed by underground cable and access of T37	590022	4743930		N	ploughed	
105e	37	crossed by underground cable and access of T37	590039	4743865		N	ploughed	
105f	37	within 120 m of underground cable and access of T37	590147	4743690		N	man-made	
105g	37	within 120 m of underground cable and access of T37	590144	4743734		N	ploughed	
109	39, 40	within 120 m of underground cable and access	592365	4744923		N	ploughed	
110	42, 43	crossed by overhead cable at Kohler Rd.	594033	4745911		N	ploughed	
115	45	crossed by underground cable and access	596481	4745600		N	ploughed	
121	49	crossed by underground cable and access at T49	590276	4742120		N	ploughed / grassed	
122a	49	crossed by underground cable and access at T49	591029	4742299		N	ploughed	
122b	49	crossed by underground cable and access at T49	590936	4742279		N	ploughed	
122c	49	crossed by underground cable and access at T49	590835	4742272		N	ploughed	
123	49	crossed by underground cable and access at T49	590075	4742274		N	ploughed	
125a	49	within 120 m of T48	590529	4742181		N	ploughed	
125b	48	crossed by underground cable and access at T49	590338	4742498		N	ploughed	
127b	51	within 120 m of overhead cable at Fisherville Rd.	591260	4742402		N	ploughed	
127c	51	within 120 m of overhead cable at Fisherville Rd.	591324	4742358		N	ploughed	
128	51	crossed by underground cable and access	591688	4742606		N	ploughed	
129	51	within 120 m of underground cable and access	591783	4742429		N	ploughed	
131a	52	crossed by underground cable and access	592820	4744091		N	ploughed	
132a	52	crossed by underground cable and access	592921	4743770		N	ploughed	
132b	52	crossed by underground cable and access	593036	4743393		N	ploughed	
134	52	crossed by underground cable and access	593186	4743285		N	ploughed	
136a	52, 53	crossed by underground cable and access	593504	4743486		N	ploughed	
137a	52, 53	crossed by underground cable and access	593670	4743517		N	ploughed	
137b	52, 53	crossed by underground cable and access	593785	4743452		N	ploughed	
148b	55, 56	within 120 m of underground cable and access	597078	4744298		N	interior forest drain - no fish habitat	
150a	55, 56	within 120 m of T55	596826	4744039		N	ploughed	
151	55, 56	within 120 m of T55	596888	4743846		N	ploughed	
153a	4, 14	within 120 m of overhead cable at Nanticoke Rd.	574425	4747536		N	ploughed	
153b	4, 14	crossed by overhead cable at Concession 6 Walpole	574586	4747386		N	ploughed	
155a	4, 14	crossed by overhead cable at Concession 6 Walpole	575119	4747483		N	ploughed / grassed	
155b	4, 14	crossed by overhead cable at Concession 6 Walpole	575188	4747505		N	ploughed	
159b	4, 5	crossed by underground cable	576280	4748821		N	ploughed	
160a	4, 5	crossed by underground cable	576280	4748760		N	grassed	Y
160b	4, 5	crossed by underground cable	576280	4748707		N	grassed	Y
168	23	within 120 m of overhead cable at Concession 5 Rainham	581222	4747333		N	ploughed	

