



Stantec

**AMHERST ISLAND WIND ENERGY PROJECT
WATER ASSESSMENT AND WATER BODY
REPORT**

File No. 160960595

April 2013

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Prepared for:

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1.0 Introduction

1.1 PROJECT OVERVIEW

Windlectric Inc. (Windlectric) is proposing to develop, construct, and operate the 56 - 75 megawatt (MW) Amherst Island Wind Energy Project (the Project) within Loyalist Township (the Township) in the County of Lennox and Addington (the County) in eastern Ontario, in response to the Government of Ontario's initiative to promote the development of renewable electricity in the province.

The Project Study Area includes Amherst Island, an approximately 3 - 15 kilometre wide corridor stretching between the Island and the mainland where the submarine cable is proposed. The mainland portion of the Project Study Area stretches from the mainland shoreline, north of the Invista Transformer Station and is generally bounded by i) County Road 4 to the West; ii) the Canadian National Railway line to the North; and iii) approximately 500 m East of Jim Snow Drive to the East (**Figure 1 - Appendix A**).

The basic components of the proposed Project include up to 36 Siemens wind turbines. The turbine model proposed utilizes the same 36 turbine pad locations that have been subject to the assessment required under the Renewable Energy Approval (REA). The layout includes 24 Siemens SWT-2.3-113 2300 kW and twelve (12) Siemens SWT-2.3-113 2221 kW model wind turbines. The layout includes 34 Siemens SWT-2.3-113 2300 kW and two (2) Siemens SWT-2.3-113 2221 kW model wind turbines. The final layout will result in a total installed nameplate capacity of approximately 56 - 75 MW. The number of wind turbines will be dependent upon final selection of the model of the wind turbine most appropriate to the proposed Project.

The proposed Project will also include a 34.5 kilovolt (kV) underground and/or overhead electrical power line collector system, fibre optic data lines from each turbine and/or wireless technology for the communication of data, a transmission line, truck turnaround areas, a submarine cable, an operations and maintenance building, permanent dock, a substation, a switching station, an un-serviced storage shed, one connection point to the existing electrical system, cable vault areas, meteorological tower(s) (met tower(s)), access road(s) to the met tower site(s), and turbine access roads with culvert installations, as required, at associated watercourse crossings.

Temporary components during construction may include staging areas for the turbines, access roads, met tower(s), collector lines and transmission line as well as crane paths, a temporary dock, site office(s), batch plant, central staging areas, and associated watercourse crossings. The electrical power line collector system would transport the electricity generated from each turbine to the substation, along the submarine cable to the mainland and then to a switching station located near to an existing Hydro One Networks Inc. (HONI) 115 kV transmission line.

The Proponent has elected to assess and seek approval for some alternative Project configurations. The REA application process will consider:

- two alternative mainland transmission line routes;
- two alternative switching station locations and corresponding point of common coupling with the HONI line;
- three alternative mainland temporary dock locations along the mainland;
- a submarine cable with three alternative submarine cable routes near the mainland;
- three alternative mainland submarine cable landing locations and corresponding cable vault locations;
- up to three alternative met tower locations; and,
- up to three potential locations for an operations and maintenance building.

Final selection of the sites to be used would be based on the results of consultation activities, detailed design / engineering work, and the conditions experienced during construction.

This **Water Assessment and Water Body Report** is intended to satisfy the requirements outlined within Ontario Regulation 359/09 and is to be submitted as a component of the REA application for the Project. The Project Study Area is not located within the Niagara Escarpment Plan, the Oak Ridges Moraine Conservation Plan Area or the Protected Countryside of the Greenbelt Plan.

In accordance with O. Reg. 359/09, the Project Location includes all land and buildings/structures associated with the Project and any air space in which the Project will occupy. This includes structures such as turbines, access roads and power lines as well as any temporary work areas (the 'constructible area' for the Project) which are required to be utilized during the construction of the Project.

A "Zone of Investigation" has been identified based on the requirements of Ontario Regulation 359/09 (O. Reg. 359/09) and the Ministry of Natural Resources' (MNR) Approval and Permitting Requirements Document (APRD). The zone of investigation encompasses the Project Location and an additional 120 m surrounding the Project Location. This report identifies water bodies that are within the Zone of Investigation and assesses potential negative environmental effects that may result from construction activities. Mitigation measures are also identified to alleviate potential negative environmental effects.

Once the Project layout was confirmed, a water records review and site assessment was conducted according to Section 30(1) of O. Reg. 359/09. Additionally, fish communities were sampled at selected water bodies within the 120 m Zone of Investigation and a general aquatic

habitat assessment was conducted. A combination of background data (including data from ASI Group) and results of Stantec's 2011 and 2012 surveys were used to determine the presence or absence of water bodies and fish habitat within the 120 m Zone of Investigation. Photographs of all water features were taken during field surveys and are included in **Appendix B**.

Locations where water bodies are present within 120 m of the Project Location are presented in Figure 2 and summarized in **Table 3.1**. All water bodies identified in this report are located greater than 30 m from any turbine blade tip. The designation of features as water bodies was agreed upon by field staff using field conditions at the time of the survey and the definition of water body provided in O. Reg. 359/09.

This **Water Assessment and Water Body Report** has been prepared in accordance with O. Reg. 359/09 (s. 39 and 40), the MOE document "Technical Guide to Renewable Energy Approvals" and the MNR's APRD.

1.2 REPORT REQUIREMENTS

A Water Assessment is a required component of a REA application, and includes a Records Review and Site investigation to determine the presence and boundaries of water bodies as defined in O. Reg. 359/09 within 120 m of the Project Location (assuming that no Lake Trout lakes that are at or above development capacity are identified within 300 m). If water bodies are identified within 120 m of the Project Location, a **Water Body Report** must be prepared.

A renewable energy project includes all activities associated with the construction, installation, use, operation, maintenance, changing or retiring of the renewable energy generation facility. Therefore, for the purposes of measuring the distance from the Project Location to a water body, a Project Location boundary is considered to be the outer limit where site preparation and construction activities will occur and where infrastructure will be located (e.g. temporary structures, laydown areas, storage facilities, generation equipment, access roads, transmission lines less than 50 kilometres in length, etc.).

This **Water Assessment and Water Body Report** is intended to satisfy the requirements outlined within O. Reg. 359/09 (s. 39 and 40) and is to be submitted as a component of the REA application. **Table 1.1** summarizes the documentation requirements of the **Water Report** as specified under O. Reg. 359/09.

**AMHERST ISLAND WIND ENERGY PROJECT
WATER ASSESSMENT AND WATER BODY REPORT**

Introduction

April 2013

Table 1.1: Water Assessment Report and Water Body Report Requirements: O. Reg. 359/09

Requirements (Water Assessment)	Completed	Section Reference
A person who proposes to engage in a renewable energy project shall conduct a water assessment, consisting of the following:		
1. A records review conducted in accordance with section 30.	✓	2.2, 4.0
2. A site investigation conducted in accordance with section 31, including:		
31(4)(1). A summary of any corrections to the report.	✓	3, Figure 2
31(4)(2). Information relating to each water body.	✓	4.1 to 4.6
31(4)(3). A map showing boundaries, location/type and distances.	✓	Figure 2 (Appendix A)
31(4)(4). A summary of methods used to make observations for the purposes of the site investigation.	✓	2.2, 2.3
31(4)(5). The name and qualifications of any person conducting the site investigation.	✓	2.4
31(4)(6)(i). The dates and times of the beginning and completion of the site investigation.	✓	2.3 and Appendix D
If an investigation was conducted by visiting the site:		
31(4)(6)(ii). The duration of the site investigation.		2.3 and Appendix D
31(4)(6)(iii). The weather conditions during the site investigation	✓	4 and Appendix D
31(4)(6)(iv). Field notes kept by the person conducting the site investigation.	✓	Appendix D
If an alternative investigation of the site was conducted:		
31(4)(7)(i). The dates of the generation of the data used in the site investigation.		N/A
31(4)(7)(ii). An explanation of why the person who conducted the alternative investigation determined that it was not reasonable to conduct the site investigation by visiting the site.		N/A
Requirements (Water Body)		
4. Report identifies and assesses any negative environmental effects of the project on a water body and on land within 30 metres of the water body.	✓	4.7
5. Report identifies mitigation measures in respect of any negative environmental effects.	✓	6.0
6. Report describes how the environmental effects monitoring plan addresses any negative environmental effects.	✓	7.0
7. Report describes how the construction plan report addresses any negative environmental effects.	✓	7.1

2.0 Methods

2.1 DEFINITION OF A WATER BODY

The presence or absence of water bodies within the Project's 120 m Zone of Investigation was assessed using the definition of a water body provided in O. Reg. 359/09, which is as follows:

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

2.2 RECORDS REVIEW

A water records review was conducted according to Section 30(1) of O. Reg. 359/09. Data were gathered through agency requests and/or accessing online databases as follows:

- Ontario Ministry of Natural Resources
- Land Information Ontario mapping database (LIO 2012)
- Natural Heritage Information Centre online database
- Cataraqui Region Conservation Authority (CRCA)

Copies of all correspondence related to the Records Review will be provided in the Record of Consultation which will be submitted as part of the complete REA application to the MOE. Information obtained as a result of the information requests/records review are presented in Section 4 of this report.

For the purposes of this report, the Amherst Island portion of the Study Area has been divided into drainage areas (Figure 1). Watercourses and waterbodies identified by LIO mapping (MNR, 2009) are delineated in Figure 2 (**Appendix A**) where "watercourses" and "waterbodies" are water features (including lakes, rivers, streams, etc.), as mapped by the MNR. These water features may or may not meet the definition of a water body as described in Section 2.1. Potential waterbodies were also identified through a review of aerial photographs of the Zone of Investigation. Further information on these potential water bodies was obtained during the site investigations (as described in Section 2.3).

The MNR was contacted to obtain any background data regarding fish communities in the Project Location (Peterborough District MNR and the Lake Ontario Management Unit).

