

Grand Bend Wind Farm
Water Assessment and
Water Body Report

Grand Bend Wind Limited Partnership
Northland Power Inc., as agent



NEEGAN BURNSIDE

February 2013



**Grand Bend Wind Limited Partnership
Water Assessment and
Water Body Report**

Prepared By:

Neegan Burnside Ltd.
292 Speedvale Avenue West Unit 20 Guelph ON N1H 1C4

Prepared for:

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Northland Power Inc., as agent

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Record of Revisions

Revision	Date	Description
0	August 27, 2012	Initial Submission to the Ministry of Environment, Municipal and Aboriginal Communities as well as Selected Government Agencies
1	February 15, 2013	Application for Renewable Energy Approval

Executive Summary

The Grand Bend Wind Limited Partnership, with Northland Power Inc. (“Northland”) as agent, are proposing to develop, construct and operate a 100 MW wind facility located north of Grand Bend, Ontario. An application for approval is being prepared under Ontario Regulation 359/09 of the *Environmental Protection Act*. The project is classified as a Class 4 Wind facility under the Regulation. The Grand Bend Wind Farm (“the Project”) is located in Huron County, spanning the lower-tier municipalities of Bluewater and South Huron. Portions of the transmission line also traverse the municipality of Huron East and municipality of West Perth in Perth County.

Under Section 29, 30, 31, 39 and 40 of O.Reg. 359/09, a Water Assessment is a required component of a REA Application for a Class 4 Wind Facility. The Water Assessment is to be completed in three stages as follows:

- Stage 1: Water Assessment, Records Review;
- Stage 2: Water Assessment, Site Investigation; and,
- Stage 3: Water Body Report.

Based on the review of existing information, agency records and in-person meetings with agency staff, a number of water bodies are present, or may be present within 120 m of the Project location. A detailed description of these features is presented in this report.

Watercourses within the Turbine and Transmission Line Study Area are generally small and characteristic of drains in highly agricultural landscapes. A total of 64 permanent and intermittent watercourses are within 120 m of the Project Location. Only six of these watercourses will require in-water works for Access Road culverts and of the six watercourse most are intermittent or seasonal. Specifically, most have been straightened and deepened to some extent. Those identified as municipal drains are typically cleaned out regularly depending on the drainage report and maintenance requirements. In addition, many agricultural fields in the area appear to have been tiled for drainage with tile drains flowing into the nearest watercourse or municipal drain.

All proposed construction methodology is covered under Operational Statements (Ontario Operational Statement Habitat Management Program) provided by DFO. The Proponent and Contractor(s) will follow the “Measures to Protect Fish and Fish Habitat” outlined in the Operational Statement, so that no impacts to water quality, or fish and fish habitat will occur.

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1.0 Introduction

1.1 Project Overview

The Grand Bend Wind Limited Partnership, with Northland Power Inc. (“Northland”) as agent, are proposing to develop, construct and operate a 100 MW wind facility located north of Grand Bend, Ontario. An application for approval is being prepared under Ontario Regulation 359/09 of the *Environmental Protection Act*. The project is classified as a Class 4 Wind facility under the Regulation. The Grand Bend Wind Farm (“the Project”) is located in Huron County, spanning the lower-tier municipalities of Bluewater and South Huron. Portions of the transmission line also traverse the municipality of Huron East and municipality of West Perth in Perth County. The project location and study area is provided in **Figure 1** in **Appendix A**.

The basic project components will include up to 48 turbines (Siemens SWT-2.3-113 direct drive wind turbine generators with a total name plate capacity of 100 MW), turbine access roads, a 36 kV electrical collection system, substation, a parts and storage (office/maintenance) building, a new transmission line within municipal road right-of ways (“ROWS”) along Sararas Road, Rodgerville Road, and Road 183 with connection to the provincial power grid at the 230 kV transmission line south of the Seaforth Transformer Station. During construction temporary components will include access roads and work/storage areas at the turbine locations and transmission connections.

Under Section 29, 30, 31, 39 and 40 of O.Reg. 359/09, a Water Assessment is a required component of a REA Application for a Class 4 Wind Facility. The Water Assessment is to be completed in three stages as follows:

- Stage 1: Water Assessment, Records Review;
- Stage 2: Water Assessment, Site Investigation; and,
- Stage 3: Water Body Report.

This report presents the findings of all three stages in order to provide a comprehensive review and assessment of water bodies in the vicinity of the Project location.

1.2 Project Location

The proposed Project is located in Huron County, spanning the lower-tier municipalities of Bluewater and South Huron as well as a portion of Huron East and the municipality of West Perth in Perth County. The Project Location shown in **Figure 1** in **Appendix A**, is bounded by:

- The Bluewater Highway (Highway 21) to the west;

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- Main Street East/Grand Bend Line to the south;
- Blackbush and Shipka Lines with a small section of the study area in the central section of the project extending to Bronson Line and to the east; and,
- Staffa Road to the north.

Two transmission line routing options were originally studied, a northern route and a southern route, as described in the Project Description Report. The northern route was identified as having fewer natural heritage as well as social, aesthetic and technical impacts constraints as was thus selected as the preferred route. This route runs from a transformer station on Lot 14, Concession 13, former Hay Township, and follows Sararas/Rodgerville Road to Line 17 and Road 183, connecting to the existing 230 kV Hydro One transmission line just south of the Seaforth Transformer Station ("TS"). The southern route was discarded as an option and was not studied any further.

O.Reg. 359/09 defines the Project Location as:

"a part of land and all or part of any building or structure in, on or over which a person is engaging in or proposes to engage in the project and any air space in which a person is engaging in or proposes to engage in the project".

For the purposes of this Project, the Project Location includes the footprint of the facility components, plus any temporary work and storage locations. The boundary of the Project Location is used for defining setback and site investigation distances according to O.Reg. 359/09. The buildable area, which includes the footprint of the facility components, plus any temporary work and storage locations, will be staked on private lands. All construction and installation activities will be conducted within these designated areas; this includes construction vehicles and personnel. Similarly, all installation activities related to collector lines within the municipal road allowance will be contained within the boundaries of the road allowance.

1.3 Project Study Area

An initial Project Study Area of 300 m around the Project Location was identified and used as the boundary of a search for potential lake trout lakes. None were found and thus the Study Area was reduced to 120 m from the Project Location for the remainder of the study.

For convenience, the Study Area was broken into two separate units, as follows:

- Turbine Study Area, including all structures associated with the turbines, access roads, below ground collector lines and the transformer station; and,
- The Transmission Line Study Area, including the overhead transmission line from the transformer station to the interconnection point with the existing 230 kV line.

All collector lines within the Turbine Study area will be constructed primarily underground unless conditions are not suitable for proposed construction methods. Transmission lines are proposed to be overhead or underground depending on the sensitivity of areas or features encountered along the proposed line. No-in water works will be required.

The Project Study Area is presented on **Figure 1, Appendix A**.

2.0 Water Assessment, Records Review

2.1 Scope of the Review

The Records Review was conducted in accordance with Sections 29 and 30 of O.Reg. 359/09 and the Technical Guide to Renewable Energy Approvals (MOE, 2012).

The Records Review must determine whether the project location is:

- in a water body;
- within 120 m of the average annual high water mark of a lake, other than a lake trout lake that is at or above development capacity;
- within 300 m of the average annual high water mark of a lake trout lake that is at or above development capacity;
- within 120 m of the average annual high water mark of a permanent or intermittent stream; and,
- within 120 m of a seepage area.

The definition of a water body provided in O.Reg. 359/09, 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”.

Information was collected to determine the potential presence of:

- lakes;
- lake trout lakes;
- permanent or intermittent streams; and,
- seepage areas.

The Records Review Results is presented in Section 2.3 below.

2.2 Publicly Available Data Sources

A summary of information sources reviewed is provided in **Table 2.1**.

Table 2.1 Publicly Available Data Sources Reviewed

Data Source	Information Provided	Reference
Policy Documents		
County of Huron Official Plan	Water bodies	http://www.huroncounty.ca/plandev/officialplan.php
Municipality of Bluewater Official Plan	Water bodies	http://www.town.bluewater.on.ca/innerpage.aspx?x=LS%2br0pdZgZIsIJ8Tz%2bz1DzNrJrRyLtgyp9xQd167M2wO384%2bNQ8V0hUDc5Hf9XC
Municipality of South Huron Official Plan	Water bodies	http://southhuron.iwebz.com/siteengine/ActivePage.asp?PageID=242
Municipality of Huron East Official Plan	Water bodies	http://www.huroneast.com/index.php?sltb=plan
Perth County Official Plan	Water bodies	http://www.perthcounty.ca/page/County_of_Perth_Official_Plan
Interactive Mapping Sites		
Ausable Bayfield Conservation Authority interactive mapping site	Water bodies; floodplains and regulation limits	http://www.camaps.ca/Geocortex/Essentials/Web/Viewer.aspx?Site=ABCAPubBing
County of Huron interactive mapping site	Water bodies	http://gis.huroncounty.ca/imf/imf.jsp?site=Huron_County
Department of Fisheries and Oceans and Conservation Ontario Aquatic Species at Risk mapping	Aquatic species at risk	http://www.conservation-ontario.on.ca/projects/DFO.html
Land Information Ontario ("LIO") publicly available datasets	Drain classification	http://www.mnr.gov.on.ca/en/Business/LIO/index.html
Other Reports and Background Documents		
Ausable Bayfield Conservation Authority, South Gullies Watershed Report Card	Water quality and aquatic habitat	http://www.abca.on.ca/downloads/reportcard/South_Gullies.pdf

2.2.1 Requests for Information and Records

Letters were sent to a number of federal, provincial, municipal and other agencies and organizations in order to request additional information and records not publicly available through web searches. In addition, several phone calls and follow-up emails were completed. A copy of correspondence with agencies (MOE and MNR) is provided in **Appendix B** and summarized in **Table 2.2**.

