ST. COLUMBAN WIND PROJECT
WATER ASSESSMENT AND
WATER BODY REPORT

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Prepared for:

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1.0 INTRODUCTION

1.1 Project Overview

St. Columban Energy LP is proposing to develop, construct, and operate the 33 megawatt (MW) St. Columban Wind Project (the Project) in the Municipality of Huron East (Huron East), Municipality of Morris-Turnberry (Morris-Turnberry), and Township of Howick (Howick), County of Huron (Huron County), in response to the Government of Ontario's initiative to promote the development of renewable electricity in the province.

The overall Project Study Area is comprised of two sections – the Wind Project Study Area and the Interconnection Line Study Area. The Wind Project Study Area is bordered on the north by Winthrop Road, on the south by Huron Road/Highway 8, on the east to the west of Perth Road 180 and on the west by Maple Line. In addition, the Interconnection Line Study Area includes the path along which an approximately 43 kilometre (km) underground electrical interconnection line is proposed to extend from the Wind Project to a transformer station and one of two connection points to the existing Hydro One Networks Inc. (HONI) electrical distribution system.

The proposed Project Location for this report includes all parts of the land in, on or over which the Project is proposed (the 'construction area' for the Project). The proposed Project Location and Project Study Areas are shown in Appendix A, Figures 1-3.

The basic components of the Project include:

15 Siemens SWT 2.3-101/SWT 2.3-113 wind turbine generators with a maximum installed nameplate capacity of 33 MW. To be conservative, two turbine models were assessed as part of the Renewable Energy Approval (REA) process – the SWT 2.3-113 (113m blade span) and the SWT 2.3-101 (101m blade span). For the noise assessment, the SWT 2.3-101 was assessed, due to its higher noise level. For potential impacts to the natural environment, and property line setback assessments, the SWT 2.3-113 was assessed, due to its longer blade length. This conservative approach ensured the 'worst case scenario' was assessed;

- A 34.5 kV underground power line collector system;
- A 27.6 kV underground power line collector system;
- Fibre optic cabling laid with the underground collector lines;
- Turbine access roads;
- Crane pads;

- Two connection points to the existing electrical system;
- Two unserviced electrical control buildings;
- An existing, currently serviced, operations and maintenance building to be leased from a participating landowner;
- A 34.5kV - approximately 43 km underground electrical interconnection line; and,
- A 44 kV/34.5 kV 15/20 MVA transformer station.

Temporary components during construction include work and storage areas at the turbine locations and along the underground electrical interconnection line. The electrical power line collector system will transport the electricity generated from the Project to two connection points to the HONI local distribution system.

St. Columban retained Stantec Consulting Ltd. (Stantec) to prepare the REA application with input from Zephyr North Ltd., and Archaeological Services Inc. The REA application is a requirement under Ontario Regulation 359/09 - Renewable Energy Approvals under Part V.0.1 of the Act of the *Environmental Protection Act* (O.Reg.359/09). According to subsection 6.(3) of O. Reg. 359/09, the Project is classified as a Class 4 Wind Facility and will follow the requirements identified in O.Reg.359/09 for such a facility.

This Water Assessment and Water Body Report is one component of the REA application for the Project, and has been prepared in accordance with O. Reg. 359/09 and the Ontario Ministry of Natural Resources' (MNR's) *Approval and Permitting Requirements Document for Renewable Energy Projects* (September 2009). An Environmental Screening Report (ESR) was prepared, and a Notice of Completion was submitted in the fall of 2009. The current REA application has drawn on information included in the ESR, supplemented with new information when necessary, to maintain compliance with the new Regulation.

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.

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 Assessment Report as specified under O. Reg. 359/09.

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:		
A records review conducted in accordance with section 30.	✓	3.3
A site investigation conducted in accordance with section 31, including:	✓	3.1, 3.2, 3.3
31(4)(1). A summary of any corrections to the report.	✓	3.3
31(4)(2). Information relating to each water body.	✓	3.3
31(4)(3). A map showing boundaries, location/type and distances.	✓	Appendix A
31(4)(4). A summary of methods used to make observations for the purposes of the site investigation.	✓	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
If an investigation was conducted by visiting the site:		
31(4)(6)(ii). The duration of the site investigation.	✓	2.3
31(4)(6)(iii).The weather conditions during the site investigation	✓	2.3
31(4)(6)(iv). Field notes kept by the person conducting the site investigation.	✓	Appendix C
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	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	N/A
Requirements (Water Body - EIS)		
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.	✓	3.1, 3.2, 3.3, 3.4
Report identifies mitigation measures in respect of any negative environmental effects.	✓	5.0
Report describes how the environmental effects monitoring plan addresses any negative environmental effects.	✓	6.0
Report describes how the construction plan report addresses any negative environmental effects.	✓	5.0, 6.0

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".

Once the Project layout and locations of water bodies were confirmed, fish communities were sampled at selected locations within the 120 m Zone of Investigation and a general aquatic habitat assessment was conducted. A combination of background data and results of Stantec's 2010 and 2011, surveys were used to determine the presence or absence of 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**.

2.2 Records Review

A water records review was conducted according to Section 30(1) of O. Reg. 359/09.

According to MNR Land Information Ontario mapping (MNR, 2009), and mapping provided by MNR's district office, Clinton (MNR, 2011) there are a number of potential watercourses and waterbodies within the Project's 120 m Zone of Investigation. These water features may or may not meet the definition of a water body as described in Section 2.1. Further information on these watercourses and waterbodies was obtained during the site investigations.

Background data regarding municipal drain classification was obtained from MNR's Land Information Ontario (LIO) database for a number of watercourses within the Zone of Investigation. No additional fish community information was available regarding fisheries and watercourses within the 120m Zone of Investigation.

Additionally, background data was requested from the Maitland Valley Conservation Authority (MVCA), the Municipality of Huron East (Huron East), the Municipality of Morris-Turnberry (Morris-Turnberry), the Township of Howick (Howick), and the County of Huron (Huron County).

Information obtained as a result of the information requests/records review are presented in Sections 3.0, 4.1, 4.2, 4.3 and 5.1 of this report. Figures depicting the watercourses identified by MNR mapping are included in Figures 2.1 through 2.5, Appendix A, where “watercourses” and “waterbodies” are water features (including lakes, rivers, streams, etc.), as mapped by MNR. These water features may or may not meet the definition of a water body as described in Section 2.1. Potential additional waterbodies were also identified through a review of aerial photographs of the Zone of Investigation. Further information on these potential watercourses and waterbodies was obtained during the site investigations (as described in Section 2.3). Additional information regarding significant species occurrences and species at risk were obtained from Fisheries and Oceans Canada’s (DFO’s) species at risk (SAR) mapping (DFO, 2010), and the MNR’s Natural Heritage Information Centre (NHIC) online database (NHIC, 2010).

2.3 Site Investigations

Site investigations were carried out according to Section 31 of O. Reg. 359/09. The investigations were conducted for full days on November 4, 2010, April 12 and 13, 2011, and October 4 through October 6, 2011 (**Appendix C**). Air temperatures during the November 2010 survey ranged from 4°C to 7°C. During the April 2011 survey, it was sunny and clear with air temperatures ranging from 6°C to 12°C. Air temperatures during the October 2011 survey ranged from 11°C to 20°C.

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 potential water bodies within 120 m of the Project Location. Results of the Water Assessment are provided (**Appendix A**), which identifies water bodies as per the O. Reg. 359/09 definition.

Fish collections were made at water bodies within the 120 m Zone of Investigation (for the Wind Project) for which recent background data were unavailable, in order to determine the sensitivity of the fish community within each watercourse . Fishing was not completed for the underground electrical interconnection line route due to seasonal restrictions. Additionally, it is expected that there will be no impacts related to the proposed interconnection line construction methods (i.e., directionally drilling in the vicinity of water bodies).

Fish were collected using a Smith Root Model 12 backpack electrofisher and were sampled on April 12 and 13, 2011. Results of the spring 2011 electrofishing survey are included in **Appendix D**.

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:

- Mark Pomeroy, B.Sc. – Fisheries Biologist
- Nancy Harttrup, B.Sc. – Senior Fisheries Biologist

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

3.0 EXISTING CONDITIONS AND PREDICTED IMPACTS

3.1 Species at Risk

A review of available mapping provided by DFO (DFO, 2010) and correspondence with MNR, revealed the presence of Rainbow (a freshwater mussel) within the 120 m Zone of Investigation (interconnection line). MNR's NHIC online database (NHIC, 2010) did not indicate the presence of any aquatic species at risk.

3.2 Water Features

The Study Area falls within the Ausable-Bayfield watershed and the Maitland River watershed; however, all water features within 120 m of the Project Location fall within the Maitland River watershed. Information pertaining to water features within 120 m of the Project Location is presented by Project component and by watercourse.

No background aquatic data was available from MVCA, the Municipality of Huron East (Huron East), the Municipality of Morris-Turnberry (Morris-Turnberry), the Township of Howick (Howick), and the County of Huron (Huron County).

Corrections to the presence of watercourses as per available mapping and background data sources are illustrated in Figures 2.1 through 2.5. These figures illustrate the presence of water bodies within the Project Location. Water features mapped in the LIO database that are deemed not to be water bodies are shown in yellow. These water features consist of grassed swales, tiled drains or other low-lying drainage features that do not meet the definition of a water body under O.Reg. 359/09.

3.2.1 Wind

According to LIO mapping, the following seven watercourses are present within 120 m of the Project Location (Wind):

- Ryan Drain
- Dillon Drainage Works
- Woods Drain
- Canada Company Drain
- Krouskopf Drain
- O'Rourke Drain
- Carpenter Drain

All water features within 120 m of the Project Location (Wind) drain into the South Maitland River before it converges with Lake Huron to the west.

3.2.2 Interconnection Line

Twenty-three watercourses are present within 120 m of the Project Location (Interconnection):

- Ryan Drain
- Dillon Drain
- Givlin Drain
- Hoegy Drainage Works
- Eckert Drainage Works
- Dietz Drain/Regell Drainage Works
- Manley Drain
- Barron Municipal Drain
- Stimore Drain
- Beauchamp Creek Drain
- Barron Drain
- Fulton Drain
- 14th Concession Drain
- Baker Municipal Drain
- Middle Maitland River
- Little Maitland River
- 9th Concession Drain
- Unnamed Tributary A of 6th Concession Drain
- Unnamed Tributary B of 6th Concession Drain
- 6th Concession Drain
- Jackling Drainage Works
- Weber Drain
- Municipal Drain No. 5

All water features within 120 m of the Project Location (Interconnection) ultimately drain into the Maitland River before it converges with Lake Huron to the west.

Based on a review of the document entitled “Inland Ontario Lakes Designated for Lake Trout Management” (MNR, 2003), there are no Lake Trout lakes identified within 300 m of either Project Location. Furthermore no lakes or additional water bodies were identified within the 120 m Zone of Investigation during field investigations.

In the following sub-sections, available background data are provided for each watercourse within the Project Location, followed by site-specific information regarding physical habitat and fish communities, as determined by Stantec in 2010 and 2011. Potential impacts to fish habitat and general mitigation measures are provided for each site, where fish habitat is present. In some cases, DFO Operational Statements may be used for construction activities in or near water (e.g. crossing watercourses with overhead lines, underground cables, etc.). When an Operational Statement is used, mitigation measures provided in the Operational Statement will protect fish habitat and no further review or approvals are required.

Although specific Operational Statements are referenced in this report, consultation with the Maitland Valley Conservation Authority (MVCA) and/or DFO may result in site-specific construction methods and mitigation measures for some locations. Additional information regarding the permitting process is provided in Section 3.5.

Only those water features occurring within 120 m of the Project Location, and that were deemed to be water bodies (as defined in O. Reg. 359/09) or provide fish habitat, are summarized in the following sections.

As indicated in Section 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 **Appendix A**. Photographs and field notes of these investigations are provided in **Appendices B** and **C**, respectively.

Water bodies within the 120 m Zone of the Investigation, where it was determined that fish habitat is present, are illustrated in **Appendix A**.

Table 3.1: Water Bodies and Fish Habitat within the 120 m Zone of Investigation

Water Body	Access Road Crossing and/or Collector Line[a]	Interconnection Line	w/in 120 m of Turbine	Fish Habitat	
				Direct	Indirect
Wind					
Ryan Drain	XX		X (T7)	X	
Dillon Drainage Works	X			X	
Woods Drain	XXX		X (T3)	X	
Canada Company Drain	XX			X	
Krouskopf Drain	XX	X		X	
O'Rourke Drain	X	X		X	
Carpenter Drain	X	X	X (T1)		X
Interconnection					
Ryan Drain		X		X	
Dillon Drainage Works		X		X	
Givlin Drain		X		X	
Hoegy Drainage Works		X		X	
Eckert Drainage Works		X		X	
Dietz Drain/Regell Drainage Works		X		X	
Manley Drain		X		X	
Barron Municipal Drain		X		X	
Stimore Drain		X		X	
Beauchamp Creek Drain		X		X	
Barron Drain		X		X	
Fulton Drain		X		X	
14th Concession Drain		X		X	
Baker Municipal Drain		X		X	
Middle Maitland River		X		X	
Little Maitland River		X		X	
9th Concession Drain		X		X	
Unnamed Tributary A of 6th Concession Drain		X			X
Unnamed Tributary B of 6th ConcessionDrain		X			X
6th Concession Drain		X		X	
Jacking Drainage Works		X		X	

Table 3.1: Water Bodies and Fish Habitat within the 120 m Zone of Investigation

Water Body	Access Road Crossing and/or Collector Line[a]	Interconnection Line	w/in 120 m of Turbine	Fish Habitat	
				Direct	Indirect
Weber Drain		X			X
Municipal Drain No. 5		X		X	

[a] The number of X's in this column denotes the number of crossings associated with each water body.

3.2.3 Ryan Drain

Ryan Drain is a tributary of the Canada Company Drain. The main channel of Ryan Drain flows west across the Project Location, crossing Beechwood Line and Bridge Road. The on-line mapping tool provided by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA, 2011) indicates that this drain has been designated a Class C municipal drain (i.e., permanent flow, warmwater, supports baitfish species). Mapping provided by MNR Clinton (2011) concurs with OMAFRA (2011) mapping. Field investigations conducted by Stantec during April 2011 revealed the presence of twelve fish species:

- Central Stoneroller (*Campostoma anomalum*)
- Northern Redbelly Dace (*Chrosomus eos*)
- Common Shiner (*Luxilus cornutus*)
- Blacknose Shiner (*Notropis heterolepis*)
- Bluntnose Minnow (*Pimephales notatus*)
- Fathead Minnow (*Pimephales promelas*)
- Blacknose Dace (*Rhinichthys atratulus*)
- Creek Chub (*Semotilus atromaculatus*)
- White Sucker (*Catostomus commersonii*)
- Brown Bullhead (*Ameiurus nebulosus*)
- Brook Stickleback (*Culaea inconstans*)
- Least Darter (*Etheostoma microperca*)

Results of the spring 2011 electrofishing survey are included in **Appendix D**.

None of the fish species captured in Ryan Drain are considered indicator species, although species such as Brown Bullhead are considered tolerant of degraded habitat conditions (CVC, 2003).

Ryan Drain is within the 120 m Zone of Investigation of the following Project elements (**Appendix A, Figure 2, Tile 1 of 5):**

- Turbine #6 access road and collector line crossing;
- Turbine #7;
- Collector line crossing on Beechwood Line between Bridge Road and Summerhill Road; and
- Underground interconnection line crossing on Manley Road southwest of Summerhill Road.

Site characteristics of the above project elements are presented in **Table 3.2**

Table 3.2: Site Characteristics within the 120 m Zone of Investigation – Ryan Drain

Water Body Name/Location[a]	Site Description	Proposed Works	Potential Impacts	Mitigation	Net Effects[b]
Ryan Drain A	Class C Drain Permanent flow; mix of pool, riffle, and run morphology; no in-water vegetation. Bankfull width = 4 to 5 m Water depth = 20 cm Substrate = gravel, cobble, silt, sand, and boulder. Direct fish habitat.	To be crossed by access road and underground collector system to Turbine #6.	Temporary increase in surface water turbidity due to possible runoff during construction. See Section 4.1. Direct effects on watercourse due to culvert crossing and disturbance of watercourse due to crossing of access road and underground collector system. See Sections 4.1, 4.3 and 4.5.	Maintain flow conveyance through site and beneath the access road to downstream fish habitat. See Sections 5.1 to 5.3.	No net effects are expected to this water body.
Ryan Drain B	Class C Drain Permanent flow; mix of pool, riffle, and run morphology; large, dense patches of watercress observed in November 2010. Bankfull width = 4 m Water depth = 40 cm Substrate = silt, hardpan clay, detritus, gravel, cobble. Direct fish habitat.	Buildable area of Turbine #7 to be located within 84 m of Ryan Drain. To be crossed by underground collector line system on Beechwood Line between Bridge Road and Summerhill Road.	Temporary increase in surface water turbidity due to possible runoff during construction. See Section 4.1, 4.3, 4.4.	Ensure appropriate sediment and erosion controls implemented. See Sections 5.1 to 5.3. Use DFO Operational Statement for Punch and Bore Crossing, Directional Drilling, or Open Cut. See Appendix E	No net effects are expected to this water body.
Ryan Drain C	Class C Drain Permanent flow; predominantly run morphology; large, dense patches of watercress observed in October 2011.	To be crossed by underground interconnection line adjacent to Manley Road.	Temporary increase in surface water turbidity due to possible runoff during construction. See Section 4.1.	Ensure appropriate sediment and erosion controls implemented. See Sections 5.1 to 5.3.	No net effects are expected to this water body.

Table 3.2: Site Characteristics within the 120 m Zone of Investigation – Ryan Drain

Water Body Name/Location[a]	Site Description	Proposed Works	Potential Impacts	Mitigation	Net Effects[b]
	Bankfull width = 3 m Water depth = 10 cm Substrate = sand, silt, clay			Use DFO Operational Statement for Punch and Bore Crossing, Directional Drilling, or Open Cut. See Appendix E	

a (**Appendix A, Figure 2, Tile 1 of 5):**
b assumes successful implementation of all mitigation measures.

3.2.4 Dillon Drainage Works

Dillon Drainage Works is a tributary of Canada Company Drain. It flows generally northwest across the Wind Project Location, and crosses Beechwood Line between Bridge Road and Summerhill Road approximately 500 m north of the location where Ryan Drain crosses Beechwood Line. The on-line mapping tool provided by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA, 2011) indicates that this drain has been designated a Class C municipal drain (i.e., permanent flow, warmwater, supports baitfish species). Mapping provided by MNR (2011) concurs with OMAFRA (2011) mapping.

Dillon Drainage Works is within the 120 m Zone of Investigation of the following Project elements (**Appendix A, Figure 2, Tile 1 of 5)**:

- Collector line crossing on Beechwood Line between Bridge Road and Summerhill Road (A); and

- Underground interconnection line crossing on Manley Road northeast of Summerhill Road (B).

Site characteristics at the above location are presented in **Table 3.3**.

Table 3.2: Site Characteristics Fish Habitat within the 120 m Zone of Investigation – Dillon Drainage Works

Water Body Name/Location[a]	Site Description	Proposed Works	Potential Impacts	Mitigation	Net Effects[b]
Dillon Drainage Works A	Class C Drain Permanent flow; dominated by riffle and run morphology; no in-water vegetation during April 2011 sampling. Bankfull width = 4.5 m Water depth = 30 cm Substrate = gravel, sand, cobble, silt, and clay. Direct fish habitat	To be crossed by underground collector system adjacent to Beechwood Line between Bridge Road and Summerhill Road	Temporary increase in surface water turbidity due to possible runoff during construction. See Section 4.1 to 4.3.	Use DFO Operational Statement for Punch and Bore Crossing, Directional Drilling, or Open Cut. See Appendix E	No net effects are expected to this water body.
Dillon Drainage Works B	Class C Drain Permanent flow; dominated by run morphology; many patches of watercress observed during October 2011 field investigations. Bankfull width = 1.5 m Water depth = 30 cm Substrate = cobble, gravel, sand, silt, and detritus.	To be crossed by underground interconnection line adjacent to Manley Road northeast of Summerhill Road	Temporary increase in surface water turbidity due to possible runoff during construction. See Section 4.1 to 4.3.	Use DFO Operational Statement for Punch and Bore Crossing, Directional Drilling, or Open Cut. See Appendix E	No net effects are expected to this water body.

a (**Appendix A, Figure 2, Tile 1 of 5).**
b assumes all mitigation measures are implemented and successful

3.2.5 Woods Drain

Woods Drain is a tributary of Canada Company Drain. It flows generally west across the Wind Project Location, and crosses Beechwood Line at its intersection with Hydro Line Road. The on-line mapping tool provided by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA, 2011) indicates that this drain has been designated a Class C municipal drain (i.e., permanent flow, warmwater, supports baitfish species). Mapping provided by MNR (2011) concurs with OMAFRA (2011) mapping. Field investigations conducted by Stantec during April 2011 revealed the presence of nine fish species:

- Central Stoneroller (*Campostoma anomalum*)
- Northern Redbelly Dace (*Chrosomus eos*)
- Common Shiner (*Luxilus cornutus*)
- Blacknose Shiner (*Notropis heterolepis*)
- Bluntnose Minnow (*Pimephales notatus*)
- Blacknose Dace (*Rhinichthys atratulus*)
- Creek Chub (*Semotilus atromaculatus*)
- White Sucker (*Catostomus commersonii*)
- Brook Stickleback (*Culaea inconstans*)

Results of the spring 2011 electrofishing survey are included in **Appendix D**.

None of the fish species captured in Woods Drain are considered indicator species. Woods Drain is within the 120 m Zone of Investigation of the following Project elements ((**Appendix A, Figure 2, Tile 1 of 5):**

- Collector Line crossing at Beechwood Line intersection with Hydro Line Road;
- Turbine #3;
- Collector line crossing on Manley Line between Hydro Line Road and Bridge Road;
- Turbine #15 access road and collector line crossing; and,
- unserviced electrical control building.

Site characteristics in the vicinity of the above locations are presented in **Table 3.4**.

Table 3.3: Site Characteristics within the 120 m Zone of Investigation – Woods Drain

Water Body Name/Location[a]	Site Description	Proposed Works	Potential Impacts	Mitigation	Net Effects[b]
Woods Drain A	Class C Drain Permanent flow; dominated by run morphology; no in-water vegetation observed during April 2011 sampling. Bankfull width = 4 to 5 m Water depth = 20 cm Substrate = gravel, sand, silt, cobble, and detritus. Direct fish habitat.	To be crossed by underground collector system adjacent to Beechwood Line and Hydro Line Road.	Temporary increase in surface water turbidity due to possible runoff during construction. See Section 4.1 to 4.3.	Use DFO Operational Statement for Punch and Bore Crossing, Directional Drilling, or Open Cut. See Appendix E	No net effects are expected to this water body at this location.
Woods Drain B	Class C Drain Permanent flow; mix of pool and run morphology; sporadic patches of dense watercress observed in November 2010. Bankfull width = 3 m Water depth = 30 cm Substrate = silt, gravel, cobble, sand, clay, and detritus. Direct fish habitat.	Buildable area of Turbine #3 to be located 52 m from Woods Drain.	Temporary increase in surface water turbidity due to possible runoff during construction. See Section 4.1 to 4.3.	Ensure appropriate sediment and erosion controls implemented. See Sections 5.1 to 5.3.	No net effects are expected to this water body at this location.
Woods Drain C	Class C Drain Permanent flow; dominated by pool and run morphology; no in-water vegetation observed in April 2011. Dense patches of watercress observed throughout channel in November 2011. Bankfull width = 3 - 4 m Water depth = 30 cm Substrate = sand, gravel, silt, cobble, clay, boulder, and detritus. Direct fish habitat.	To be crossed by underground collector system adjacent to Manley Line.	Temporary increase in surface water turbidity due to possible runoff during construction. See Section 4.1 to 4.3.	Use DFO Operational Statement for Punch and Bore Crossing, Directional Drilling, or Open Cut. See Appendix E	No net effects are expected to this water body at this location.