Location ID	Nearest Turbine	Project Component(s) within 120 m of Drainage Feature	UTM Easting	UTM Northing	Distance to disturbance (m)	Meets O. Reg. 359/09 definition of "water body"	If not a water body, reason	Within Haldimand County OP Riverine Hazardland (Valleyland)?
170	13, 14	crossed by underground cable and access	573604	4746030		N	ploughed	Y
175	T61	crossed by overhead transmission line	578663	4746148		N	ploughed	
176	22, T61, t-line	crossed by overhead transmission line	578780	4745991		N	ploughed	
177a	22	crossed by overhead transmission line	579802	4746338		N	ploughed / grassed	
177d	22	within 120 m of overhead transmission line	579573	476151		N	ploughed	
178	22	within 120 m of overhead transmission line	580101	4746315		N	ploughed	
179b	16, 22	crossed by overhead cable at Concession 5 Walpole	578586	4746805		N	ploughed / grassed	
180	6, 16	crossed by overhead cable at Sandusk Rd.	578200	4747723		N	ploughed / grassed	
182	9, 10	crossed by overhead cable at Concession 7 Rainham	586249	4750370		N	ploughed / grassed	
183	26, T58	within 120 m of overhead cable at Concession 5 Walpole	584998	4748016		N	man-made	
184a	26, T58	within 120 m of overhead cable at Concession 5 Walpole	584931	4748093		N	ploughed / grassed	
184b	26, T58	crossed by overhead cable at Concession 5 Walpole	585222	4748182		N	ploughed	
184d	9, T58	crossed by overhead cable at Regional Road 53	585610	4748676		N	ploughed / grassed	
184e	9, T58	crossed by overhead cable at Regional Road 53	585634	4748572		N	ploughed / grassed	
185a	27, T62	crossed by overhead cable at Concession 5 Rainham	587015	4747684		N	grassed	
185d	18, T62	within 120 m of overhead cable at Concession 5 Rainham	587417	4747771		N	ploughed	
185e	18, T62	within 120 m of overhead cable at Concession 5 Rainham	587730	4747778		N	ploughed	
187	19, 28	within 120 m of overhead cable at Concession 5 Rainham	590969	4748560		N	ploughed	
188	33	within 120 m of overhead cable at Kohler Rd.	593520	4747610		N	man-made	
188a	33	within 120 m of overhead cable at Kohler Rd.	593577	4747386		N	ploughed / grassed	
188b	33	crossed by overhead cable at Kohler Rd.	593621	4747232		N	ploughed / grassed	
188c	27, T62	crossed by overhead cable Concession 5 Rainham	586832	4747576	0	N	Grassed swale draining into 185b	N
188d	42,43	within 120 m of overhead cable at Kohler Rd.	593819	4746595		N	man-made	
189	33	within 120 m of overhead cable at Concession 4 Rainham	593947	4747830		N	ploughed	
190	42	within 120 m of Concession 4 Rainham	593282	4746268		N	ploughed	
191	42	within 120 m of Concession 4 Rainham	593428	4746303		N	man-made	
192	42	within 120 m of Concession 4 Rainham	593064	4746319		N	man-made	
193	42	within 120 m of Concession 4 Rainham	593557	4746230		N	man-made	
194b	26	within 120 m of overhead cable at Concession 4 Walpole	585334	4746689		N	man-made	
195c	27	within 120 m of overhead cable at Regional Rd. 53	586313	4746266		N	grassed	
196	31, T62	within 120 m of overhead cable at Concession 4 Rainham	588133	4746539		N	ploughed	
197	31	within 120 m of overhead	588892	4746708		N	man-made	