2.3 SITE INVESTIGATIONS

Site investigations were carried out according to Section 31 of O. Reg. 359/09. The investigations were conducted on dates provided in Table 2.1.

Table 2.1: Summary of Field Investigations; Amherst Island Wind Project

	Date	Duration
Watercourses		
2011	May 17	9:00-5:00 (8 hours)
	May 18	9:00-6:30 (9.5 hours)
	May 19	9:00-5:45 (8.75 hours)
	May 20	9:00-11:00 (2 hours)
	July 6	12:00-2:00 (2 hours)
	July 7	5:00 pm-6:45 pm (1.75 hours)
	2012	March 27
March 28		11:00-2:30 (3.5 hours)
May 18		6:00 pm-7:00 pm (1 hour)
August 15		11:30-3:00 (3.5 hours)
Lake Ontario		
2011	July 4 to July 13	7:30-3:30 (8 hours per day)
	August 2	11:00-4:30 (5.5 hours)
	August 3	8:30-3:30 (7 hours)
	August 4	11:00-4:00 (5 hours)
	August 5	8:30-4:30 (8 hours)
	September 12	11:00-5:00 (6 hours)
	September 13	8:00-4:00 (8 hours)

The specific time of day at which each water body (or mapped water feature) was assessed, is provided on the field notes included in Appendix D of the Water Assessment and Water Body Report.

In addition to field data collected by Stantec, ASI Group collected bathymetry data and photographs/videos of areas along the proposed submarine cable route between Amherst Island and the mainland and at the proposed dock option locations on the mainland and the island. This information was used to supplement Stantec's habitat information.

The purpose of the site investigations was to:

- Ground truth the results of the records review to identify any required corrections;
- Determine whether any additional water bodies exist, other than those identified in the records review; and
- Identify the boundaries of any water body located within 120 m of the Project Location.

While on site, the field crews used visual inspections to verify the presence or absence of water bodies within 120 m of the Project Location. A few of the surface water features identified on MNR mapping (e.g. watercourses) did not exist in the field; therefore, these features were not classified as water bodies during Stantec's 2011 and 2012 field investigations (**Table 3.1**).

In some cases, marshes or portions of other on-line wetland features meet the definition of a water body if they are part of a permanent or intermittent channel or seepage area. All other wetland types do not contain channels and therefore do not meet the definition of a water body under O. Reg. 359/09 and are addressed in the NHA/EIS.

Once the Project Layout and locations of water bodies were confirmed, a general aquatic habitat assessment was conducted within the 120 m Zone of Investigation. Fish communities were sampled at representative locations. Fish were collected using either a Model 12 or Smith Root Model 24 backpack electrofisher or minnow traps and were sampled on May 17 to 20 and July 6 and 7, 2011 in small flowing water bodies. In cases where one water body traversed several Project components, one or two representative locations were fished to determine the general species assemblage for the watercourse. Specific locations where fishing was completed are identified in the fisheries data provided **Appendix C**.

With respect to Lake Ontario, habitat mapping was conducted by boat within the Project Location in water up to 2 m in depth. Information regarding physical characteristics of areas greater than 2 m deep was collected for Windlectric by ASI Group and provided supplementary data to the Stantec surveys. Nearshore fish sampling in Lake Ontario was conducted from July 4 to 13 and August 2 to 4, 2011. Fish communities were sampled in representative locations in the nearshore area using non-lethal fishing methods (electrofishing boat, minnow traps, fyke nets) (Figure 3).

As a result of the collection of background data and field data, an assessment was made with respect to the presence or absence of fish habitat at each surveyed reach in the Zone of Investigation. The following criteria were used for the designation of fish habitat:

Direct Fish Habitat – Permanent – permanently flowing watercourse with available fish community data (background and/or Stantec surveys).

Direct Fish Habitat – Seasonal – intermittent watercourse (as per drain classification or field observation) that is directly connected to a downstream watercourse that supports fish or where Stantec surveys captured fish.

Indirectly Contributes to Fish Habitat – intermittent flow (as per field observations) and although no fish were observed or captured, the channel contributes indirectly (e.g., allochthonous inputs, flow) to downstream reaches supporting fish.

Not Fish Habitat – not directly connected to a downstream water feature that supports fish or where Stantec surveys captured fish.

2.4 QUALIFICATIONS

The following Stantec personnel were responsible for the identification of water bodies and for determining any implications associated with fish and fish habitat:

- Ryan Park, B.Sc. – Fisheries Biologist
- Katie Easterling, H.B.Sc, Dip. (F&W), EPt. – Fisheries Biologist
- Marc Faiella, Dip. – Fisheries Biologist
- Nancy Harttrup, B.Sc. – Senior Fisheries Biologist

Curricula vitae are provided in **Appendix F**.

3.0 Water Bodies within the 120 m Zone of Investigation

As indicated in Section 2.2, the presence or absence of water bodies within the Zone of Investigation was assessed using the definition of a water body provided in O. Reg. 359/09. Based on the results of field investigations and the Records Review, water bodies within 120 m of the Project Location are summarized in **Table 3.1** and illustrated in **Figure 2 (Appendix A)**. A total of 22 water bodies were identified within the 120 m Zone of Investigation. Based on the site investigation, a number of corrections were required to the records obtained from available MNR mapping. At 26 locations where there was a mapped watercourse within or crossing the Zone of Investigation, the mapped features did not meet the definition of a water body. Criteria for their exclusion as water bodies are provided in Table 3.1 and these locations were not investigated further. During the field investigations, there were no additional water bodies, lakes or seepage areas identified within 120 m of the Project Location other than those described in Sections 4.1 to 4.6. Corrections to the MNR watercourse layer are illustrated in **Figure 2**. Photographs and field notes of these investigations are provided in **Appendices B, C and D**, respectively.

Additional field surveys included fish sampling at selected locations and an assessment of fish habitat. Water bodies within the 120 m Zone of the Investigation are listed in **Table 3.2**, which identifies Project components and areas providing fish habitat. Water bodies that provide fish habitat are illustrated in **Figure 5 (Appendix A)**.

Based on a review of the document entitled "Inland Ontario Lakes Designated for Lake Trout Management" (MNR, 2003), there are no Lake Trout (*Salvelinus namaycush*) lakes that are at or above development capacity identified within 300 m of the Project Location.

Table 3.1: Summary of mapped watercourses/waterbodies (LIO) in the Zone of Investigation and criteria for REA water bodies - Amherst Island Wind Project

Water Feature	WB Station(s)	NWB Station(s)	Tile No. in Figure 2	Water Body+			Criteria for Screening Out Mapped Watercourses (Not a Water Body)									Comments
				permanent stream	intermittent stream	seep++	No Surface Feature Present	Swale**	Grassed Waterway*	Temporary Channel for Surface Drainage*	Roadside Ditch*	Temporarily Poned Area Normally Farmed*	Dugout Pond*	Rock Chute*	Other	
Northern Drainage																
	1		2		✓											
		3	1							✓						No defined channel; cow pasture with active grazing.
	21		3		✓											WB at Front Road.
		21	3							✓						Approx. 50m upstream of road, surficial drainage only (no channel).
		31	2				✓									No evidence of channel.
		32	2				✓									No evidence of channel.
		33	2				✓									No evidence of channel.
	55		2		✓											
		56	2							✓						
	57		3		✓											
Eastern Drainage																
	8		3		✓											
	9		3		✓											
		11	3							✓						
		28	3				✓			✓						
		30	3							✓						
	58		3		✓											
		59	3							✓						
Southern Drainage																
		10	3				✓									Diffuse surficial drainage.
		12	3							✓						Surficial drainage.
		13	3							✓						
		14	3							✓						Diffuse surficial drainage.
		16	2				✓			✓						Shallow furrows for surficial drainage.
		18	2				✓			✓						Not a WB within the Zone of Investigation;

Table 3.1: Summary of mapped watercourses/waterbodies (LIO) in the Zone of Investigation and criteria for REA water bodies - Amherst Island Wind Project

Water Feature	WB Station(s)	NWB Station(s)	Tile No. in Figure 2	Water Body+			Criteria for Screening Out Mapped Watercourses (Not a Water Body)									Comments
				permanent stream	intermittent stream	seep++	No Surface Feature Present	Swale**	Grassed Waterway*	Temporary Channel for Surface Drainage*	Roadside Ditch*	Temporarily Poned Area Normally Farmed*	Dugout Pond*	Rock Chute*	Other	
																surficial drainage.
	19		2	✓												
		20	2								✓					Grassed ditch parallel to 2nd Concession.
	36		2		✓											
	37		2		✓											
	38		2		✓											
		39								✓						Surficial drainage through pasture, turns into a water body at confluence with Miller Drain (but outside of ZOI).
	52		2		✓											
	53		2		✓											Trapezoidal channel.
	60		2		✓											
Western Drainage																
	6		1		✓											
	25		1		✓											
		26	1				✓			✓						No defined channel.
		41	1				✓									No defined channel; pasture.
		50	1				✓									Located in pasture.
	51		1		✓											
		54	1							✓						
Mainland																
		M1 Trib	4							✓						
	M2		4		✓											
	M3		4		✓											
	M4		4		✓											
	M9		4		✓											
	M7				✓											

Table 3.1: Summary of mapped watercourses/waterbodies (LIO) in the Zone of Investigation and criteria for REA water bodies - Amherst Island Wind Project

Water Feature	WB Station(s)	NWB Station(s)	Tile No. in Figure 2	Water Body+			Criteria for Screening Out Mapped Watercourses (Not a Water Body)									Comments
				permanent stream	intermittent stream	seep++	No Surface Feature Present	Swale**	Grassed Waterway*	Temporary Channel for Surface Drainage*	Roadside Ditch*	Temporarily Poned Area Normally Farmed*	Dugout Pond*	Rock Chute*	Other	
	M10		4		✓											Lower portion near Taylor Kidd Road is not a water body.
		M11	4						✓							
Lake Ontario																
	n/a		2 & 4	Lake												
Seeps																
None	n/a															There were no groundwater seeps identified in the Project Location.