Table 2.2 Summary of Agencies Contacted, Records Requested and Records Received

Source and Contact Information	Records Requested	Agency Response/Records Reviewed
Source: Huron County Contact: Mike Burroughs, GIS Technician Dates Contacted: April 4, 2011	<ul style="list-style-type: none"> Aerial photography. 	<ul style="list-style-type: none"> 2006 orthorectified aerial photography. 2010 orthorectified aerial photography.
Source: Environment Canada-Canadian Wildlife Service Contact: John Fischer, Environmental Assessment Coordinator Dates Contacted: December 16, 2011	<ul style="list-style-type: none"> Federal species at risk records. 	<ul style="list-style-type: none"> Email of Jan 3, 2012 indicated that CWS does not maintain spatial database of records. referred to publicly available data on NHIC, OBBA and SARA Registry for further info.
Source: Fisheries and Oceans Canada Southern Ontario District Office Contact: Rick Kiriluk, Fish Habitat Biologist Dates Contacted: December 16, 2011	<ul style="list-style-type: none"> Fish habitat information. Aquatic Species at Risk records. 	<ul style="list-style-type: none"> Informed that information could be provided at a later date once project details were known. Informed that watercourse crossing locations should be sent by mail to Referrals Coordinator at the Harvester Road office.
Source: Huron County Contact: Claire Dodds, County Planner Dates Contacted: October 24, 2011	<ul style="list-style-type: none"> General records of known natural heritage features and water bodies. 	<ul style="list-style-type: none"> No response provided; meeting arranged to discuss municipal concerns and interests.
Source: Huron County Contact: Craig Metzger, Senior Planner Dates Contacted: October 24, 2011	<ul style="list-style-type: none"> General records of known natural heritage features and water bodies. 	<ul style="list-style-type: none"> No records of natural heritage features provided. Provided copy of Municipality of Bluewater's zoning bylaw for commercial scale wind turbines.
Source: Municipality of South Huron Contact: Dwayne McNab, Manager of Building and Development Dates Contacted: October 24, 2011	<ul style="list-style-type: none"> General records of known natural heritage features and water bodies. 	<ul style="list-style-type: none"> No response provided; meeting arranged to discuss municipal concerns and interests.

Source and Contact Information	Records Requested	Agency Response/Records Reviewed
<p>Source: Municipality of Bluewater Contact: Arlene Parker, Planning Coordinator Dates Contacted: October 24, 2011</p>	<ul style="list-style-type: none"> • General records of known natural heritage features and water bodies. 	<ul style="list-style-type: none"> • Letter received from CAO. Directed to contact ABCA for natural heritage data.
<p>Source: Ministry of the Environment Contact: Scott Abernethy, Surface Water Group Leader, Southwestern Region Dates Contacted: May 23, 2012</p>	<ul style="list-style-type: none"> • Process and scope of work for conducting the Site Investigation. 	<ul style="list-style-type: none"> • Confirmation on scope of work received via e-mail (May 24, 2012).
<p>Source: Ministry of Natural Resources Contact: Chris Godwin, Area Biologist Dates Contacted: May 25, 2012</p>	<ul style="list-style-type: none"> • Fish records for watercourses where in-water work is proposed 	<ul style="list-style-type: none"> • Fish records for proposed culvert crossings received May 28, 2012.
<p>Source: Ausable Bayfield Conservation Authority Contact: Geoff Cade, Supervisor of Water and Planning; Tracy Boitsen, GIS Technician Dates Contacted: April 19, 2011; October 24, 2011; November 24, 2011; December 15, 2011; February 22, 2012</p>	<ul style="list-style-type: none"> • General records of known natural heritage features and water bodies. • Regulation Limit mapping; • Aquatic habitat mapping; • Aquatic species at risk records. 	<ul style="list-style-type: none"> • Regulation Limit; • Records of Species at Risk. • Drinking water source protection features (highly vulnerable aquifers and groundwater recharge areas).
<p>Source: Upper Thames River Conservation Authority Contact: Karen Winfield, Land Use Regulations Officer; Phil Simm, GIS Technician Dates Contacted: February 7, 2012</p>	<ul style="list-style-type: none"> • General records of known natural heritage features and water bodies. • Regulation Limit mapping. • Drain Classifications. • Aquatic habitat mapping. • Aquatic species at risk records. 	<ul style="list-style-type: none"> • Regulation Limit mapping; • Drinking water source protection features (highly vulnerable aquifers and groundwater recharge areas).

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Source and Contact Information	Records Requested	Agency Response/Records Reviewed
<p>Source: Aamjiwnaang First Nation Contact: Chief Christopher Plain Dates Contacted: February 21, 2012</p>	<ul style="list-style-type: none"> • General records of known natural heritage features and water bodies. • Aboriginal Traditional Knowledge. 	<ul style="list-style-type: none"> • No response received.
<p>Source: Bkejwanong Territory (Walpole Island First Nation) Contact: Chief Joseph Gilbert Dates Contacted: February 21, 2012</p>	<ul style="list-style-type: none"> • General records of known natural heritage features and water bodies. • Aboriginal Traditional Knowledge. 	<ul style="list-style-type: none"> • No response received.
<p>Source: Chippewas of Kettle & Stony Point Contact: Chief Elizabeth Cloud Dates Contacted: February 21, 2012</p>	<ul style="list-style-type: none"> • General records of known natural heritage features and water bodies. • Aboriginal Traditional Knowledge. 	<ul style="list-style-type: none"> • No response received.
<p>Source: Delaware Nation, Moravian of the Thames Contact: Chief Gregory Peters Dates Contacted: February 21, 2012</p>	<ul style="list-style-type: none"> • General records of known natural heritage features and water bodies. • Aboriginal Traditional Knowledge. 	<ul style="list-style-type: none"> • No response received.
<p>Source: Chippewas of the Thames First Nation Contact: Chief Richard Miskokomon Dates Contacted: February 21, 2012</p>	<ul style="list-style-type: none"> • General records of known natural heritage features and water bodies. • Aboriginal Traditional Knowledge. 	<ul style="list-style-type: none"> • No response received.
<p>Source: Caldwell First Nation Contact: Chief Louise Hillier Dates Contacted: February 21, 2012</p>	<ul style="list-style-type: none"> • General records of known natural heritage features and water bodies. • Aboriginal Traditional Knowledge. 	<ul style="list-style-type: none"> • No response received.
<p>Source: Muncee-Delaware First Nation Contact: Dan Miskokomon, Band Manager Dates Contacted: February 21, 2012</p>	<ul style="list-style-type: none"> • General records of known natural heritage features and water bodies. • Aboriginal Traditional Knowledge. 	<ul style="list-style-type: none"> • No response received.

Source and Contact Information	Records Requested	Agency Response/Records Reviewed
Source: Six Nations of the Grand Territory Contact: Chief William Montour Dates Contacted: February 21, 2012	<ul style="list-style-type: none"> General records of known natural heritage features and water bodies. Aboriginal Traditional Knowledge. 	<ul style="list-style-type: none"> No response received.
Source: Grand River Community Metis Council Contact: Cora Bunn, President Dates Contacted: February 21, 2012	<ul style="list-style-type: none"> General records of known natural heritage features and water bodies. Aboriginal Traditional Knowledge. 	<ul style="list-style-type: none"> No response received.
Source: Windsor-Essex-Kent Metis Council Contact: Robert Leboeuf, President Dates Contacted: February 21, 2012	<ul style="list-style-type: none"> General records of known natural heritage features and water bodies. Aboriginal Traditional Knowledge. 	<ul style="list-style-type: none"> No response received.
Source: Metis Nation of Ontario Contact: Melanie Paradis, Director Dates Contacted: February 21, 2012	<ul style="list-style-type: none"> General records of known natural heritage features and water bodies. Aboriginal Traditional Knowledge. 	<ul style="list-style-type: none"> No response received.

2.2.2 Agency Meetings

In-person meetings were held with a number of agencies to obtain additional information, records and to review areas of concern requiring additional study during the Site Investigation. Meetings are summarized in **Table 2.3**.

Table 2.3 Summary of Agency Meetings

Agency	Date	Location	Topic of Discussion
Ministry of Natural Resources, Renewable Energy Provincial Field Program Staff	August 25, 2011	Neegan Burnside Guelph Office	<ul style="list-style-type: none"> Review results of MNR's records review. Discussion regarding significant features and species. Review of protocols for surveying and identifying features of significance.
Ausable Bayfield Conservation Authority (ABCA)	March 1, 2012	ABCA Office	<ul style="list-style-type: none"> Flood Regulation Limit. Level II Agreement with DFO.

Agency	Date	Location	Topic of Discussion
			<ul style="list-style-type: none"> Proposed crossing designs and mitigation measures. Potential for Aquatic Species at Risk. Available information on water body types, fish habitat and species records.
Perth County, West Perth, Huron East, South Huron	February 13, 2012	West Perth Office in Mitchell	<ul style="list-style-type: none"> Discussion of municipal concerns. Request made for natural heritage feature data.
Huron County, South Huron	February 27, 2012	South Huron Office in Exeter	<ul style="list-style-type: none"> Discussion of municipal concerns. Request made for natural heritage feature data.
Huron County	March 2, 2012	Huron County Office in Goderich	<ul style="list-style-type: none"> Discussion of municipal concerns. Request made for natural heritage feature data.

2.3 Records Review Results

Based on the review of existing information, agency records and in-person meetings with agency staff, a number of water bodies are present, or may be present within 120 m of the Project location. A detailed description of these features is presented in the following sections. Data provided by ABCA and MNR (fish collection records) is summarized in **Appendix C**. Features and water body locations are shown on **Figures 2, 2a through 2h, Appendix A**.

2.3.1 Watershed

The Project Study Area is located entirely within Ausable Bayfield Conservation Authority (“ABCA”) governed watersheds. The Turbine Study Area is within a subwatershed known as the “South Gullies”. This area is comprised of numerous small watercourses and drains that outlet directly to Lake Huron.