Location ID	Nearest Turbine	Project Component(s) within 120 m of Drainage Feature	UTM Easting	UTM Northing	Distance to disturbance (m)	Meets O. Reg. 359/09 definition of "water body"	If not a water body, reason	Within Haldimand County OP Riverine Hazardland (Valleyland)?
		cable at Concession 4 Rainham						
198b	31	within 120 m of overhead cable at Concession 4 Rainham	588837	4746590		N	man-made	
200b	31	within 120 m of overhead cable at Fisherville Rd.	589977	4746263		N	man-made	
202a	32, 38	crossed by overhead cable at Concession 3 Rainham	591048	4745783		N	grassed	Y
202b	32, 38	crossed by overhead cable at Concession 3 Rainham	591282	4745807		N	grassed	
202c	32, 38	within 120 m of overhead cable at Concession 3 Rainham	591221	4745867		N	man-made	
203a	32, 40	crossed by overhead cable at Concession 3 Rainham	592036	4745979		N	ploughed	
203b	32, 40	crossed by overhead cable at Concession 3 Rainham	592288	4746038		N	ploughed	
203c	32, 40	within 120 m of overhead cable at Concession 3 Rainham	592177	4745895		N	man-made	
203d	38, 51	within 120 m of overhead cable at Concession 3 Rainham	591751	4743919		N	man-made	
204	8, 17	within 120 m of overhead cable at Cheapside Rd.	581771	4748616		N	ploughed	
205	8, 17	within 120 m of overhead cable at Cheapside Rd.	581823	4748789		N	man-made	
206	22, 23	crossed by overhead cable at Concession 5 Walpole	580162	4747129		N	ploughed	
208	24	within 120 m of T24	582937	4746909		N	ploughed / grassed	
209	9	crossed by overhead cable at Regional Rd. 53	585342	4749547		N	ploughed / grassed	
265	9	crossed by overhead cable at Regional Road 53	585452	4749166		N	ploughed / grassed	
211-a	27, 30	within 120 m of Concession 4 Rainham	586600	4746202		N	man-made	
211-b	27, 30	within 120 m of Concession 4 Rainham	586833	4746253		N	man-made	
211-c	30, T62	within 120 m of Concession 4 Rainham	587804	4746468		N	ploughed / grassed	
212	31	within 120 m of Concession 4 Rainham	589125	4746860		N	man-made	
213	31	within 120 m of Concession 4 Rainham	589392	4746865		N	man-made	
215	10	within 120 m of overhead cable at Concession 7 Rainham	586589	4750530		N	man-made	
217	31, 32	crossed by overhead cable at Fisherville Road	590069	4746445		N	roadside ditch/grassed	Y
218	31, 32	within 120 m of Fisherville Rd.	590025	4746519		N	roadside ditch/grassed	
219	31, 32, 37, 38	crossed by overhead cable at Fisherville Road	590398	4745310		N	ploughed	
221	37, 38	crossed by overhead cable at Concession 4 Rainham	590852	4743772		N	ploughed	
222	38, 51	within 120 m of overhead cable at Regional Rd. 3	591379	4743865		N	ploughed / grassed	
222-a	38, 51	within 120 m of overhead cable at Regional Rd. 3	591056	4743786		N	ploughed	
223	38, 51	crossed at Regional Rd. 3	591828	4743974		N	grassed	
224	41, 42	within 120 m of overhead cable at Concession 3 Rainham	592751	4746137		N	ploughed	
225	41, 42	within 120 m of overhead cable at Concession 4 Rainham	592821	4746237		N	man-made	
226	43, 54	within 120 m of overhead cable at Regional Rd. 3	595224	4744954		N	man-made	
228	45, 54	within 120 m of overhead cable at Regional Rd. 3	595772	4744945		N	man-made	

Location ID	Nearest Turbine	Project Component(s) within 120 m of Drainage Feature	UTM Easting	UTM Northing	Distance to disturbance (m)	Meets O. Reg. 359/09 definition of "water body"	If not a water body, reason	Within Haldimand County OP Riverine Hazardland (Valleyland)?
229	45, 54	within 120 m of overhead cable at Regional Rd. 3	596018	4745026		N	ploughed / grassed	
231	45, 55	within 120 m of overhead cable at Regional Rd. 3	596663	4745118		N	man-made	
233	45, 46	crossed by overhead cable at Regional Rd. 3	596979	4745267		N	roadside ditch/grassed	
234	45, 46	crossed by overhead cable at Regional Rd. 3	597179	4745312		N	roadside ditch/grassed	
235	46	crossed by underground cable and access	597498	4745534		N	grassed	
236	56	within 120 m of T56	596978	4743571		N	grassed	
237	52	crossed by underground cable and access Rd.	592983	4743559		N	ploughed	
238	38, 51	within 120 m of overhead cable at Regional Rd. 3	592307	4744015		N	ploughed	
238-a	38, 51	within 120 m of overhead cable at Regional Rd. 3	592308	4744096		N	man-made	
239	38, 51	within 120 m of overhead cable at Regional Rd. 3	592086	4744044		N	man-made	
240	38, 51	within 120 m of overhead cable at Regional Rd. 3	591855	4743836		N	man-made	
242-a	48, 51	within 120 m of overhead cable at Fisherville Rd.	591078	4742966		N	ploughed	
244	36	within 120 m of overhead cable at Regional Rd. 3	589479	4743525		N	man-made	
246	49, 51	crossed by overhead cable at Fisherville Road	591186	4742594		N	ploughed	
246-a	49, 51	crossed by overhead cable at Fisherville Road	591172	4742652		N	ploughed	
247	19, 33	within 120 m of overhead cable at Kohler Rd.	593084	4749099		N	ploughed	
248	19, 33	crossed by overhead cable at Kohler Rd.	593093	4748903		N	ploughed / grassed	
259	16, 21	within 120 m of underground cable at Concession 5 Walpole	578024	4746674		N	ploughed / grassed	
260	T60, T61, t-line	crossed by overhead transmission line	576765	4744348		N	grassed	
260a	T60, T61, t-line	crossed by overhead transmission line	577459	4744659		N	ploughed / grassed	Y
260b	T60, T61, t-line	crossed by overhead transmission line	577398	4744935		N	ploughed / grassed	
289	28, 33	crossed by overhead cable at Kohler Rd.	593373	4748009		N	ploughed	
296	4	within 120 m of T4	575536	4748523		N	no wet vegetation	Y
297	5, T59	within 120 m of overhead cable at Concession 6 Walpole	576607	4747775		N	ploughed	Y
300	7	within 120 m of T7	579834	4748932		N	ploughed	
301	7, 8	within 120 m of underground cable and access	580341	4749224		N	ploughed	
311	22, 23	crossed by overhead transmission line	580520	4746773		N	ploughed	
313	11	crossed by underground cable and access	587496	4751089		N	ploughed	
316	31, T62	within 120 m of overhead cable at Concession 4 Rainham	588237	4746671		N	ploughed	
317	31, T62	within 120 m of overhead cable at Concession 4 Rainham	588553	4746699		N	no wet feature	
318	31, T62	within 120 m of overhead cable at Concession 4 Rainham	588733	4746779		N	ploughed	
320	19, 33	crossed by overhead cable at Concession 5 Rainham	592880	4748939		N	ploughed	
321	19, 33	crossed by overhead cable at Kohler Rd.	593156	4748747		N	ploughed	
322	33	within 120 m of overhead cable at Kohler Rd.	593526	4747548		N	ploughed	
323	33	within 120 m of overhead	593720	4746906		N	ploughed	