+ if all three criteria are 'no', then the feature is not a water body

++ a site of emergence of ground water where the water table is present at the ground surface, including a spring

** low lying feature with no defined channel and not dominated by aquatic vegetation

* as per REA Definition O. Reg 359/09

WB = Water Body

NWB = Non-Water Body

AMHERST ISLAND WIND ENERGY PROJECT
WATER ASSESSMENT AND WATER BODY REPORT
 Water Bodies within the 120 m Zone of Investigation
 April 2013

Table 3.2: Summary of Water Bodies and Project Components

Water Body	Crossing Class		Within 120 m				Fish Habitat	
	Access Road ^a	Collector Line	Turbine ^b	Access Road ^a	Collector Line	Substation/Switching Station/MET Tower	Direct Permanent (P) or Seasonal (S)	Indirect
Northern Drainage								
Station 1	S06 crosses twice	1	-	Dock	-	-	S	
Station 55	-	1	-	-	-	-	S	
Station 57	-	1	-	-	-	-	S	
Station 21	-	1	-	-	-	-	S	
Eastern Drainage								
Stations 30 and 58	-	1	-	-	-	-	S	
Station 9	-	1	-	-	-	-	S	
Station 8	-	1	-	S28	-	-	S	
Southern Drainage								
Station 19	-	1	-	-	-	-	P	
Stations 52, 36, 38, 34 and 35	S20	2	S34	S16	-	-	P	
Station 37 and 60	S34	-	-	-	-	-	S	
Station 53	-	1	-	S16	-	-	S	
Western Drainage								
Station 51	-	1	-	-	-	-	S	
Stations 25 and 54	-	1	-	-	-	-		□
Station 6	-	1	-	-	-	-	S	

AMHERST ISLAND WIND ENERGY PROJECT
WATER ASSESSMENT AND WATER BODY REPORT
 Water Bodies within the 120 m Zone of Investigation
 April 2013

Table 3.2: Summary of Water Bodies and Project Components

Water Body	Crossing Class		Within 120 m				Fish Habitat	
	Access Road ^a	Collector Line	Turbine ^b	Access Road ^a	Collector Line	Substation/Switching Station/MET Tower	Direct Permanent (P) or Seasonal (S)	Indirect
Mainland								
Option 1								
M2					1		S	
M3		1					S	
M4/M9					1		S	
Option 2								
M2						1	S	
Lake Ontario								
Mainland	Facilities Dock and Submarine Cable Landing Area						P	
Island	Facilities Dock and Submarine Cable Landing Area						P	
Offshore	Submarine Cable on Lake Bottom						P	

^a includes crane path and underground collector line

^b turbine plus associated laydown area

4.0 Existing Conditions and Predicted Impacts

In the following sub-sections, available background data are provided for each subwatershed, followed by site-specific information regarding physical habitat and fish communities, as determined by Stantec in 2011 and 2012. Potential impacts to fish habitat and references to standard mitigation measures are provided for each site, where fish habitat is present (Section 4.1).

Fisheries and Oceans Canada (DFO) was consulted during the preparation of this report for input with respect to possible DFO authorization requirements based on the Project Layout. Consultation with the DFO will continue as Project details are finalized, and Windlectric will comply with any DFO conditions and recommendations for the Project. Further consultation with the Cataraqui Region Conservation Authority (CRCA) and/or DFO may result in site-specific construction methods and mitigation measures for some locations. Additional information regarding the permitting process from the CRCA and DFO is provided in Section 4.7.

Electricity will be transported by the electrical power line collector system and the Project is planning to bury the collector lines, unless requested otherwise by the Township.

Weather conditions at the time of the field surveys are summarized in **Table 4.1**, with specific daily information provided on the field notes in **Appendix D**.

Table 4.1: Weather conditions during and preceding Site Investigations

Dates	Air Temperature (Range) °C	Weather Prior to Surveys
May 17 to 20, 2011	7 – 23	Excessive rain in weeks prior to surveys. Rain during surveys
July 6, 2011	28 – 29	Light precipitation
March 27-28, 2012	5 – 7	Mar 27 – no previous precipitation Mar 28 – moderate precipitation prior to survey
August 15, 2012	15 - 25	Minor precipitation prior to survey

The spring of 2011 was extremely wet, with significant rainfall during the month prior to the field survey. At Environment Canada’s Kingston Climate station, a total of 78 mm of rain was recorded between May 1 and May 16. Another 7 mm was recorded from May 17 to May 20. The long-term average (1971 to 2000) total precipitation for the month of May in the Kingston area is 75 mm.

Due to the shallow limestone bedrock, water does not infiltrate the soil and percolate through to the water table, but drains mainly overland. As a result, a majority of the island was temporarily flooded or saturated due to these extremely wet conditions in May 2011. Field notes from the site investigations are included in **Appendix D**.

Water bodies within the Zone of Investigation are described according to the following subwatersheds:

- Northern Drainage, i.e. all watercourses/tributaries flowing to the north side of the island
- Southern Drainage, i.e. all watercourses/tributaries flowing to the south side of the island
- Western Drainage, i.e. all watercourses/tributaries flowing to the west end of the island
- Eastern Drainage, i.e. all watercourses/tributaries flowing to the east end of the island
- Mainland Drainage, i.e. all watercourses/tributaries flowing south to Lake Ontario

In addition to watercourses and tributaries on land, Lake Ontario is within the Project Location. The nearshore areas of Lake Ontario within the Project Location are included in this report due to the submarine cable crossing and docking facilities that are part of the project.

Information on mapped water features that were not deemed to be water bodies is provided in photographs (**Appendix B**) and field notes (**Appendix D**) and summarized in **Table 3.1**. Within each subwatershed, only those water features occurring within 120 m of the Project Location and that were deemed to be water bodies, are summarized in **Sections 4.1 to 4.6**. Turbine S34 is located 106 m from a water body; there are no water bodies within 30 m of the blade-tip of any turbine (**Figure 2**).

4.1 NORTHERN DRAINAGE

4.1.1 Station 1

Situated along Front Road, approximately 500 m west of the hamlet of Stella, this unnamed tributary flows northeast into Lake Ontario (**Figure 2**). Upstream of Front Road, this watercourse consists of two tributaries, the first of which is a narrow, shallow, slightly braided watercourse flowing through a vegetated channel. A second tributary flows south through an incised, vegetated channel and converges with the first tributary approximately 50 m west of the road culvert. Downstream of Front Road this watercourse flows under a driveway and into a wetland. Based on field observations conducted in May, 2011, it was concluded that this watercourse provides seasonally direct fish habitat upstream of Front Road. No background data was available from the CRCA or the MNR regarding watercourse thermal regime classification or the fish community. Electrofishing efforts by Stantec in May 2011 yielded 20 Banded Killifish and one Pumpkinseed.

Within the Zone of Investigation, there is:

- One reach of this watercourse that is designated as a water body that provides seasonal fish habitat. It is crossed twice by the access road to S06 and by a proposed collector line. The reach and is within 120 m of the proposed submarine cable landing area and temporary dock.

Habitat characteristics at Station 1 are provided in **Table 4.2** along with references to general impacts, mitigation measures/Operational Statements and net effects.

4.1.2 Station 55

Situated along Front Road approximately 100 m east of McDonalds Lane in the hamlet of Stella, this unnamed tributary flows north into Lake Ontario (**Figure 2**). This natural watercourse consists of a channel with a slight meander underlain by coarse substrates. Based on field observations conducted in August, 2012, it was concluded that this watercourse provides seasonally direct fish habitat. No background data was available from the CRCA or the MNR regarding watercourse thermal regime classification or the fish community. Stantec was unable to conduct fish sampling in 2012 at the proposed collector line crossing due to insufficient water depths at the time of the survey.

Within the Zone of Investigation, there is:

- One reach of this watercourse that is designated as a water body that provides seasonal fish habitat and is crossed by a proposed collector line.

Habitat characteristics at Station 55 are provided in **Table 4.2** along with references to general impacts, mitigation measures/Operational Statements and net effects.

4.1.3 Station 57

The waterbody associated with Station 57 is situated along Front Road approximately 2 km east of the hamlet of Stella (**Figure 2**). This watercourse flows through a densely vegetated riparian area and is underlain by cobble and sand substrates. Based on field observations conducted in August, 2012, it was concluded that this watercourse provides seasonally direct fish habitat. No background data was available from the CRCA or the MNR regarding watercourse thermal regime classification or the fish community. Stantec was unable to conduct fish sampling in 2012 at the proposed collector line crossing due to insufficient water depths at the time of the survey.

Within the Zone of Investigation, there is:

- One reach of this watercourse that is designated as a water body that provides seasonal fish habitat and is crossed by a proposed collector line.

Habitat characteristics at Station 57 are provided in **Table 4.2** along with references to general impacts, mitigation measures/Operational Statements and net effects.

4.1.4 Station 21

Situated along Front Road, approximately 300 m west of Marshall 40 Foot Road, this unnamed tributary flows northwest to Lake Ontario (**Figure 2**). Upstream of Front Road, this watercourse consists of a shallow, grassy channel flowing down a gradient to the road allowance. Downstream a narrow, shallow, slightly meandering watercourse flows through a small valley to Lake Ontario. Based on field observations conducted in May, 2011, it was concluded that this watercourse provides seasonally direct fish habitat. No background data was available from the CRCA or the MNR regarding watercourse thermal regime classification or the fish community. Stantec was unable to conduct fish sampling in 2011 at the proposed collector line crossing due to insufficient water depths at the time of the survey and the downstream reach of the water body is located on private property.

Within the Zone of Investigation, there is:

- One reach designated as a water body that provides seasonal fish habitat, and is crossed by a proposed collector line.