Based on a review of the ABCA Fish Habitat Management Plan the “Gullies” is a sub-basin comprised of numerous tributary systems flowing west to Lake Huron. A gully is defined as a water erosion feature, having a head and a mouth and constant or intermittent discharge. The sub-basin drains over the St. Joseph till with agriculture being the dominant land use. In the southern gullies basin, soils are dominated by silty-

clay tills which experience periods of low base flows. Fish communities are typically limited in these intermittent streams (ABCA, April 2001).

The Transmission Line Study Area begins within the South Gullies area and extends to the east where it traverses the Black Creek subwatershed. This creek is a tributary of the Ausable River system which flows southward and to the west, flowing into Lake Huron at Port Franks, south of the Study Area.

At Road 183, the transmission line crosses into the Bannockburn subwatershed in the vicinity of the Shephard Creek Drain. The drain flows into the Bannockburn River and subsequently to the Bayfield River and Lake Huron at the Town of Bayfield, north of the Study Area.

2.3.2 Lakes and Lake Trout Lakes

The Lake Huron shoreline is approximately 150 m from the Project Location at the nearest point assuming the Bluewater Highway as a temporary access road for construction. All turbines are greater than 300 m from Lake Huron although some access roads start from the Bluewater Highway and travel east. Lake Huron is not considered a lake trout lake that is at or above development capacity. The project thus meets the required setback from lakes.

No other lakes or lake trout lakes were identified within 300 m of the Project Location.

2.3.3 Permanent and Intermittent Watercourses

There are 64 permanent and intermittent watercourses within 120 m of the Project Location. Watercourses within the Turbine and Transmission Line Study Area are generally small and characteristic of drains in highly agricultural landscapes. Specifically, most have been straightened and deepened to some extent. Those identified as municipal drains are typically cleaned out regularly depending on the drainage report and maintenance requirements. In addition, many agricultural fields in the area appear to have been tiled for drainage with tile drains flowing into the nearest watercourse or municipal drain.

Watercourses listed below have been separated into the Turbine Study Area (includes Collector Line crossings) and the Transmission Line Study Area. Additional information on the watercourses within the Turbine and Transmission Line Study Areas is also provided in Section 3.0.

A summary of the watercourses and municipal drains within 120 m of the Project Location is provided in **Table 2.4**. The location of watercourses is provided on **Figures 2a through 2h, Appendix A**.

Table 2.4 Permanent and Intermittent Watercourses within 120 m of the Project Location

Watercourse Name	Drain Class	Thermal Regime	Fish Community
Turbine Study Area			
"G"	-	N/A	N/A
Adams Drain	C	Warm	Bait Fish
Adams Drain	F	N/A	N/A
Charette Drain	F	N/A	N/A
Charette Drain Trib.	F	N/A	N/A
Datars Millers Drain	C	Warm	Bait Fish
Drysdale Drain	F	N/A	N/A
Fahner Drain	*closed drain	N/A	N/A
Fourcier Drain	F	N/A	N/A
from Pepper Drain	F	N/A	N/A
Geiger Drain	C	Warm	Bait Fish
Glazier Drain	F	N/A	N/A
Kading Drain	C	Warm	Bait Fish
Maple Grove Branch	C	Warm	Bait Fish
Masse Drain	C	Warm	Bait Fish
Miller Drain	-	N/A	N/A
Pepper Drain	F	N/A	N/A
Pepper Drain Branch A	F	N/A	N/A
Pergel Drain	F	N/A	N/A
Pergel Drain Branch b	F	N/A	N/A
Ratz Drain Ext	C	Warm	Bait Fish
Ratz Municipal Drain 1999	C	Warm	Bait Fish
St Joseph Airport South Drain	F	N/A	N/A
Truemner Drain	C	Warm	Bait Fish
Turnbull Drain	F	N/A	N/A
Unknow Hay F	C	Warm	Bait Fish
Unknown Hay A	C	Warm	Bait Fish
Unknown Hay A	F	N/A	N/A
Unknown Hay B	F	N/A	N/A
Unknown Hay C	F	N/A	N/A
Unknown Hay D	F	N/A	N/A

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Watercourse Name	Drain Class	Thermal Regime	Fish Community
Unknown Hay D Trib	F	N/A	N/A
Unknown Hay E	F	N/A	N/A
Unknown Hay G	F	N/A	N/A
Unknown Hay H	A	Cold	Bait Fish
Unknown Stan L	C	Warm	Bait Fish
Unknown Stan M	F	N/A	N/A
Webb Drain	C	Warm	Bait Fish
Transmission Line Study Area			
Big Drainage Works	-	N/A	N/A
Black Creek Drain Branch West	C	Warm	Bait Fish
Black Creek Drain, aka Black Creek	E	Warm	Top Predators
Branch "A"	-	N/A	N/A
Branch "F"	-	N/A	N/A
Branderhorst Drainage Works	-	N/A	N/A
Brock Drainage Works	-	N/A	N/A
Geary Creek Drainage Works	A	Cold	Not Known
Geiger Drain, aka Black Creek	D	Cold	Trout/Salmon
Gieger Drainage Works	D	Cold	Trout/Salmon
Glenn Drain	A	Cold	Not Known
Glen-Somerville Drain	F	N/A	N/A
Hoggarth Drainage Works	C	Warm	Bait Fish
Kading Drain	C	Warm	Bait Fish
McDonald Drainage Works	F	N/A	N/A
Mitchell Drainage Works	A	Cold	Not Known
Norris Municipal Drain 2002	-	N/A	N/A
Rowcliffe Drain	-	N/A	N/A
Rowcliffe-Geiger Drain	-	N/A	N/A
Shephard Creek Drainage Works	A	Cold	Not Known
Stephan Drain	C	Warm	Bait Fish
Truemner Drain	C	Warm	Bait Fish
Tyndall Drainage Works	C	Warm	Bait Fish
Unnamed	-	N/A	N/A
Zurich Drain South, aka St Joseph	F	N/A	N/A

Watercourse Name	Drain Class	Thermal Regime	Fish Community
Zurich Drain Trib. B.	F	N/A	N/A

2.3.4 Floodplain

The ABCA regulates land within the floodplain of water bodies and wetlands in its jurisdiction. A total of six watercourse crossings will be within the flood regulated area and therefore require a permit under the ABCA's Generic Flood Regulation (*Ontario Regulation 174/06*). Components of the project (i.e., access roads) may also fall within the flood regulated limit although are proposed to be designed in a way that does not effect the watercourses ability to convey flow. ABCA Regulation Limit mapping is provided on **Figures 2a through 2h, Appendix A**.

2.3.5 Water Quality

According to ABCA Watershed Report Cards (2007), water quality indicators generally show that water quality in the South Gullies, Bannockburn and Black Creek subwatersheds "need to be enhanced", each having an overall "C" grade. Water quality conditions are summarized in **Table 2.5**.

Table 2.5 Water Quality

Water Quality Indicator	Total Phosphorus	E. coli	Benthic Invertebrates	Overall Grade
Water Quality Target	0.03 mg/L	100 cfu ("colony forming units")/100 mL	Rated according to the Family Biotic Index which ranges from 1 (healthy) to 10 (degraded)	Graded A (Excellent) to F (Degraded and needs considerable improvement)
South Gullies Actual Findings	0.07 mg/L	236 cfu/100 mL	5.2	C
Black Creek Actual Findings	0.09 mg/L	933 cfu/100 mL	5.9	C
Bannockburn Actual Findings	0.06 mg/L	355 cfu/100 mL	5.1	C

2.3.6 Fish and Fish Habitat

Within the Turbine Study Area, fish habitat is primarily limited to small drains, most of which are intermittent or are providing habitat for bait fish only, as noted in **Table 2.4**. Only the "Unknown Hay H Drain" provides cold water habitat conditions within the

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Turbine Study Area with a fish community consisting of white sucker (*Catostomus commersoni*), creek chub (*Semotilus atromaculatus*), and blacknose dace (*Rhinichthys atratulus*) based on ABCA 2011 fish collection data. No in-water works are proposed for the Unknown Hay H drain although an access road to the south west of Turnbull Road is required for Turbine T-40 although no crossing is required.

Within the Transmission Line Study Area, there are a variety of watercourse types, providing permanent, intermittent, warm and cold water habitats. The Black Creek and its tributaries, including the Geiger Drain provide the highest quality fish habitat, including habitat for top predators and cold water conditions suitable for salmonids. The Shephard Creek Drainage Works, near Chiselhurst and Mitchell Drainage Works, west of McTaggart Line and Rogerville Road, also provides coldwater habitat conditions.

All transmission lines are proposed to be overhead, no poles will be located within the watercourses. Any underground collection and/or transmission lines will be installed by punch and bore or directional drilling (no-in water works required).

No major rivers or lakes are found within 120 m of the Project Location.

2.3.6.1 MNR Fish Collection Records for Permanent Crossings

Fish records were obtained from the MNR (Guelph District, Clinton Office) for water bodies that require permanent crossings (culverts) and are presented in **Table 2.6** below:

Table 2.6 MNR Fish Collection Records

Water Body	Crossing ID	Fish Species
Hay G	CR-013	No Data
Kading Drain	CR-018	Brook stickleback, bluntnose minnow, white sucker, creek chub, rainbow darter, northern redbelly dace, blacknose dace, Johnny darter, common shiner, brook trout
Hay E	CR-023	No Data
Hay B (north and south crossings)	CR-031 and CR-032	Northern redbelly dace, blacknose dace, creek chub
Saint Joseph Drain South	CR-041	No Data

Based on the species listed above, brook trout (*Salvelinus fontinalis*) are the most sensitive and have been captured by MNR in the Kading drain. Detailed information was not provided by MNR and the capture of brook trout may be an old record. All other

species listed above are regionally common and are considered to be low sensitivity. A copy of the correspondence with MNR is provided in **Appendix B**.