Table 3.3: Site Characteristics within the 120 m Zone of Investigation – Woods Drain

Water Body Name/Location[a]	Site Description	Proposed Works	Potential Impacts	Mitigation	Net Effects[b]
Woods Drain D	Class C Drain Permanent flow; pool, and run morphology; large, dense patches of watercress throughout in November 2010. Bankfull width = 2 to 3.5 m Water depth = 30 cm Substrate = silt, detritus, and clay. Direct fish habitat.	To be crossed by access road and underground collector system to Turbine #15 and unserviced electrical control building.	Temporary increase in surface water turbidity due to possible runoff during construction. See Section 4.1 to 4.3. Direct effects on watercourse due to culvert crossing and disturbance of watercourse due to crossing of access road and underground collector system. See Sections 4.1, 4.3 and 4.5.	Maintain flow conveyance through site and beneath the access road to downstream fish habitat. See Sections 5.1 to 5.3. Use DFO Operational Statement for Punch and Bore Crossing, Directional Drilling, or Open Cut. See Appendix E	No net effects are expected to this water body.

a (**Appendix A, Figure 2, Tile 1 of 5).**
b assumes successful implementation of all mitigation measures.

3.2.6 Canada Company Drain

Canada Company Drain is the main water feature traversing the Wind Project Location, and most other watercourses within the Wind Project Location are tributaries to this drain. It flows generally northwest across the Project Location, crossing Manley Line, Beechwood Line, Hydro Line Road and Maple Line prior to exiting the Project Location and ultimately converging with the South Maitland River to the west. The on-line mapping tool provided by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA, 2011) indicates that this drain has been designated a Class C municipal drain (i.e., permanent flow, warmwater, supports baitfish species). Mapping provided by MNR (2011) concurs with OMAFRA (2011) mapping. Field investigations conducted by Stantec during April 2011 revealed the presence of twelve fish species:

- Central Stoneroller (*Campostoma anomalum*)
- Northern Redbelly Dace (*Chrosomus eos*)
- Brassy Minnow (*Hybognathus hankinsoni*)
- Common Shiner (*Luxilus cornutus*)
- Blacknose Shiner (*Notropis heterolepis*)
- Blacknose Dace (*Rhinichthys atratulus*)
- Creek Chub (*Semotilus atromaculatus*)
- White Sucker (*Catostomus commersonii*)
- Brook Stickleback (*Culaea inconstans*)
- Rock Bass (*Ambloplites rupestris*)
- Least Darter (*Etheostoma microperca*)
- Johnny Darter (*Etheostoma nigrum*)

Results of the spring 2011 electrofishing survey are included in **Appendix D**.

None of the fish species captured in Canada Company Drain are considered indicator species.

The Canada Company Drain is within the 120 m Zone of Investigation of the following Project elements (**Appendix A, Figure 2, Tile 1 of 5):**

- Collector line crossing at Beechwood Line south of Hydro Line Road (A); and
- Turbine #14 access road and collector line crossing (B).

Site characteristics at the above locations are presented in **Table 3.5**

Table 3.4: Site Characteristics within the 120 m Zone of Investigation – Canada Company Drain

Water Body Name/Location[a]	Site Description	Proposed Works	Potential Impacts	Mitigation	Net Effects[b]
Canada Company Drain A	Class C Drain Permanent flow; dominated by run morphology; no in-water vegetation during April 2011 sampling. Bankfull width = 5 m Water depth = 40 cm Substrate = gravel, sand, silt, detritus and cobble. Direct fish habitat.	To be crossed by underground collector system adjacent to Beechwood Line, 150 m south of intersection with Hydro Line Road.	Temporary increase in surface water turbidity due to possible runoff during construction. See Section 4.1 to 4.3.	Use DFO Operational Statement for Punch and Bore Crossing, Directional Drilling, or Open Cut. See Appendix E	No net effects are expected to this water body.
Canada Company Drain B	Class C Drain Permanent flow; dominated by run morphology; no in-water vegetation during Nov. 2010 and April 2011 sampling. Bankfull width = 2.5 m Water depth = 50 cm Substrate = silt, clay, gravel, sand and detritus. Direct fish habitat.	To be crossed by access road and collector system to Turbine #14.	Direct effects on watercourse due to culvert crossing and disturbance of watercourse due to crossing of access road and collector system. See Sections 4.1, 4.2 and 4.4.	Maintain flow conveyance through site and beneath the access road to downstream fish habitat. See Sections 5.1 to 5.3. Use DFO Operational Statement for Punch and Bore Crossing, Directional Drilling, or Open Cut. See Appendix E	No net effects are expected to this water body.

a (**Appendix A, Figure 2, Tile 1 of 5).**
b assumes successful implementation of all mitigation measures.

3.2.7 Krouskoff Drain

Krouskoff Drain is a tributary of Ryan Drain. The two drains converge at Maple Line, adjacent to the western limit of the Wind Project Location. Krouskoff Drain flows generally northwest across the Wind Project Location, crossing Manley Line and Beechwood Line prior to its confluence with Ryan Drain. The on-line mapping tool provided by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA, 2011) indicates that this drain has been designated a Class C municipal drain (i.e., permanent flow, warmwater, supports baitfish). Mapping provided by MNR (2011) concurs with OMAFRA (2011) mapping. Field investigations conducted by Stantec during April 2011 revealed the presence of six fish species:

- Central Mudminnow (Umbra limi)
- Bluntnose Minnow (*Pimephales notatus*)
- Fathead Minnow (*Pimephales promelas*)
- Creek Chub (*Semotilus atromaculatus*)
- Brook Stickleback (*Culaea inconstans*)
- Pumpkinseed (*Lepomis gibbosus*)

Results of the spring 2011 electrofishing survey are included in **Appendix D**.

None of the fish species captured in Krouskoff Drain are considered indicator species.

Krouskoff Drain is within the 120 m Zone of Investigation of the following Project elements (**Appendix A, Figure 2, Tile 1 of 5)**:

- Turbine #4 access road and collector line crossing;
- Collector line and interconnection line crossings at Manley Line and Bridge Road intersection.

Site characteristics are presented in **Table 3.6**.

Table 3.5: Site Characteristics within the 120 m Zone of Investigation – Krouskopf Drain

Water Body Name/Location[a]	Site Description	Proposed Works	Potential Impacts	Mitigation	Net Effects[b]
Krouskoff Drain A	Class C Drain Permanent flow; dominated by run morphology; large, dense patches of watercress present during November 2010 and April 2011 sampling. Bankfull width = 1.75 m Water depth = 30 cm Substrate = silt, gravel, clay, and detritus. Direct fish habitat.	To be crossed by access road and underground collector system to Turbine #4.	Direct effects on watercourse due to culvert crossing and disturbance of watercourse due to crossing of access road and underground collector system. See Sections 4.1, 4.3 and 4.5.	Maintain flow conveyance through site and beneath the access road to downstream fish habitat. See Sections 5.1 to 5.3. Use DFO Operational Statement for Punch and Bore Crossing, Directional Drilling, or Open Cut. See Appendix E	No net effects are expected to this water body.
Krouskoff Drain B	Class C Drain Permanent flow; dominated by run morphology; grasses present in-water during April 2011 sampling. Bankfull width = 3 m Water depth = 10 cm Substrate = silt, clay, and detritus. Direct fish habitat.	To be crossed by underground collector system and interconnection line at intersection of Manley Line and Bridge Road.	Temporary increase in surface water turbidity due to possible runoff during construction. See Section 4.1 to 4.3.	Use DFO Operational Statement for Punch and Bore Crossing, Directional Drilling, or Open Cut. See Appendix E	No net effects are expected to this water body.

a (**Appendix A, Figure 2, Tile 1 of 5).**
b assumes successful implementation of all mitigation measures.

3.2.8 O'Rourke Drain

O'Rourke Drain is the eastern-most tributary of the Canada Company Drain within the Wind Project Location. It flows generally west across the Project Location, crossing Manley Line where it intersects with Hydro Line Road. The on-line mapping tool provided by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA, 2011) indicates that this drain has been designated a Class A municipal drain (i.e., permanent flow, cool/cold water, does not support salmonids). Mapping provided by MNR (2011) concurs with OMAFRA (2011) mapping. Field investigations conducted by Stantec during April 2011 revealed the presence of seven fish species:

- Central Stoneroller (*Campostoma anomalum*)
- Northern Redbelly Dace (*Chrosomus eos*)
- Brassy Minnow (*Hybognathus hankinsoni*)
- Common Shiner (*Luxilus cornutus*)
- Bluntnose Minnow (*Pimephales notatus*)
- Creek Chub (*Semotilus atromaculatus*)
- White Sucker (*Catostomus commersonii*)

Results of the spring 2011 electrofishing survey are included in **Appendix D**.

None of the fish species captured in O'Rourke Drain are considered indicator species.

O'Rourke Drain is located within 120 m of the following Project elements (**Appendix A, Figure 2, Tile 1 of 5)**:

- Collector line crossings along Hydro Line Road near the intersection of Manley Line

Site characteristics are presented in **Table 3.7**.

Table 3.6: Site Characteristics Fish Habitat within the 120 m Zone of Investigation – O'Rourke Drain

Water Body Name/Location[a]	Site Description	Proposed Works	Potential Impacts	Mitigation	Net Effects[b]
O'Rourke Drain	Class A Drain Permanent flow; dominated by run morphology; no in-water vegetation during April 2011 sampling. Bankfull width = 4 m Water depth = 30 cm Substrate = silt Direct fish habitat	To be crossed by underground collector system and adjacent to Hydro Line Road in vicinity of intersection with Manley Line.	Temporary increase in surface water turbidity due to possible runoff during construction. See Section 4.1 to 4.3.	Use DFO Operational Statement for Punch and Bore Crossing, Directional Drilling, or Open Cut. See Appendix E	No net effects are expected to this water body.

a (**Appendix A, Figure 2, Tile 1 of 5).**
b assumes all mitigation measures are implemented and successful

3.2.9 Carpenter Drain

Carpenter Drain is a short water feature originating at Manley Line (between Highway 8 and Hydro Line Road) and ending approximately 500 m northwest, where it converges with the Canada Company Drain. The on-line mapping tool provided by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA, 2011) indicates that this drain has been designated a Class C municipal drain (i.e., permanent flow, warmwater, supports baitfish). Mapping provided by MNR (2011) concurs with OMAFRA (2011) mapping. Field investigations conducted by Stantec during April 2011 did not capture any fish species and it was concluded that this water body contributes indirectly to fish habitat.

Carpenter Drain is within the 120 m Zone of Investigation associated with the following three Project elements (**Appendix A, Figure 2, Tile 1 of 5).**

- Turbine #1
- Collector Line crossing along Manley Line

Site characteristics are presented in Table **3.8**

Table 3.7: Site Characteristics Fish Habitat within the 120 m Zone of Investigation – Carpenter Drain

Water Body Name/Location[a]	Site Description	Proposed Works	Potential Impacts	Mitigation	Net Effects[b]
Carpenter Drain	Class C Drain Intermittent flow; dominated by run morphology during April 2011 sampling. Bankfull width = 3 m Water depth = 10 cm Substrate = silt Stantec field investigations suggest that this water body contributes indirectly to fish habitat.	Buildable area of Turbine #1 to be located 69 m from Carpenter Drain. Underground collector system to be located within 5 m crossed by underground collector system adjacent to Manley Line.	Temporary increase in surface water turbidity due to possible runoff during construction. See Section 4.1 to 4.3.	Ensure appropriate sediment and erosion controls implemented. See Sections 5.1 and 5.3. Use DFO Operational Statement for Punch and Bore Crossing, Directional Drilling, or Open Cut. See Appendix E	No net effects are expected to this water body at this location.

a (**Appendix A, Figure 2, Tile 1 of 5).**
b assumes all mitigation measures are implemented and successful

3.2.10 Givlin Drain

Givlin Drain is a tributary of the Dillon Drainage Works. It flows northwest across the Project Location, crossing Manley Line before turning southwest to converge with Dillon Drainage Works. A defined channel is present only on the west side of Manley Line. Field investigations suggest that Givlin Drain has been piped on the east side of Manley Road. The on-line mapping tool provided by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA, 2011) indicates that this drain has been designated a Class C municipal drain (i.e., permanent flow, warmwater, supports baitfish species). Mapping provided by MNR (2011) concurs with OMAFRA (2011) mapping.

Givlin Drain is within the 120 m Zone of Investigation of the following Project element (**Appendix A, Figure 2, Tile 1 of 5):**

- Interconnection line crossing approximately adjacent to Manley Road, approximately 575 m northeast of Summerhill Road.

Site characteristics of the above project element are presented in **Table 3.9**.

Table 3.8: Site Characteristics within the 120 m Zone of Investigation – Givlin Drain

Water Body Name/Location[a]	Site Description	Proposed Works	Potential Impacts	Mitigation	Net Effects[b]
Givlin Drain	Class C Drain Permanent flow consisting of flat morphology. Watercress observed during October 2011 field investigations. Bankfull width = 1.5 m Water depth = 10 cm Substrate = sand and silt.	To be crossed by underground interconnection line adjacent to Manley Line, northeast of Summerhill Road.	Temporary increase in surface water turbidity due to possible runoff during construction. See Section 4.1.	Use DFO Operational Statement for Punch and Bore Crossing, or Directional Drilling. See Appendix E	No net effects are expected to this water body.

a (**Appendix A, Figure 2, Tile 1 of 5).**
b assumes successful implementation of all mitigation measures.

3.2.11 Hoegy Drainage Works

Hoegy Drainage Works is a major tributary of the Dillon Drainage Works. It flows generally west across the Project Location, crossing the interconnection line route, as well as the northwest corner of the Wind Project Location before converging with Dillon Drainage Works. The on-line mapping tool provided by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA, 2011) indicates that this drain has been designated a Class C municipal drain (i.e., permanent flow, warmwater, supports baitfish species). Mapping provided by MNR (2011) concurs with OMAFRA (2011) mapping.

Hoegy Drainage Works is within the 120 m Zone of Investigation of the following Project element (**Appendix A, Figure 2, Tile 1 of 5):**

- Interconnection line crossing adjacent to Manley Road, approximately 1.2 km northeast of Summerhill Road.

Site characteristics of the above project element are presented in **Table 3.10**.

Table 3.9: Site Characteristics within the 120 m Zone of Investigation – Hoegy Drainage Works

Water Body Name/Location[a]	Site Description	Proposed Works	Potential Impacts	Mitigation	Net Effects[b]
Hoegy Drainage Works	Class C Drain Permanent flow dominated by run morphology; dense watercress observed downstream of Manley Line Road, sparse watercress during October 2011 field investigations. Bankfull width = 2 m Water depth = 20 cm Substrate = sand, gravel, and silt.	To be crossed by underground interconnection line adjacent to Manley Road, northeast of Summerhill Road.	Temporary increase in surface water turbidity due to possible runoff during construction. See Section 4.1.	Use DFO Operational Statement for Punch and Bore Crossing, or Directional Drilling. See Appendix E	No net effects are expected to this water body.

a (**Appendix A, Figure 2, Tile 1 of 5).**
b assumes successful implementation of all mitigation measures.

3.2.12 Eckert Drainage Works

Eckert Drainage Works is a tributary of the Hoegy Drainage Works. It flows generally west across the Project Location, crossing the interconnection line route at Manley Line. The on-line mapping tool provided by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA, 2011) indicates that this drain has been designated a Class C municipal drain (i.e., permanent flow, warmwater, supports baitfish species). Mapping provided by MNR (2011) concurs with OMAFRA (2011) mapping.

Eckert Drainage Works is within the 120 m Zone of Investigation of the following Project element (**Appendix A, Figure 2, Tile 1 of 5):**

- Interconnection line crossing adjacent to Manley Road, approximately 600 m southwest of Winthrop Road.

Site characteristics of the above project element are presented in **Table 3.11**

Table 3.10: Site Characteristics within the 120 m Zone of Investigation – Eckert Drainage Works

Water Body Name/Location[a]	Site Description	Proposed Works	Potential Impacts	Mitigation	Net Effects[b]
Eckert Drainage Works	Class C Drain Permanent flow with pool morphology; *Lemna* sp. Prevalent on downstream side of Manley Line during October 2011 field investigations. Bankfull width = 1.5 m Water depth = 20 cm Substrate = silt, sand, and gravel	To be crossed by underground interconnection line adjacent to Manley Line, southwest of Winthrop Road.	Temporary increase in surface water turbidity due to possible runoff during construction. See Section 4.1.	Use DFO Operational Statement for Punch and Bore Crossing, or Directional Drilling. See Appendix E	No net effects are expected to this water body.

a (**Appendix A, Figure 2, Tile 1 of 5).**
b assumes successful implementation of all mitigation measures.

3.2.13 Dietz Drain/Regell Drainage Works

Dietz Drain/Regell Drainage Works is a tributary of Hoegy Drainage Works. It flows generally southwest across the Project Location, crossing the interconnection line route adjacent to Manley Line, north of Winthrop Road. The on-line mapping tool provided by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA, 2011) indicates that this drain has been designated a Class C municipal drain (i.e., permanent flow, warmwater, supports baitfish species). Mapping provided by MNR (2011) concurs with OMAFRA (2011) mapping.

Dietz Drain/Regell Drainage Works is within the 120 m Zone of Investigation of the following Project element (**Appendix A, Figure 2, Tile 1 of 5):**

- Interconnection line crossing approximately adjacent to Manley Line, approximately 650 m northeast of Winthrop Road.

Site characteristics of the above project element are presented in **Table 3.12**.

Table 3.11: Summary of Site Characteristics within the 120 m Zone of Investigation – Dietz Drain/Regell Drainage Works

Water Body Name/Location[a]	Site Description	Proposed Works	Potential Impacts	Mitigation	Net Effects[b]
Dietz Drain/Regell Drainage Works	Class C Drain Permanent flow dominated by run morphology; sparse watercress observed during October 2011 field investigations. Bankfull width = 2.25 m Water depth = 15 cm Substrate = gravel, sand, silt, cobble, and boulder.	To be crossed by underground interconnection line adjacent to Manley Line, northeast of Winthrop Road.	Temporary increase in surface water turbidity due to possible runoff during construction. See Section 4.1.	Use DFO Operational Statement for Punch and Bore Crossing, or Directional Drilling. See Appendix E	No net effects are expected to this water body.

a (**Appendix A, Figure 2, Tile 1 of 5).**
b assumes successful implementation of all mitigation measures.

3.2.14 Manley Drain

Manley Drain is a tributary of Barron Drain. Barron Drain ultimately converges with the South Maitland River to the west of the Project Location. Manley Drain flows generally northwest across the Project Location, crossing the interconnection line route adjacent to Manley Line, south of Sawmill Road. The on-line mapping tool provided by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA, 2011) indicates that this drain has been designated a Class C municipal drain (i.e., permanent flow, warmwater, supports baitfish species). Mapping provided by MNR (2011) concurs with OMAFRA (2011) mapping.

Manley Drain is within the 120 m Zone of Investigation of the following Project element (**Appendix A, Figure 2, Tile 2 of 5):**

- Interconnection line crossing approximately adjacent to Manley Line, approximately 600 m south of Sawmill Road.

Site characteristics of the above project element are presented in **Table 3.13**.

Table 3.12: Site Characteristics within the 120 m Zone of Investigation – Manley Drain

Water Body Name/Location[a]	Site Description	Proposed Works	Potential Impacts	Mitigation	Net Effects[b]
Manley Drain	Class C Drain Permanent flow dominated by run morphology; sparse watercress observed during October 2011 field investigations. Bankfull width = 2 m Water depth = 25 cm Substrate = gravel, sand, silt, and cobble.	To be crossed by underground interconnection line adjacent to Manley Line, south of Sawmill Road.	Temporary increase in surface water turbidity due to possible runoff during construction. See Section 4.1.	Use DFO Operational Statement for Punch and Bore Crossing, or Directional Drilling. See Appendix E	No net effects are expected to this water body.

a (**Appendix A, Figure 2, Tile 2 of 5)**
b assumes successful implementation of all mitigation measures.

3.2.15 Barron Municipal Drain

Barron Municipal Drain is a tributary of the South Maitland River. It flows generally west across the Project Location, prior to converging with the South Maitland River west of the Project Location. The on-line mapping tool provided by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA, 2011) indicates that this drain has been designated a Class A municipal drain (i.e., permanent flow, coldwater, supports baitfish species but does not support salmonids). Mapping provided by MNR (2011) concurs with OMAFRA (2011) mapping.

Barron Municipal Drain is within the 120 m Zone of Investigation of the following Project element (**Appendix A, Figure 2, Tile 2 of 5):**

- Interconnection line crossing adjacent to Manley Line, approximately 500 m north of Sawmill Road.

Site characteristics of the above project element are presented in **Table 3.14**.

Table 3.13: Site Characteristics within the 120 m Zone of Investigation – Barron Municipal Drain

Water Body Name/Location[a]	Site Description	Proposed Works	Potential Impacts	Mitigation	Net Effects[b]
Barron Municipal Drain	Class A Drain Permanent flow dominated by run morphology; sparse Typha sp. observed throughout channel during October 2011 field investigations. Bankfull width = 3 m Water depth = 30 cm Substrate = clay, cobble, and gravel.	To be crossed by underground interconnection line adjacent to Manley Line, north of Sawmill Road.	Temporary increase in surface water turbidity due to possible runoff during construction. See Section 4.1.	Use DFO Operational Statement for Punch and Bore Crossing, or Directional Drilling. See Appendix E	No net effects are expected to this water body.

a (**Appendix A, Figure 2, Tile 2 of 5)**
b assumes successful implementation of all mitigation measures.

3.2.16 Stimore Drain

Stimore Drain is a tributary of Barron Drain, which ultimately converges with the South Maitland River to the west of the Project Location. Stimore Drain flows generally southwest across the Project Location, crossing the interconnection line route adjacent to Manley Line, south of Hullet-McKillop Road. The on-line mapping tool provided by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA, 2011) indicates that this drain has been designated a Class C municipal drain (i.e., permanent flow, warmwater, supports baitfish species). Mapping provided by MNR (2011) concurs with OMAFRA (2011) mapping.