Habitat characteristics at Station 21 are provided in **Table 4.2** along with references to general impacts, mitigation measures/Operational Statements and net effects.

4.2 EASTERN DRAINAGE

4.2.1 Stations 30 and 58

Situated along Front Road, this unnamed tributary flows northeast to Lake Ontario (**Figure 2**). Upstream of Front Road (Station 30), the watercourse consists of shallow, surficial drainage through furrows in the pasture, while downstream a narrow channel flows through a Reed Canary Grass floodplain (Station 58). Based on field observations conducted in May, 2011 and August 2012, it was concluded that this watercourse provides seasonally direct fish habitat. No background data was available from the CRCA or the MNR regarding watercourse thermal regime classification or the fish community. Stantec was unable to conduct fish sampling in 2011 or 2012 at the proposed collector line crossing due to insufficient water depths at the time of the survey.

Within the Zone of Investigation, there is:

- One reach designated as a water body that provides seasonal fish habitat, and is crossed by a proposed collector line.

Habitat characteristics at Station 30 and 58 are provided in **Table 4.2** along with references to general impacts, mitigation measures/Operational Statements and net effects.

4.2.2 Station 9

Situated along Lower 40 Foot Road, this unnamed tributary flows east into Lake Ontario (**Figure 2**). Upstream, this watercourse consists of shallow drainage through a field, while the downstream reach consists of an extremely sinuous channel flowing through the adjacent field. Based on field observations in May 2011, it was concluded that this watercourse provides seasonally direct fish habitat. No background data was available from the CRCA or the MNR regarding watercourse thermal regime classification or the fish community. Electrofishing efforts by Stantec in May 2011 yielded 16 Fathead Minnows and one Banded Killifish.

Within the Zone of Investigation, there is:

- One reach designated as a water body that provides seasonal fish habitat, and is crossed by a proposed collector line.

Habitat characteristics at Station 9 are provided in **Table 4.2** along with references to general impacts, mitigation measures/Operational Statements and net effects.

4.2.3 Station 8

Situated along Lower 40 Foot Road, this unnamed tributary flows east into Lake Ontario (**Figure 2**). Upstream, a trenched channel conveys flow through a small wooded area to the road culvert. Downstream the reach consists of a narrow, shallow channel with a slight meander pattern flowing through the adjacent field. Based on field observations during May 2011, it was concluded that this watercourse provides seasonally direct fish habitat. No background data was available from the CRCA or the MNR regarding watercourse thermal regime classification or the fish community. Electrofishing efforts by Stantec in May 2011 yielded eight Fathead Minnows and 19 Banded Killifish.

Within the Zone of Investigation, there is:

- One reach designated as a water body that provides seasonal fish habitat, and is crossed by a proposed collector line. The reach is also located within 120 m of the proposed access road to S28.

Habitat characteristics at Station 8 are provided in **Table 4.2** along with references to general impacts, mitigation measures and net effects.

4.3 SOUTHERN DRAINAGE

4.3.1 Station 19

The tributary associated with Station 19 (**Figure 2**) originates in a large swamp/wetland to the east and consists of a relatively wide and deep channel flowing southwest to converge just north of the Amherst Island ANSI with the Miller Municipal Drain. Based on field observations

conducted in May, 2011, this watercourse provides direct fish habitat. No background data was available from the CRCA or the MNR regarding watercourse thermal regime classification or the fish community. Field investigations conducted by Stantec in 2011 yielded 76 fish of the following five species:

- Brook Stickleback
- Bluegill
- Central Mudminnow
- Fathead Minnow
- Northern Redbelly Dace

Within the Zone of Investigation, there is:

- One reach designated as a water body that provides fish habitat, and is crossed proposed collector lines at two locations.

Habitat characteristics at Station 19 are provided in **Table 4.2** along with references to general impacts, mitigation measures/Operational Statements and net effects.

4.3.2 Miller Municipal Drain (Station 52, 36, 38, 34 and 35)

The Miller Municipal Drain originates north of Second Concession Road and consists of a wide, deep, incised drain flowing south, east and then southwest. It flows through an area used for cattle grazing and converges with the large watercourse associated with Station 19 just north of the Amherst Island ANSI. According to LIO mapping, this drain has been mapped as a class “F” drain – intermittent or ephemeral for more than two months. Based on field observations conducted in May, 2011, this watercourse likely provides direct fish habitat as fish were captured in the far upper reaches (Station 52) and large carp were observed in the lower reaches (Station 34). No background data was available from the CRCA or the MNR regarding watercourse thermal regime classification or the fish community.

Field investigations conducted by Stantec in 2011 yielded 120 fish of the following seven species:

- Banded Killifish
- Brook Stickleback
- Common Carp
- Central Mudminnow
- Fathead Minnow
- Northern Redbelly Dace
- Pumpkinseed

Within the Zone of Investigation, there is:

- One reach that has been designated as water body that provides fish habitat and is crossed by a proposed collector line and is located within 120 m of the proposed access road to Turbine S16.
- One reach that has been designated as water body that provides fish habitat and is crossed by the proposed access road to Turbine S20, crossed by a proposed collector line and is located 106 m from Turbine S34.

Habitat characteristics at Miller Municipal Drain are provided in **Table 4.2** along with references to general impacts, mitigation measures/Operational Statements and net effects.

4.3.3 Station 37 and 60

The tributary associated with Stations 37 and 60 (Figure 2) consists of a narrow, slightly incised channel flowing through a pasture and eventually converging with the Miller Municipal Drain. Based on field observations conducted in May, 2011, this watercourse likely provides seasonally direct fish habitat. No background data was available from the CRCA or the MNR regarding watercourse thermal regime classification or the fish community. Field investigations conducted by Stantec in 2011 in the Miller Municipal Drain yielded the following species that are may also occur in the tributary associated with Station 37:

- Banded Killifish
- Brook Stickleback
- Central Mudminnow
- Fathead Minnow
- Northern Redbelly Dace
- Pumpkinseed

Within the Zone of Investigation, there is:

- One reach designated as a water body that provides seasonal fish habitat and is crossed by the proposed access road to Turbine S34.

Habitat characteristics at Station 37 are provided in **Table 4.2** along with references to general impacts, mitigation measures/Operational Statements and net effects.

4.3.4 Station 53

The watercourse associated with Station 53 is a short, narrow, incised channel flowing south to Miller Municipal Drain at 2nd Concession (**Figure 2**). Based on field observations conducted in March 2012, it was concluded that this watercourse provides seasonally direct fish habitat. No background data was available from the CRCA or the MNR regarding watercourse thermal

regime classification or the fish community. Stantec was unable to conduct fish sampling in 2012 due to insufficient water depths at the time of the survey.

Within the Zone of Investigation, there is:

- One reach designated as a water body that provides seasonal fish habitat, and is located within 120 m of a proposed collector line.

Habitat characteristics at Station 53 are provided in **Table 4.2** along with references to general impacts, mitigation measures/Operational Statements and net effects.

4.4 WESTERN DRAINAGE

4.4.1 Station 51

Situated along 2nd Concession Road, the watercourse associated with Station 51 flows south to converge with a drainage area that flows west to a large wetland along the west side of the island. The upstream reach consists of a shallow channel flowing south along the east side of a small wooded area and the downstream reach is a shallow channel flowing along a tree line between two agricultural fields. Based on field observations conducted in March 2012, it was concluded that this watercourse provides seasonally direct fish habitat, as fish were observed in the densely vegetated channel. No background data was available from the CRCA or the MNR regarding watercourse thermal regime classification or the fish community. Electrofishing was not conducted at this station during the March 2012 field investigation due to low water levels and thick vegetation.

Within the Zone of Investigation, there is:

- One reach of this watercourse that is designated as a water body that provides seasonal fish habitat and is crossed by a proposed collector line.

Habitat characteristics at Station 51 are provided in **Table 4.2** along with references to general impacts, mitigation measures/Operational Statements and net effects.

4.4.2 Stations 25 and 54

Immediately upstream of 2nd Concession Road, the tributary associated with Station 25 (**Figure 2**) provides shallow surficial drainage conveys water from the surrounding pasture. At the time of the May 2011 field investigation, landowner permission was not granted to further assess the upstream reach. Downstream of 2nd Concession Road, this watercourse consists of an incised channel with a mix of vegetation and exposed limestone bedrock. Approximately 50 m downstream, the watercourse loses channel definition and transitions to diffuse surficial drainage through the surrounding pasture. Based on field observations conducted in May, 2011, this watercourse likely contributes indirectly to fish habitat through flow and nutrient inputs to downstream fish habitat. No background data was available from the CRCA or the MNR

regarding watercourse thermal regime classification or the fish community. Stantec was unable to conduct fish sampling in 2011 at the proposed collector line crossing locations due to insufficient water depth at the time of the survey.

Within the Zone of Investigation, there is:

- One reach of the watercourse designated as a water body that contributes indirectly to fish habitat, and is crossed by a proposed collector line.

Habitat characteristics at Stations 25 and 54 are provided in **Table 4.2** along with references to general impacts, mitigation measures/Operational Statements and net effects.

4.4.3 Station 6

The tributary associated with Station 6 consists of a shallow, vegetated, slightly meandering channel that flows west through a pasture to Art McGinns Road (**Figure 2**). Downstream of Art McGinns Road this watercourse flows into a large wetland complex along the Lake Ontario shoreline. Based on field observations conducted in May, 2011, it was concluded that this watercourse provides seasonally direct fish habitat. No background data was available from the CRCA or the MNR regarding watercourse thermal regime classification or the fish community. Electrofishing efforts by Stantec in May 2011 did not yield any fish.

Within the Zone of Investigation, there is:

- One reach designated as a water body that provides seasonal fish habitat, and is crossed by a proposed collector line.

Habitat characteristics at Station 6 are provided in **Table 4.2** along with references to general impacts, mitigation measures/Operational Statements and net effects.