2.3.6.2 ABCA Fish Collection Information

As part of the Records Review, Burnside contacted ABCA and requested information on historical fish collection records and any other information pertaining to fish and fish habitat. ABCA provided fish collection information for the areas within the Project Location including the proposed transmission line along Rogerville Road. Only one station was provided for the Unknown Hay H Drain on Turnbull Road and six stations along the proposed transmission line.

Fish records obtained from the ABCA for the following water bodies that require overhead or underground transmission line crossings are presented in **Table 2.7** below.

Table 2.7 ABCA Fish Collection Information

Water Body (ABCA Station Number)	Project Location	Collection Date (mm/dd/yy)	Fish Species
Unknown Hay H Drain (GUL-19)	Collector Line along Turnbull Road	6/14/2011	White sucker, creek chub, blacknose dace
Black Creek Drain – aka Black Creek (775-AB)	Transmission Line along Rogerville Road	8/29/02	Common carp, blackside darter, bluntnose minnow, fathead minnow, rock bass, white sucker, brook stickleback, northern redbelly dace, johnny darter, common shiner, creek chub, greenside darter, blacknose dace
Black Creek (HABLA1)	Transmission Line along Rogerville Road	6/18/10	Observation: Brook trout, rainbow trout
Geiger Drain (DD04)	Transmission Line along Rogerville Road	6/17/2012	fathead minnow, rainbow trout, creek chub, bluntnose minnow, brook trout, johnny darter, blacknose dace, white sucker, brook stickleback
Mitchell Drainage Works (387-AB and 498-AB)	Transmission Line along Rogerville Road	6/1/2003	Observation: Brook trout

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Water Body (ABCA Station Number)	Project Location	Collection Date (mm/dd/yy)	Fish Species
Shepard Creek Drainage Works	Transmission Line along Rogerville Road	10/31/2001	blacknose dace, bluntnose minnow, brook stickleback, johnny darter

Of the species listed, brook trout (*Salvelinus fontinalis*), rainbow trout (*Oncorhynchus mykiss*) and greenside darter (*Etheostoma blennioides*) are the most sensitive and have been captured in the watercourses listed above. All other species listed by ABCA are regionally common and are considered to be low sensitivity. No fish collection information was available for the watercourses that will require permanent culverts within the Turbine Study area.

A copy of the fish collection Information provided by ABCA is found in **Appendix C**.

2.3.7 Habitat of Endangered and Threatened Species

Aquatic species designated as Endangered and Threatened under the *Ontario Endangered Species Act* are not present in the Study Area. See MNR meeting minutes on April 10, 2012 in Appendix B.

2.3.8 Groundwater Recharge and Discharge Areas/Seepage Areas

Information for Drinking and Source Water Protection in the ABCA watershed was limited to recharge area mapping within the project location (see **Appendix E**). Source protection zones were also illustrated for the protection of drinking water supply areas. Mapping showing areas of discharge was not available from ABCA. One area was noted for seepage by NSE during their ELC fieldwork and was located east of a pond on the Charette Drain tributary. This area is up-gradient of any proposed works. No discharge or seepage areas were noted by Burnside during the site investigation other than those areas associated with tile drain outlets.

3.0 Site Investigation

The Records Review was conducted in accordance with Section 31 of O.Reg. 359/09 and the Technical Guide to Renewable Energy Approvals (MOE, 2012).

The purpose of the Site Investigation is to determine:

- whether the results of the Records Review are correct or require correction;
- whether any additional water bodies exist, other than those identified in the Records Review; the boundaries, located within 120 m of the project location, of any water body that was identified in the records review or site investigation; and,
- the distance from the project location to the boundaries determined above.

3.1 Project Site Plan

A Project Site Plan was issued on April 18, 2012, identifying the location of turbines, access roads, construction areas, underground collector lines, a transformer station and overhead transmission line. As a result, the locations of new culverts, below-ground crossings of electrical lines and crossing of over-head transmission lines were identified.

The Site Plan is shown on **Figure 2a through 2h** in **Appendix A**.

Table 3.1 below indicates the type of watercourse crossings proposed.

3.2 Scope of the Investigation

The scope of the Site Investigation was based on the level of impact predicted. As such, the Site Investigation was focused primarily on water bodies directly affected by in-water work where new culverts are required. The investigation included observations and measurements at each proposed crossing, as described in **Section 3.3** below.

The remaining watercourses were studied using an Alternative Investigation that involved the use of aerial photography, a windshield survey and general observations from the nearest road crossing to confirm the findings of the Records Review.

Table 3.1 Type of Water Course Crossings Proposed

Crossing ID	Watercourse Name	In-water Work Proposed	Crossing Methodology	Watercourse Type	Drain Class	Thermal Regime	Fish Community	Easting	Northing
CR-013	Unknown Hay G	Y	Install New Culvert	Natural Watercourse	F	N/A	N/A	442208	4799740
CR-018	Kading Drain	Y	Install New Culvert	Municipal Drain	C	Warm	Bait Fish	442525	4800257
CR-023	Unknown Hay E	Y	Install New Culvert	Natural Watercourse	F	N/A	N/A	443145	4802294
CR-031	Unknown Hay B (north)	Y	Install New Culvert	Natural Watercourse	F	N/A	N/A	443948	4809699
CR-032	Unknown Hay B (south)	Y	Install New Culvert	Natural Watercourse	F	N/A	N/A	443982	4809441
CR-041	St Joseph Airport South Drain	Y	Replace Existing Culvert	Municipal Drain	F	N/A	N/A	444196	4807925

3.3 Methodology

The locations where new culverts are proposed were visited on December 13 and 14, 2011, March 22, and June 27, 2012. Information was collected in accordance with the MTO/DFO/MNR Protocol (MTO 2006). This protocol involves collecting detailed information about the watercourse including location, channel dimensions, morphology, fish observations, riparian habitat and fish habitat mapping. This protocol is accepted for all watercourse crossings and is recognized by Conservation Authorities (CAs), Ministry of Natural Resources (MNR) and Department of Fisheries and Oceans (DFO).

The MTO Protocol was used since it is the most accepted method of assessment for culvert crossings and provides a thorough documentation of existing aquatic conditions. Habitat mapping was also conducted at the proposed crossing locations along with visual observations of aquatic life (fish, crayfish, macrophytes, etc.). Fish collections were not part of the Site Investigation since all proposed culvert crossings are considered direct fish habitat. Weather conditions, survey times and locations are provided in the MTO Watercourse Field Record Form in **Appendix F**.

A search for seepage areas was conducted as part of the Natural Heritage Assessment during Ecological Land Classification mapping. Seepage areas are locations where groundwater comes to the surface and are typically present at the base of a slope. Searches focused on the presence of indicators such as iron staining and vegetation types including jewelweed, skunk cabbage, and watercress.

A description of the existing conditions along with completed MTO/DFO/MNR protocol forms are provided in **Appendix F**.

3.3.1 Qualifications

Burnsides' Aquatic Resources Specialist (Christopher Pfohl, C.E.T.) conducted all site investigations and records review for the water bodies within the Project Location. Mr. Pfohl's CV is provided in **Appendix G**.

3.4 Site Investigation Results

3.4.1 Changes to the Records Review

Based on the Site Investigation, no changes were made to the Records Review. No additional water bodies were identified within 120 m of the Project and the drain classifications provided appeared to be accurate.

3.4.2 Watercourses with Proposed New Culverts

Six watercourses will be crossed by new access roads requiring the installation of new culverts. Each watercourse is described below and summarized in **Table 3.2**.

Table 3.2 Summary of Watercourses at Proposed Culvert Locations

Crossing ID	Watercourse Name	Easting	Northing	Watercourse Type	Drain Class	Thermal Regime	Fish Community	Mean Wetted Width	Mean Wetted Depth	Substrate	Riparian Vegetation
CR-013	Unknown Hay G	442208	4799740	Natural Watercourse	F	N/A	N/A	0.20m	0.30m	SA	Grasses and shrubs, limited width
CR-018	Kading Drain	442525	4800257	Municipal Drain	C	Warm	Bait Fish	1.60m	0.30m	SA/GR/Co	Grasses and shrubs, limited width
CR-023	Unknown Hay E	443145	4802294	Natural Watercourse	F	N/A	N/A	0.50m	0.15m	SA	Grasses and shrubs, limited width
CR-031	Unknown Hay B (north)	443948	4809699	Natural Watercourse	F	N/A	N/A	1.30m	0.15m	SA/GR/Co	Grasses and shrubs, limited width, some mature trees
CR-032	Unknown Hay B (south)	443982	4809441	Natural Watercourse	F	N/A	N/A	1.30m	0.27m	SA/GR/Co	Grasses and shrubs, limited width
CR-041	St Joseph Airport South Drain	444196	4807925	Municipal Drain	F	N/A	N/A	0.80m	0.20m	SA/GR	Grasses and shrubs, limited width

Based on the six watercourses proposed for culvert crossings, two are municipal drains and four are natural watercourses based on the Records Review. A description of each watercourse or drain based on site conditions is provided below.

Unknown HayG

This drain will need to be crossed by an access road for construction and future maintenance of T-37 and T-38. The Unknown Hay G drain originates from closed tile drains approximately 240 m upstream of the proposed culvert crossing (CR-013). The drain is an open channel from the tile drain outlets downstream to Lake Huron and flows east to west under the Bluewater Highway 21. It is classified as an F Drain and receives intermittent flows depending on seasonal conditions and precipitation. At the time of the site visit this drain was dry with no visible standing water. The channel was U-shaped, typical of an agricultural drain with steep banks. Underground tile outlets discharge to the drain upstream of the proposed crossing location. Overhanging vegetation was present and comprised of grasses along a limited riparian width. Numerous seasonal and impassable barriers were identified due to low water levels. Long enclosed sections of watercourse were also observed at Highway 21.