Stimore Drain is within the 120 m Zone of Investigation of the following Project element (**Appendix A, Figure 2, Tile 2 of 5):**

- Interconnection line crossing adjacent to Manley Road, approximately 1.1 km south of Hullet-McKillop Road.

Site characteristics of the above project element are presented in **Table 3.15**.

Table 3.14: Site Characteristics within the 120 m Zone of Investigation – Stimore Drain

Water Body Name/Location[a]	Site Description	Proposed Works	Potential Impacts	Mitigation	Net Effects[b]
Stimore Drain	Class C Drain Permanent flow dominated by run morphology; Treed riparian area. Bankfull width = 3.5 m Water depth = 10 cm Substrate = gravel, cobble, silt, and boulder.	To be crossed by underground interconnection line adjacent to Manley Line, south of Hullet-McKillop Road.	Temporary increase in surface water turbidity due to possible runoff during construction. See Section 4.1.	Use DFO Operational Statement for Punch and Bore Crossing, or Directional Drilling. See Appendix E	No net effects are expected to this water body.

a (**Appendix A, Figure 2, Tile 2 of 5)**
b assumes successful implementation of all mitigation measures.

3.2.17 Beauchamp Creek Drain

Beauchamp Creek Drain is a tributary of the Middle Maitland River. Beauchamp Creek Drain flows generally northwest across the interconnection line route, ultimately converging with the Middle Maitland River to the northwest of the Project Location. The on-line mapping tool provided by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA, 2011) indicates that this drain has been designated a Class C municipal drain (i.e., permanent flow, warmwater, supports baitfish species). Mapping provided by MNR (2011) concurs with OMAFRA (2011) mapping.

Beauchamp Creek Drain is within the 120 m Zone of Investigation of the following Project element (**Appendix A, Figure 2, Tile 3 of 5):**

- Interconnection line crossing adjacent to McNabb Line, approximately 650 m north of Walton Road.

Site characteristics of the above project element are presented in **Table 3.16**.

Table 3.15: Site Characteristics within the 120 m Zone of Investigation – Beauchamp Creek Drain

Water Body Name/Location[a]	Site Description	Proposed Works	Potential Impacts	Mitigation	Net Effects[b]
Beauchamp Creek Drain	Class C Drain Permanent flow dominated by run morphology; large, dense patches of *Elodea* sp. observed during October 2011 field investigations. Bankfull width = 9 m Water depth = 30 cm Substrate = sand, silt, cobble, and boulder.	To be crossed by underground interconnection line adjacent to McNabb Line, north of Walton Road.	Temporary increase in surface water turbidity due to possible runoff during construction. See Section 4.1.	Use DFO Operational Statement for Punch and Bore Crossing, or Directional Drilling. See Appendix E	No net effects are expected to this water body.

a (**Appendix A, Figure 2, Tile 3 of 5)**
b assumes successful implementation of all mitigation measures

3.2.18 Barron Drain

Barron Drain is a tributary of Beauchamp Creek Drain, which ultimately converges with the Middle Maitland River to the northwest of the Project Location. Generally, the Barron Drain flows northwest across the Project Location. The on-line mapping tool provided by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA, 2011) indicates that this drain has been designated a Class C municipal drain (i.e., permanent flow, warmwater, supports baitfish species). Mapping provided by MNR (2011) concurs with OMAFRA (2011) mapping.

Barron Drain is within the 120 m Zone of Investigation of the following Project element (**Appendix A, Figure 2, Tile 3 of 5):**

- Interconnection line crossing adjacent to McNabb Line, approximately 800 m northeast of Walton Road.

Site characteristics of the above project element are presented in **Table 3.17**.

Table 3.16: Site Characteristics within the 120 m Zone of Investigation – Barron Drain

Water Body Name/Location[a]	Site Description	Proposed Works	Potential Impacts	Mitigation	Net Effects[b]
Barron Drain	Class C Drain Permanent flow dominated by run morphology; large, dense patches of watercress observed (>95% surface coverage) during October 2011 field investigations as well as sparse cattails. Bankfull width = 2 m Water depth = 15 cm Substrate = silt and gravel.	To be crossed by underground interconnection line adjacent to McNabb Line, northeast of Walton Road.	Temporary increase in surface water turbidity due to possible runoff during construction. See Section 4.1.	Use DFO Operational Statement for Punch and Bore Crossing, or Directional Drilling. See Appendix E	No net effects are expected to this water body.

a (**Appendix A, Figure 2, Tile 3 of 5)**
b assumes successful implementation of all mitigation measures.

3.2.19 Fulton Drain

Fulton Drain is a tributary of Beauchamp Creek Drain, which is itself a tributary of the Middle Maitland River. Fulton Drain generally flows northeast across the Project Location. The on-line mapping tool provided by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA, 2011) indicates that this drain has been designated a Class C municipal drain (i.e., permanent flow, warmwater, supports baitfish species). Mapping provided by MNR (2011) concurs with OMAFRA (2011) mapping.

Fulton Drain is within the 120 m Zone of Investigation of the following Project element (**Appendix A, Figure 2, Tile 3 of 5):**

- Interconnection line crossing adjacent to McNabb Line, approximately 250 m north of Moncrieff Road.

Site characteristics of the above project element are presented in **Table 3.18**.

Table 3.17: Site Characteristics within the 120 m Zone of Investigation – Fulton Drain

Water Body Name/Location[a]	Site Description	Proposed Works	Potential Impacts	Mitigation	Net Effects[b]
Fulton Drain	Class C Drain Permanent flow dominated by run morphology; large, dense patches of watercress and grass (>95% surface coverage) observed during October 2011 field investigations. Bankfull width = 3 m Water depth = 20 cm Substrate = sand, silt, gravel, boulder, and clay.	To be crossed by underground interconnection line adjacent to McNabb Line, north of Moncrieff Road.	Temporary increase in surface water turbidity due to possible runoff during construction. See Section 4.1.	Use DFO Operational Statement for Punch and Bore Crossing, or Directional Drilling. See Appendix E	No net effects are expected to this water body.

a (**Appendix A, Figure 2, Tile 3 of 5)**
b assumes successful implementation of all mitigation measures.

3.2.20 Fourteenth Concession Drain

Fourteenth Concession Drain is a tributary of Beauchamp Creek Drain, which ultimately converges with the Middle Maitland River to the northwest of the Project Location. Fourteenth Concession Drain flows generally northwest across the interconnection line route. The on-line mapping tool provided by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA, 2011) indicates that this drain has been designated a Class C municipal drain (i.e., permanent flow, warmwater, supports baitfish species). Mapping provided by MNR (2011) concurs with OMAFRA (2011) mapping.

Fourteenth Concession Drain is within the 120 m Zone of Investigation of the following Project element (**Appendix A, Figure 2, Tile 3 of 5)**

- Interconnection line crossing adjacent to McNabb Line, at St. Michaels Road.

Site characteristics of the above project element are presented in **Table 3.19**.

Table 3.18: Site Characteristics within the 120 m Zone of Investigation – Fourteenth Concession Drain

Water Body Name/Location[a]	Site Description	Proposed Works	Potential Impacts	Mitigation	Net Effects[b]
Fourteenth Concession Drain	Class C Drain Permanent flow dominated by run morphology; patches of watercress observed throughout channel during October 2011 field investigations. Some undercutting of banks observed. Bankfull width = 2 m Water depth = 20 cm Substrate = sand, gravel, silt, and cobble.	To be crossed by underground interconnection line adjacent to McNabb Line, at St. Michaels Road.	Temporary increase in surface water turbidity due to possible runoff during construction. See Section 4.1.	Use DFO Operational Statement for Punch and Bore Crossing, or Directional Drilling. See Appendix E	No net effects are expected to this water body.

a (**Appendix A, Figure 2, Tile 3 of 5)**
b assumes successful implementation of all mitigation measures.

3.2.21 Baker Municipal Drain

Baker Municipal Drain is a tributary Baker Drain, which converges with the Middle Maitland River to the northwest of the Project Location. Baker Municipal Drain flows generally northwest across the interconnection line route. The watercourse is piped to the east of McNabb Line. The on-line mapping tool provided by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA, 2011) indicates that this drain has been designated a Class A municipal drain (i.e., permanent flow, cool/coldwater, does not support salmonids). Mapping provided by MNR (2011) concurs with OMAFRA (2011) mapping.

Baker Municipal Drain is within the 120 m Zone of Investigation of the following Project element (**Appendix A, Figure 2, Tile 3 of 5)**

- Interconnection line crossing adjacent to McNabb Line, approximately 550 m southwest of Cranbrook Road.

Site characteristics of the above project element are presented in **Table 3.20**.

Table 3.19: Site Characteristics within the 120 m Zone of Investigation – Baker Municipal Drain

Water Body Name/Location[a]	Site Description	Proposed Works	Potential Impacts	Mitigation	Net Effects[b]
Baker Municipal Drain	Class A Drain Permanent flow dominated by run morphology; dense grasses in channel. Possible pike spawning habitat. Water feature piped on east side of road. Bankfull width = 4 m Water depth = 10 cm Substrate = cobble, sand, and silt.	To be crossed by underground line adjacent to McNabb Line, southwest of Cranbrook Road.	Temporary increase in surface water turbidity due to possible runoff during construction. See Section 4.1.	Use DFO Operational Statement for Punch and Bore Crossing, or Directional Drilling. See Appendix E	No net effects are expected to this water body.

a (**Appendix A, Figure 2, Tile 3 of 5)**
b assumes successful implementation of all mitigation measures.

3.2.22 Middle and Little Maitland River

The Maitland River is a tributary of Lake Huron. There are two crossings Maitland River branches (Middle Maitland River and Little Maitland River) within the Project Location. At both locations, the river generally flows northwest across the interconnection route. The on-line mapping tool provided by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA, 2011) indicates that none of the reaches that fall within the Project Location are regulated under the *Drainage Act*. The Maitland River (within the Project Location) possesses a warmwater thermal regime and supports a variety of fish species (Huron County, 2005). The following species of fish observed during October 2011 field investigations:

- Redhorse sp.;
- Northern Hognose Sucker;
- White Sucker;
- Smallmouth Bass; and,
- Cyprinids.

The Maitland River is within the 120 m Zone of Investigation of the following Project elements (**Appendix A, Figure 2, Tile 3 of 5):**

- Interconnection line crossing adjacent to McNabb Line, approximately 500 m north of Cranbrook Road (Middle Maitland River) (Figure 2, Tile 3 of 5); and
- Interconnection line crossing adjacent to Johnston Line, approximately 50 m north of Amberley Road (Little Maitland River); (Figure 2, Tile 5 of 5).

Site characteristics of the above project element are presented in **Table 3.21**.

Table 3.20: Site Characteristics within the 120 m Zone of Investigation – Maitland River

Water Body Name/Location[a]	Site Description	Proposed Works	Potential Impacts	Mitigation	Net Effects[b]
Middle Maitland River	Natural watercourse Permanent flow dominated by run morphology; large, dense patches of *Elodea* sp. observed during October 2011 field investigations. Beaver dam observed approximately 100 m upstream of McNabb Road. Bankfull width = 22 m Water depth = 40 cm Substrate = sand, gravel, silt, and boulder.	To be crossed by underground interconnection line adjacent to McNabb Line, north of Cranbrook Road.	Temporary increase in surface water turbidity due to possible runoff during construction. See Section 4.1.	Use DFO Operational Statement for Punch and Bore Crossing, or Directional Drilling. See Appendix E	No net effects are expected to this water body.
Little Maitland River	Natural watercourse Permanent flow dominated by run morphology; *Nymphaea* sp., *Lemna* sp. and sporadic, dense patches of watercress observed during October 2011 field investigations. Slight bank slumping from historic cattle access (presently fenced out). Many fish observed during October 2011 field investigations. Bankfull width = 17 m Water depth = 40 cm Substrate = sand, gravel, silt, boulder, and cobble.	To be crossed by underground interconnection line adjacent to Johnston Line, north of Amberley Road.	Temporary increase in surface water turbidity due to possible runoff during construction. See Section 4.1.	Use DFO Operational Statement for Punch and Bore Crossing, or Directional Drilling. See Appendix E	No net effects are expected to this water body.

a (**Appendix A, Figure 2, Tile 3 of 5)**
b assumes successful implementation of all mitigation measures.

3.2.23 Ninth Concession Drain

Ninth Concession Drain is a tributary of the Middle Maitland River. It flows generally northwest across the interconnection line route, ultimately converging with the Middle Maitland River to the west of the Project Location. The on-line mapping tool provided by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA, 2011) indicates that this drain has been designated a Class B municipal drain (i.e., permanent flow, warmwater, supports top level predators or other sensitive fish species). Mapping provided by MNR (2011) concurs with OMAFRA (2011) mapping.

Ninth Concession Drain is within the 120 m Zone of Investigation of the following Project element (**Appendix A, Figure 2, Tile 3 of 5):**

- Interconnection line crossing adjacent to McNabb Line, approximately 400 m northeast of Newry Road.

Site characteristics of the above project element are presented in **Table 3.22**.

Table 3.21: Site Characteristics within the 120 m Zone of Investigation – Ninth Concession Drain

Water Body Name/Location[a]	Site Description	Proposed Works	Potential Impacts	Mitigation	Net Effects[b]
Ninth Concession Drain	Class B Drain Permanent flow dominated by run morphology; sparse patches of watercress and *Lemna* sp. observed during October 2011 field investigations. Downstream banks eroded due to cattle access. Bankfull width = 1.25 m Water depth = 10 cm Substrate = silt and sand.	To be crossed by underground interconnection line adjacent to McNabb Line, northeast of Newry Road.	Temporary increase in surface water turbidity due to possible runoff during construction. See Section 4.1.	Use DFO Operational Statement for Punch and Bore Crossing, or Directional Drilling. See Appendix E	No net effects are expected to this water body.

a (**Appendix A, Figure 2, Tile 3 of 5):**
b assumes successful implementation of all mitigation measures.

3.2.24 Unnamed Tributary of Sixth Concession Drain

The southerly crossing of the unnamed tributary of Sixth Concession Drain occurs on McNabb Line, approximately 600 m northeast of Cardiff Road and consists of two ponded areas on opposite sides of the road. Roadside observations suggest that the ponded areas have no defined outflows. The northerly crossing of the unnamed tributary of Sixth Concession Drain also occurs on McNabb Line, approximately 1 km northeast of Cardiff Road. The watercourse generally flows northwest prior to converging with Sixth Concession Drain immediately to the northwest of the Project Location. The on-line mapping tool provided by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA, 2011) does not show the Unnamed Tributary of Sixth Concession Drain wetted area, but field investigations identified it as being a potential water body. Mapping provided by MNR (2011) does not show the Unnamed Tributary of Sixth Concession Drain.

The Unnamed Tributary of Sixth Concession Drain is within the 120 m Zone of Investigation of the following Project elements (**Appendix A, Figure 2, Tile 4 of 5):**

- Interconnection line crossing adjacent to McNabb Line, approximately 600 m northeast of Cardiff Road (A); and

- interconnection line crossing adjacent to McNabb Line, approximately 650 m northeast of Cardiff Road (B).

Site characteristics of the above project elements are presented in **Table 3.23**.

Table 3.22: Site Characteristics within the 120 m Zone of Investigation – Unnamed Tributary of Sixth Concession Drain

Water Body Name/Location[a]	Site Description	Proposed Works	Potential Impacts	Mitigation	Net Effects[b]
Unnamed Tributary A of Sixth Concession Drain	Two ponded areas dominated by grasses; Spring Peeper heard calling during October 2011 field investigations. Pond diameter: 50 m (NW pond), 15 m (SE pond) Water depth = unknown (no access) Substrate = unknown (no access)	To be crossed by underground interconnection line adjacent to McNabb Line, northeast of Cardiff Road.	Temporary increase in surface water turbidity due to possible runoff during construction. See Section 4.1.	Use DFO Operational Statement for Punch and Bore Crossing, or Directional Drilling. See Appendix E	No net effects are expected to this water body.
Unnamed Tributary B of Sixth Concession Drain	Likely intermittent flow dominated by pool morphology; sparse areas containing cattails observed during October 2011 field investigations. Possible Northern Pike spawning habitat. Bankfull width = 1.25 m Water depth = 10 cm Substrate = silt, clay, and gravel.	To be crossed by underground interconnection line adjacent to McNabb Line, northeast of Cardiff Road.	Temporary increase in surface water turbidity due to possible runoff during construction. See Section 4.1.	Use DFO Operational Statement for Punch and Bore Crossing, or Directional Drilling. See Appendix E	No net effects are expected to this water body.

a (**Appendix A, Figure 2, Tile 4 of 5)**
b assumes successful implementation of all mitigation measures.

3.2.25 Sixth Concession Drain

Sixth Concession Drain is a tributary of the Little Maitland River. It flows generally north across the interconnection line route, ultimately converging with the Little Maitland River to the northeast of the Project Location. The on-line mapping tool provided by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA, 2011) indicates that this drain has been designated a Class C municipal drain (i.e., permanent flow, warmwater, supports baitfish species). Mapping provided by MNR (2011) concurs with OMAFRA (2011) mapping.

The Sixth Concession Drain is within the 120 m Zone of Investigation of the following Project element (**Appendix A, Figure 2, Tile 4 of 5):**

- Interconnection line crossing adjacent to Browntown Road, approximately 400 m west of McNabb Line.

Site characteristics of the above project elements are presented in **Table 3.24**.

Table 3.23: Site Characteristics within the 120 m Zone of Investigation –Sixth Concession Drain

Water Body Name/Location[a]	Site Description	Proposed Works	Potential Impacts	Mitigation	Net Effects[b]
Sixth Concession Drain	Class C Drain Permanent flow dominated by run morphology; patches of *Elodea* sp. and dense watercress observed during October 2011 field investigations. Bankfull width = 2.5 m Water depth = 20 cm Substrate = sand, gravel, silt, and cobble.	To be crossed by underground interconnection line adjacent to Browntown Road, west of McNabb Line.	Temporary increase in surface water turbidity due to possible runoff during construction. See Section 4.1.	Use DFO Operational Statement for Punch and Bore Crossing, or Directional Drilling. See Appendix E	No net effects are expected to this water body.

a (**Appendix A, Figure 2, Tile 4 of 5)**
b assumes successful implementation of all mitigation measures.

3.2.26 Jackling Drainage Works

Jackling Drainage Works is a tributary of the Little Maitland River. It flows generally northwest across the interconnection line route, ultimately converging with the Little Maitland River to the northwest of the Project Location. The on-line mapping tool provided by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA, 2011) indicates that this drain has reaches within the Project Location that have been designated Class D (i.e., permanent flow, coldwater, supports salmonids) and Class A (i.e., permanent flow, cool/coldwater, does not support salmonids). Mapping provided by MNR (2011) concurs with OMAFRA (2011) mapping.

Jackling Drainage Works is within the 120 m Zone of Investigation of the following Project elements (**Appendix A, Figure 2, Tile 4 of 5):**

- Interconnection line crossing adjacent to Browntown Road, approximately 900 m northwest of McNabb Line (A); and

- Interconnection line crossing adjacent to Johnston Line, approximately 900 m northeast of Browntown Road (B).

Site characteristics of the above project elements are presented in **Table 3.25.**

Table 3.24: Site Characteristics within the 120 m Zone of Investigation – Jackling Drainage Works

Water Body Name/Location[a]	Site Description	Proposed Works	Potential Impacts	Mitigation	Net Effects[b]
Jackling Drainage Works A	Class A Drain Permanent flow dominated by run morphology; patches of cattails and watercress observed during October 2011 field investigations. Bankfull width = 0.5 m Water depth = 5 cm Substrate = cobble, silt, gravel, and sand.	To be crossed by underground interconnection line adjacent to Browntown Road, northwest of McNabb Line.	Temporary increase in surface water turbidity due to possible runoff during construction. See Section 4.1.	Use DFO Operational Statement for Punch and Bore Crossing, or Directional Drilling. See Appendix E	No net effects are expected to this water body.
Jackling Drainage Works B	Class A Drain Permanent flow dominated by run morphology; sporadic patches of sparse watercress observed during October 2011 field investigations. Bankfull width = 2 m Water depth = 20 cm Substrate = sand, gravel, and silt.	To be crossed by underground interconnection line adjacent to Johnston Line northeast of Browntown Road.	Temporary increase in surface water turbidity due to possible runoff during construction. See Section 4.1.	Use DFO Operational Statement for Punch and Bore Crossing, or Directional Drilling. See Appendix E	No net effects are expected to this water body.

a (**Appendix A, Figure 2, Tile 4 of 5)**
b assumes successful implementation of all mitigation measures.

3.2.27 Weber Drain

Weber Drain is a tributary of the Little Maitland River. It flows generally northwest across the interconnection line route, ultimately converging with the Little Maitland River immediately to the northwest of the Project Location. The on-line mapping tool provided by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA, 2011) indicates that this drain has been designated a Class F municipal drain (i.e., intermittent flow). A defined channel is present only on the northwest side of Johnston Line. Mapping provided by MNR (2011) concurs with OMAFRA (2011) mapping.

Weber Drain is within the 120 m Zone of Investigation of the following Project element (**Appendix A, Figure 2, Tile 4 of 5):**

- Interconnection line crossing adjacent to Johnston Line, approximately 850 m northeast of Jamestown Road.

Site characteristics of the above project element are presented in **Table 3.26**.

Table 3.25: Site Characteristics within the 120 m Zone of Investigation – Weber Drain

Water Body Name/Location[a]	Site Description	Proposed Works	Potential Impacts	Mitigation	Net Effects[b]
Weber Drain	Class F Drain Intermittent flow dominated by run morphology; sparse patches of watercress observed during October 2011 field investigations. Channel begins on northwest side of Johnston Line. May provide Northern Pike spawning habitat. Bankfull width = 1.5 m Water depth = 15 cm Substrate = silt and sand.	To be crossed by underground interconnection line adjacent to Johnston Line, northeast of Jamestown Road.	Temporary increase in surface water turbidity due to possible runoff during construction. See Section 4.1.	Use DFO Operational Statement for Punch and Bore Crossing, or Directional Drilling. See Appendix E	No net effects are expected to this water body.

a (**Appendix A, Figure 2, Tile 4 of 5)**
b assumes successful implementation of all mitigation measures.

3.2.28 Municipal Drain No. 5

Municipal Drain No. 5 is a major tributary of the Little Maitland River. It converges with the river immediately to the west of the Project Location. Municipal Drain No. 5 flows generally northwest across the interconnection line route. The on-line mapping tool provided by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA, 2011) indicates that this drain has not been classified. Stantec's 2011 field investigations revealed watercourse characteristics suggesting that the watercourse is permanently flowing. Its proximity to the Little Maitland River suggests that it provides direct fish habitat.

Municipal Drain No. 5 is within the 120 m Zone of Investigation of the following Project element (**Appendix A, Figure 2, Tile 5 of 5):**

- Interconnection line crossing adjacent to Johnston Line, approximately 1 km northwest of Jamestown Road.

Site characteristics of the above project element are presented in **Table 3.27**.