4.5 MAINLAND

4.5.1 M2

Located along Bath Road (Highway 33), approximately 150 m west of Jim Snow Drive, the tributary associated with Station M2 (**Figure 2**) was dry at the time of the field investigation. Upstream of Bath Road this watercourse consists of a narrow cattail lined channel, while the downstream reach flows through a large box culvert directly connected to Lake Ontario. Based on field observations conducted in July, 2011, it was concluded that this watercourse provides seasonally direct fish habitat. No background data was available from the CRCA or the MNR regarding watercourse thermal regime classification or the fish community. A review of historical air photos indicate the channel is man-made as indicated by the straight channel visible at the time.

Within the Zone of Investigation for Option 1, there is:

- One reach of the tributary that has been designated as a water body that provides seasonal fish habitat, and is located within the area designated as Laydown, Storage, Parking and Office area.

Within the Zone of Investigation for Option 2, there is:

- One reach of the tributary that has been designated as a water body that provides seasonal fish habitat, and is located within the 120 m of the proposed collector line.

Habitat characteristics at Station M2 are provided in **Table 4.2** along with references to general impacts, mitigation measures/Operational Statements and net effects.

4.5.2 M3

Located along Jim Snow Drive, approximately 200 m south of Taylor Kidd Boulevard, the tributary associated with Station M3 (**Figure 2**) was dry at the time of the field investigation. This watercourse consists primarily of a narrow channel flowing through a terrestrial meadow. Based on field observations conducted in July, 2011, it was concluded that this watercourse provides seasonally direct fish habitat. No background data was available from the CRCA or the MNR regarding watercourse thermal regime classification or the fish community.

Within the Zone of Investigation Option 2, there is:

- One reach of the tributary that has been designated as a water body that provides seasonal fish habitat, and is crossed by a proposed collector line.

Habitat characteristics at Station M3 are provided in **Table 4.2** along with references to general impacts, mitigation measures/Operational Statements and net effects.

4.5.3 M4/M9

Located along Taylor Kidd Boulevard, approximately 200 m west of Jim Snow Drive, this watercourse consists of a shallow, cattail lined channel flowing along the south side of Taylor Kidd Boulevard (**Figure 2**). Based on field observations conducted in March, 2012, it was concluded that this watercourse provides seasonally direct fish habitat. No background data was available from the CRCA or the MNR regarding watercourse thermal regime classification or the fish community.

Within the Zone of Investigation for Option 2, there is:

- One reach of the tributary that has been designated as a water body that provides seasonal fish habitat, and is located within 120 m of a proposed collector line.

Habitat characteristics at Station M4/M9 are provided in **Table 4.2** along with references to general impacts, mitigation measures/Operational Statements and net effects.

4.6 LAKE ONTARIO

The only recent fish community data available from fish collection sites within the Study Area were provided by the MNR's Lake Ontario Management Unit (LOMU). The data were from a 2009 survey during which fish were collected at previously established sampling stations. MNR survey locations are included in the fishing stations illustrated in **Figure 3**. MNR catch data are provided in **Appendix C**.

None of the agencies contacted had any additional information with respect to specific documented areas of fish habitat in the Study Area; however the Eastern Canada Response Corporation (ECRC) provided a map indicating a Chinook Salmon spawning area in Parrots Bay, east of the Study Area (mainland).

Based on data provided by the MNR, the following fish species are known to occur in the nearshore habitats of this part of Lake Ontario: Largemouth Bass, Smallmouth Bass, Yellow Perch, Bluegill, Pumpkinseed, Common Carp and Brown Bullhead.

The MNR initially classified the nearshore areas of the Study Area as coldwater habitat. Stantec provided habitat information collected by Stantec and ASI to the MNR and based on the lack of suitable Lake Trout spawning habitat in the Study Area, the MNR subsequently concurred that the habitats within the vicinity of the dock and cable landing areas support warmwater fish species.

4.6.1 Island

The cable landing and dock facility is located on the Lake Ontario shoreline of Amherst Island. Substrate in the nearshore area at the cable landing and dock location was primarily bedrock in the nearshore area, with areas of cobble overlaid by silt and/or algae farther offshore; scattered aquatic vegetation was also present in the area (**Figure 4**). This area corresponds to ASI substrate sampling station CR20 and ROV Transects TR1 and TR2 (photos and maps in **Appendix B**). Supporting photographs and substrate information from underwater photography and sediment sampling (ASI data) are included in **Appendix B** and illustrate the presence of algae and aquatic vegetation. ASI's substrate samples and descriptions show that in approximately 2 m of water the substrate is flat, angular sedimentary rock with approximately 65% coverage by algae.

The bottom gradient at the proposed island dock location is fairly gradual and reaches a depth of approximately 4 m at the end of the proposed dock.

Stantec's fish survey in 2011 captured Yellow Perch, Bluntnose Minnow, Spottail Shiner, Round Goby and Common Carp in the vicinity of the proposed island dock and cable landing.

The proposed dock location and cable landing area (submarine cable) are located in the nearshore area of Lake Ontario on the north shore of Amherst Island.

4.6.2 Mainland

West Dock Option

The depth profile of the West option is gradual and would require a relatively long dock structure. Estimated water depth at the end of a dock at this location would be approximately 4.5 m. Substrate at this location was primarily sand with very little vegetation (**Figure 4**); rock piles are present in the near shore area immediately west of the proposed dock site. There is a proposed cable landing area associated with this dock location.

Photographs and data from an ASI sediment sampling station in the area (ASI Station NS19) are included in **Appendix B** and illustrate dense growth of aquatic vegetation in the area.

Center Dock Option

The substrate at this proposed dock location is characterized by cobble and sand in the nearshore area, with scattered aquatic vegetation. Bathymetry at this proposed dock (and cable landing) location is the most gradual of the mainland options, potentially resulting in the longest dock structure. Water depth at the end of a proposed dock at this location would be close to 4 m.

Farther offshore, results of ASI's sediment sampling and ROV video show the lake bottom characteristics as algae-covered scattered boulders over sand (**Appendix B**).

East Dock Option

The lake bottom at this proposed dock location is the steepest of the three options, resulting in the shortest dock structure. Water depth would be approximately 5 m at the end of a dock at this location. Substrates were identified as sand with scattered vegetation with large rubble piles located immediately west of the proposed dock location.

Photographs from ASI's ROV support the above assessment and illustrate similarity of habitat beyond the 2 m surveyed by Stantec (**Appendix B**). This area is characterized by fine substrates and patchy aquatic vegetation.

Optional Cable Landing Area

This location is an optional cable landing area and there is no dock proposed for this site. The bottom substrate at this cable landing area is predominantly sand with a gradual slope of the lake bottom. At the time of the 2011 survey, submergent aquatic vegetation was present but was patchy and sparse. There was a row of mature trees on the shoreline in this area.

4.6.3 Offshore

Bathymetric data for the portion of Lake Ontario between Amherst Island and the mainland east indicates that the lake bottom is relatively flat at about 20 m deep for most of the cable crossing route. Maximum depth is approximately 37 m, which occurs closer to the mainland (approximately 800 m from shore).

Information provided to the Project by ASI indicated the predominant sediment types in the majority of the deep water areas between Amherst Island and the mainland (from approximately 15 m and deeper) are grey clays, grey muds, and black silty muds. In water depths less than 15 m the lakebed material generally tends to transition from muds and clays, to sands, gravels, then exposed bedrock with occasional boulders as depth decreases towards shore (mainland and the Amherst Island sides of the Study Area).

Within this deep water area, a proposed a submarine cable will be placed on the lake bottom.

Table 4.2: Summary of Water Bodies Within the 120 m Zone of Investigation

Reach ID ^a	Site Description	Proposed Works ^{ab}	Potential Impacts	Mitigation	Net Effects ^c
Northern Drainage					
Tributary Associated with Station 1	Intermittent flow dominated by flat morphology. Bankfull width = 3 m. Water depth = 20 cm. Substrate = silt and gravel. Fished May 2011 (Stantec). Seasonal fish habitat.	Crossed twice by access road to Turbine S06 and once by a proposed collector line. Potential submarine cable landing area and dock to be located within 120 m of water body providing fish habitat.	Construction activities associated with the installation of the turbine access roads and culverts may affect the reach (e.g. Temporary increase in surface water turbidity due to runoff during construction (Section 5.1 and 5.2.) Construction activities within the constructible area of the cable landing and dock may affect the reach despite being outside of the constructible area (e.g. Temporary increase in surface water turbidity due to runoff during construction. (Section 5.1.)	See Sections 6.1, 6.2, 6.3. Follow DFO Operational Statement (OS) for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings (Appendix E)	New access road culvert. As per preliminary agency consultation, effects of a culvert at this location can be mitigated. DFO consultation is ongoing and the Project will comply with required permits and/or conditions.
Tributary Associated with Station 55	Intermittent flow, dry at the time of the field investigation. Bankfull width = 6 m. Water depth = n/a. Substrate = bedrock, cobble, silt and detritus. Seasonal fish habitat.	Crossed by a proposed collector line along Front Road.	With the exception of standard construction activities, collector line crossings of a water body should not affect the reach outside the constructible area (see Sections 5.1, 5.3).	See Sections 6.1 and 6.3. Follow DFO OS for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings (Appendix E).	None expected.
Tributary Associated with Station 57	Intermittent flow, dry at the time of the field investigation. Bankfull width = 7 m. Water depth = n/a. Substrate = cobble and sand. Seasonal fish habitat.	Crossed by a proposed collector line along Front Road.	With the exception of standard construction activities, collector line crossings of a water body should not affect the reach outside the constructible area (see Sections 5.1, 5.3).	See Sections 6.1 and 6.3. Follow DFO OS for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings (Appendix E).	None expected.
Tributary Associated with Station 21	Intermittent flow dominated by run and pool morphology. Bankfull width = 2 m. Water depth = 5 to 10 cm. Substrate = limestone bedrock and vegetation. Seasonal fish habitat.	Crossed by a proposed collector line along Front Road.	With the exception of standard construction activities, collector line crossings of a water body should not affect the reach outside the constructible area (see Sections 5.1, 5.3).	See Sections 6.1 and 6.3. Follow DFO OS for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings (Appendix E).	None expected.
Eastern Drainage					
Tributary Associated with Station 30/58	Intermittent dry at the time of the field investigation. Bankfull width = 5 m. Water depth = n/a. Substrate = limestone bedrock, silt and detritus. Seasonal fish habitat.	Crossed by a proposed collector line along Front Road.	With the exception of standard construction activities, collector line crossings of a water body should not affect the reach outside the constructible area (see Sections 5.1, 5.3).	See Sections 6.1 and 6.3. Follow DFO OS for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings (Appendix E).	None expected.
Tributary Associated with Station 9	Intermittent flow dominated by run and flat morphology, with occasional pools and riffles. Bankfull width = 4 m. Water depth = 30 cm. Substrate = bedrock, silt, gravel and detritus. Seasonal fish habitat.	Crossed by a proposed collector line along Lower 40 Foot Road.	With the exception of standard construction activities, collector line crossings of a water body should not affect the reach outside the constructible area (see Sections 5.1, 5.3).	See Sections 6.1 and 6.3. Follow DFO OS for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings (Appendix E).	None expected.