Kading Drain

The Kading Drain will need to be crossed to access and construct turbines T-34, 35, 36, 37 and 38. This is a municipal drain that flows east to west, under the Bluewater Highway and outlets to Lake Huron. The Kading Drain is classified as a C Drain providing fish habitat for primarily warmwater baitfish. It is a permanent watercourse with active erosion observed along both banks within the proposed crossing location (CR-018). Channel morphology is trapezoidal with a linear alignment and a low flow channel meandering within the base. A limited riparian width exists within the crossing location consisting primarily of grasses and shrubs. The upstream reaches have a mature riparian corridor that provides good habitat within the adjacent woodlot to the east. Water clarity was good during the survey and numerous (>100) cyprinids were observed. Substrate consisted of sand and gravel with sporadic cobble in riffle sections. Stream morphology was comprised of primarily runs with a limited number of small pools and short riffle sections. Large woody debris was associated with erosion and mature deciduous riparian areas. A farm access culvert was observed upstream of the proposed crossing location consisting of a large corrugated steel pipe (CSP).

Unknown Hay E

This drain will need to be crossed (CR-023) by an access road for construction and future maintenance of T-27. The Unknown Hay E drain flows east to west and outlets to Lake Huron. It is classified as an F Drain and provides seasonal habitat for small cyprinids and receives intermittent flows depending on seasonal conditions and weather. At the time of the site visit this drain did have flow with good clarity. The channel was U-shaped, typical of an agricultural drain with steep banks. Two underground tile outlets

discharge to the drain upstream of the proposed crossing location. Overhanging vegetation was present and comprised of grasses along a limited riparian width. Fish (cyprinids) were observed in March and April 2012.

Unknown Hay B (North)

The north branch of the Hay B Drain will need to be crossed (CR-031) to access and construct turbine T-05. The drain flows east to west to the Bluewater Highway and runs south along the east side of the highway and flows into the south branch of the Hay B Drain. The mainstem of the Hay B Drain flows west under the Bluewater Highway and into Lake Huron. The Hay B Drain is classified as an F Drain providing seasonal intermittent flows. This drain may provide seasonal fish habitat depending on downstream barriers. Channel morphology is trapezoidal with a linear alignment and a low flow channel meandering within the base. A limited riparian width exists with primarily grasses lining the banks and sporadic mature deciduous trees that provide shade. Water clarity was good during the survey although no fish were observed. A culvert was observed downstream of the proposed crossing location although it is on a non-participating landowner's property.

Unknown Hay B (South)

The south branch of the Hay B Drain will need to be crossed (CR-032) to access and construct turbine T-06. The mainstem of the Hay B Drain flows west under the Bluewater Highway and into Lake Huron. The Hay B Drain is classified as an F Drain providing seasonal intermittent flows. This drain may provide seasonal fish habitat depending on downstream barriers. Channel morphology is trapezoidal with a linear alignment and a low flow channel meandering within the base. Some large woody debris was observed upstream of the proposed crossing location along with a tile outlet entering from the south. Moderate erosion was noted on the left bank looking downstream. A limited riparian width exists with primarily grasses lining the banks and sporadic mature deciduous trees that provide shade. Water clarity was good during the survey although no fish were observed in December 2011.

Saint Joseph Airport South Drain

The Saint Joseph Airport South Drain (SJASD) will need to be crossed to access and construct turbines T-11, 12, and 13. This is a municipal drain that flows east to west, under the Bluewater Highway and outlets to Lake Huron. The SJASD is classified as an F Drain providing seasonal fish habitat for primarily warmwater baitfish. It is classified as an intermittent watercourse with minor erosion observed along left bank looking downstream. There is an existing culvert/farm equipment crossing at the proposed crossing location (CR-041). Channel morphology is trapezoidal with a linear alignment and a low flow channel meandering within the base. A plunge pool exists at the outlet of the culvert with primarily runs upstream and short riffle sections downstream. A limited riparian width exists within the crossing location consisting primarily of grasses and

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some mature trees and shrubs. Substrate consisted of sand and gravel with sporadic cobble and boulder in downstream sections. Large woody debris was associated with erosion and mature deciduous riparian areas.

3.4.2.1 Collector Line Crossings

Watercourses within the Project Location that require collector line crossings are not discussed in detail based on the proposed crossing methodology. Collector lines will be placed in the road Right of Way (ROW) within the road shoulder or, if required, a punch and bore method, directional drill, dry open-cut crossing or/and isolated open-cut crossing of watercourses will be determined based on site conditions.

The watercourses that will be crossed by the collector lines are listed in **Table 3.3** along with watercourse/drain classifications by ABCA. Collector line watercourse crossing locations are shown on **Figures 2, 2a through 2h, Appendix A.**

Table 3.3 Summary of Watercourses at Collector Line Crossings

Crossing ID	Watercourse Name	Drain Class	In-Water Work Proposed	Crossing Methodology	Approvals	Easting	Northing
CR-002	Adams Drain	C	N	Punch & Bore or Directional Drill	DFO (Op. Statement)	441556	4796626
CR-003	Turnbull Drain	F	N	Punch & Bore or Directional Drill	DFO (Op. Statement)	441632	4797658
CR-008	Webb Drain	C	N	Punch & Bore or Directional Drill	DFO (Op. Statement)	441740	4796929
CR-010	Unknown Hay H	A	N	Punch & Bore or Directional Drill	DFO (Op. Statement)	441857	4798894
CR-014	Turnbull Drain	F	N	Punch & Bore or Directional Drill	DFO (Op. Statement)	442262	4797737
CR-015	Unknown Hay E	F	N	Punch & Bore or Directional Drill	DFO (Op. Statement)	442337	4802138
CR-024	Unknown Hay A	C	N	Punch & Bore or Directional Drill	DFO (Op. Statement)	443206	4810475
CR-025	Drysdale Drain	F	N	Punch & Bore or Directional Drill	DFO (Op. Statement)	443279	4811035
CR-026	Charette Drain	F	N	Punch & Bore or Directional Drill	DFO (Op. Statement)	443394	4804267
CR-027	Adams Drain	F	N	Punch & Bore or Directional Drill	DFO (Op. Statement)	443623	4800400
CR-030	Pepper Drain	F	N	Punch & Bore or Directional Drill	DFO (Op. Statement)	443856	4802884
CR-034	Datars Millers Drain	C	N	Punch & Bore or Directional Drill	DFO (Op. Statement)	444017	4801745
CR-037	"G"	-	N	Punch & Bore or Directional Drill	DFO (Op. Statement)	444084	4801412
CR-039	Miller Drain	-	N	Punch & Bore or Directional Drill	DFO (Op. Statement)	444129	4800952
CR-040	Unknow Hay F	C	N	Punch & Bore or Directional Drill	DFO (Op. Statement)	444140	4800871
CR-042	Adams Drain	F	N	Punch & Bore or Directional Drill	DFO (Op. Statement)	444223	4800280
CR-043	Unknown Stan M	F	N	Punch & Bore or Directional Drill	DFO (Op. Statement)	444253	4811191
CR-045	Unknown Stan M	F	N	Punch & Bore or Directional Drill	DFO (Op. Statement)	444773	4811070
CR-046	Drysdale Drain	F	N	Punch & Bore or Directional Drill	DFO (Op. Statement)	444817	4810772
CR-047	Unknown Hay A	F	N	Punch & Bore or Directional Drill	DFO (Op. Statement)	444929	4810017
CR-049	Unknown Hay B	F	N	Punch & Bore or Directional Drill	DFO (Op. Statement)	444999	4809540
CR-050	Unknown Hay B	F	N	Punch & Bore or Directional Drill	DFO (Op. Statement)	445043	4809244
CR-051	Unknown Hay C	F	N	Punch & Bore or Directional Drill	DFO (Op. Statement)	445125	4808691
CR-053	Pergel Drain Branch b	F	N	Punch & Bore or Directional Drill	DFO (Op. Statement)	445342	4807233
CR-054	Pergel Drain	F	N	Punch & Bore or Directional Drill	DFO (Op. Statement)	445394	4806868
CR-055	Fourcier Drain	F	N	Punch & Bore or Directional Drill	DFO (Op. Statement)	445459	4806406
CR-056	Geiger Drain	C	N	Punch & Bore or Directional Drill	DFO (Op. Statement)	445505	4806086
CR-057	Truemner Drain	C	N	Punch & Bore or Directional Drill	DFO (Op. Statement)	445585	4805517
CR-059	Charette Drain Trib.	F	N	Punch & Bore or Directional Drill	DFO (Op. Statement)	445710	4804628
CR-060	Charette Drain	F	N	Punch & Bore or Directional Drill	DFO (Op. Statement)	445806	4803950
CR-061	Unknown Hay D	F	N	Punch & Bore or Directional Drill	DFO (Op. Statement)	445847	4803522
CR-204	Kading Drain	C	N	Punch & Bore or Directional Drill	DFO (Op. Statement)	444330	4799512

3.4.2.2 Transmission Line Crossings

Watercourses within the Project Location that require overhead transmission line crossings are not discussed in detail based on the proposed crossing methodology (overhead). Transmission lines will be constructed within the road ROW (buried in roadside shoulder) or along roadside ditches utilizing existing hydro ROW and infrastructure. The main concern or potential impacts with overhead line construction is associated with riparian vegetation removal next to watercourses within an overhead corridor. Hydro pole bases would be constructed outside of the flood regulated areas where possible.