Table 3.26: Site Characteristics within the 120 m Zone of Investigation –Municipal Drain No. 5

Water Body Name/Location[a]	Site Description	Proposed Works	Potential Impacts	Mitigation	Net Effects[b]
Municipal Drain No. 5	Unclassified Municipal Drain Permanent flow dominated by run morphology; small broken beaver dam observed approximately 70 m upstream of Johnston Line during October 2011 field investigations. Undercut banks prevalent. Bankfull width = 20 m Water depth = 60 cm Substrate = sand, silt, clay, gravel, cobble, and boulder.	To be crossed by underground interconnection line adjacent to Johnston Line, northwest of Jamestown Road.	Temporary increase in surface water turbidity due to possible runoff during construction. See Section 4.1.	Use DFO Operational Statement for Punch and Bore Crossing, or Directional Drilling. See Appendix E	No net effects are expected to this water body.

a (**Appendix A, Figure 2, Tile 5 of 5)**
b assumes successful implementation of all mitigation measures.

3.3 Summary of Predicted Impacts to Fish Habitat and Approval Processes

3.3.1 Fisheries Habitat

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 MVCA has a Level 2 agreement with DFO; therefore, they can determine how the proponent can mitigate any potential impacts to fish and fish habitat to avoid HADD. If impacts to fish and fish habitat can be fully mitigated, the MVCA can issue a Letter of Advice (LOA) directing how the work can proceed. If the MVCA determines that impacts cannot be fully mitigated, the project will be forwarded to DFO for review and compensation measures will need to be discussed to ensure No Net Loss of fish habitat.

Once compensation measures have been agreed upon in principle with DFO, the proponent needs to submit a Letter of Intent (LOI) to Compensate for Fish Habitat Loss (outlining the details of the proposed work and required mitigation measures, and resulting net impact to fish habitat). The LOI should include a Fish Habitat Compensation Plan that identifies the proposed habitat enhancement works to compensate for the predicted impacts to fish habitat. DFO approval under the *Fisheries Act* allows the HADD to occur following the conditions of the Authorization.

The DFO's Risk Management Framework (RMF) is a process by which the risk of an undertaking to fish habitat can be assessed. Project risk is based on the sensitivity of fish habitat and the nature of the work being proposed. By providing information in a format that follows the RMF, all the necessary information will be available for efficient review and decision making.

Based on the current project layout and proposed environmental mitigation measures, in-water work would potentially affect fish or fish habitat at four locations associated with the Project. DFO Authorization may be required due to culvert crossings and underground collector line installation, at locations presented in **Table 3.28**.

Table 3.27: Locations of Potential Net Effects to Fish Habitat

Water Body	Access Road Crossing (Associated Turbine)	Fish Habitat	
		Direct	Indirect
Ryan Drain	X (T6)	X	
Woods Drain	X (T15)	X	
Canada Company Drain	X (T14)	X	
Krouskopf Drain	X (T4)	X	

It is assumed that all negative effects associated with turbine construction and underground collector and interconnection line installation can be mitigated using DFO Operational Statements (**Appendix E**) or standard mitigation measures. When an Operational Statement is used, mitigation measures provided in the Operational Statement will protect fish habitat and no further review or approvals are required. Although specific Operational Statements are referenced in this report, consultation with the MVCA and/or DFO may result in site-specific construction methods and mitigation measures for some locations. In such cases, additional sites may require review, and details of construction methods, etc. should be submitted for agency review.

3.3.2 Species at Risk

As discussed in Section 3.1, DFO mapping and correspondence with MNR have identified the presence of Rainbow (a freshwater mussel) in the Little Maitland River at one of the proposed interconnection line crossing locations. It is anticipated that all collector lines and interconnection lines in the vicinity of water bodies will be directionally drilled. With the implementation of the proposed mitigation measures, it is expected that there will be no negative effects to aquatic species at risk as a result of The Wind Project.

4.0 POTENTIAL IMPACTS

4.1 General Construction-Related Impacts

The potential impacts of the Project to watercourses located with 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.

4.2 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.

4.3 Underground Collector Lines and Interconnection Line

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

- Erosion and sedimentation from site disturbance and dewatering;
- Collapse of the punch or bore hole under the stream;
- Disturbing riparian vegetation can reduce shoreline cover, shade and food production areas; and
- Machinery fording the stream can disturb bottom and bank substrates, disrupt sensitive fish life stages and introduce deleterious substances.

5.0 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 municipalities, the MVCA and DFO. The extent of mitigation would be dependent on project details such as technical requirements, construction methods and schedule.

5.1 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 120 m 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. Construction activities are typically restricted according to watercourse thermal regime. In Guelph District (Clinton Area), construction within warmwater watercourses not permitted from March 16 to June 30.
- All materials and equipment used for site preparation and Project construction would 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 would be stored and stabilized away from the water;
  - Refuelling and maintenance of construction equipment would occur a minimum of 100 m from a water body;
  - As appropriate, spills would be reported to the Ministry of the Environment (MOE) Spills Action Centre;
  - Any part of equipment entering the water would 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 would be placed in the water.
- Sediment and erosion control measures would be implemented prior to construction and maintained during the construction phase to prevent entry of sediment into the water:
  - Silt fencing and/or barriers would be used along all construction areas adjacent to water bodies;
  - No equipment would be permitted to enter any water bodies beyond the silt fencing during construction;

- All sediment and erosion control measures would 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 would 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 would occur until the sediment and/or erosion problem is addressed;
- All disturbed areas of the construction site would be stabilized immediately and re-vegetated as soon as conditions allow; and
- Sediment and erosion control measures would be left in place until all areas of the construction site have been stabilized.

Work areas, including areas used for soil excavation, stockpiling, spreading and relocation, would be sufficiently distant from watercourses to preclude sediment inputs due to erosion of stored soil materials.

5.2 Mitigation Measures for 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. This Operational Statement includes details of mitigation measures. The DFO Operational Statement for Temporary Stream Crossings can be found in **Appendix D**.

Under flowing water conditions, water must be pumped 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

- Coffer dams (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 sand bags are used, clean, washed material would be used to build the berm. The berm face would 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 would not be taken from below the high water mark.

- Coffer dams would 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 would 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 would be restored after coffer dam removal.
- Water from dewatered areas would 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.
- Coffer dams would 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 would 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 would 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 would 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 would not be completed during flood stage flows or during times when heavy precipitation is occurring or is expected.

5.3 Mitigation Measures for Underground Collector and Interconnection Lines

As appropriate, the Construction Contractor (or designate) would be on-site during installation of watercourse crossings to ensure compliance with specifications and site plans. In particular, the Construction Contractor should ensure that pre-construction preparation is completed prior to commencement of in-stream work and that bank, bed, and floodplain conditions are restored to an acceptable condition following completion of construction.

Where required, the Construction Contractor would ensure that detailed pre-construction profiles of the slopes, banks, and bed are determined prior to installation of the power line and/or roads. The Construction Contractor should monitor weather forecasts prior to the installation of the crossings, particularly before crossings of watercourses with year-round flow.

There are several crossing techniques that may be employed for installation of a buried collector or interconnection 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. These are described in more detail below. There are DFO Operational Statements for all of the above methods and all are included in **Appendix E**.

A summary of mitigation measures for Dry Open-Cut crossings and Isolated Open-Cut crossings is provided below:

Dry Open-Cut

Mitigation measures for dry open-cut crossings (dry watercourses) include (also see **Appendix E)** Operational Statement, including conditions of use):

- Crossings would be undertaken on days when precipitation is not expected;
- The tracked excavator would be working in the dry when excavating a trench;
- Topsoil stockpiles would be reasonably distant from watercourses to preclude sediment inputs due to erosion of stored soil materials;
- Water crossings would be backfilled with substrate material that is consistent with the existing substrate size and texture and should remain in/under the crossing;
- The water crossing bed and bank areas would be rehabilitated to pre-excavation condition; and
- Materials such as sand bags, straw bales, geotextile filters, and/or pumps would be readily available on-site so that the crossing can be completed in the dry in case of unexpected stream flow.

Isolated Open-Cut (Dam and Pump Crossings)

Mitigation measures to employ at low flow watercourses include (also see **Appendix E** Operational Statement, including conditions of use):

- Where an open cut crossing is not possible, in-stream work would be completed in the dry by de-watering the work area and diverting and/or pumping flows around cofferdams placed at the limits of the work area:
  - To the extent practicable, crossings would take place on days when precipitation is not expected;
  - Existing stream flows would be maintained downstream of the de-watered work area without interruption, during all stages of the work;
  - Fish, if present, would be removed from the work area prior to de-watering and released alive immediately upstream;
  - Flow dissipaters and/or filter bags, or equivalent, would be placed at water discharge points to prevent erosion and sediment release;
  - Sediment laden dewatering discharge would be pumped to a temporary settling basin well away from the watercourse and allowed to settle and/or filter through the riparian vegetation before re-entering the watercourse downstream of the construction area;
  - As conditions warrant the work area would be stabilized against the impacts of high flow events at the end of each workday;
  - Work in the channel and floodplain would be suspended and the work area stabilized when there is a high probability of a convective rainfall event and during warm winter periods when there is a high likelihood of significant snowmelt runoff;
  - Silt or debris that has accumulated around the temporary cofferdams would be removed prior to their withdrawal; and
  - If greater than 50,000 l/d is to be taken from the dewatering area, a Permit to Take Water may be required.

Directional Drilling

According to the DFO Operational Statement, a proponent may proceed with High-Pressure Directional Drilling without DFO review when the following conditions are met:

- Construct during low-water periods during the allowable construction window for work in warmwater steams in the Guelph District (July 1 to March 15).
- Use existing trails, roads, or cut lines wherever possible, as access routes to avoid disturbance to the riparian vegetation.

- Design the drill path to an appropriate depth below the watercourse to minimize the risk of frac-out and to a depth to prevent the line from becoming exposed due to natural scouring of the stream bed.
- The drill entry and exit points would be far enough from the banks of the watercourse such that there is minimal impact on the banks.
- The removal of selected plants may be necessary to access the construction site; removals should be kept to a minimum and within the road right-of-way.
- Machinery fording the watercourse to bring equipment to the opposite side is limited to a one-time-event and should only occur if an existing crossing is not available or practical.
- Operate machinery on land above the ordinary high water mark in a manner that minimizes disturbances to the banks of the watercourse (see DFO Operational Statement for additional details).
- Construct a dugout/settling basin at the drilling exit site to contain drilling mud to prevent sediment and other deleterious substances from entering the watercourse. If this cannot be achieved, use silt fences or other effective sediment and erosion control measures to prevent drilling mud from entering the watercourse.
- Monitor the watercourse to observe signs of surface migration (frac-out) of drilling mud during all phases of construction.
- Stabilize any waste materials removed from the work site to prevent them from entering the watercourse.
- Vegetate any disturbed areas by planting and seeding preferably with native trees, shrubs or grasses. Cover such areas with mulch to prevent erosion and to help seeds germinate. Maintain effective sediment and erosion control measures until re-vegetation of disturbed areas is achieved.
- Develop a contingency plan and emergency frac-out response (see DFO Operational Statement).

6.0 MONITORING

6.1 Construction

Methods/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 prior to commencement of in-stream work (if required). Where required and if applicable, 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.

Performance Objectives/Additional Actions

The Environmental Monitor should ensure that bank, bed, and floodplain conditions are restored to an acceptable condition following construction.

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.

Additionally, compensation strategies and/or permits from Fisheries and Oceans Canada and/or MVCA, as applicable, would likely 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.

As discussed in Section 4.0 of this report, potential effects consist of changes to the riparian vegetation community, silt and sediment release, and impacts to aquatic habitat resulting from in-water works during construction of all Project components. Section 5.0 of this report and Section 3.3.2 of the Construction Plan Report describe measures to mitigate potential impacts to water bodies.

6.2 Operation

The Environmental Effects Monitoring Plan (EEMP) for the Project is provided in Section 6.0 of the Design and Operations Report. Operation activities that have the potential to affect aquatic

habitat include accidental spills and/or leaks. Mitigation measures to prevent impacts related to spills or leaks as presented in the EEMP are summarized below.

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 the DFO Authorization. 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 installation. If significant habitat enhancement or compensation measures are required, monitoring may also include assessments of the fish community and habitat use.

7.0 CONCLUSION

This **Water Assessment and Water Body Report** for the St. Columban Wind Project has been prepared by Stantec for St. Columban Energy LP in accordance with Ontario Regulation 359/09. This report is one component of the REA application for the Project.

Locations where water bodies are present within 120 m of a proposed project component are presented in **Figure 2**, and are summarized in **Table 3.1**. The designation of various 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.

Based on the current Project layout and proposed environmental mitigation measures, in-water work would potentially affect four water bodies that contain fish habitat, as summarized in **Table 3.28**. DFO Authorization may be required for the culvert crossings and underground collector line installation associated with the access roads to the four turbine sites.

If proposed construction techniques and mitigation measures are implemented, none of the proposed activities associated with the Project are expected to result in net impacts to aquatic species at risk.

Additionally, based on a review of the document entitled “Inland Ontario Lakes Designated for Lake Trout Management” (MNR, 2003), there are no Lake Trout lakes identified within 300 m of the Project Location.

This report has been prepared by Stantec for the sole benefit of St. Columban Energy LP, and may not be used by any third party without the express written consent of St Columban Energy LP. 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.

STANTEC CONSULTING LTD.

Mark Pomeroy
Fisheries Biologist

Nancy Hartrup, B.Sc.
Senior Fisheries Biologist

8.0 REFERENCES

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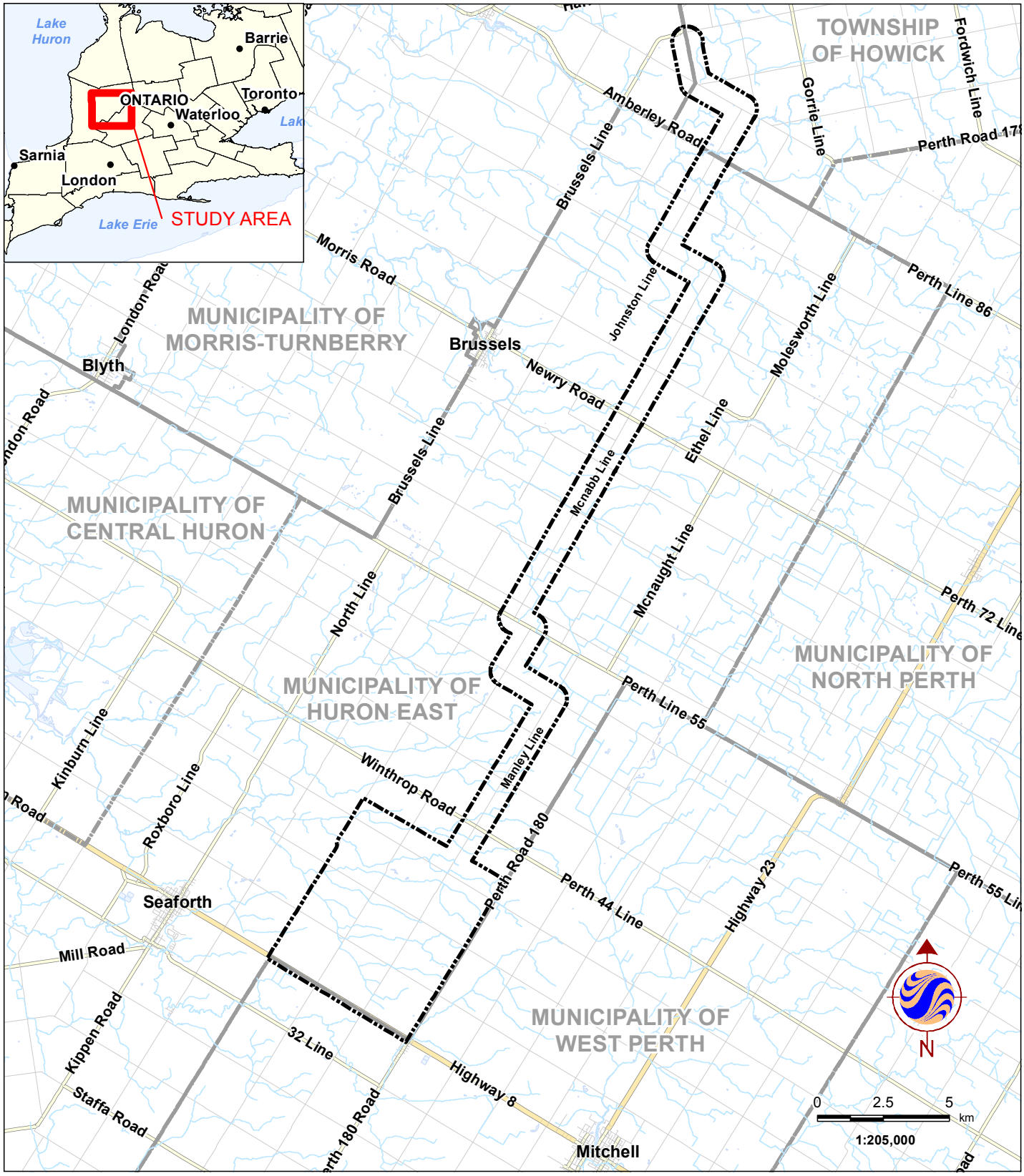
Appendix A

Figures



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Revised: 2011-12-15 By: dharvey

December, 2011
160960649

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Legend

- Study Area
- Highway
- Major Road
- Local Road
- Municipal Boundary
- Watercourse

Notes

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Client/Project

ST. COLUMBAN ENERGY LP
ST. COLUMBAN WIND PROJECT

Figure No.

1

Title

PROJECT LOCATION

Legend

- Study Area
- 120m Zone of Investigation

Project Components

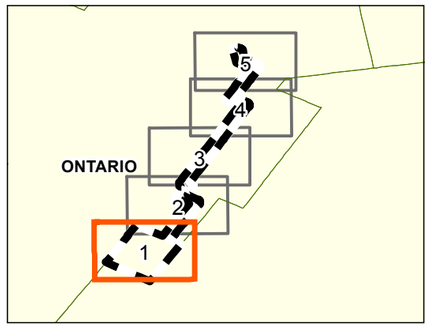
- Turbine Location
- Construction Area
- Underground Collector
- Access Road
- Proposed Underground Electrical Interconnection Line Route
- Unserviced Electrical Control Building
- Point of Connection

Existing Features

- Road
- Railway
- Watercourse
- Waterbody

Water Body Location (Width not to scale)

- Water Body (as defined in O.Reg 359/09)
- Not Water Body (as defined in O.Reg 359/09)



Notes

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Client/Project
ST. COLUMBAN ENERGY LP
ST. COLUMBAN WIND PROJECT

Figure No.
2.0

Title
WATER BODY LOCATIONS
Tile 1 of 5

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Revised: 2011-03-11 By: pworsell

Legend

- Study Area
- 120m Zone of Investigation

Project Components

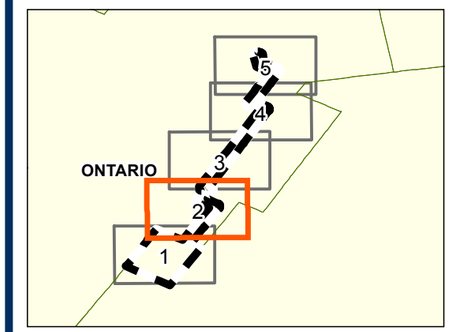
- Turbine Location
- Construction Area
- Underground Collector
- Access Road
- Proposed Underground Electrical Interconnection Line Route
- Unserviced Electrical Control Building
- Point of Connection

Existing Features

- Road
- Railway
- Watercourse
- Waterbody

Water Body Location (Width not to scale)

- Water Body (as defined in O.Reg 359/09)
- Not Water Body (as defined in O.Reg 359/09)



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Client/Project
ST. COLUMBAN ENERGY LP
ST. COLUMBAN WIND PROJECT

Figure No.
2.0

Title
WATER BODY LOCATIONS
Tile 2 of 5

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Revised: 2011-03-11 By: pworsell

Legend

- Study Area
- 120m Zone of Investigation

Project Components

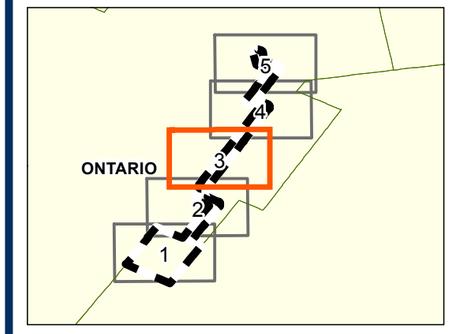
- Turbine Location
- Construction Area
- Underground Collector
- Access Road
- Proposed Underground Electrical Interconnection Line Route
- Unserviced Electrical Control Building
- Point of Connection

Existing Features

- Road
- Railway
- Watercourse
- Waterbody

Water Body Location (Width not to scale)

- Water Body (as defined in O.Reg 359/09)
- Not Water Body (as defined in O.Reg 359/09)



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ST. COLUMBAN ENERGY LP
ST. COLUMBAN WIND PROJECT

Figure No.
2.0

Title
WATER BODY LOCATIONS
Tile 3 of 5

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Revised: 2011-03-11 By: pworsell

Legend

- Study Area
- 120m Zone of Investigation

Project Components

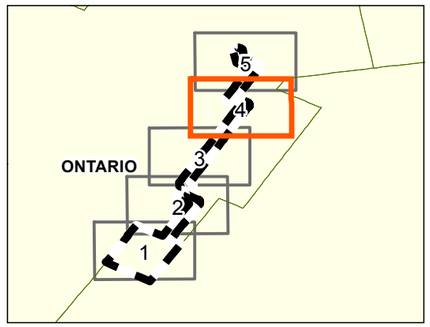
- Turbine Location
- Construction Area
- Underground Collector
- Access Road
- Proposed Underground Electrical Interconnection Line Route
- Unserviced Electrical Control Building
- Point of Connection

Existing Features

- Road
- Railway
- Watercourse
- Waterbody

Water Body Location (Width not to scale)

- Water Body (as defined in O.Reg 359/09)
- Not Water Body (as defined in O.Reg 359/09)



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ST. COLUMBAN ENERGY LP
ST. COLUMBAN WIND PROJECT

Figure No.
2.0

Title
WATER BODY LOCATIONS
Tile 4 of 5

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Revised: 2011-03-11 By: pworsell

Legend

- Study Area
- 120m Zone of Investigation

Project Components

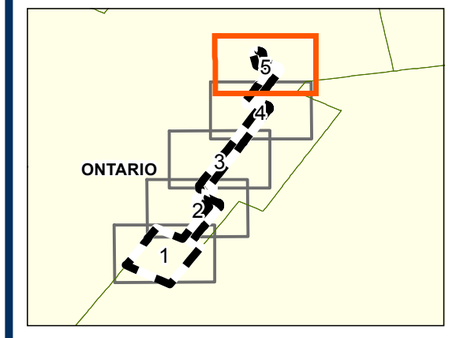
- Turbine Location
- Construction Area
- Underground Collector
- Access Road
- Proposed Underground Electrical Interconnection Line Route
- Unserviced Electrical Control Building
- Point of Connection

Existing Features

- Road
- Railway
- Watercourse
- Waterbody

Water Body Location (Width not to scale)

- Water Body (as defined in O.Reg 359/09)
- Not Water Body (as defined in O.Reg 359/09)