Table 4.2: Summary of Water Bodies Within the 120 m Zone of Investigation

Reach ID ^a	Site Description	Proposed Works ^{ab}	Potential Impacts	Mitigation	Net Effects ^c
Tributary Associated with Station 8	Intermittent flow dominated by pool and flat morphology . Bankfull width = 4 m. Water depth = 20 cm. Substrate = bedrock, silt, gravel and detritus. Seasonal fish habitat .	Crossed by a proposed collector line along Lower 40 Foot Road.	With the exception of standard construction activities, collector line crossings of a water body should not affect the reach outside the constructible area (see Sections 5.1, 5.3).	See Sections 6.1 and 6.3. Follow DFO OS for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings (Appendix E).	None expected.
Southern Drainage					
Tributary Associated with Station 19	Permanent Flow dominated by run and flat morphology. Bankfull width = 4 m. Water depth = 60 cm to >1.5 m. Substrate = Silt and detritus. Fish habitat.	Crossed by a proposed collector line along Stella 40 Foot Road.	With the exception of standard construction activities, collector line crossings of a water body should not affect the reach outside the constructible area (see Sections 5.1, 5.3).	See Sections 6.1 and 6.3. DFO OS for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings (Appendix E).	None expected.
Miller Municipal Drain (Stations 52, 36, 38, 34 and 35)	Permanent flow dominated by pool and flat morphology (downstream areas). Upstream areas (Stns 52, 36, 38) are intermittent. Bankfull width = 3 to 15 m. Water depth = 15 cm. Substrate = Silt and clay. Fish habitat.	Crossed by an access road to Turbine S20 and twice by a proposed collector line along 2 nd Concession Road. Turbine S34, underground collector line and access road to S16 to be located within 120 m of water body providing fish habitat. Turbine S34 is located 106 m from a water body.	Construction activities associated with the installation of the turbine and turbine access roads may affect the reach (e.g. Temporary increase in surface water turbidity due to runoff during construction See Section 5.1 and 5.2). With the exception of standard construction activities, collector line crossings of a water body should not affect the reach outside the constructible area (see Sections 5.1, 5.3).	See Sections 6.1, 6.2, 6.3/6.4. Follow DFO OS for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings (Appendix E).	New access road culvert. As per preliminary agency consultation, effects of a culvert at this location can be mitigated. DFO consultation is ongoing and the Project will comply with required permits and/or conditions.
Tributary Associated with Station 37/60	Intermittent flow dominated by float morphology. Bankfull width = 4 m. Water depth = 20 cm. Substrate = Silt and clay. Seasonal fish habitat.	Crossed by an access road to Turbine S34.	Construction activities associated with the installation of the turbine access roads may affect the reach (e.g. Temporary increase in surface water turbidity due to runoff during construction (Section 5.1 and 5.2).	See Sections 6.1 and 6.2.	New access road culvert. As per preliminary agency consultation, effects of a culvert at this location can be mitigated. DFO consultation is ongoing and the Project will comply with required permits and/or conditions.
Tributary Associated with Station 53	Intermittent flow that was dry at the time of the field investigation. Bankfull width = 1.5 m. Water depth = n/a. Substrate = silt, clay and muck. Seasonal fish habitat.	Located within 120 m of a proposed collector line.	With the exception of standard construction activities, collector lines located within 120 m of a water body should not affect the reach outside the constructible area (see Section 5.1).	See Section 6.1.	None expected.
Western Drainage					
Tributary Associated with Station 51	Likely intermittent flow dominated by pool and flat morphology. Bankfull width = 2.2 m. Water depth = 15 cm. Substrate = sand, silt, clay and detritus. Likely seasonal fish habitat.	Crossed by a proposed collector line.	With the exception of standard construction activities, collector line crossings of a water body should not affect the reach outside the constructible area (see Sections 5.1, 5.3).	See Sections 6.1 and 6.3. Follow DFO OS for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings (Appendix E)	None expected.

Table 4.2: Summary of Water Bodies Within the 120 m Zone of Investigation

Reach ID ^a	Site Description	Proposed Works ^{ab}	Potential Impacts	Mitigation	Net Effects ^c
Tributary Associated with Stations 25 and 54	Intermittent flow dominated by run habitat with occasional pool morphology. Bankfull width = 5 m. Water depth = 10 cm. Substrate = Clay, gravel, silt, boulder and detritus. Contributes indirectly to fish habitat.	Crossed by a proposed collector line.	With the exception of standard construction activities, collector line crossings of a water body should not affect the reach outside the constructible area (see Sections 5.1, 5.3).	See Sections 6.1 and 6.3. Follow DFO OS for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings (Appendix E)	None expected.
Tributary Associated with Station 6	Intermittent flow dominated by flat morphology. Bankfull = 5 m. Water depth = 30 cm . Substrate = Silt and detritus. Seasonal fish habitat .	Crossed by a proposed collector line.	With the exception of standard construction activities, collector line crossings of a water body should not affect the reach outside the constructible area (see Sections 5.1, 5.3).	See Sections 6.1 and 6.3. Follow DFO OS for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings (Appendix E)	None expected.
Mainland					
Tributary Associated with Station M2	Intermittent flow that was dry at the time of the field visit. Bankfull width = 1.5 m. Water depth = dry. Substrate = Silt, muck, sand, cobble and detritus. Seasonal fish habitat.	<i>Option 1</i> Located within proposed Laydown Area <i>Option 2</i> Located within 120 m of a proposed collector line and dock location.	With the exception of standard construction activities, collector lines and docks located within 120 m of a water body should not affect the reach outside the constructible area (see Section 5.1).	See Section 6.1.	None expected.
Tributary Associated with Station M3	Intermittent flow that was dry at the time of the field visit. Bankfull width = 1 m. Water depth = dry. Substrate = soil. Seasonal fish habitat.	<i>Option 2</i> Crossed by a proposed collector line.	With the exception of standard construction activities, collector line crossings of a water body should not affect the reach outside the constructible area (see Sections 5.1, 5.3).	See Sections 6.1 and 6.3. Follow DFO OS for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings (Appendix E)	None expected.
Tributary Associated with Station M9/M4	Likely intermittent flow, dominated by flat and pool morphology. Bankfull width = 2 m. Water depth = 15 cm. Substrate = silt, clay, marl, muck and detritus. Likely seasonal fish habitat.	<i>Option 2</i> Within 120 m of a proposed collector line.	With the exception of standard construction activities, collector line crossings of a water body should not affect the reach outside the constructible area (see Section 5.1).	See Section 6.1.	None expected.
Lake Ontario					
Amherst Island Shoreline	Littoral zone of Lake Ontario. Bedrock with scattered cobble and sparse vegetation. Habitat for warmwater fish species.	Dock and Cable Landing Final dock design - to be determined (no infilling required). Cable landing area – bury cable in trench to approx. 100 m from the average high water mark; clamshell armour to be used from end of trench to 3 m depth (under average water level conditions?)	Dock construction and operation – Section 5.4. Cable Landing – Section 5.5.	See Sections 6.4 and 6.5.	New dock structure on island shoreline; although there will be a permanent footprint of the dock footings, effects can be mitigated. DFO consultation is ongoing and the Project will comply with required permits and/or conditions..

Table 4.2: Summary of Water Bodies Within the 120 m Zone of Investigation

Reach ID ^a	Site Description	Proposed Works ^{ab}	Potential Impacts	Mitigation	Net Effects ^c
Mainland Shoreline	Littoral zone of Lake Ontario. Habitat for warmwater fish species at all three locations. <i>West Option:</i> Sand. <i>Centre Option:</i> Sand and cobble with scattered vegetation. <i>East Option:</i> Predominantly sand with scattered vegetation; steeper slope relative to the West and Centre options. <i>Optional Cable Landing:</i> Sand with patchy vegetation; gradual slope.	Dock and Cable Landing Final dock design - to be determined (no infilling required). Cable landing area – bury cable in trench to approx. 100 m from the average high water mark; clamshell armour to be used from end of trench to 3 m depth (under average water level conditions).	Dock construction and operation – Section 5.4. Cable landing – Section 5.5.	See Sections 6.4 and 6.5 and DFO OS for Underwater Cables (Appendix E).	New dock structure on shoreline; although there will be a footprint of the dock footings, effects can be mitigated. DFO consultation is ongoing and the Project will comply with required permits and/or conditions..
Offshore	Deepwater zone of Lake Ontario.	Submarine cable on lake bottom (115 kV, 180 mm diameter [approx.] 4 km long [approx.]). Clamshell armour at MTO air bubbler.	General construct impacts, temporary disturbance to lake bed – Section 5.5. Operation – Section 5.5.	Section 6.5 and see DFO OS for Underwater Cables (Appendix E).	None Expected.

a see **Figures 2, 4 and 5 (Appendix A)**

b the Project is planning to bury the collector lines unless requested otherwise by the Township; construction method to bury the collector line is not known at the time of report preparation (i.e. drilling vs. open cut)

c assumes all mitigation measures are implemented and successful

4.7 SUMMARY OF IN-WATER WORK IN OR NEAR FISH HABITAT

Based on the current Project layout, in-water work has the potential to affect fish or fish habitat, or areas that contribute indirectly to fish habitat, at three watercourse locations on Amherst Island, and two locations in the nearshore area of Lake Ontario (**Table 4.3**).