The watercourses that will be crossed by the transmission lines are listed in **Table 3.4** along with watercourse/drain classifications by ABCA. Collector line watercourse crossing locations are shown on **Figures 2, 2a through 2h, Appendix A.**

Table 3.4 Summary of Watercourses at Transmission Line Crossings

Crossing ID	Drain Name	Drain Class	In-Water Work Proposed	Crossing Methodology	Approvals	Easting	Northing
CR-062	Truemner Drain	C	N	Overhead Line Construction	DFO (Op. Statement)	446724	4805341
CR-063	Truemner Drain	C	N	Overhead Line Construction	DFO (Op. Statement)	447664	4805426
CR-100	Truemner Drain	C	N	Overhead Line Construction	DFO (Op. Statement)	448727	4805624
CR-101	Zurich Drain South, aka St Joseph	F	N	Overhead Line Construction	DFO (Op. Statement)	450280	4805827
CR-102	Black Creek Drain Branch West	C	N	Overhead Line Construction	DFO (Op. Statement)	452247	4806097
CR-103	Stephan Drain	C	N	Overhead Line Construction	DFO (Op. Statement)	453100	4806219
CR-104	Black Creek Drain, aka Black Creek	E	N	Overhead Line Construction	DFO (Op. Statement)	455354	4806535
CR-105	Branch "F"	-	N	Overhead Line Construction	DFO (Op. Statement)	457904	4806864
CR-106	Rowcliffe Drain	-	N	Overhead Line Construction	DFO (Op. Statement)	460000	4807167
CR-107	Geiger Drain, aka Black Creek	D	N	Overhead Line Construction	DFO (Op. Statement)	460380	4807223
CR-108	Gieger Drainage Works	D	N	Overhead Line Construction	DFO (Op. Statement)	462196	4807491
CR-109	Mitchell Drainage Works	A	N	Overhead Line Construction	DFO (Op. Statement)	462795	4807579
CR-110	Mitchell Drainage Works	A	N	Overhead Line Construction	DFO (Op. Statement)	463164	4807633
CR-111	Mitchell Drainage Works	A	N	Overhead Line Construction	DFO (Op. Statement)	463454	4807676
CR-112	Mitchell Drainage Works	A	N	Overhead Line Construction	DFO (Op. Statement)	464042	4807877
CR-113	Brock Drainage Works	-	N	Overhead Line Construction	DFO (Op. Statement)	464296	4808271
CR-114	Brock Drainage Works	-	N	Overhead Line Construction	DFO (Op. Statement)	464574	4808696
CR-115	Brock Drainage Works	-	N	Overhead Line Construction	DFO (Op. Statement)	464741	4808954
CR-116	Shephard Creek Drainage Works	A	N	Overhead Line Construction	DFO (Op. Statement)	465144	4809596
CR-117	Shephard Creek Drainage Works	A	N	Overhead Line Construction	DFO (Op. Statement)	465439	4810102
CR-118	Hoggarth Drainage Works	C	N	Overhead Line Construction	DFO (Op. Statement)	465615	4810380
CR-119	McDonald Drainage Works	F	N	Overhead Line Construction	DFO (Op. Statement)	466513	4811771
CR-120	Norris Municipal Drain 2002	-	N	Overhead Line Construction	DFO (Op. Statement)	466754	4812156
CR-121	Geary Creek Drainage Works	A	N	Overhead Line Construction	DFO (Op. Statement)	467268	4812979
CR-122	Big Drainage Works	-	N	Overhead Line Construction	DFO (Op. Statement)	467870	4813992
CR-123	Unnamed	-	N	Overhead Line Construction	DFO (Op. Statement)	468667	4815281
CR-124	Unnamed	-	N	Overhead Line Construction	DFO (Op. Statement)	468934	4815715
CR-125	Unnamed	-	N	Overhead Line Construction	DFO (Op. Statement)	469366	4816381
CR-126	Tyndall Drainage Works	C	N	Overhead Line Construction	DFO (Op. Statement)	469680	4816890

3.4.3 Remaining Watercourses within 120 m of the Project Location

Based on the Records Review, numerous watercourses exist within 120 m of the project location. Correspondence with the MOE REA Team (Scott Abernethy, personal communication) to confirm the appropriate level of detail required for the Water Assessment and Water Bodies Report including water bodies/watercourses found within 120 m of the project location that are not proposed to be impacted. Burnside provided an approach to MOE regarding confirmation of the water bodies found within the 120 m boundary to document the location (based on the records review), type and sensitivity. MOE confirmed in an e-mail (dated May 24, 2012) that this would be a sufficient level of detail for water bodies that would not be impacted and/or altered as a result of the project (see **Appendix B** for correspondence with MOE). Any water bodies that require alteration (i.e., culvert crossings) have been described above.

Water bodies listed in the records review have been identified and confirmed using the 2010 Ortho Imagery (SWOOP 2010), field observations or by roadside access. Some of the water bodies that exist within the 120 m boundary are also located on non-participating land owner properties and are not directly accessible due to private property.

During the layout phase of the project, a number of watercourses were observed that will not require crossings for access roads although detailed information was collected. This information is provided below for some of the watercourses within the 120 m boundary where access to private property was available.

3.4.3.1 Turbine Study Area

Stan L Drain

The Stan L Drain flows south east to northwest and outlets to Lake Huron. A limited section of this drain will be within 120 m of the access road for the T-01 turbine. Based on the mapping, the Stan L drain is considered to be a C Drain and provides permanent warm water habitat for baitfish.

Stan M Drain

This drain may need to be crossed by an access road for construction and future maintenance of two turbines (T-01 and T-02). The Stan M drain flows east to west and outlets to Lake Huron. It is classified as an F Drain and may provide seasonal habitat for fish and provide intermittent flows depending on seasonal conditions and weather. At the time of the site visit this drain did have flow although clarity was low due to previous rain events. The channel was U-shaped, typical of an agricultural drain with steep banks. Overhanging vegetation was present and comprised of grasses along a limited

riparian width. Macrophytes consist of small patches of watercress. No fish were observed due to water clarity and depth.

Hay C Drain

The Hay C Drain is located south of Danceland Road and flows east to west towards Lake Huron. It is classified as an F Drain that is intermittent with seasonal flows. Like other F Drains it may provide seasonal habitat for cyprinids depending on the potential for downstream barriers. Channel morphology is trapezoidal with a linear alignment and a low flow channel meandering within the base. A macrophyte bed was observed at the crossing location and appeared to be a *veronica spp.* or commonly called Speedwell. Veronica is an aquatic macrophyte that typically grows along edges of shallow sandy watercourses. Substrate consisted of sand and gravel with sporadic cobble.

Some large woody debris was observed upstream of the proposed crossing location along with a tile outlet entering from the south. Some erosion was noted on the left bank looking downstream. A limited riparian width exists with primarily grasses lining the banks and sporadic mature deciduous trees that provide shade. Water clarity was good during the survey although no fish were observed.

Fahner Drain

Based on the records review and 2010 Ortho imagery (SWOOP 2010) received from MNR this drain is classified as a closed drain therefore does not provide direct fish habitat. The closed drain provides a source of water to the open portion of the Fahner drain approximately 770 m downstream where it has been daylighted and is an open channel. Based on the definition provided in the Regulation this is not considered to be a water body and measures to protect the closed portion of the drain will be incorporated into the design.

Maple Grove B

The Maple Grove B drain flows east to west and outlets to Lake Huron. Proposed turbines T-45 and T-46 encroach on this drain within the 120 m project location although no project components will cross this drain. It is classified as a C Drain and provides permanent fish habitat for warm water baitfish species. At the time of the site visit this drain did have moderate flow with good clarity. The channel was U-shaped, typical of an agricultural drain with steep banks. Morphology was similar to most drains observed within the region consisting of short riffles and long flats. Overhanging vegetation was present and comprised of grasses and mature deciduous trees along a limited riparian width. Substrate consisted of sand with some gravelly sections and macrophytes were not observed. Fish were observed (white sucker and cyprinids) in riffle sections and appeared to be remnants of previous spawning activity.

Ratz Drain

The Ratz Drain flows east to west and outlets to Lake Huron. Proposed turbine T-48 encroaches on this drain within the 120 m project location, although no project components will cross this drain. It is classified as a C Drain and provides permanent fish habitat for warm water baitfish species. At the time of the site visit this drain did have moderate flow with good clarity. The channel was U-shaped, typical of an agricultural drain with steep banks. Morphology consisted of an irregular meandering channel, steep banks with short riffles, long flats and sporadic pools. Moderate erosion was observed on both banks and may be a result of tile drain outlets increasing flows during precipitation periods. Overhanging vegetation was present and comprised of grasses and mature deciduous trees along a riparian area that varied in width. Substrate consisted of sand with some gravelly sections and macrophytes were not observed. Fish were observed (creek chub and cyprinids) in riffle sections and appeared to be remnants of previous spawning activity.

3.4.4 Seepage Areas

No seepage areas were identified during the Site Investigation. Seepage areas are typically present at the base or along a slope and are characterized by vegetation such as jewelweed, skunk cabbage, and watercress. Iron staining of the soils around seeps is often an indicator of the presence of groundwater.

According to base mapping for the area, watercourses generally originate to the east of the turbine and road access areas, and not within any of the woodlands immediately adjacent to the project. No evidence of seeps or springs, such as the indicators noted above, was observed during field investigations in areas that are proposed for access road crossings.

Groundwater discharge in the base of the drains found within the project location may occur due to the invert of the constructed drain or tile influence within the local area. Seeps or springs were not observed as seen in typical discharge areas based on the location of the study area and the flat topography associated with this region.

A seepage area identified during the Ecological Land Classification (ELC) study by North South Environmental (NSE) was located east of the Charette Drain crossing (underground crossing of a collector line). Based on a review of NSE field notes, seepage was observed approximately 350 m east and up-gradient of the proposed underground collector line crossing (CR-026).

A review of the Drinking Water Source Protection mapping for groundwater recharge areas in the ABCA watershed illustrated that major recharge zones are southeast or east

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of the study area and outside of the project locations 120 m boundary. A copy of the Source Protection mapping for the ABCA watershed is provided in **Appendix E**.

As such, it was concluded that seepage areas are not present within the 120 m project location and proposed watercourse crossings.