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ST. COLUMBAN WIND PROJECT

Figure No.
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Title
WATER BODY LOCATIONS
Tile 5 of 5

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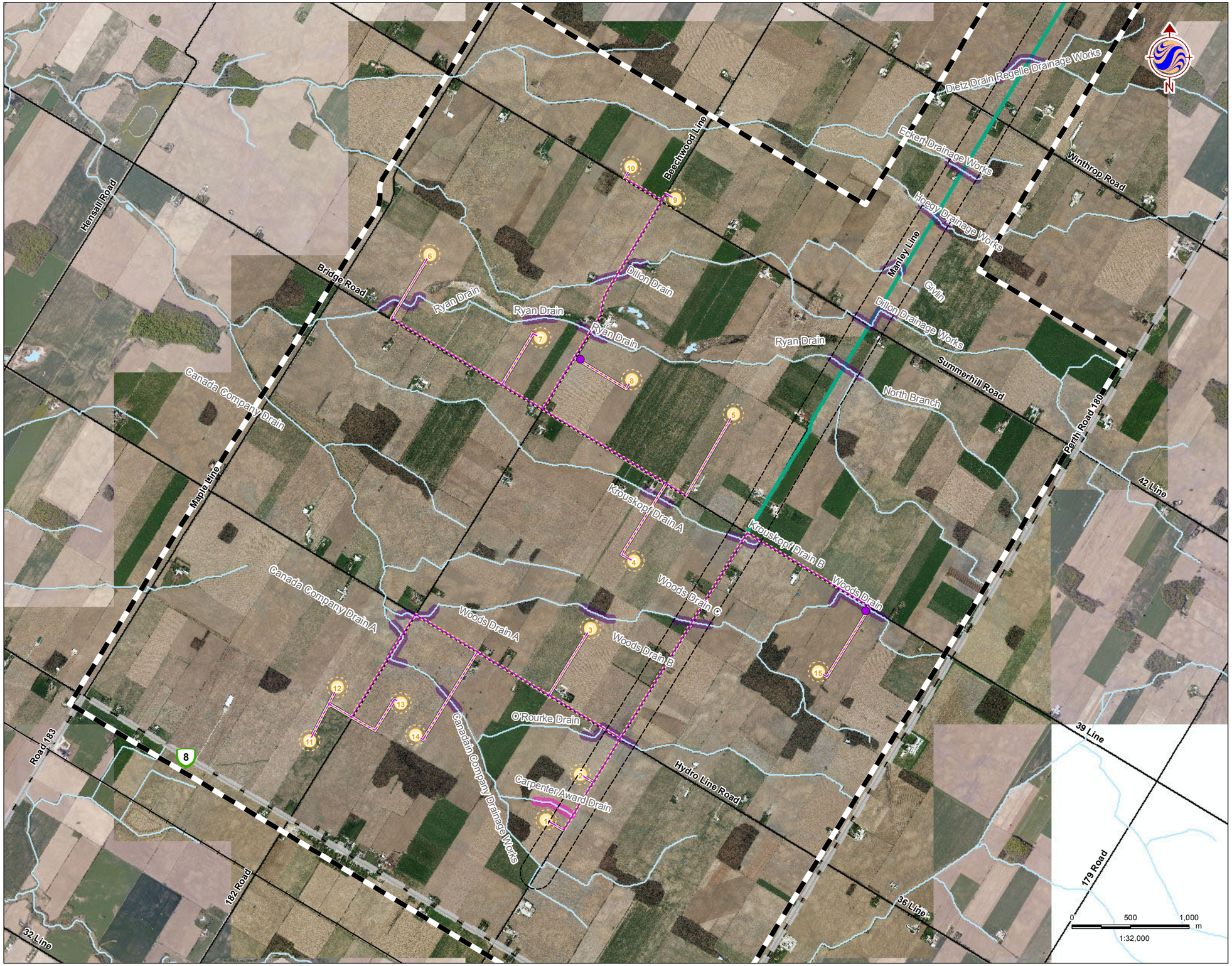

Legend

- Study Area
- 120m Zone of Investigation
- 140m Zone of Investigation

Project Components

- Turbine Location
- Construction Area
- Underground Collector
- Access Road
- Proposed Underground Electrical Interconnection Line Route
- Unserviced Electrical Control Building
- Point of Connection

Existing Features

- Road
- Railway
- Watercourse
- Waterbody
- Direct Fish Habitat
- Indirectly Contributes to Fish Habitat

Notes

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ST. COLUMBAN WIND PROJECT

Figure No.
3.0

Title
FISH HABITAT
Tile 1 of 5

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Revised: 2011-03-11 By: pworsell

Legend

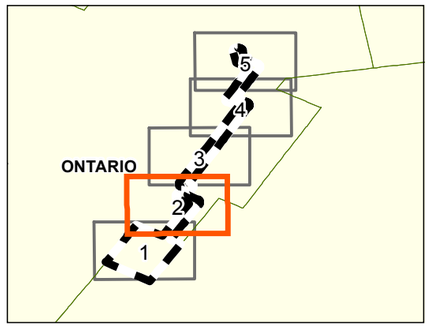
- Study Area
- 120m Zone of Investigation
- 140m Zone of Investigation

Project Components

- Turbine Location
- Construction Area
- Underground Collector
- Access Road
- Proposed Underground Electrical Interconnection Line Route
- Unserviced Electrical Control Building
- Point of Connection

Existing Features

- Road
- Railway
- Watercourse
- Waterbody
- Direct Fish Habitat
- Indirectly Contributes to Fish Habitat



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ST. COLUMBAN WIND PROJECT

Figure No.
3.0

Title
FISH HABITAT
Tile 2 of 5

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Revised: 2011-03-11 By: pworsell

Legend

- Study Area
- 120m Zone of Investigation
- 140m Zone of Investigation

Project Components

- Turbine Location
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- Unserviced Electrical Control Building
- Point of Connection

Existing Features

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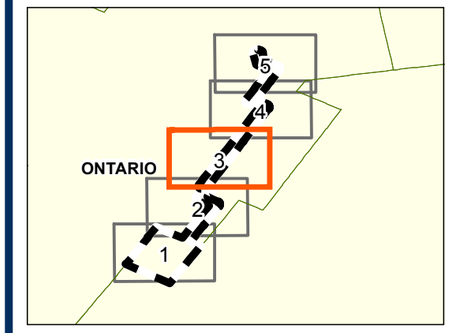
- Railway
- Watercourse
- Waterbody
- Direct Fish Habitat
- Indirectly Contributes to Fish Habitat



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ST. COLUMBAN WIND PROJECT

Figure No.
3.0

Title
FISH HABITAT
Tile 3 of 5

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Revised: 2011-03-11 By: pworsell

Legend

- Study Area
- 120m Zone of Investigation
- 140m Zone of Investigation

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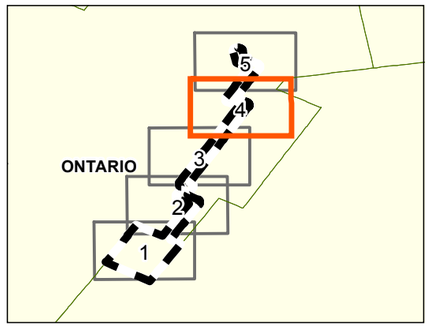
- Unserviced Electrical Control Building
- Point of Connection

Existing Features

- Road
- Railway
- Watercourse
- Waterbody
- Direct Fish Habitat
- Indirectly Contributes to Fish Habitat



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ST. COLUMBAN WIND PROJECT

Figure No.
3.0

Title
FISH HABITAT
Tile 4 of 5

W:\active\60960649\drawing\GIS\MXD\WaterAssessment\60960649_Fig3_FishHabitat_20111215.mxd
Revised: 2011-03-11 By: pworsell

Legend

- Study Area
- 120m Zone of Investigation
- 140m Zone of Investigation

Project Components

- Turbine Location
- Construction Area
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Existing Features

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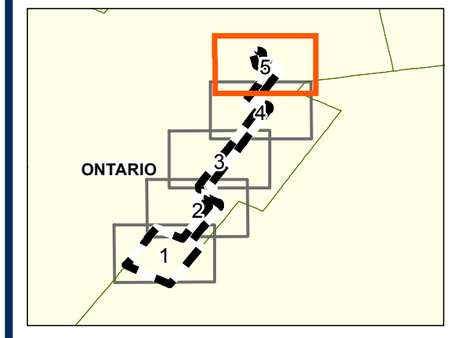

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ST. COLUMBAN WIND PROJECT

Figure No.
3.0

Title
FISH HABITAT
Tile 5 of 5

W:\active\60960649\drawing\GIS\MXD\WaterAssessment\60960649_Fig3_FishHabitat_20111215.mxd
Revised: 2011-03-11 By: pworsell

Appendix B

Photographic Record

Photo 1: Ryan Drain A - Facing upstream (northeast). Site is located about 250 metres northeast of the Bridge Road and Maple Line intersection.

Photo 2: Ryan Drain A - Facing downstream (southwest). Site is located about 250 metres northeast of the Bridge Road and Maple Line intersection.

Photo 3: Ryan Drain A - Existing substrate conditions. Site is located about 250 metres northeast of the Bridge Road and Maple Line intersection.

Photo 4: Ryan Drain B - Facing upstream (southeast). Photo location is approximately 200 m east of Beechwood Line, northeast of Bridge Road.

Photo 5: Ryan Drain B - Facing upstream (southeast). Photo location is approximately 200 m east of Beechwood Line, northeast of Bridge Road.

Photo 6: Ryan Drain B - Facing upstream (southeast). Photo location is approximately 200 m west of Beechwood Line, northwest of Bridge Road

Stantec

Client/Project
PRISTINE POWER INC.
ST. COLUMBAN WIND PROJECT

April 2011
160960649

Appendix
B

Title
PHOTOGRAPHIC RECORD
WINTER 2010

Photo 7: Ryan Drain B - Facing downstream (northwest). Photo location is approximately 200 m west of Beechwood Line, northwest of Bridge Road.

Photo 8: Ryan Drain B - Existing substrate conditions. Photo location is approximately 200 m west of Beechwood Line, northwest of Bridge Road.

Photo 9: Ryan Drain B – Note dense patches of watercress. Photo location is approximately 200 m west of Beechwood Line, northwest of Bridge Road.

Photo 10: Krouskopf Drain A - Facing upstream (southeast). Site is located half way between Beechwood Line and Manley Line, 75 metres south of Bridge Road.

Photo 11: Krouskopf Drain A - Facing downstream (northwest). Site is located half way between Beechwood Line and Manley Line, 75 metres south of Bridge Road.

Photo 12: Krouskopf Drain A – Note dense watercress covering water surface. Site is located half way between Beechwood Line and Manley Line, 75 metres south of Bridge Road.

Photo 13: Woods Drain - Facing upstream (southeast). Site is located approximately 600 m north of Hydro Line Road and 1.3 km east of Beechwood Line.

Photo 14: Woods Drain - Facing downstream (northwest). Site is located approximately 600 m north of Hydro Line Road and 1.3 km east of Beechwood Line.

Photo 15: Woods Drain - Existing substrate conditions. Site is located approximately 600 m north of Hydro Line Road and 1.3 km east of Beechwood Line.

Photo 16: Canada Company Drain - Facing upstream (southeast). Site is located approximately 1 km east of Beechwood Road and 500 m south of Hydro Line Road.

Photo 17: Canada Company Drain - Facing upstream (southeast). Site is located approximately 1 km east of Beechwood Road and 500 m south of Hydro Line Road.

Photo 18: Canada Company Drain - Existing substrate conditions. Site is located approximately 1 km east of Beechwood Road and 500 m south of Hydro Line Road.

Photo 19: Carpenter Drain – Facing upstream approximately 50 m downstream (west) of Road 180. Note dense grasses.

Photo 20: 0Carpenter Drain – Facing downstream approximately 50 m downstream (west) of Road 180

Photo 21: Woods Drain C - Facing upstream (southeast). Site is located on Bridge Road, northwest of Perth Road 180.

Photo 22: Woods Drain C - Facing downstream (northwest). Site is located on Bridge Road, northwest of Perth Road 180.

Photo 23: Woods Drain C - Existing substrate conditions. Site is located on Bridge Road, northwest of Perth Road 180.

Photo 1: Ryan Drain A - Facing upstream (northeast). Site is located about 250 metres northeast of the Bridge Road and Maple Line intersection.

Photo 2: Ryan Drain A - Facing downstream (southwest). Site is located about 250 metres northeast of the Bridge Road and Maple Line intersection.

Photo 3: Ryan Drain A - Existing substrate conditions. Site is located about 250 metres northeast of the Bridge Road and Maple Line intersection.

Photo 4: Dillon Drain - Facing upstream (northeast). Site is located on Beechwood Line, about 700 metres southwest of Summerhill Road.

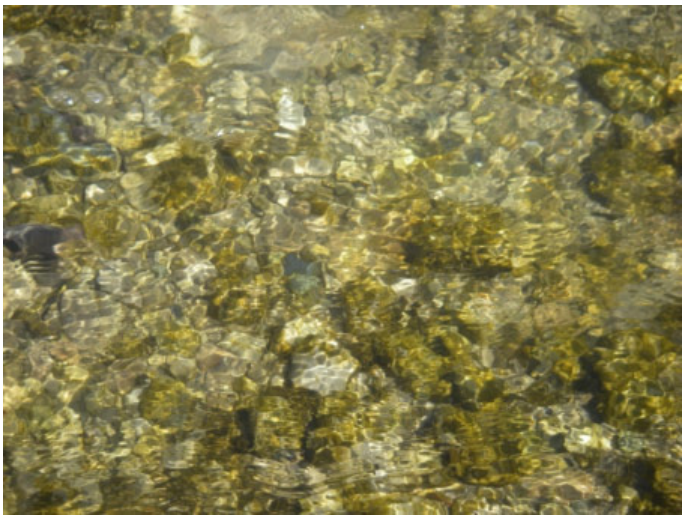

Photo 5: Dillon Drain - Facing downstream (southwest). Site is located on Beechwood Line about 700 metres southwest of Summerhill Road.

Photo 6: Dillon Drain - Existing substrate conditions. Site is located on Beechwood Line, about 700 metres southwest of Summerhill Road.

Stantec

Client/Project
PRISTINE POWER INC.
ST. COLUMBAN WIND PROJECT

April 2011
160960649

Appendix
B

Title
PHOTOGRAPHIC RECORD
SPRING 2011

Photo 7: Ryan Drain B - Facing upstream (southeast). Site is located on Beechwood Line, northeast of Bridge Road.

Photo 8: Ryan Drain B - Facing downstream (northwest). Site is located on Beechwood Line, northeast of Bridge Road.

Photo 9: Ryan Drain B - Existing substrate conditions. Site is located on Beechwood Line, northeast of Bridge Road.

Photo 10: Woods Drain B - Facing upstream (southeast). Site is located at the corner of Beechwood Line and Hydro Line Road.

Photo 11: Woods Drain B - Facing downstream (northwest). Site is located at the corner of Beechwood Line and Hydro Line Road.

Photo 12: Woods Drain B - Existing substrate conditions. Site is located at the corner of Beechwood Line and Hydro Line Road.

Photo 13: Canada Company Drain - Facing upstream (southwest). Site is located 200 metres southwest of the Hydro Line Road and Beechwood Line intersection.

Photo 14: Canada Company Drain - Facing downstream (northwest). Site is located 200 metres southwest of the Hydro Line Road and Beechwood Line intersection.

Photo 15: Canada Company Drain - Existing substrate conditions. Site is located 200 metres southwest of the Hydro Line Road and Beechwood Line intersection.

Photo 16: Krouskopf Drain A - Facing upstream (southeast). Site is located half way between Beechwood Line and Manley Line, 75 metres south of Bridge Road.

Photo 17: Krouskopf Drain A - Facing downstream (northwest). Site is located half way between Beechwood Line and Manley Line, 75 metres south of Bridge Road.

Photo 18: Krouskopf Drain A - Existing substrate conditions. Site is located half way between Beechwood Line and Manley Line, 75 metres south of Bridge Road.

Photo 19: Krouskopf Drain B - Facing upstream (southeast). Site is located at the corner of the Bridge Road and Manley Line intersection.

Photo 20: Krouskopf Drain B - Facing downstream (northwest). Site is located at the corner of the Bridge Road and Manley Line intersection.

Photo 21: Krouskopf Drain B - Existing substrate conditions. Site is located at the corner of the Bridge Road and Manley Line intersection.

Photo 22: O'Rourke Drain - Facing upstream (southeast). Site is located at the intersection of 181 Road and Hydro Line Road.

Photo 23: O'Rourke Drain - Facing downstream (northwest). Site is located at the intersection of 181 Road and Hydro Line Road.

Photo 24: O'Rourke Drain - Existing substrate conditions. Site is located at the intersection of 181 Road and Hydro Line Road.

Photo 25: Carpenter Drain - Facing downstream (northwest). Site is located 1 kilometre northeast of Highway 8 on Manley Line.

Photo 26: Carpenter Drain -Facing upstream (southeast) of the absent creek channel. Site is located 1 kilometre northeast of Highway 8 on Manley Line.

Photo 27: Carpenter Drain - Existing substrate conditions. Site is located 1 kilometre northeast of Highway 8 on Manley Line.

Photo 28: Woods Drain C - Facing upstream (southeast). Site is located on Bridge Road, northwest of Perth Road 180.

Photo 29: Woods Drain C - Facing downstream (northwest). Site is located on Bridge Road, northwest of Perth Road 180.

Photo 30: Woods Drain C - Existing substrate conditions. Site is located on Bridge Road, northwest of Perth Road 180.

Appendix C

Field Notes

Layout #1
Water Body

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Stantec

Project St. Columban
Station # 6 (Ryan Drain A)
Photos Taken 0022, 0023, 0024, 0025
GPS Coordinates 0474514 4823570
Descriptive Location approx 150m north of Bridge Rd, approx 1.5 km west of Beechwood ~~Rd~~ Line

Project # 1609600649
Field Staff M. Pomeroy, K. Dibbley
Date Nov 4, 2010
Time 2:55 pm

Water Quality

Dissolved Oxygen (mg/L) 12.25 pH 7.76 Conductivity (µS/cm) 650
Water Temperature (°C) 5.87 Air Temperature (°C) _____
Weather conditions in previous 24 hrs rain, cold

Watercourse Dimensions & Morphology

Mean Watercourse Width 1.5 (m) Maximum Pool Depth 0.7 (cm)
Mean Bankfull Width 3.0 (m) Mean Water Depth 0.4 (cm)
_____% Riffle _____% Pool _____% Run _____% Flat
Evidence of eroding banks, Comments on bank stability undercut banks

Substrate – Upstream (% cover)

_____ Bedrock	45 Silt	_____ Boulder	10 Clay	<5% Cobble	
_____ Muck	25 Gravel	_____ Marl	10 Sand	10 Detritus	

Substrate – Downstream (% cover)

_____ Bedrock	45 Silt	_____ Boulder	10 Clay	<5% Cobble	
_____ Muck	25 Gravel	_____ Marl	10 Sand	10 Detritus	

In-water Cover

Cover Types Present (circle):
Undercut Banks, Deep Pool, Vascular Plants, Overhanging Vegetation, Woody Debris, Boulder, Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream 30% ; grass ; early
Downstream 30% ; grass ; early
Adjacent Land Use
Upstream ag (crop)
Downstream ag (crop)

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream none
Downstream none
Migratory Obstructions (seasonal, permanent)
Upstream none
Downstream none
Note any fish observations none

Other Habitat Notes, Incidental Wildlife Observations, etc. none

Field Notes Authored by M. Pomeroy Field Notes QA/QCed by Mark Pmry Page 1 of 27

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Stantec

Project Pristine Paver | Project # 160960649
Station # T6A (Ryan Drain A) | Field Staff MP & YC
Photos Taken 7442, 7443, 7444 | Date April 13/11
GPS Coordinates 0474516 4823565 | Time 12:21
Descriptive Location near intersection of Bridge rd & maple line (250m NE of intersection)

Water Quality

Dissolved Oxygen (mg/L) 15.15 | pH 8.37 | Conductivity (µS/cm) 385
Water Temperature (°C) 9.34 | Air Temperature (°C) 12
Weather conditions in previous 24 hrs Sunny, partly cloudy, no ppt, windy

Watercourse Dimensions & Morphology

Mean Watercourse Width 2 (m) | Maximum Pool Depth 65 (cm)
Mean Bankfull Width 4-5 (m) | Mean Water Depth 20 (cm)
40 % Riffle | 30 % Pool | 30 % Run | ____ % Flat
Evidence of eroding banks, Comments on bank stability ____

Substrate – Upstream (% cover)

____ Bedrock	20 Silt	5 Boulder	____ Clay	30 Cobble
____ Muck	30 Gravel	____ Marl	15 Sand	____ Detritus

Substrate – Downstream (% cover)

____ Bedrock	____ Silt	____ Boulder	____ Clay	____ Cobble
____ Muck	____ Gravel	____ Marl	____ Sand	____ Detritus

In-water Cover

Cover Types Present (circle): Undercut Banks | Deep Pool | Vascular Plants | Overhanging Vegetation | Woody Debris | Boulder | Other ____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream 15 %, grasses, some shrubs & trees, early succession
Downstream ____
Adjacent Land Use
Upstream cropland
Downstream ____

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream ____
Downstream ____
Migratory Obstructions (seasonal, permanent)
Upstream ____
Downstream ____
Note any fish observations — dead stonerollers

Other Habitat Notes, Incidental Wildlife Observations, etc. —

Field Notes Authored by M.v.P | Field Notes QA/QCed by Kelly Clayton |

Layout #1

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Water Body

Stantec

Project St. Columban Windfarm
Station # 7 (Ryan Drain B)
Photos Taken 0005, 0006, 0007, 0008, 0009, 0010, 0011, 0012, 0013
GPS Coordinates 17T 7112E 4823406N NAD 83
Descriptive Location 400m west of Beechwood Line, 750m north of Bridge Rd

Project # 160960649
Field Staff M. Ponergy, R. D. Dibley
Date Nov 4, 2010
Time 10:55am

Water Quality

Dissolved Oxygen (mg/L) 8.03 pH 7.53 Conductivity (µS/cm) 682
Water Temperature (°C) 5.38 Air Temperature (°C) _____
Weather conditions in previous 24 hrs Rain

Watercourse Dimensions & Morphology

Mean Watercourse Width 1.5 (m) Maximum Pool Depth 0.65 (cm)
Mean Bankfull Width 2.5 (m) Mean Water Depth 0.5 (cm)
_____% Riffle _____% Pool _____% Run _____% Flat
Evidence of eroding banks, Comments on bank stability banks stable heavily vegetated
minor slumping at very top of channel

Substrate – Upstream (% cover)

_____ Bedrock	35 Silt	_____ Boulder	_____ Clay	<5 Cobble	
5 Muck	25 Gravel	_____ Marl	30 Sand	5 Detritus	

Substrate – Downstream (% cover)

_____ Bedrock	35 Silt	_____ Boulder	_____ Clay	<5 Cobble	
5 Muck	25 Gravel	_____ Marl	30 Sand	5 Detritus	

In-water Cover

Cover Types Present (circle): ~~Overhanging Vegetation~~ Undercut Banks Woody Debris Deep Pool Boulder Vascular Plants Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream 25%, grasses, early
Downstream 25%, grasses, early
Adjacent Land Use
Upstream Agriculture
Downstream Agriculture