Location ID	Nearest Turbine	Project Component(s) within 120 m of Drainage Feature	UTM Easting	UTM Northing	Distance to disturbance (m)	Meets O. Reg. 359/09 definition of "water body"	If not a water body, reason	Within Haldimand County OP Riverine Hazardland (Valleyland)?
		cable at Kohler Rd.						
324	33	within 120 m of overhead cable at Concession 4 Rainham	594182	4747889		N	ploughed	
334	35, 36	within 120 m of overhead cable at Regional Rd. 3	589245	4743453		N	swimming pool	
338	22	crossed by overhead cable at Concession 5 Rainham	580016	4747078		N	ploughed	
339	22	crossed by underground cable and access road	580038	4747002		N	ploughed	
340	22	crossed by overhead transmission line	580147	4746624		N	ploughed	
341	22	crossed by overhead transmission line	580190	4746479		N	ploughed	
295	13, 14	crossed by underground cable and access road between 13 and 14	573587	4746193		N	ploughed	Y
338	22	crossed by overhead cable at Concession 5 Walpole	580016	4747078		N	ploughed	
346	27	crossed by overhead cable at Regional Rd. 53	586175	4746701		N	field swale	
348	25	crossed by underground cable	584264	4746657		N	field swale	
349	25	crossed by underground cable	584203	4746975		N	field swale	
350	3	within 120 m of underground cable at Nanticoke Rd.	574195	4748374		N	no watercourse, hazardland	Y
351	39	within 120 m of overhead cable at Concession 3 Rainham	591784	4746030		N	no watercourse, hazardland	Y
352	39	within 120 m of overhead cable at Concession 3 Rainham	592307	4746163		N	no watercourse, hazardland	Y
355	56	crossed by underground cable and access road	596282	4744389		N	ploughed	

APPENDIX B

Site Investigation Field Notes

At Golder Associates we strive to be the most respected global group of companies specializing in ground engineering and environmental services. Employee owned since our formation in 1960, we have created a unique culture with pride in ownership, resulting in long-term organizational stability. Golder professionals take the time to build an understanding of client needs and of the specific environments in which they operate. We continue to expand our technical capabilities and have experienced steady growth with employees now operating from offices located throughout Africa, Asia, Australasia, Europe, North America and South America.

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