Based on previously submitted REA applications, it is likely that most Project-related impacts to water bodies and aquatic habitat can be mitigated. Locations where further DFO consultation will occur during the permitting process include sites where new roads and culverts are proposed, and for project components in Lake Ontario. At these locations, DFO can issue a Letter of Advice if they conclude that the works can be conducted in a manner that will not require a *Fisheries Act* authorization. Windlectric Inc. will comply with any conditions and recommendations resulting from the DFO consultation process.

Table 4.3: Water Bodies that provide fish habitat where in-water work is required

Reach ID	Fish Habitat Type	
	Direct	Indirect
Northern Drainage		
Station 1 (Access Road to Turbine S06)	X (seasonal)	
Southern Drainage		
Miller Municipal Drain - Stations 52, 38, 34 and 35 (Access Road to Turbine S20)	X	
(Station 37/60 (Access Road to Turbine S34)	X (seasonal)	
Lake Ontario		
Island – nearshore area (Dock and Cable Landing)	X	
Mainland – nearshore area (Dock and Cable Landing)	X	

The conclusions of No Net Effects (**Table 4.2**) assume that negative effects associated with turbine construction, underground (or overhead if required) collector line installation can be mitigated. If conditions of applicable Operational Statements can be met and the mitigation measures implemented no further DFO review or approvals would be required. Although specific Operational Statements are referenced in this report, consultation with the DFO may result in site-specific construction methods and mitigation measures for some locations.

The Construction Plan Report (CPR) describes activities associated with all components of project construction including the installation of culverts on access roads, construction of collector lines, transmission lines, the submarine cable and docks. The CPR identifies potential effects of construction on surface water, fish and fish habitat and mitigation measures to protect these features and consistent with those listed in this report. The CPR also provides details of monitoring plans and contingency measures.

5.0 Overview of Potential Impacts

5.1 GENERAL CONSTRUCTION-RELATED IMPACTS

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

- Short-term increase in turbidity from runoff and soil erosion during construction; and
- Water quality and habitat disturbance effects to aquatic habitat (loss of shade, reduced bank stability, reduced input of leaves, twigs and insects).

5.2 CULVERTS AND ACCESS ROADS

Potential impacts related to the installation and maintenance of culvert crossings in addition to the general impacts listed above may include:

- Disturbance to aquatic biota and habitat during installation;
- Permanent enclosure of portions of a watercourse;
- Loss of bed material within the length of the culvert; and
- Changes to riparian vegetation within road allowance.

Culverts must be designed and installed such that there is no:

- Restriction of flows through the culvert resulting in upstream pooling;
- Erosion at the culvert inlets and outlets; and
- Barrier to fish passage to upstream environments.

5.3 COLLECTOR LINES

Electricity will be transported by the electrical power line collector system. It should be emphasized that the Project is planning to bury the collector lines, unless requested otherwise by the Township.

5.3.1 Overhead Collector Lines

Short-term impacts on watercourses may include loss of riparian vegetation which can result in increased turbidity during construction but also affects fish habitat by removing sources of shade, cover and food production. There are no long term impacts associated with the operation and maintenance of overhead collector lines.

5.3.2 Underground Collector Lines

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

- Erosion and sedimentation from site disturbance and dewatering;
- Collapse of the punch or bore hold under the stream;
- Reduced shoreline cover, shade and food production areas due to disturbance of riparian vegetation;
- Disturbance of stream banks and bottom substrates, disruption of sensitive fish life stages due to machinery fording the stream; and
- Introduction of deleterious substances due machinery fording the stream (if equipment is not properly maintained).

5.4 DOCK CONSTRUCTION AND OPERATION

The construction and installation of docks can affect fish habitat by covering or changing spawning areas, removing cover features such as rocks and logs, causing erosion and sedimentation (due to shoreline erosion) introducing deleterious substances (during construction and operation) and disrupting sensitive life stages of fish. In large water bodies, docks can also alter currents in the nearshore area.

5.5 SUBMARINE CABLE CONSTRUCTION AND OPERATION

The placement of underwater cables is a common practice used to deliver utility services such as electricity across water bodies when overhead lines are not feasible (DFO Operating Statement for Underwater Cable). Placing cables on the lake bottom is more favourable than burying them, as it generates less sediment and avoids the need to use machinery in deep water areas. Excavation is often required to bury the cable near the shoreline for safety reasons.

The trench required to bury the submarine cable in the nearshore area will extend up to approximately 100 m from the average high water mark. For safety reasons, the cable should be protected to a water depth of 3 m. From the end of the trench to where water depth is 3 m, the cable will be encased in clamshell armour (metal). During construction, potential impacts to fish and fish habitat include disruption of sensitive fish spawning areas (e.g., gravel, cobble, and rock rubble), erosion and sedimentation caused by disturbance to the shoreline and bed of water bodies, removal of riparian (bank) vegetation and underwater rocks and logs that provide cover, shade and food, and disruption of sensitive fish life stages.

During the operational phase, submarine cables produce magnetic fields. The only effect of cables on the ambient electrical environment may be on the local geomagnetic field as a weak magnetic field source. While a number of species are reported to be capable of detecting changes in the Earth's magnetic field, the narrow linear feature of the field around the cable

makes it unlikely that long distance navigation, migration, or major behavioural patterns of those species would be affected.

Monitoring studies have been conducted for off-shore wind projects (marine environments in Europe and the UK; Dong Energy et al, 2006; CEMACS, 2003) to determine if there are effects on the behavior or movement of marine organisms. Since the studies found that the magnetic fields of submarine power cables are either small or zero (with the exception of monopolar D.C. cables), results of marine studies completed for offshore wind projects concluded that the electromagnetic fields of submarine cables would not have any significant effects on the marine environment.

6.0 Standard Mitigation Measures for Working around Fish Habitat

Standard mitigation measures used for works in and around water are summarized below. Specific details of the mitigation measures to be implemented would be determined through consultations with the local municipality, the CRCA and DFO once details of construction methods are finalized. The extent of mitigation would be dependent on project details such as technical requirements, construction methods and schedule.

Since specific construction details are not known at the time of report preparation, the list of mitigation measures is extensive such that all measures are included and the appropriate measures will be applied once the construction method has been finalized. For example, specific construction methods for underground collector line crossings of specific water bodies are not known at this time; therefore, mitigation measures for open cut methods and drilling under the watercourse are included. Specific timing of construction is not known at this time. Measures for the use of coffer dams (dam and pump) and fish removals are included in the event they will be required. If the watercourses are dry at the time of construction, these measures would not be applicable.

6.1 GENERAL MITIGATION MEASURES

There are many mitigation measures to protect fish and fish habitat from potential effects during the construction phase of a project. General mitigation measures for construction activities near a watercourse in the Zone of Investigation include:

- All in-water work would be completed within MNR timing windows to protect local fish populations during their spawning and egg incubation periods. A typical construction timing window for warmwater streams in the Peterborough District is July 1 to March 31.
- The MNR provided the following in-water timing window for nearshore work at the cable landing sites (Lake Ontario): July 1 to March 31 (no work between April 1 and June 30).
- All materials and equipment used for the purpose of site preparation and Project construction shall be operated and stored in a manner that prevents any deleterious substance (e.g., petroleum products, silt, etc.) from entering the water:
 - Any stockpiled materials should be stored and stabilized away from the water;
 - Refuelling and maintenance of construction equipment should occur a minimum of 100 m from a water body;
 - As appropriate, spills should be reported to the MOE Spills Action Centre;
 - Any part of equipment entering the water should be free of fluid leaks and externally cleaned/degreased to prevent any deleterious substance from entering the water; and
 - Only clean material, free of fine particulate matter should be placed in the water.
- Sediment and erosion control measures should be implemented prior to construction and maintained during the construction phase to prevent entry of sediment into the water:

- Silt fencing and/or barriers should be used along all construction areas adjacent to natural areas;
- No equipment should be permitted to enter any natural areas beyond the silt fencing during construction;
- All sediment and erosion control measures should be inspected at least weekly and during and immediately following rainfall events to ensure that they are functioning properly and are maintained and/or upgraded as required;
- Topsoil stockpiles should be sufficiently distant from watercourses to preclude sediment inputs due to erosion of stored soil materials;
- If the sediment and erosion control measures are not functioning properly, no further work should occur until the sediment and/or erosion problem is addressed;
- All disturbed areas of the construction site should be stabilized immediately and re-vegetated as soon as conditions allow; and
- Sediment and erosion control measures should be left in place until all areas of the construction site have been stabilized.

6.2 NEW CULVERT CROSSINGS

Culverts would be required at watercourses crossed by access roads. Culverts should be sized according to hydrologic requirements to be determined during the detailed design / permit application stage. Other technical requirements may influence culvert size and materials.

Where fish habitat is present, culverts must be installed such that fish passage is maintained. Where a watercourse provides indirect habitat, the culvert must continue to convey flow to downstream areas.

Specific methods for culvert installation would be dependent on culvert type, size and construction seasons. If a temporary access road is required, the DFO Operational Statement for Temporary Stream Crossings can be used if the specific conditions can be met. The Operational Statement includes details of mitigation measures.