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream watercress - possible brook trout spawning (confirm by fishing)
Downstream watercress - possible brook trout spawning (confirm by fishing)
Migratory Obstructions (seasonal, permanent)
Upstream none
Downstream none
Note any fish observations Lots of fish observed, fish observed in more than 1 spot in channel (200+ fish)

Other Habitat Notes, Incidental Wildlife Observations, etc. _____
Pileated woodpecker
Lots of fish observed, abundant watercress

Field Notes Authored by R. Dibley Field Notes QA/QCed by Mark Ponergy

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Stantec

Project 160960649- Pristine Power
Station # TT8 RyanDrainB
Photos Taken 7418, 7419, 7420
GPS Coordinates 0476071, 4823340
Descriptive Location on Beechwood Line, NE of Bridge road

Project # 160960649
Field Staff Mark P & Kelly
Date 2011/04/12
Time 11:20

Water Quality

Dissolved Oxygen (mg/L) 14.86 pH 8.50 Conductivity (µS/cm) 368
Water Temperature (°C) 6.19 Air Temperature (°C) 7°C
Weather conditions in previous 24 hrs sunny, partly cloudy

Watercourse Dimensions & Morphology

Mean Watercourse Width 2 (m) Maximum Pool Depth 0.75 (cm)
Mean Bankfull Width 4 (m) Mean Water Depth 0.40 (cm)
15 % Riffle 50 % Pool 45 % Run ____ % Flat
Evidence of eroding banks, Comments on bank stability ____

Substrate – Upstream (% cover)

____ Bedrock	50% Silt	____ Boulder	30% Clay (hard pan)	5% Cobble
____ Muck	5% Gravel	____ Marl	____ Sand	10% Detritus

Substrate – Downstream (% cover)

____ Bedrock	____ Silt	____ Boulder	____ Clay	____ Cobble
____ Muck	____ Gravel	____ Marl	____ Sand	____ Detritus

In-water Cover

Cover Types Present (circle): Undercut Banks, Deep Pool, Overhanging Vegetation, Woody Debris, Boulder, Vascular Plants, Other ____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream 100% - grasses, early successional
Downstream ____
Adjacent Land Use
Upstream agriculture / crop
Downstream ____

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream deep pools
Downstream ____
Migratory Obstructions (seasonal, permanent)
Upstream step-pool areas
Downstream ____
Note any fish observations refer to e-fish sheet

Other Habitat Notes, Incidental Wildlife Observations, etc. ____

Field Notes Authored by MP Field Notes QA/QCed by Kelly Clayton

Stantec

Stantec Consulting Ltd - Electrofishing Record and Catch Results

Project Number 121961.0649 Station Number T7T8 (Ryan Drain B)

Project Name Pristine Paver/St. Columban Pass No. (if applicable)

Project manager ~~Mark P.~~ Shawna P Date (yyyymmdd): 2011/04/12

Descriptive Location St. Columban, On
- on Beechwood Line, NE of Bridgeroad

UTM coordinates 0476071 easting 4823340 northing zone 17T

Fishing Method (circle one): (Backpack) Boat Unit Model/Make SR LR24

Sampling Method (circle one): even (habitat) transect spot

Effort (Electrofishing Seconds): 785 Number of Netters: 1 Number of Anodes: 1

Settings

Frequency (Hz) 45 Voltage (volts) 350 Current (Amps) _____ Power (Watts) _____

Station Information

Length of Stream Surveyed (m) 60m

Station Characteristics: Width (m): Range 1.5-3 Average: 2

Depth (m): Range 0.1-0.75 Average: 0.4

Water Clarity/Colour: clear Water Velocity if Measured (m/s): _____

Temperature (°C) 6.79 Conductivity (uS/cm) 368

pH 8.50 Dissolved Oxygen (mg/L) 14.86

Catch Data

Species	Number of Fish	Species	Number of Fish
white sucker	4		
Creek Chub	26		
brown bullhead?	1		
N. redbelly dace	14		
brook stickleback	14		
fathead minnow	1		
Central stoneroller	2		
Comman Shiner	3		
black-nose dace	4		
blacknose shiner	4		
least darter	7		
bluntnose minnow	1		

Fish Measurements on Separate Sheet? Y/(N)

Field Staff: M. Pomeroy, K. Clayton

Notes By: Kelly

(Station Diagram on Back)

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Layout #1
Waterbody

Stantec

Project St. Columban
Station # 8 (Ryan Drain B)
Photos Taken 0014, 0015
GPS Coordinates 476424 4823169
Descriptive Location NE of Beechwood, approx 300m

Project # 160960649
Field Staff M. Pomeroy, R. Dibbley
Date Nov 4 2010
Time 1225 pm

Water Quality
Dissolved Oxygen (mg/L) 9.37 pH 7.63 Conductivity (µS/cm) 700
Water Temperature (°C) 5.49 Air Temperature (°C) _____
Weather conditions in previous 24 hrs rain, cold

Watercourse Dimensions & Morphology
Mean Watercourse Width 1.25 (m) Maximum Pool Depth 0.75 (cm)
Mean Bankfull Width 2.0 (m) Mean Water Depth 0.5 (cm)
_____% Riffle 20 % Pool 80 % Run _____% Flat
Evidence of eroding banks, Comments on bank stability _____

Substrate – Upstream (% cover)

_____ Bedrock	10 Silt	_____ Boulder	25 Clay (hardpan)	50 Cobble	
_____ Muck	15 Gravel	_____ Marl	_____ Sand	_____ Detritus	

Substrate – Downstream (% cover)

_____ Bedrock	10 Silt	_____ Boulder	25 Clay	50 Cobble	
_____ Muck	15 Gravel	_____ Marl	_____ Sand	_____ Detritus	

In-water Cover
Cover Types Present (circle): (Undercut Banks) (Deep Pool) (Vascular Plants) (Overhanging Vegetation) Woody Debris Boulder Other _____

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream 30%, grass, early
Downstream 30%, grass, early
Adjacent Land Use
Upstream ag.
Downstream ag.

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream none
Downstream none
Migratory Obstructions (seasonal, permanent)
Upstream none
Downstream none
Note any fish observations none

Other Habitat Notes, Incidental Wildlife Observations, etc. small mammal (mouse or vole)

Field Notes Authored by M. Pomeroy Field Notes QA/QCed by Mark Pmery Page 6 of 27

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Stantec

Project Pristine Power | Project # 160960649
Station # T10T9C (Dillon Drain) | Field Staff MP & KC
Photos Taken 7445, 7446, 7449 | Date Oct 2/11
GPS Coordinates 04-762911 4823832 | Time 12:40
Descriptive Location flat under Beechwood Rd, about 700m SW of Summerhill Rd

Water Quality
Dissolved Oxygen (mg/L) 15.5 | pH 8.32 | Conductivity (µS/cm) 385
Water Temperature (°C) 9.67 | Air Temperature (°C) 12
Weather conditions in previous 24 hrs partly cloud/sun, no ppt, windy

Watercourse Dimensions & Morphology
Mean Watercourse Width 2 (m) | Maximum Pool Depth 60 (cm)
Mean Bankfull Width 4.5 (m) | Mean Water Depth 30 (cm)
45 % Riffle | 10 % Pool | 45 % Run | ____ % Flat
Evidence of eroding banks, Comments on bank stability some erosion on banks

Substrate – Upstream (% cover)

____ Bedrock	5 Silt	____ Boulder	5 Clay	15 Cobble
____ Muck	40 Gravel	____ Marl	35 Sand	____ Detritus

Substrate – Downstream (% cover)

____ Bedrock	____ Silt	____ Boulder	____ Clay	____ Cobble
____ Muck	____ Gravel	____ Marl	____ Sand	____ Detritus

In-water Cover
Cover Types Present (circle): (Undercut Banks) Overhanging Vegetation | Woody Debris | (Deep Pool) Boulder | Vascular Plants | Other ____

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream 0% cover, grass, early successional
Downstream ____
Adjacent Land Use
Upstream adjacent land is cropland
Downstream ____

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream deep pools, undercut banks
Downstream ____
Migratory Obstructions (seasonal, permanent)
Upstream ____
Downstream ____
Note any fish observations ____

Other Habitat Notes, Incidental Wildlife Observations, etc. ____

Stantec Consulting Ltd - Electrofishing Record and Catch Results

Project Number 160910649 Station Number 13C north (Woods Drain A)

Project Name Pristine Power/St Columban Pass No. (if applicable)

Project manager ~~Mark P.~~ Shawna P. Date (yyyymmdd): 2011/04/12

Descriptive Location St Columban, On
– Corner of Beechwood and Hydro Line Rd

UTM coordinates 0474554 easting 4820920 northing zone 17T

Fishing Method (circle one): (Backpack) Boat Unit Model/Make SR LR24

Sampling Method (circle one): even (habitat) transect spot

Effort (Electrofishing Seconds): 460 Number of Netters: 1 Number of Anodes: 1

Settings

Frequency (Hz) 45 Voltage (volts) 350 Current (Amps) _____ Power (Watts) _____

Station Information

Length of Stream Surveyed (m) 60m

Station Characteristics: Width (m): Range 1.0 – 2.5 Average: 1.5

Depth (m): Range 0.10 – 0.40 Average: 0.20

Water Clarity/Colour: Clear / Colourless Water Velocity if Measured (m/s): _____

Temperature (°C) 6.72 Conductivity (uS/cm) 345

pH 8.48 Dissolved Oxygen (mg/L) 15.41

Catch Data

Species	Number of Fish	Species	Number of Fish
Blacknose Dace	1		
Central Stoneroller	3		
Common Shiner	2		
Brook Stickleback	1		
Creek Chub	2		
Bluntnose Minnow	1		
Blacknose Shiner	2		
	+50 stoneroller		
	+20 Blacknose Dace		
	+20 Creek Chub		
N. Redbelly Dace	1		
~~Unknown Shiner~~	1		
White Sucker	1		

Fish Measurements on Separate Sheet? Y/N

Field Staff: M. Pomeroy, K. Clayton

Notes By: M. Pomeroy

(Station Diagram on Back)

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Stantec

Project Pristine Power (Woods Drain A) Project # 160960649
Station # 13C North. Field Staff MP & KC
Photos Taken 7421, 7422, 7423 Date Apr 12/11
GPS Coordinates 0474554 4820920 Time 12:10
Descriptive Location corner of Beechwood & Hydroline Rd

Water Quality
Dissolved Oxygen (mg/L) 15.11 pH 8.48 Conductivity (µS/cm) 345
Water Temperature (°C) 6.72 Air Temperature (°C) 7°C
Weather conditions in previous 24 hrs sunny, partly cloudy

Watercourse Dimensions & Morphology
Mean Watercourse Width 1.5 (m) Maximum Pool Depth 0.4 (cm)
Mean Bankfull Width ____ (m) Mean Water Depth 0.20 (cm)
30 % Riffle 10 % Pool 60 % Run ____ % Flat
Evidence of eroding banks, Comments on bank stability ____

Substrate – Upstream (% cover)

____ Bedrock	20% Silt	____ Boulder	____ Clay	15% Cobble
____ Muck	40% Gravel	____ Marl	20% Sand	5% Detritus

Substrate – Downstream (% cover)

____ Bedrock	____ Silt	____ Boulder	____ Clay	____ Cobble
____ Muck	____ Gravel	____ Marl	____ Sand	____ Detritus

In-water Cover
Cover Types Present (circle): Overhanging Vegetation, Undercut Banks, Woody Debris, Deep Pool, Boulder, Vascular Plants, Other ____

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream 100%, grasses/low herbaceous, early successional
Downstream ____
Adjacent Land Use
Upstream field/crop
Downstream ____

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream deep pool - lots of stone rollers, blacknose dace & creek chub
Downstream ____
Migratory Obstructions (seasonal, permanent)
Upstream fallen tree.
Downstream ____
Note any fish observations refer to e-fish sheet.

Other Habitat Notes, Incidental Wildlife Observations, etc. ____

Field Notes Authored by Mark P Field Notes QA/QCed by Kelly Clayton

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Layout #1
Water Body

Stantec

Project St. Columban
Station # 3 (Woods Drain B)
Photos Taken 0026, 0027, 0028
GPS Coordinates 0476129 4842932
Descriptive Location approx 600m north of Hydro Line and 1300m east of Beechwood Line

Project # 160960649
Field Staff M. Pomeroy, R. Dibsley
Date Nov 4 2010
Time 330pm

Water Quality
Dissolved Oxygen (mg/L) 10.22 pH 7.64 Conductivity (µS/cm) 713
Water Temperature (°C) 6.46 Air Temperature (°C) 5°C
Weather conditions in previous 24 hrs cold, rain

Watercourse Dimensions & Morphology
Mean Watercourse Width 1.5 (m) Maximum Pool Depth 0.7 (cm)
Mean Bankfull Width 3.0 (m) Mean Water Depth 0.3 (cm)
____ % Riffle 40 % Pool ____ % Run ____ % Flat
Evidence of eroding banks, Comments on bank stability 10-15% exposed bank

Substrate – Upstream (% cover)

____ Bedrock	30 Silt	____ Boulder	10 Clay	15 Cobble	
____ Muck	25 Gravel	____ Marl	10 Sand	10 Detritus	

Substrate – Downstream (% cover)

____ Bedrock	30 Silt	____ Boulder	10 Clay	15 Cobble	
____ Muck	25 Gravel	____ Marl	10 Sand	10 Detritus	

In-water Cover
Cover Types Present (circle): (Undercut Banks) (Deep Pool) (Vascular Plants) (Overhanging Vegetation) (Woody Debris) (Boulder) Other ____

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream 25%, grass, early
Downstream 25%, grass, early
Adjacent Land Use
Upstream ag (crop), woodlot
Downstream ag (crop), woodlot

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream none
Downstream sparse patches of dense watercress
Migratory Obstructions (seasonal, permanent)
Upstream none
Downstream none
Note any fish observations none

Other Habitat Notes, Incidental Wildlife Observations, etc. none

Field Notes Authored by M. Pomeroy Field Notes QA/QCed by Mark Pomeroy Page 10 of 27

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Stantec

Project St. Columban
Station # T3C (Woods Drain C)
Photos Taken none.
GPS Coordinates 0476932 4820859 17T
Descriptive Location approx 1.1 km N of Hydro Line Rd, on Manley Rd.

Project # 160960649
Field Staff M. Pomeroy, K. Clayton
Date Apr. 13, 2011
Time 10:45 am

Water Quality
Dissolved Oxygen (mg/L) 14.92 pH 8.37 Conductivity (µS/cm) 372
Water Temperature (°C) 6.23 Air Temperature (°C) 6°C
Weather conditions in previous 24 hrs sunny, partly cloudy, no precip

Watercourse Dimensions & Morphology
Mean Watercourse Width 1.5 (m) Maximum Pool Depth 0.3 (cm)
Mean Bankfull Width 4 (m) Mean Water Depth 0.2 (cm)
20 % Riffle 20 % Pool 60 % Run ____ % Flat
Evidence of eroding banks, Comments on bank stability

Substrate – Upstream (% cover)

____ Bedrock	30 Silt	____ Boulder	____ Clay	15 Cobble
____ Muck	30 Gravel	____ Marl	20 Sand	5 Detritus

Substrate – Downstream (% cover)

____ Bedrock	____ Silt	SAME ____ Boulder	____ Clay	____ Cobble
____ Muck	____ Gravel	____ Marl	____ Sand	____ Detritus

In-water Cover
Cover Types Present (circle): (Overhanging Vegetation) (Undercut Banks) Woody Debris (Deep Pool) Boulder Vascular Plants Other ____

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream 40, grass, early
Downstream same
Adjacent Land Use
Upstream crop,
Downstream same

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream riffles (Central Stonerollers observed spawning)
Downstream same.
Migratory Obstructions (seasonal, permanent)
Upstream none
Downstream none.
Note any fish observations Central Stonerollers, Creek Chub - See efishing sht.

Other Habitat Notes, Incidental Wildlife Observations, etc.

Field Notes Authored by M. Pomeroy Field Notes QA/QCed by K. Clayton

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Stantec

Project Pristine Power | Project # 1609960649
Station # TISA (Woods Drain D) | Field Staff MP & KC
Photos Taken 7433, 7434, 7435 | Date Apr 13/11
GPS Coordinates 04 7845, 4820985 | Time 10:30
Descriptive Location on Bridge rd, NW of Perth Rd 180

Water Quality
Dissolved Oxygen (mg/L) 13.97 | pH 7.77 | Conductivity (µS/cm) 400
Water Temperature (°C) 4.25 | Air Temperature (°C) 12°C
Weather conditions in previous 24 hrs sunny, partly cloudy, windy

Watercourse Dimensions & Morphology
Mean Watercourse Width 1.5 (m) | Maximum Pool Depth 60 (cm)
Mean Bankfull Width 3.5 (m) | Mean Water Depth 60 (cm)
____% Riffle | 50 % Pool | 50 % Run | ____% Flat
Evidence of eroding banks, Comments on bank stability

Substrate – Upstream (% cover)

____Bedrock	85% Silt	____Boulder	5% Clay	____Cobble
____Muck	____Gravel	____Marl	____Sand	10% Detritus

Substrate – Downstream (% cover)

____Bedrock	____Silt	____Boulder	____Clay	____Cobble
____Muck	____Gravel	____Marl	____Sand	____Detritus

In-water Cover
Cover Types Present (circle): Overhanging Vegetation, Undercut Banks, Woody Debris, Deep Pool, Boulder, Vascular Plants, Other____

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream 55% , grasses, some shrubs & trees, trees are mature grasses - early successional
Downstream
Adjacent Land Use
Upstream corn field.
Downstream

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream instream vegetation, logs, deep pools.
Downstream
Migratory Obstructions (seasonal, permanent)
Upstream instream logs
Downstream
Note any fish observations

Other Habitat Notes, Incidental Wildlife Observations, etc.

Field Notes Authored by Mark P | Field Notes QA/QCed by Kelly Clayton | Page 12 of 27

Stantec Consulting Ltd - Electrofishing Record and Catch Results

Project Number 160960649 Station Number TISA (Woodis Drain D

Project Name Pristine Power/St. Columban Pass No. (if applicable)

Project manager ~~Mark P.~~ Shawna P. Date (yyyymmdd): 20111041112

Descriptive Location St. Columban, On on Bridge rd. NW of Perth rd 180.

UTM coordinates 0478450 easting 4820985 northing zone 17T

Fishing Method (circle one): (Backpack) Boat Unit Model/Make SR LR24

Sampling Method (circle one): even (habitat) transect spot

Effort (Electrofishing Seconds): 3565 Number of Netters: 1 Number of Anodes: 1

Settings

Frequency (Hz) 45 Voltage (volts) 350 Current (Amps) _____ Power (Watts) _____

Station Information

Length of Stream Surveyed (m) 50m

Station Characteristics: Width (m): Range 1-2m Average: 1.5m

Depth (m): Range 30-80 cm Average: 60cm

Water Clarity/Colour: clear/colourless Water Velocity if Measured (m/s): slow (less than 0.1m/s)

Temperature (°C) 4.25 Conductivity (uS/cm) 400

pH 7.72 Dissolved Oxygen (mg/L) 13.97

Catch Data

Species	Number of Fish	Species	Number of Fish
creek chub	•• (2)		
white sucker	• (1)		
common shiner	• (1)		

Fish Measurements on Separate Sheet? Y/N

Field Staff: MP, KC

Notes By: Mark P

(Station Diagram on Back)

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Layout #1
Water Body

Stantec

Project St. Columban
Station # 15 (Woods Drain D)
Photos Taken 0032, 0033, 0034
GPS Coordinates 0478428 4820997
Descriptive Location @ Bridge Rd. Roadside ditch containing watercourse (SW side of road)

Project # 160960649
Field Staff M. Pomeroy, K. Dibbley
Date Nov 4 2010
Time 4:30pm

Water Quality
Dissolved Oxygen (mg/L) 7.32 pH 7.43 Conductivity (µS/cm) 799
Water Temperature (°C) 6.99 Air Temperature (°C) _____
Weather conditions in previous 24 hrs rain, cold

Watercourse Dimensions & Morphology
Mean Watercourse Width 1.25 (m) Maximum Pool Depth 0.5 (cm)
Mean Bankfull Width 2.0 (m) Mean Water Depth 0.3 (cm)
_____% Riffle _____% Pool _____% Run 100 % Flat
Evidence of eroding banks, Comments on bank stability <5% exposed bank

Substrate – Upstream (% cover)

_____Bedrock	80 Silt	_____Boulder	20 Clay	_____Cobble
_____Muck	_____Gravel	_____Marl	_____Sand	_____Detritus

Substrate – Downstream (% cover)

_____Bedrock	80 Silt	_____Boulder	20 Clay	_____Cobble
_____Muck	_____Gravel	_____Marl	_____Sand	_____Detritus

In-water Cover
Cover Types Present (circle): (Overhanging Vegetation) Undercut Banks Woody Debris Deep Pool Boulder (Vascular Plants) Other_____

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream 50% - grass, early
Downstream 80% - grass, early
(US & DS of culvert)
Adjacent Land Use
Upstream ag (crop)
Downstream ag (crop)

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream upwellings?
Downstream upwellings?
Migratory Obstructions (seasonal, permanent)
Upstream none
Downstream none
Note any fish observations 50+ fish @ pool @ roadside culvert

Other Habitat Notes, Incidental Wildlife Observations, etc. dense watercress, in large patches

Field Notes Authored by M. Pomeroy Field Notes QA/QCed by Mark Pomeroy

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Stantec

Project Pristine Power
Station # FISC sartin (Canada Creek Co)
Photos Taken 7424, 7425, 7426
GPS Coordinates 04744668, 4820762
Descriptive Location SW of the corner of Hydroline rd & Beechwood rd

Project # 160960649
Field Staff MP & KC
Date Apr 12/11
Time 3:08

Water Quality

Dissolved Oxygen (mg/L) 14.74 pH 8.30 Conductivity (µS/cm) 344
Water Temperature (°C) 8.95 Air Temperature (°C) 7°C
Weather conditions in previous 24 hrs sunny, partly cloudy

Watercourse Dimensions & Morphology

Mean Watercourse Width 2.5 (m) Maximum Pool Depth 0.6m (cm)
Mean Bankfull Width 5 (m) Mean Water Depth 0.4 m (cm)
10 % Riffle 20 % Pool 70 % Run ____ % Flat
Evidence of eroding banks, Comments on bank stability some erosion on N bank.