4.0 Water Body Report

Based on the Technical Guide to Renewable Energy Approvals, a water body report must be completed if the construction, installation or expansion of a renewable energy facility is within the setback distances set out in O.Reg. 359/09 of any water body outlined in the Water Assessment Report. If water bodies are confirmed to be in the project location that are within the setbacks outlined in the Technical Guide, an assessment of potential negative environmental effects related to the project (construction, operation and decommissioning) on water bodies and the 30 m of land surrounding the feature. Once the potential for negative effects are determined, mitigation measures to avoid negative effects or impacts must be developed along with an Environmental Effects Monitoring Plan to measure success.

4.1 Potential Negative Environmental Effects and Mitigation Measures

All watercourses within the project location are considered low sensitivity and are comprised of mainly agricultural drains that are intermittent with regionally common fish species. Mitigation measures have been developed to avoid potential impacts to fish and fish habitat during construction of access roads and culverts. Effects and mitigation measures are addressed below and summarised in Table 4.1. Monitoring measures are also summarised in Table 4.1.

Site specific impacts have been determined based on proposed construction methods and proximity to the water body and the sensitivity of that water body. The main potential for impact is at access road culverts during construction and are the most likely to cause negative environmental effects. A total of six watercourse crossings are required for access roads and turbine construction. Information regarding the existing conditions of each water body has been discussed in detail in **Section 3.4.2 and Table 3.2** above.

The federal Fisheries Act governs the protection of fish and aquatic habitat, including the harmful alteration, disruption or destruction (HADD) of fish habitat (Section 35), and the deposition of deleterious substances into fisheries waters (Section 36). DFO has signed agreements with 35 of the 36 Conservation Authorities in Ontario to review proposed projects under Section 35 of the Fisheries Act. The ABCA have a Level 2 Agreement with DFO, therefore they can determine how the proponent can mitigate any potential impacts to fish and fish habitat.

Based on the current Project layout and proposed environmental mitigation measures, in-water work would potentially affect fish or fish habitat, or areas that contain fish habitat, at six locations. Although specific Operational Statements are referenced in this

report, consultation with the ABCA and/or DFO may result in site-specific construction methods and mitigation measures for some locations.

If impacts to fish and fish habitat can be fully mitigated, a Letter of Advice (LOA) will be issued by the ABCA indicating that the proposed activities will not likely cause a HADD if the proposed set of mitigation measures is followed. If the ABCA determines that impacts cannot be fully mitigated, the project is forwarded to the local DFO office for further review.

General mitigation measures and potential negative effects to water bodies and associated habitat are provided below.

4.1.1 General Mitigation Measures

General mitigation measures are provided below with respect to all components of the project within the Turbine and Transmission Line Study Areas.

4.1.1.1 Fish and Fish Habitat

Effect

- a) In-water works will be required and negative effects to local fish populations may occur
- b) Direct impacts to fish and fish habitat from construction activities. In-water works for culverts. Six culverts will be constructed as a result of the project and need for access roads to turbine locations.

Mitigation

- a) No in-water works will occur outside of the warmwater timing window from July 1 to March 30 (no in-water works from April 1 to June 30)
- b) All fish will be salvaged prior to in-water works and all improvement/enhancement will be conducted in the dry. Any areas adjacent to the immediate work area will be protected using standard mitigation measures as discussed above (silt fencing, segregation of the work area, fish salvage, etc.). Suitably sized substrate will be placed inside culverts to provide similar conditions. A fish collection permit will be acquired from MNR that will also have conditions related to the salvage of fish at the proposed culvert crossings.

Sediment and erosion control measures (such as silt fence barriers, turbidity curtains, etc.) will be installed and maintained during the work phase and until the

site has been stabilized. Control measures will be inspected daily to ensure they are functioning and are maintained as required. If control measures are not functioning properly, no further work will occur until the problem is resolved. All temporary erosion and sediment control measures will be installed in accordance with recognized provincial standards. Extra silt fence/turbidity curtain will be on site, should additional sediment control be required.

Minimize any in-water operation of heavy equipment and minimize operation of the same on the banks of the watercourse. All equipment fueling and maintenance will be done a safe distance (30 m) from the edge of the water to ensure that no deleterious substances enter the water.

Any stockpiled material will be stored and stabilized away from the watercourse. All materials and equipment used for the purpose of site preparation and project completion should be operated and stored in a manner that prevents any deleterious substance (e.g., petroleum products, silt, etc.) from entering the water.

Incorporate mitigation measures covered under DFO Operational Statements (Ontario Operational Statement Habitat Management Program: Punch and Bore Crossings, Directional Drill, Dry Open-cut Crossing or/and Isolated Open-cut Crossing). If the proponent and contractors follow the "Measures to Protect Fish and Fish Habitat" outlined in the Operational Statement, no impacts to water quality, or fish and fish habitat are expected. A copy of the Operational Statement accepted by DFO in Ontario is provided in **Appendix H**.

All disturbed areas of the work site should be stabilized immediately and re-vegetated as soon as conditions allow. During detailed design, correspondence will be maintained with ABCA. It is of note that ABCA confirmed (meeting of March 1, 2012) that they anticipate that a LOA will be issued for this project.

No in-water works are to be conducted between April 1 to June 30. All disturbed areas of the work site should be stabilized immediately and re-vegetated as soon as conditions allow.

Residual Net Effects

No residual net effects are expected if the above noted mitigation measures are incorporated into the construction and design.

4.1.1.2 Vegetation Removal

Effect

- a) Bank work will be required for access road culverts and negative effects to riparian vegetation may occur.
- b) Negative effects to riparian vegetation may occur along collector and transmission lines during construction works in and around water bodies.

Mitigation

- a) No in-water works will occur outside of the warmwater timing window from July 1 to March 30 (no in-water works from April 1 to June 30).

Vegetation clearing along banks where access road culverts will be constructed is limited to the maximum width of the access road. The contractor will ensure that excess vegetation removal does not occur. Construction staging (materials and equipment storage) will be placed outside of the riparian corridor to avoid excessive trampling of native vegetation along watercourses.

- b) Areas where vegetation has been removed as a result from construction works will be replanted with native vegetation and seeded with approved seed mix based on approval from ABCA.

Disturbance to areas within the drip line of mature trees will be avoided using hoarding or construction fencing.

Incorporate mitigation measures covered under DFO Operational Statements (Ontario Operational Statement Habitat Management Program: Punch and Bore Crossings, Directional Drill, Dry Open-cut Crossing or/and Isolated Open-cut Crossing) for riparian vegetation. If the proponent and contractors follow the "Measures to Protect Fish and Fish Habitat" outlined in the Operational Statement, no impacts to water quality, or fish and fish habitat are expected. A copy of the Operational Statement accepted by DFO in Ontario is provided in **Appendix H**.

Residual Net Effects

No residual net effects are expected if the above noted mitigation measures are incorporated into the construction and design.

4.1.1.3 Surface Water and Soils

Effect

- a) Potential for sediments to enter watercourse as a result of the following project activities:
 - stockpiling;
 - excavation; and,
 - construction.
- b) Potential water quality impairments (sediment loading; fuels and lubricants from machinery). Potential for localized water quality impacts as a result of spills.

Mitigation

- a) The footprint of disturbed area will be minimized as much as possible, for example, vegetated buffers/setbacks will be left in place adjacent to watercourses/ water bodies to the maximum extent possible.

An erosion and sediment control plan will be developed during detailed design prior to construction. Implementation of the erosion and sediment control measures will conform to recognized standard specifications such as Ontario Provincial Standards Specification (OPSS) and the requirements of ABCA.

Prevent any in-water operation of heavy equipment and minimize operation of the same on the banks of the watercourse. Any stockpiled material will be stored and stabilized away from the watercourse. All materials and equipment used for the purpose of site preparation and project completion should be operated and stored in a manner that prevents any deleterious substance (e.g., petroleum products, silt, etc.) from entering the water.

Sediment and erosion control measures (silt curtains, silt fence, rock check dams) will be installed and will be maintained during the work phase and until the site has been stabilized. Control measures should be inspected daily to ensure they are functioning and are maintained as required. If control measures are not functioning properly, no further work will occur until the problem is resolved.

Any temporary mitigation measures will be installed prior to the commencement of any clearing, grubbing, excavation, filling or grading works and will be maintained on a regular basis, prior to and after runoff events.

Water quality impacts related to surface water run-off should be mitigated to avoid downstream impacts to water bodies by controlling surface water run-off within the boundaries of the site.

All disturbed areas of the work site should be stabilized immediately and re-vegetated as soon as conditions allow.

- b) All equipment fuelling and maintenance will be done at a safe distance (30 m) from the watercourses to ensure that no deleterious substances enter the waterway.

The contractor will be required to develop spill prevention and contingency plans for construction and operational phases of the project. Personnel will be trained in how to apply the plans and the plans will be reviewed to strengthen their effectiveness and ensure continuous improvement. Spills will be immediately contained and cleaned up in accordance with provincial regulatory requirements and the contingency plan. A hydrocarbon spill response kit will be on site at all times during the work. Spills will be reported to the Ontario Spills Action Center at 1-800-268-6060.

Residual Net Effects

No residual net effects are expected if the above noted mitigation measures are incorporated into the construction and design.

4.1.1.4 Groundwater

Effect

- a) Potential for localized groundwater quality impacts as a result of spills.
- b) Potential dewatering of the work area may be required that may effect local waterbodies (reduction in base flow).

Mitigation

- a) Refuelling of equipment and fuel storage should be conducted in designated areas away from the watercourses with spill protection provided.
- b) If applicable, work area will be dewatered as per recognised provincial standards and pumped into acceptable dewatering traps. Based on a review of local hydrogeology, proposed dewatering techniques, and turbine footings, no more

than 50,000 L/day will be extracted therefore no impacts to local residents or water bodies is expected. A monitoring plan will be developed to avoid any localized impacts to groundwater.