Under flowing water conditions, water must be pumped or flumed around the work area in order to install a culvert. The following steps outline how a site can be isolated for culvert construction:

Temporary Isolation

- Cofferdams (e.g., aqua-dams, sand bags, concrete blocks, steel or wood wall, clean rip-rap, sheet pile or other appropriate designs) can be used to separate the in-water work site from flowing water.
- If rip rap or pea gravel bags are used, clean, washed material should be used to build the berm. The berm face should consist of clean, washed granular material that is adequately sized (i.e., moderate sized rip rap and not sand or gravel) to hold the berm in place during construction. Material to build the berms should not be taken from below the high water mark.
- Cofferdams should be designed to accommodate any expected high flows of the watercourse during the construction period.
- Before starting construction, fish should be salvaged from behind the coffer dam and returned to an area immediately upstream of the isolated area. Salvage operations would consist of electrofishing and/or seining.
- Accumulated sediment should be removed (ensuring that the original bed of the watercourse is not excavated) from behind the coffer dam before its removal.
- The original channel bottom gradient and substrate should be restored after coffer dam removal.
- Water from dewatered areas should be treated or diverted into a vegetated area or settling basin to remove suspended solids and prevent sediment and other deleterious substances from entering the watercourse.
- Cofferdams should be removed in a downstream to upstream sequence to allow gradual re-introduction of water to the dewatered area and prevent excessive suspension of silt or other bed material.
- Pump intakes should be sized and adequately screened to prevent debris blockage and fish mortality (refer to the DFO Freshwater Intake End-of-Pipe Fish Screen Guidelines).
- The pumping system should be sized to accommodate any expected high flows of the watercourse during the construction period. Back-up pumps should be kept on site in case of pump failure.
- The pump should be discharged to a grassed area to allow water to reenter the watercourse only after it has been filtered through vegetation to prevent silt deposition. If no suitable areas exist, a filter bag should be placed on the outlet to filter the water prior to reentry into the watercourse.
- Work should not be completed during flood stage flows or during times when heavy precipitation is occurring or is expected.

6.3 COLLECTOR LINES

6.3.1 Overhead Collector/Transmission Lines

The DFO has prepared an Operational Statement for overhead line construction (Ontario Operational Statement Habitat Management Program: Overhead Line Construction – see **Appendix E**). This Operational Statement provides measures to protect fish and fish habitat when undertaking this type of construction activity. In addition to measures identified in the Operational Statement, an Emergency Spill Kit should be available on site in the event of leaks from machinery.

Although construction of overhead lines (as required) would not require any in-water works, as discussed in the Operational Statement, it is the riparian habitat that is most sensitive to disturbance from overhead line construction. Riparian vegetation occurs adjacent to the watercourse and directly contributes to fish habitat by providing shade, cover and spawning and food production areas.

According to the DFO Operational Statement, a proponent may proceed with an overhead line project without DFO review when the conditions of the Operational Statement are met (**Appendix E**).

6.3.2 Underground Collector Lines

There are several crossing techniques that may be employed for installation of a buried collector line. According to DFO the order of preference for such crossings, in order to protect fish and fish habitat is: 1) punch or bore, 2) high pressure directional drilling, 3) dry open-cut crossing and 4) isolated open-cut crossing. There are DFO Operational Statements for all of the above methods and all are included in **Appendix E**, where mitigation measures are also described.

In addition to measures identified in the Operational Statement, an Emergency Spill Kit should be available on site in the event of leaks from machinery.

6.4 DOCK CONSTRUCTION

Since specific construction details are not known at the time of report preparation, the list is extensive such that all measures are included and the appropriate measures will be applied as needed. Although the scale of the proposed docks is larger than that covered by DFO's Operational Statement for Dock and Boathouse Construction, the conditions and mitigation measures listed in the Operational Statement should be implemented to minimize impacts on the aquatic environment.

As the final construction method is not known at the time of report production, the following list of measures is provided and may or may not apply, dependent on the final dock location and design.

- Measures listed in the DFO Operational Statement for Dock Construction
- Follow MNR in-water construction timing windows
- Work from barges where possible
- Shoreline restoration plan
- Sediment and erosion control
- Protection of water quality during construction
- Fish removal plan (for drilling of piles, construction of hydraulic lifts, etc.)

6.5 SUBMARINE CABLE CONSTRUCTION

Although the scale of the submarine cable component of the project is larger than that covered by DFO's Operational Statement for Underwater Cables, the conditions and mitigation measures listed in the Operational Statement should be implemented to minimize impacts on the aquatic environment. As the final construction method is not known at the time of report production, measures for both trenching and directional drilling in the nearshore area are provided below.

6.5.1 Landing Areas

Trenching

Due to the bathymetry in the nearshore areas, trenching to bury the cable exceeds the criteria for trench length of DFO's Operational Statement for Underwater Cables. In addition to the following measures, the principles and mitigation measures of the Operational Statement will be followed:

- Clamshell armouring of cable to protect cable in shallow water and minimize trenching. Trenching to extend approximately 100 m from the Lake Ontario High Water Mark within which the cable will be buried. Metal clamshell armour will protect the cable from the end of the trench to a water depth of 3 m.
- Follow DFO Blasting Guidelines (if applicable)
- Follow MNR in-water construction timing windows
- Backfill trench using native materials
- Work from barges where possible
- Shoreline restoration plan
- Restoration of work area (removal of work platforms if required)

- Sediment control
- Protection of water quality during construction
- Fish removal plan

Directional Drilling

- Measures listed in the DFO Operational Statement for High-Pressure Directional Drilling
- Follow MNR in-water construction timing windows
- Isolation of the exit location for the protection of water quality and control of drilling fluids (sediment control silt curtain)
- Restoration of any in-water work areas
- Restoration of shoreline

Sediment control

6.5.2 Offshore

The cable will be laid on the lake bottom from barges on the lake surface. Mitigation measures listed in DFO's Operational Statement regarding refueling and maintenance of machinery, spill kits, etc. will be implemented. The cable material is a galvanized steel type armour with cross-linkable polyethylene insulation which minimizes the electromagnetic field around the cable.

7.0 Monitoring

7.1 CONSTRUCTION

Methodologies/Sampling Protocols

As appropriate, an Environmental Monitor should be on-site during installation of Project components that could potentially affect aquatic habitats to ensure compliance with specifications, site plans and permits. In particular, the Construction Contractor would ensure that pre-construction preparation is completed (e.g. erosion and sediment control plans) prior to commencement of in-stream work (if required). The Construction Contractor would ensure that detailed pre-construction profiles of the slopes, banks, and bed are determined prior to installation of the access roads, crane paths and power lines. The Environmental Monitor should monitor weather forecasts prior to the installation of access roads, crane paths and power lines, particularly prior to work near aquatic habitats.

The Environmental Monitor will:

- Perform routine checks of all erosion and sediment control measures
- Monitor flow conveyance during in-water works where culvert replacements are required
- Visually inspect access/exit pits and directional drill line for frac-outs
- Inspect drilling equipment and material for spills or leaks

Performance Objectives/Additional Actions

The Environmental Monitor should ensure that bank, bed, and floodplain conditions are restored to pre-construction conditions, where possible, following completion of the construction activities.

Environmental monitoring following spring run-off the year after construction (first year of operations) should also occur, to review the effectiveness of the bank and slope re-vegetation (if required), to check bank and slope stability, and to ensure surface drainage has been maintained. In the event that adverse effects are noted, appropriate remedial measures should be completed as necessary (i.e. site rehabilitation and re-vegetation) and additional follow-up monitoring conducted as appropriate, under the direction of an environmental advisor.

Compensation strategies and/or permits from the DFO and/or the CRCA, as applicable, may include conditions of approval such as construction and post-construction monitoring. All such strategies and/or permits should be obtained prior to construction, and all such conditions and requirements would be implemented as appropriate.

7.2 OPERATION

The Environmental Effects Monitoring Plan for the Project is provided in the **Design and Operations Report**. Operation activities that have the potential to affect aquatic habitat includes accidental spills and/or leaks. Proper storage of materials (e.g. maintenance fluids) at off-site storage containers would greatly reduce the potential for accidental spills and/or leaks.

Appropriate remedial measures may be completed as necessary and additional follow-up monitoring conducted as appropriate in the event of an accidental spill and/or leak. The level of monitoring and reporting should be based on the severity of the spill/leak and may be discussed with the MOE (Spills Action Centre) and MNR.

If *Fisheries Act* approvals are required from DFO, some monitoring may be required, and would be stated in any DFO Authorizations. Monitoring typically includes photographic records during construction and for two years after the completion of construction to ensure survival of plantings and overall function of the installations.

8.0 Conclusions

The Amherst Island Wind Project **Water Assessment and Water Body Report** has been prepared by Stantec for Windlectric Inc. (c/of Algonquin Power Co.) in accordance with Ontario Regulation 359/09. This report is one component of the REA application for the Project.

Careful siting of the wind turbines at the Amherst Island Wind Energy Project ensures that all 36 turbines are located greater than 30 m from any lake or stream. There is a water body located 106 m from the blade tip of Turbine 34. Water bodies located within 120 m of a turbine or structure, or crossed by an access road or collector line are identified in Tables 3.2 and 4.2. All other water bodies in the Study Area are located greater than 120 m from the Project Location

Locations where water bodies are present within 120 m of the proposed Project Location are presented in **Figure 2**. Aquatic habitat characteristics at each water body summarized in **Table 4.2**.

Based on the current Project layout and proposed environmental mitigation measures, construction activities will not result in negative effects to water bodies or fish habitat at proposed collector line crossings. At culverts, docks and cable landing areas (**Table 4.3**), DFO can issue a Letter of Advice if they conclude that the works can be conducted in a manner that will not require a *Fisheries Act* authorization. Consultation with the DFO will continue as Project details are finalized, and Windlectric Inc. will comply with any DFO conditions and recommendations for the Project. .

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

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