Substrate – Upstream (% cover)

____ Bedrock	25% Silt	____ Boulder	____ Clay	5% Cobble
____ Muck	30% Gravel	____ Marl	30% Sand	10% Detritus

Substrate – Downstream (% cover)

____ Bedrock	____ Silt	____ Boulder	____ Clay	____ Cobble
____ Muck	____ Gravel	____ Marl	____ Sand	____ Detritus

In-water Cover

Cover Types Present (circle): (Overhanging Vegetation) Undercut Banks Deep Pool Vascular Plants
Woody Debris Boulder Other ____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream 90%, grasses/some trees & shrubs, N bank early successional
Downstream S bank mature
Adjacent Land Use
Upstream agriculture / crop.
Downstream ____

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream ____
Downstream ____
Migratory Obstructions (seasonal, permanent)
Upstream ____
Downstream ____
Note any fish observations See e-fish sheet

Other Habitat Notes, Incidental Wildlife Observations, etc. ____

Field Notes Authored by Mark P Field Notes QA/QCed by Kelly Clayton

Stantec Consulting Ltd - Electrofishing Record and Catch Results

Project Number 160960649 Station Number T13C south (Canada company Dra. A)

Project Name Pristine Power/St. Columban Pass No. (if applicable)

Project manager ~~Mark P.~~ Shawna Peddle Date (yyyymmdd): 20111041112

Descriptive Location St. Columban, On
Southwest of the corner of Hydroline rd & Beechwood rd

UTM coordinates 0474466 easting 4820762 northing zone 17T

Fishing Method (circle one): (Backpack) Boat Unit Model/Make SR LR24

Sampling Method (circle one): even (habitat) transect spot

Effort (Electrofishing Seconds): 775 Number of Netters: 1 Number of Anodes: 1

Settings

Frequency (Hz) 45 Voltage (volts) 350 Current (Amps) _____ Power (Watts) _____

Station Information

Length of Stream Surveyed (m) 60m

Station Characteristics: Width (m): Range 2.0-4.0 Average: 2.5

Depth (m): Range 0.4-0.6 Average: 0.4

Water Clarity/Colour: Clear/colourless Water Velocity if Measured (m/s): _____

Temperature (°C) 8.95°C Conductivity (uS/cm) 344

pH 8.30 Dissolved Oxygen (mg/L) 19.74

Catch Data

Species	Number of Fish	Species	Number of Fish
Rock Bass	1		
Central Stoneroller	23		
N. Redbelly Dace	12		
Brassy Minnow	1		
Common Shiner	22		
White Sucker	3		
Creek Chub	12		
Brook Stickleback	4		
Blacknose Shiner	5		
Blacknose Dace	3		
Johnny Darter	1		
Least Darter	5		

Fish Measurements on Separate Sheet? Y/N

Field Staff: M. Pomeroy
K. Clayton

Notes By: M. Pomeroy

~~(Station Diagram on Back)~~

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Layout #1
Waterbody

Stantec

Project St. Columban
Station # 14 (Canada Company Drain B)
Photos Taken 0016, 0017, 0018
GPS Coordinates 0474855 4820213
Descriptive Location approx 1Km east of Beechwood Rd, approx 500m south of Hydro Line (Rd)

Project # 160960649
Field Staff M. Pomeroy, K. Dibbley
Date Nov 4 2010
Time 1:40pm

Water Quality
Dissolved Oxygen (mg/L) 10.46 pH 7.67 Conductivity (µS/cm) 719
Water Temperature (°C) 6.20 Air Temperature (°C) _____
Weather conditions in previous 24 hrs rain, cold

Watercourse Dimensions & Morphology
Mean Watercourse Width 2 (m) Maximum Pool Depth 0.75 (cm)
Mean Bankfull Width 2.5 (m) Mean Water Depth 0.5 (cm)
_____% Riffle 20 % Pool 80 % Run _____% Flat
Evidence of eroding banks, Comments on bank stability slight slumping

Substrate – Upstream (% cover)

_____ Bedrock	65 Silt	_____ Boulder	15 Clay	_____ Cobble	
_____ Muck	10 Gravel	_____ Marl	5 Sand	5 Detritus	

Substrate – Downstream (% cover)

_____ Bedrock	65 Silt	_____ Boulder	15 Clay	_____ Cobble	
_____ Muck	10 Gravel	_____ Marl	5 Sand	5 Detritus	

In-water Cover
Cover Types Present (circle): ~~Overhanging Vegetation~~ Undercut Banks Woody Debris Deep Pool Boulder Vascular Plants Other_____

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream 10%, grass, early
Downstream 10%, grass, early
Adjacent Land Use
Upstream ag. (crop)
Downstream ag (crop)

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream none
Downstream none
Migratory Obstructions (seasonal, permanent)
Upstream none
Downstream none
Note any fish observations none

Other Habitat Notes, Incidental Wildlife Observations, etc. dead crayfish.

Field Notes Authored by M. Pomeroy Field Notes QA/QCed by Mark Pomeroy

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Stantec

Project Pristine Paver | Project # 160960649
Station # T14A (Canadian Co. Drain B) | Field Staff MP & KC
Photos Taken — | Date April 13/10
GPS Coordinates 474718 4820384 | Time 3:08
Descriptive Location approx 250m SE of Beechwood Line & approx 1Km NE of Hwy 8

Water Quality
Dissolved Oxygen (mg/L) 14.74 | pH 8.36 | Conductivity (µS/cm) 344
Water Temperature (°C) 8.05 | Air Temperature (°C) 7
Weather conditions in previous 24 hrs sunny, partly cloudy

Watercourse Dimensions & Morphology
Mean Watercourse Width 2.5 (m) | Maximum Pool Depth 60 (cm)
Mean Bankfull Width 5 (m) | Mean Water Depth 40 (cm)
_____% Riffle | 20 % Pool | 70 % Run | _____% Flat
Evidence of eroding banks, Comments on bank stability —

Substrate – Upstream (% cover)

_____Bedrock	25 Silt	_____Boulder	_____Clay	5 Cobble
_____Muck	30 Gravel	_____Marl	30 Sand	10 Detritus

Substrate – Downstream (% cover)

_____Bedrock	_____Silt	_____Boulder	_____Clay	_____Cobble
_____Muck	_____Gravel	_____Marl	_____Sand	_____Detritus

In-water Cover
Cover Types Present (circle): Overhanging Vegetation | Undercut Banks | Woody Debris | Deep Pool | Boulder | Vascular Plants | Other_____

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream 10%, grasses/some trees & shrubs, mix of early successional & some mature
Downstream —
Adjacent Land Use
Upstream Cropland
Downstream —

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream —
Downstream —
Migratory Obstructions (seasonal, permanent)
Upstream —
Downstream —
Note any fish observations —

Other Habitat Notes, Incidental Wildlife Observations, etc. —

Layout #1
Water Body

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Stantec

Project St. Columban
Station # 4 (Krouskopf Drain A)
Photos Taken 0019, 0020, 0021
GPS Coordinates 0476597 4821955
Descriptive Location 75m south of Bridge Rd, 1300m east of Beechwood Line

Project # 160960649
Field Staff M.P., R.D
Date Nov 4 2010
Time 230pm

Water Quality
Dissolved Oxygen (mg/L) 6.94 pH 7.48 Conductivity (µS/cm) 702
Water Temperature (°C) 7.13 Air Temperature (°C) _____
Weather conditions in previous 24 hrs cold, windy, overcast

Watercourse Dimensions & Morphology
Mean Watercourse Width 1.50 (m) Maximum Pool Depth 0.3 (cm)
Mean Bankfull Width 1.75 (m) Mean Water Depth 0.3 (cm)
_____% Riffle _____% Pool _____% Run 100 % Flat
Evidence of eroding banks, Comments on bank stability no evidence of bank erosion - heavily vegetated banks

Substrate – Upstream (% cover)
_____Bedrock 60 Silt _____Boulder 10 Clay _____Cobble
_____Muck 15 Gravel _____Marl _____Sand 15 Detritus

Substrate – Downstream (% cover)
_____Bedrock 60 Silt _____Boulder 10 Clay _____Cobble
_____Muck 15 Gravel _____Marl _____Sand 15 Detritus

In-water Cover
Cover Types Present (circle):
(Overhanging Vegetation) Undercut Banks Deep Pool (Vascular Plants)
Woody Debris Boulder Other_____

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream 5%, grass, early
Downstream 5%, grass, early
Adjacent Land Use
Upstream residential, ag (crop & pasture)
Downstream residential, ag (crop & pasture)

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream 95% channel coverage w watercress ∴ potential upwellings
Downstream 95% channel coverage w watercress ∴ potential upwellings
Migratory Obstructions (seasonal, permanent)
Upstream none
Downstream none
Note any fish observations none

Other Habitat Notes, Incidental Wildlife Observations, etc. none

Field Notes Authored by M. Pomeroy
Field Notes QA/QCed by Mark Pomeroy

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Stantec

Project St. Columban Wind Farm
Station # T4A (KrouskopfDrain)
Photos Taken 7436, 7437, 7438
GPS Coordinates 0476689 4822078
Descriptive Location 75m south of Bridge Line b/w Manley and Beechwood

Project # 160960649
Field Staff MP & KC
Date April 13 2011
Time 10:45

Water Quality

Dissolved Oxygen (mg/L) 19.74 pH 8.35 Conductivity (µS/cm) 420
Water Temperature (°C) 8.49 Air Temperature (°C) 12
Weather conditions in previous 24 hrs clear, cloudy, warm, windy

Watercourse Dimensions & Morphology

Mean Watercourse Width 1.5 (m) Maximum Pool Depth 0.3 (cm)
Mean Bankfull Width 3.5 (m) Mean Water Depth 0.2 (cm)
5 % Riffle 25 % Pool 70 % Run ____ % Flat
Evidence of eroding banks, Comments on bank stability slight slumping

Substrate – Upstream (% cover)

____ Bedrock	50 Silt	____ Boulder	20 Clay	____ Cobble
____ Muck	20 Gravel	____ Marl	____ Sand	10 Detritus

Substrate – Downstream (% cover)

____ Bedrock	____ Silt	____ Boulder	____ Clay	____ Cobble
____ Muck	____ Gravel	____ Marl	____ Sand	____ Detritus

In-water Cover

Cover Types Present (circle): (Overhanging Vegetation) Undercut Banks (Woody Debris) (Deep Pool) Boulder (Vascular Plants) Other ____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream 5%, grass, early
~~Downstream~~
Adjacent Land Use
Upstream crop, residential, horse pasture
~~Downstream~~

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream Brook Stickleback
~~Downstream~~
Migratory Obstructions (seasonal, permanent)
Upstream none
~~Downstream~~
Note any fish observations refer to electrofishing sheet.

Other Habitat Notes, Incidental Wildlife Observations, etc. stickleback are breeding
watercress present

Field Notes Authored by M. Pomeroy Field Notes QA/QCed by Kelly C

Stantec Consulting Ltd - Electrofishing Record and Catch Results

Project Number 160960649 Station Number T4A (Krouskopf Drain A)

Project Name Pristine Power St. Columban Pass No. (if applicable)

Project manager Mark P. Shawnap Date (yyyymmdd): 20110413

Descriptive Location St. Columban, On 1/2 way b/w Beechwood line and Manley Line, 75m south of Bridge Rd

UTM coordinates 0476689 easting 4822078 northing zone 17T

Fishing Method (circle one): (Backpack) Boat Unit Model/Make SR LR24

Sampling Method (circle one): even habitat transect spot

Effort (Electrofishing Seconds): 324 Number of Netters: 1 Number of Anodes: 1

Settings

Frequency (Hz) 45 Voltage (volts) 350 Current (Amps) Power (Watts)

Station Information

Length of Stream Surveyed (m) 40

Station Characteristics: Width (m): Range 1.0-2.0 Average: 1.5

Depth (m): Range 0.1-0.5 Average: 0.25

Water Clarity/Colour: clear/colourless Water Velocity if Measured (m/s): moderate (≈ 0.1m/s)

Temperature (°C) 8.49 Conductivity (uS/cm) 420

pH 8.35 Dissolved Oxygen (mg/L) 19.79

Catch Data

Species	Number of Fish	Species	Number of Fish
Brook Stickleback	☒		
Creek Chub	2		
N. Redbelly Dace	11		
Pumpkinseed	1		
Bluntnose Minnow	1		
Central Mudminnow	2		

Fish Measurements on Separate Sheet? Y/(N)

Field Staff: M. Pomeroy, K. Clayton

Notes By: M. Pomeroy

~~(Station Diagram on Back)~~

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Stantec

Project Pristine Power | Project # 160960649
Station # TISC (Krauskopf Drain B) | Field Staff MP & KC
Photos Taken 7439, 7440, 7441 | Date Apr 13/11
GPS Coordinates 0477369, 4821576 | Time 11:42
Descriptive Location @ the corner of Bridge rd & Manley rd

Water Quality
Dissolved Oxygen (mg/L) 17.19 | pH 7.86 | Conductivity (µS/cm) 475
Water Temperature (°C) 8.82 | Air Temperature (°C) 12°C
Weather conditions in previous 24 hrs sunny, partly cloudy, windy, no ppt

Watercourse Dimensions & Morphology
Mean Watercourse Width 1.5 (m) | Maximum Pool Depth 15 (cm)
Mean Bankfull Width 3m (m) | Mean Water Depth 10 (cm)
_____% Riffle | _____% Pool | 100 % Run | _____% Flat
Evidence of eroding banks, Comments on bank stability —

Substrate – Upstream (% cover)

_____Bedrock	60% Silt	_____Boulder	20% Clay	_____Cobble
_____Muck	_____Gravel	_____Marl	_____Sand	20% Detritus

Substrate – Downstream (% cover)

_____Bedrock	_____Silt	_____Boulder	_____Clay	_____Cobble
_____Muck	_____Gravel	_____Marl	_____Sand	_____Detritus

In-water Cover
Cover Types Present (circle):
Overhanging Vegetation | Undercut Banks | Woody Debris | Deep Pool | Boulder | Vascular Plants | Other_____

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream 15%, mostly grasses, some shrubs & trees, mostly early successional
Downstream _____
Adjacent Land Use
Upstream Crops
Downstream _____

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream Instream vegetation
Downstream _____
Migratory Obstructions (seasonal, permanent)
Upstream _____
Downstream _____
Note any fish observations —

Other Habitat Notes, Incidental Wildlife Observations, etc. _____

Field Notes Authored by Mark P. | Field Notes QA/QCed by Kelly C

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Stantec

Project Pristine Power | Project # 160960649
Station # T2C (O'Rourke Drain) | Field Staff MP & KC
Photos Taken 7427, 7428, 7429 | Date 3:41
GPS Coordinates 0476147 4819957 | Time April 12/11
Descriptive Location 18th & Hydroline rd intersection (flows through intersection)

Water Quality
Dissolved Oxygen (mg/L) 17.95 | pH 8.37 | Conductivity (µS/cm) 410
Water Temperature (°C) 10.82 | Air Temperature (°C) 7°C
Weather conditions in previous 24 hrs cloudy, warm, no ppt

Watercourse Dimensions & Morphology
Mean Watercourse Width 2.5 (m) | Maximum Pool Depth 40cm (cm)
Mean Bankfull Width 4 (m) | Mean Water Depth 30cm (cm)
_____% Riffle | _____% Pool | 100 % Run | _____% Flat
Evidence of eroding banks, Comments on bank stability _____

Substrate – Upstream (% cover)

_____Bedrock	100% Silt	_____Boulder	_____Clay	_____Cobble
_____Muck	_____Gravel	_____Marl	_____Sand	_____Detritus

Substrate – Downstream (% cover)

_____Bedrock	_____Silt	_____Boulder	_____Clay	_____Cobble
_____Muck	_____Gravel	_____Marl	_____Sand	_____Detritus

In-water Cover
Cover Types Present (circle): Overhanging Vegetation | Undercut Banks | Woody Debris | Deep Pool | Boulder | Vascular Plants | Other_____

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream 0%, grasses, early successional
Downstream _____
Adjacent Land Use
Upstream agriculture / crops
Downstream _____

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream grasses instream
Downstream _____
Migratory Obstructions (seasonal, permanent)
Upstream _____
Downstream _____
Note any fish observations see efish sheets

Other Habitat Notes, Incidental Wildlife Observations, etc. _____

Field Notes Authored by Mark P | Field Notes QA/QCed by Kelly Clayton

Stantec

Stantec Consulting Ltd - Electrofishing Record and Catch Results

Project Number 160960649 Station Number T2C (O'Rourke Drain)

Project Name Pristine Power/St. Columban Pass No. (if applicable) 3

Project manager ~~Mark P.~~ Shawna P Date (yyyymmdd): 2011/04/12

Descriptive Location St. Columban, On
Near 181rd & Hydroline rd intersection

UTM coordinates 0476147 easting 4819957 northing zone 17T

Fishing Method (circle one): (Backpack) Boat Unit Model/Make SR LR24

Sampling Method (circle one): even (habitat) transect spot

Effort (Electrofishing Seconds): 260 Number of Netters: 1 Number of Anodes: 1

Settings

Frequency (Hz) 45 Voltage (volts) 350 Current (Amps) _____ Power (Watts) _____

Station Information

Length of Stream Surveyed (m) 60m

Station Characteristics: Width (m): Range 1.5-3m Average: 2.5m

Depth (m): Range 20cm-40cm Average: 30 cm

Water Clarity/Colour: Clear/colourless Water Velocity if Measured (m/s): _____

Temperature (°C) 10.82 Conductivity (uS/cm) 4.10

pH 8.37 Dissolved Oxygen (mg/L) 17.95

Catch Data

Species	Number of Fish	Species	Number of Fish
Creek chub	(3)		
common shiner	(7)		
N redbelly	(11)		
C. stoneroller	(8)		
white sucker	(3)		
C. mudminnow	(2)		
Brassy minnow	(2)		

Fish Measurements on Separate Sheet? Y/N

Field Staff: MP

KC

Notes By: _____

(Station Diagram on Back)

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Layout #1 Waterbody

Stantec

Project St. Columban
Station # 1 (Carpenter Drain)
Photos Taken 0029, 0030, 0031
GPS Coordinates 0475876 4819235
Project # 160960649
Field Staff M. Pomeroy, R. Dibbley
Date Nov 4 2010
Time 4:10 pm
Descriptive Location perperdicular to Manley Line approx 900 m South of Hydro Line

Water Quality
Dissolved Oxygen (mg/L) 8.10 pH 7.32 Conductivity (µS/cm) 783
Water Temperature (°C) 9.94 Air Temperature (°C) 5°C
Weather conditions in previous 24 hrs cold, rain

Watercourse Dimensions & Morphology
Mean Watercourse Width 1.0 (m) Maximum Pool Depth 0.3 (cm)
Mean Bankfull Width 1.5 (m) Mean Water Depth 0.2 (cm)
____% Riffle ____% Pool ____% Run 100 % Flat
Evidence of eroding banks, Comments on bank stability 10-15% exposed bank

Substrate – Upstream (% cover)

____Bedrock	90 Silt	____Boulder	10 Clay	____Cobble
____Muck	____Gravel	____Marl	____Sand	____Detritus

Substrate – Downstream (% cover)

____Bedrock	90 Silt	____Boulder	10 Clay	____Cobble
____Muck	____Gravel	____Marl	____Sand	____Detritus

In-water Cover
Cover Types Present (circle): Overhanging Vegetation, Undercut Banks, Woody Debris, Deep Pool, Boulder, Vascular Plants, Other____

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream 100% > grass > early
Downstream 100% > grass > early
Adjacent Land Use
Upstream ag (crop)
Downstream ag (crop)

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream none
Downstream none
Migratory Obstructions (seasonal, permanent)
Upstream none
Downstream none
Note any fish observations none

Other Habitat Notes, Incidental Wildlife Observations, etc. none

Field Notes Authored by M. Pomeroy Field Notes QA/QCed by Mark Pomeroy

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Stantec

Project St. Columban Wind Farm
Station # TIC (Carpenter Drain)
Photos Taken 7430, 7431, 7432
GPS Coordinates 0475913 4819221
Descriptive Location 1 km NE of Hwy 8 on Manley Rd.

Project # 160960649
Field Staff MP & KC
Date April 13 2011
Time 9:40

Water Quality

Dissolved Oxygen (mg/L) 12.46 pH 7.71 Conductivity (µS/cm) 393
Water Temperature (°C) 5.92 Air Temperature (°C) 4
Weather conditions in previous 24 hrs cloudy, warm, no precip

Watercourse Dimensions & Morphology

Mean Watercourse Width 2 (m) Maximum Pool Depth 30 (cm)
Mean Bankfull Width 3 (m) Mean Water Depth 10 (cm)
_____% Riffle _____% Pool 100 % Run _____% Flat
Evidence of eroding banks, Comments on bank stability erosion only @ culvert

Substrate – Upstream (% cover)

_____Bedrock 100 Silt _____Boulder _____Clay _____Cobble
_____Muck _____Gravel _____Marl _____Sand _____Detritus

Substrate – Downstream (% cover)

_____Bedrock _____Silt _____Boulder _____Clay _____Cobble
_____Muck _____Gravel _____Marl _____Sand _____Detritus

In-water Cover

Cover Types Present (circle): Overhanging Vegetation, Undercut Banks, Woody Debris, Deep Pool, Boulder, Vascular Plants, Other_____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream 100%, grass, early
Downstream
Adjacent Land Use
Upstream crop
Downstream

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream none
Downstream
Migratory Obstructions (seasonal, permanent)
Upstream none
Downstream
Note any fish observations none.