Residual Net Effects

No residual net effects are expected if the above noted mitigation measures are incorporated into the construction and design.

4.1.2 Proposed Culvert Crossings

Proposed construction methodology to avoid impacts to fish and fish habitat is covered under an Operational Statements (Ontario Operational Statement Habitat Management Program: Dry Open-cut Crossing or/and Isolated Open-cut Crossing) provided by DFO. The Proponent and Contractor(s) will follow the "Measures to Protect Fish and Fish Habitat" outlined in the Operational Statement, therefore no impacts to water quality, or fish and fish habitat are expected. A copy of the Operational Statement accepted by DFO is provided in **Appendix H**.

4.1.3 Underground Collection Lines

All proposed construction methodology (listed above in order of preference) is covered under Operational Statements (Ontario Operational Statement Habitat Management Program: Punch and Bore Crossings) provided by DFO. The Proponent and Contractor(s) will follow the "Measures to Protect Fish and Fish Habitat" outlined in the Operational Statement, therefore no impacts to water quality, or fish and fish habitat are expected. A copy of the Operational Statement accepted by DFO is provided in **Appendix H**.

4.1.4 Overhead Transmission Lines

All proposed construction methodology to avoid impacts to fish and fish habitat is covered under an Operational Statements (Ontario Operational Statement Habitat Management Program: Overhead Line Construction) provided by DFO. The Proponent and Contractor(s) will follow the "Measures to Protect Fish and Fish Habitat" outlined in the Operational Statement, therefore no impacts to water quality, or fish and fish habitat are expected. A copy of the Operational Statement accepted by DFO is provided in **Appendix H**.

Table 4.1 Summary of Environmental Effects, Mitigation, Performance Objectives, Monitoring and Contingency Measures

Affected Environmental Feature(s)	Project Phase	Potential Effects	Performance Objective	Mitigation Strategy	Monitoring Plan and Contingency Measures
Aquatic Species and Aquatic Habitat Watercourse Crossings: CR-013, CR-018, CR-023, CR-031, CR-032, CR-041	Construction Decommissioning	<ul style="list-style-type: none"> Potential direct effects to aquatic habitat quality from sedimentation during construction activities (i.e., culverts for access roads). Effects to riparian vegetation during construction. Effects to fish during in-water works. Potential failure of slopes – impacts to bed/banks of stream during culvert construction. 	<ul style="list-style-type: none"> Minimize indirect effects from dust, sedimentation and erosion. Minimize direct effects to fish and fish habitat during construction. 	<ul style="list-style-type: none"> Erosion and sediment control measures (i.e., silt fence, straw bales, wooden stakes, sand bags, filters, pumps, snow fencing) will be installed and will be maintained during the construction work phase and until the site has been stabilized. Implementation of the erosion and sediment control measures will conform to industry best management practices and recognized standard specifications such as Ontario Provincial Standards Specifications (OPSS). Minimize footprint for culvert crossings at access roads. Culvert construction will take place outside fish and fish habitat timing windows, and will be designed and installed according to the requirements of the Ausable Bayfield Conservation Authority. Directional drilling and/or punch and bore operations will be designed with launching and receiving pits with appropriate setbacks from watercourses wherever possible. Dewatering from open excavations will take place on tile-drained agricultural land to promote infiltration and settling of suspended solids prior to entering a watercourse. Fish salvage will be conducted by a qualified biologist under a Scientific Collection Permit from MNR and all fish captured within the work area will be released downstream unharmed. Operational Statements (OS) provided by DFO will be used where appropriate to ensure that no impact to fish and fish habitat will occur during construction (i.e., punch and bore, directional drilling, open-cut watercourse crossings and isolated dam and pump). 	<ul style="list-style-type: none"> Regular weekly site inspection will occur by designated Environmental Monitor for sediment and erosion control measures. Severe weather conditions may require additional site visits depending on the proximity of the watercourse. The level of monitoring and reporting would be based on the severity of the spill and may be discussed with the MOE Spills Action Center and MNR. <p>Contingency Measures</p> <ul style="list-style-type: none"> Environmental Monitor will be responsible for “stop works” if mitigation measures are not incorporated into the construction activities or performance objectives are not achieved. Changes to the mitigation measures to best suit the current conditions will be adopted to achieve overall performance objective.
Aquatic Species and Aquatic Habitat	Construction Operation Decommissioning	<ul style="list-style-type: none"> Potential contamination from accidental spills. 	<ul style="list-style-type: none"> Minimize potential for indirect effects from accidental spills. 	<ul style="list-style-type: none"> Hazardous material transportation and application will occur in designated areas according to operational procedures. Proper spill containment equipment will be used and maintained on site. No fuelling within 30 m of any watercourse. No fuel storage within 30 m of any watercourse. A spill containment kit will be available during construction for every location that heavy equipment is operated. 	<ul style="list-style-type: none"> Regular site inspections will occur by designated Environmental Monitors for in-water works and work adjacent to sensitive areas. The level of monitoring and reporting would be based on the severity of the spill and may be discussed with the MOE Spills Action Center and MNR. <p>Contingency Measures</p> <ul style="list-style-type: none"> Additional sediment and erosion control measure (silt fence, erosion control blankets, etc.) will be on site a ready for use if original measures are not suitable. Refer to Spill Contingency Plan. Contaminated soil will be removed and disposed of at an approved facility.

Affected Environmental Feature(s)	Project Phase	Potential Effects	Performance Objective	Mitigation Strategy	Monitoring Plan and Contingency Measures
Surface Water/Soils	Construction Operation Decommissioning	<ul style="list-style-type: none"> Short-term degradation of soil/water quality and fisheries habitat due to accidental spills or releases. 	<ul style="list-style-type: none"> Minimize indirect effects from dust, sedimentation and erosion. Minimize potential for indirect effects from accidental spills. 	<ul style="list-style-type: none"> Erosion and sediment control measures (i.e., silt fence, straw bales, wooden stakes, sand bags, filters, pumps, snow fencing) will be installed and will be maintained during the construction work phase and until the site has been stabilized. Implementation of the erosion and sediment control measures will conform to industry best management practices and recognized standard specifications such as Ontario Provincial Standards Specifications (OPSS). Culvert construction will take place outside fish and fish habitat timing windows, and will be designed and installed according to the requirements of the Ausable Bayfield Conservation Authority. Directional drilling and/or punch and bore operations will be designed with launching and receiving pits with appropriate setbacks from watercourses wherever possible. Dewatering from open excavations will take place on tile-drained agricultural land to promote infiltration and settling of suspended solids prior to entering a watercourse. Hazardous material transportation and application will occur in designated areas according to operational procedures. Proper spill containment equipment will be used and maintained on site. 	<ul style="list-style-type: none"> Regular site inspection will occur by designated Environmental Monitors. The level of monitoring and reporting would be based on the severity of the occurrence and may be discussed with the MOE Spills Action Center and MNR. <p>Contingency Measures</p> <ul style="list-style-type: none"> Contaminated soil will be removed and disposed of at an approved facility.
Groundwater	Construction Operation Decommissioning	<ul style="list-style-type: none"> Potential direct impacts to groundwater quality and quantity due to water taking at Parts and Storage Building. Water quality impacts due to potential fuel and oil spills. Dewatering operations during construction are not expected to impact groundwater quantity or quality. Refer to the Construction Plan Report for further details. 	<ul style="list-style-type: none"> Minimize impacts to groundwater quality and quantity. No spills. 	<ul style="list-style-type: none"> Confirmation of water supply needs and capacity for the Part and Storage Building will be verified at the detailed design phase. If required, detailed design and implementation plans will include measures for water storage and/or water treatment. An Emergency Response and Communications Plan will be developed during detailed design to ensure proper mitigation and notification procedures are in place regarding groundwater quality during Project operation. 	<ul style="list-style-type: none"> Regular site inspection will occur by designated Environmental Monitors. The level of monitoring and reporting would be based on the severity of the occurrence and may be discussed with the MOE Spills Action Center and MNR. <p>Contingency Measures</p> <ul style="list-style-type: none"> All spills that could potentially have an adverse environmental effect, are outside the normal course of events, or are in excess of the prescribed regulatory levels would be reported to the MOE's Spills Action Centre.

4.2 Construction Plan Report

As part of the Water Body Report a description of how the Construction Plan Report will address any negative impacts to water bodies and the 30 m of land surrounding the water body within the project location. Based on a review of the Construction Plan Report with regards to construction, operation and decommissioning, potential effects related to the project phase along with appropriate mitigation measures and monitoring have been determined in **Table 4.1** above.

4.3 Environmental Effects Monitoring Plan

Based on a review of the mitigation table in the Environmental Effects Monitoring Plan the table above provides a list of potential environmental effects, mitigation measures and monitoring to avoid impacts to water bodies and the 30 m of land surrounding the project location have been determined in **Table 4.1** above.

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5.0 Conclusion

The Grand Bend Wind Farm is located within the vicinity of water bodies and components of the project will require crossings that allow for the construction of access roads, collection and transmission lines. Based on the Records Review, Site Investigation and determination of potential impacts to these water bodies, accepted mitigation measures have been proposed. The mitigation measures that have been proposed will protect and limit impacts to the low sensitivity water bodies described within this report.

The project layout was designed to avoid impacts to these features as much as possible. Performance objectives have been set with the goal of avoiding impacts to all water bodies. With the mitigation, monitoring and contingency measures described in this report, it is anticipated that performance objectives can be met.

Respectfully submitted,


Neegan Burnside Ltd.

Signature  _____ Date February 2013
Christopher Pfohl, C.E.T.
Aquatic Resources Specialist

Reviewed by:

Signature  _____ Date February 2013
Lyle Parsons, BES
Project Manager

Approved by:

Signature  _____ Date February 2013
Jim Mulvale, P.Eng.
Manager, Environmental, Health and Safety
Northland Power Inc.

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6.0 References

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