Other Habitat Notes, Incidental Wildlife Observations, etc. red wing black birds

Field Notes Authored by M. Pomeroy Field Notes QA/QCed by Kelly Clayton

Stantec

Stantec Consulting Ltd - Electrofishing Record and Catch Results

Project Number 160960649 Station Number T1C (Carpenter Drain)

Project Name Pristine Power/St. Columban Pass No. (if applicable)

Project manager ~~Mark P~~ Shawna P. Date (yyyymmdd): 2011/04/13

Descriptive Location St. Columban, On 1Km NE of Hwy 8 on Manley Rd

UTM coordinates 0475913 easting 4819221 northing zone 17T

Fishing Method (circle one): (Backpack) Boat Unit Model/Make SR LR24

Sampling Method (circle one): even (habitat) transect spot

Effort (Electrofishing Seconds): 156 Number of Netters: 1 Number of Anodes: 1

Settings

Frequency (Hz) 45 Voltage (volts) 350 Current (Amps) _____ Power (Watts) _____

Station Information

Length of Stream Surveyed (m) 50

Station Characteristics: Width (m): Range 2 Average: 2

Depth (m): Range 0.1-0.3 Average: 0.1

Water Clarity/Colour: clear/colourless Water Velocity if Measured (m/s): _____

Temperature (°C) 5.92 Conductivity (uS/cm) 393

pH 7.71 Dissolved Oxygen (mg/L) 12.46

Catch Data

Species	Number of Fish	Species	Number of Fish
None			

Fish Measurements on Separate Sheet? Y/(N)

Field Staff: M. Pomeroy, K. Clayton

Notes By: M. Pomeroy

(Station Diagram on Back)

Appendix D

Electrofishing Results

Watershed / Creek ID	Date[a]	Effort (seconds)	Station Length (m)	Fish Captured	Water Quality (Temperature, Dissolved Oxygen)	Comments
Ryan Drain B	Apr 4/11	785	60	White Sucker (4)	6.19°C, 14.86 mg/L	
				Creek Chub (26)		
				Brown Bullhead (1)		
				Northern Redbelly Dace (14)		
				Brook Stickleback (14)		
				Fathead Minnow (1)		
				Central Stoneroller (2)		
				Common Shiner (3)		
				Blacknose Dace (4)		
				Blacknose Shiner (3)		
				Least Darter (7)		
				Bluntnose Minnow (1)		
Woods Drain A	Apr 12/11	460	60	Blacknose Dace (8)	6.72°C, 15.41 mg/L	observed additional fish - approx. 50 Stone Rollers, 20 Blacknose Dace, and 20 Creek Chub in pool
				Central Stoneroller (31)		
				Common Shiner (13)		
				Brook Stickleback (2)		
				Creek Chub (3)		
				Bluntnose Minnow (1)		
				Blacknose Shiner (3)		
				Northern Redbelly Dace (1)		
				White Sucker (1)		
Woods Drain D	Apr 12/11	356	50	Creek Chub (2)	4.25°C, 13.97 mg/L	
				White Sucker (1)		
				Common Shiner (1)		
Canada Company Drain A	Apr 12/11	775	60	Rock Bass (1)	8.95°C, 14.74 mg/L	
				Central Stoneroller (27)		
				Northern Redbelly Dace (14)		
				Brassy Minnow (1)		
				Common Shiner (24)		
				White Sucker (6)		
				Creek Chub (15)		
				Brook Stickleback (5)		
				Blacknose Shiner (2)		
				Blacknose Dace (7)		
				Johnny Darter (1)		
				Least Darter (2)		
Krouskopf Drain A	Apr 13/11	324	40	Brook Stickleback (10)	8.49°C, 19.74 mg/L	
				Creek Chub (2)		
				Northern Redbelly Dace (7)		
				Pumpkinseed (1)		
				Bluntnose Minnow (1)		
				Central Mudminnow (2)		
O'Rourke Drain	Apr 12/11	260	60	Creek Chub (3)	10.82°C, 17.95 mg/L	
				Common Shiner (7)		
				Northern Redbelly Dace (11)		
				Central Stoneroller (8)		
				White Sucker (3)		
				Central Mudminnow (2)		
				Brassy Minnow (2)		
Carpenter Drain	Apr 13/11	156	50	No fish caught or observed	5.92°C, 12.46 mg/L	

Appendix E

DFO Operational Statements

Fisheries and Oceans Canada | Pêches et Océans Canada

NOTIFICATION FORM

Fisheries and Oceans Canada
Ontario Operational Statement

Version 3.1

PROPONENT INFORMATION

NAME:	STREET ADDRESS:	
CITY/TOWN:	PROVINCE/TERRITORY:	POSTAL CODE:
TEL. NO. (RESIDENCE):	TEL. NO. (WORK):	
FAX NO:	EMAIL ADDRESS:	

CONTRACTOR INFORMATION (provide this information if a Contractor is working on behalf of the Proponent)

NAME:	STREET ADDRESS:	
CITY/TOWN:	PROVINCE/TERRITORY:	POSTAL CODE:
TEL. NO. (RESIDENCE):	TEL. NO. (WORK):	
FAX NO:	EMAIL ADDRESS:	

PROJECT INFORMATION

Select Operational Statements that are being used (check all applicable boxes):

- ❒ Beach Creation for Residential Use
- ❒ Beaver Dam Removal
- ❒ Bridge Maintenance
- ❒ Clear-Span Bridges
- ❒ Culvert Maintenance
- ❒ Dock and Boathouse Construction
- ❒ High-Pressure Directional Drilling
- ❒ Ice Bridges and Snow Fills
- ❒ Isolated Pond Construction
- ❒ Isolated or Dry Open-cut Stream Crossings
- ❒ Maintenance of Riparian Vegetation in Existing Rights-of-Way
- ❒ Mineral Exploration Activities
- ❒ Moorings
- ❒ Overhead Line Construction
- ❒ Public Beach Maintenance
- ❒ Punch & Bore Crossings
- ❒ Routine Maintenance Dredging
- ❒ Submerged Log Salvage
- ❒ Temporary Stream Crossing
- ❒ Underwater Cables

Select the type of water body or watercourse at or near your project:

- ❒ River, Stream, Creek
- ❒ Lake (8 hectares or greater)
- ❒ Marine (Ocean or Sea)
- ❒ Pond or wetland (pond is less than 8 hectares)
- ❒ Estuary

PROJECT LOCATION (S) (fill out this section if the project location is different from Proponent Information; append multiple project locations on an additional sheet if necessary)

Name of water body or watercourse	Coordinates of the Project (UTM co-ordinate or Degrees, Minutes, Seconds), if available Easting: Northing: Latitude: Longitude:
Legal Description (Plan, Block, Lot, Concession, Township)	Directions to Access the Project Site (i.e., Route or highway number, etc.)
Proposed Start Date (YYYY/MM/DD):	Proposed Completion Date (YYYY/MM/DD):

We ask that you notify DFO, preferably 10 working days before starting your work, by filling out and sending in, by mail or by fax, this notification form to the DFO office in your area. This information is requested in order to evaluate the effectiveness of the work carried out in relation to the Operational Statement.

I, _____ (print name) certify that the information given on this form is, to the best of my knowledge, correct and complete.

Signature _____ Date _____

Note: If you cannot meet all of the conditions and cannot incorporate all of the measures in the Operational Statement then your project may result in a violation of subsection 35(1) of the *Fisheries Act* and you could be subject to enforcement action. In this case, you should contact your Conservation Authority, or the DFO office in your area (see Ontario DFO office list), or Parks Canada if the project is located within its jurisdiction, including the Trent-Severn Waterway and the Rideau Canal, if you wish to obtain more information on the possible options you should consider to avoid contravention of the *Fisheries Act*. For activities carried out under the *Crown Forest Sustainability Act*, the requirements of the applicable Operational Statements are addressed through an existing agreement and the Ontario Ministry of Natural Resources is the first point of contact.

Information about the above-noted proposed work or undertaking is collected by DFO under the authority of the *Fisheries Act* for the purpose of administering the fish habitat protection provisions of the *Fisheries Act*. Personal information will be protected under the provisions of the *Privacy Act* and will be stored in the Personal Information Bank DFO-SCI-605. Under the *Privacy Act*, individuals have a right to, and on request shall be given access to, any personal information about them contained in a personal information bank. Instructions for obtaining personal information are contained in the Government of Canada's Info Source publications available at **www.infosource.gc.ca** or in Government of Canada offices. Information other than "personal" information may be accessible or protected as required by the provisions of the *Access to Information Act*.

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http://www.dfo-mpo.gc.ca/oceans-habitat/habitat/modernizing-moderniser/epmp-pmpe/index_f.asp

DFO/2007-1329

ISOLATED OR DRY OPEN-CUT STREAM CROSSINGS

Fisheries and Oceans Canada
Ontario Operational Statement

Version 1.0

For the purpose of this Operational Statement, the term "Isolated Crossing" means a temporary stream crossing technique that allows work (e.g., trenched pipeline or cable installation) to be carried out "in-the-dry" while diverting the natural flow around the site during construction. These types of open trenched crossings are isolated using flume or dam and pump techniques (see *Pipeline Associated Watercrossings*, 2005 at **http://www.capp.ca/default.asp?V_DOC_ID=763&PubID=96717**). The term "Dry Open-cut Stream Crossing" means a temporary stream crossing work (e.g., trenched pipeline or cable installation) that is carried out during a period when the entire stream width is seasonally dry or is frozen to the bottom.

The risks to fish and fish habitat associated with isolated open cut stream crossings include the potential for direct damage to substrates, release of excessive sediments, loss of riparian habitat, stranding of fish in dewatered areas, impingement/entrainment of fish at pump intakes, and disruption of essential fish movement patterns. Similarly, dry open-cut stream crossings pose a risk to fish and fish habitat due to potential harmful alteration of substrates, loss of riparian habitat, and release of excessive sediment once stream flows resume.

The order of preference for carrying out a cable or pipeline stream crossing, in order to protect fish and fish habitat, is: a) punch or bore crossing (see *Punch & Bore Crossings* Operational Statement); b) high-pressure directional drill crossing (see *High-Pressure Directional Drilling* Operational Statement); c) dry open-cut crossing; and d) isolated open-cut crossing. This order must be balanced with practical considerations at the site.

Fisheries and Oceans Canada (DFO) is responsible for protecting fish and fish habitat across Canada. Under the *Fisheries Act* no one may carry out a work or undertaking that will cause the harmful alteration, disruption or destruction (HADD) of fish habitat unless it has been authorized by DFO. By following the conditions and measures set out below you will be in compliance with subsection 35(1) of the *Fisheries Act*.

The purpose of this Operational Statement is to describe the conditions under which it is applicable to your project and the measures to incorporate into your project in order to avoid negative impacts to fish habitat. You may proceed with your isolated or dry open-cut stream crossing project without a DFO review when you meet the following conditions:

- if working within the Thames River, Sydenham River, Ausable River, Grand River, or Maitland River, you have contacted your Conservation Authority or local DFO Office (see Ontario DFO office list) to ensure that your project will not impact Schedule I mussel species at risk under the federal *Species at Risk Act* (SARA), before proceeding,
- for dry, open-cut crossings the watercourse is dry or frozen completely to the bottom at the site,
- for isolated crossings, the channel width of the watercourse at the crossing site is less than 5 meters from ordinary high water mark to ordinary high water mark (HWM) (see definition below),
- the isolated crossing does not involve the construction or use of an off-stream diversion channel, or the use of earthen dams,
- the isolated crossing ensures that all natural upstream flows are conveyed downstream during construction, with no change in quality or quantity,
- the site does not occur at a stream location involving known fish spawning habitat, particularly if it is dependent on groundwater upwelling,
- the use of explosives is not required to complete the crossing, and
- you incorporate the *Measures to Protect Fish and Fish Habitat when Carrying Out an Isolated or Dry Open-cut Stream Crossing* listed below.

If you cannot meet all of the conditions listed above and cannot incorporate all of the measures listed below then your project may result in a violation of subsection 35(1) of the *Fisheries Act* and you could be subject to enforcement action. In this case, you should contact your Conservation Authority, or the DFO office in your area (see Ontario DFO office list) or Parks Canada if the project is located within its jurisdiction, including the Trent-Severn Waterway and the Rideau Canal, if you wish to obtain an opinion on the possible options you should consider to avoid contravention of the *Fisheries Act*.

You are required to respect all municipal, provincial and federal legislation that applies to the work being carried out in relation to this Operational Statement. The activities undertaken in this Operational Statement must also comply with SARA (**www.sararegistry.gc.ca**). If you have questions regarding this Operational Statement, please contact one of the agencies listed above.

We ask that you notify DFO, preferably 10 working days before starting your work, by filling out and sending the Ontario Operational Statement notification form (**www.dfo-mpo.gc.ca/regions/central/habitat/os-eo/prov-terr/index_e.htm**) to the DFO office in your area. This information is requested in order to evaluate the effectiveness of the work carried out in relation to this Operational Statement.

Measures to Protect Fish and Fish Habitat when Carrying Out an Isolated or Dry Open-Cut Stream Crossing

1. Use existing trails, roads or cut lines wherever possible, as access routes to avoid disturbance to the riparian vegetation.

2. Locate crossings at straight sections of the stream, perpendicular to the banks, whenever possible. Avoid crossing on meander bends, braided streams, alluvial fans, active floodplains or any other area that is inherently unstable and may result in the erosion and scouring of the stream bed.

3. Complete the crossing in a manner that minimizes the duration of instream work.

4. Construction should be avoided during unusually wet, rainy or winter thaw conditions.

5. While this Operational Statement does not cover the clearing of riparian vegetation, the removal of select plants may be necessary to access the construction site. This removal should be kept to a minimum and within the utility right-of-way.

6. Machinery fording a flowing watercourse to bring equipment required for construction to the opposite side is limited to a one-time event (over and back) and is to occur only if an existing crossing at another location is not available or practical to use. Operational Statements are also available for *Ice Bridges and Snow Fills*, *Clear-Span Bridges*, and *Temporary Stream Crossing*.

    - **6.1.** If minor rutting is likely to occur, stream bank and bed protection methods (e.g., swamp mats, pads) should be used provided they do not constrict flows or block fish passage.
    - **6.2.** Grading of the stream banks for the approaches should not occur.
    - **6.3.** If the stream bed and banks are steep and highly erodible (e.g., dominated by organic materials and silts) and erosion and degradation is likely to occur as a result of equipment fording, then a temporary crossing structure or other practice should be used to protect these areas.
    - **6.4.** Time the one-time fording to prevent disruption to sensitive fish life stages by adhering to appropriate fisheries timing windows (see the *Ontario In-Water Construction Timing Windows*).
    - **6.5.** Fording should occur under low flow conditions and not when flows are elevated due to local rain events or seasonal flooding.

7. Operate machinery in a manner that minimizes disturbance to the watercourse bed and banks.

    - **7.1.** Protect entrances at machinery access points (e.g., using swamp mats) and establish single site entry and exit.
    - **7.2.** Machinery is to arrive on site in a clean condition and is to be maintained free of fluid leaks.
    - **7.3.** Wash, refuel and service machinery and store fuel and other materials for the machinery away from the water to prevent deleterious substances from entering the water.
    - **7.4.** Keep an emergency spill kit on site in case of fluid leaks or spills from machinery.

8. Install effective sediment and erosion control measures before starting work to prevent entry of sediment into the watercourse. Inspect them regularly during the course of construction and make all necessary repairs if any damage occurs.

9. Stabilize any waste materials removed from the work site, above the HWM, to prevent them from entering the watercourse. This could include covering spoil piles with biodegradable mats or tarps or planting them with grass or shrubs.

10. Vegetate any disturbed areas by planting and seeding preferably with native trees, shrubs or grasses and cover such areas with mulch to prevent soil erosion and to help seeds germinate. If there is insufficient time remaining in the growing season, the site should be stabilized (e.g., cover exposed areas with erosion control blankets to keep the soil in place and prevent erosion) and vegetated the following spring.

    - **10.1.** Maintain effective sediment and erosion control measures until re-vegetation of disturbed areas is achieved.

Measures to Protect Fish and Fish Habitat when Carrying Out an Isolated Crossing

Temporary isolation is used to allow work “in-the-dry” while maintaining the natural downstream flow by installing dams up and downstream of the site and conveying all of the natural upstream flow into a flume, or pumping it around the isolated area. In addition to measures 1 to 10, the following measures should be carried out when conducting an isolated stream crossing:

11. Time isolated crossings to protect sensitive fish life stages by adhering to fisheries timing windows (see Measure 6.4).

12. Use dams made of non-earthen material, such as water-inflated portable dams, pea gravel bags, concrete blocks, steel or wood wall, clean rock, sheet pile or other appropriate designs, to separate the dewatered work site from flowing water.

    - **12.1.** If granular material is used to build dams, use clean or washed material that is adequately sized (i.e., moderately sized rock and not sand or gravel) to withstand anticipated flows during the construction. If necessary, line the outside face of dams with heavy poly-plastic to make them impermeable to water. Material to build these dams should not be taken from below the HWM of any water body.
    - **12.2.** Design dams to accommodate any expected high flows of the watercourse during the construction period.

13. Before dewatering, rescue any fish from within the isolated area and return them safely immediately downstream of the worksite.

13.1. You will require a permit from DFO to relocate any aquatic species that are listed as either endangered or threatened under SARA. Please contact your Conservation Authority or the DFO office in your area to determine if an aquatic species at risk is in the vicinity of your project and, if appropriate, use the DFO website at **www.dfo-mpo.gc.ca/species-especes /permits/sarapermits_e.asp** to apply for a permit.

14. Pump sediment laden dewatering discharge into a vegetated area or settling basin, and prevent sediment and other deleterious substances from entering any water body.

15. Remove accumulated sediment and excess spoil from the isolated area before removing dams.

16. Stabilize the **streambed** and restore the original channel shape, bottom gradient and substrate to pre-construction condition before removing dams.

17. Ensure **banks** are stabilized, restored to original shape, adequately protected from erosion and re-vegetated, preferably with native species.

18. If rock is used to stabilize banks, it should be clean, free of fine materials, and of sufficient size to resist displacement during peak flood events. The rock should be placed at the original stream bank grade to ensure there is no infilling or narrowing of the watercourse.

19. Gradually remove the downstream dam first, to equalize water levels inside and outside of the isolated area and to allow suspended sediments to settle.

20. During the final removal of dams, restore the original channel shape, bottom gradient and substrate at these locations.

21. Pumped Diversion
Pumped diversions are used to divert water around the isolated area to maintain natural downstream flows and prevent upstream ponding.

21.1. Ensure intakes are operated in a manner that prevents streambed disturbance and fish mortality. Guidelines to determine the appropriate mesh size for intake screens may be obtained from DFO (e.g., *Freshwater Intake End-of-Pipe Fish Screen Guideline* (1995), available at **www.dfo-mpo.gc.ca/Library/223669.pdf**).

21.2. Ensure the pumping system is sized to accommodate any expected high flows of the watercourse during the construction period. Pumps should be monitored at all times, and back-up pumps should be readily available on-site in case of pump failure.

21.3. Protect pump discharge area(s) to prevent erosion and the release of suspended sediments downstream, and remove this material when the works have been completed.

Measures to Protect Fish and Fish Habitat when Carrying Out a Dry Open-Cut Stream Crossing

In addition to measures 1 to 10, the following measures should be carried out when conducting a dry open-cut stream crossing:

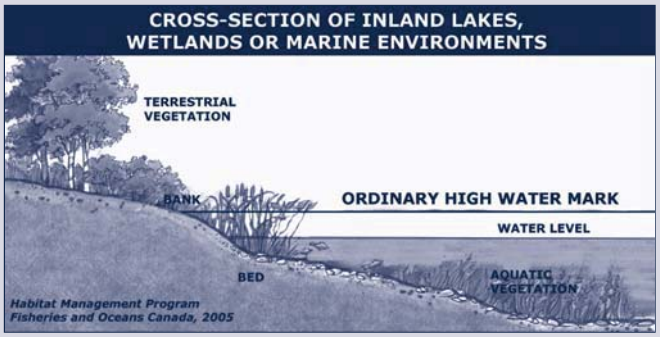
22. Stabilize the **streambed** and restore the original channel shape, bottom gradient and substrate to pre-construction condition.

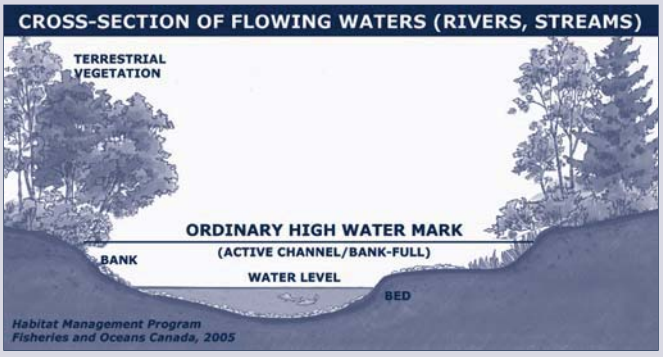
23. Ensure **banks** are stabilized, restored to original shape, adequately protected from erosion and re-vegetated, preferably with native species.

Definition:

Ordinary high water mark (HWM) - The usual or average level to which a body of water rises at its highest point and remains for sufficient time so as to change the characteristics of the land. In flowing waters (rivers, streams) this refers to the "active channel/bank-full level" which is often the 1:2 year flood flow return level. In inland lakes, wetlands or marine environments it refers to those parts of the water body bed and banks that are frequently flooded by water so as to leave a mark on the land and where the natural vegetation changes from predominately aquatic vegetation to terrestrial vegetation (excepting water tolerant species). For reservoirs this refers to normal high operating levels (Full Supply Level).

For the Great Lakes this refers to the 80th percentile elevation above chart datum as described in DFO's Fish Habitat and Determining the High Water Mark on Lakes.





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DFO/2007-1329

PUNCH & BORE CROSSINGS

Fisheries and Oceans Canada
Ontario Operational Statement

Version 3.0

For the purpose of this Operational Statement, the term punch and bore refers to a trenchless crossing method which involves the excavation of a vertical bell hole or shallow depression on either side of the watercourse. Horizontal punching or boring between the two points, at an appropriate depth below the watercourse, completes the creation of a passage-way for the crossing. Punch and bore crossings allow cables and pipelines to be installed under watercourses without imparting any disturbance to the bed and banks. Punch and bore crossings differ from high-pressure directional drilled crossings, in that no pressurized mud systems are required, thereby avoiding the risk of sediment release due to frac-out.

Punch and bore crossings can negatively impact fish and fish habitat due to erosion and sedimentation from site disturbance and dewatering of bell holes or the collapse of the punch or bore hole under the stream. Disturbing riparian vegetation can reduce important shoreline cover, shade and food production areas. Machinery fording the stream can disturb bottom and bank substrates, disrupt sensitive fish life stages, and introduce deleterious substances if equipment is not properly maintained. Impacts can be reduced if an emergency response plan and clean-up materials are in place.

The general order of preference for carrying out a cable or pipeline stream crossing in order to protect fish and fish habitat is: a) a punch or bore crossing, b) high-pressure directional drill crossing (see *High-Pressure Directional Drilling* Operational Statement), c) dry open-cut crossing, and d) isolated open-cut crossing (see *Isolated or Dry Open-cut Stream Crossings* Operational Statement). This order must be balanced with practical considerations at the site.

Fisheries and Oceans Canada (DFO) is responsible for protecting fish and fish habitat across Canada. Under the *Fisheries Act* no one may carry out a work or undertaking that will cause the harmful alteration, disruption or destruction (HADD) of fish habitat unless it has been authorized by DFO. By following the conditions and measures set out below you will be in compliance with subsection 35(1) of the *Fisheries Act*.

The purpose of this Operational Statement is to describe the conditions under which it is applicable to your project and the measures to be incorporated into your project in order to avoid negative impacts to fish habitat. You may proceed with your punch or bore crossing project without a DFO review when you meet the following conditions:

- the crossing is not a wet open-cut crossing,
- the crossing technique will not damage the stream bed or bank and thereby negatively impact fish or fish habitat,
- the site does not occur at a stream location involving known fish spawning habitat, particularly if it is dependent on groundwater upwelling, and
- you incorporate the *Measures to Protect Fish and Fish Habitat when Conducting Punch and Bore Crossings*, listed below.

If you cannot meet all of the conditions listed above and cannot incorporate all of the measures listed below then your project may result in a violation of subsection 35(1) of the *Fisheries Act* and you could be subject to enforcement action. In this case, you should contact your Conservation Authority, or the DFO office in your area (see Ontario DFO office list) or Parks Canada if the project is located within its jurisdiction, including the Trent-Severn Waterway and the Rideau Canal, if you wish to obtain an opinion on the possible options you should consider to avoid contravention of the *Fisheries Act.*

You are required to respect all municipal, provincial or federal legislation that applies to the work being carried out in relation to this Operational Statement. The activities undertaken in this Operational Statement must also comply with the *Species at Risk Act* (**www.sararegistry.gc.ca**). If you have questions regarding this Operational Statement, please contact one of the agencies listed above.

We ask that you notify DFO, preferably 10 working days before starting your work by filling out and sending the Ontario Operational Statement notification form (**www.dfo-mpo.gc.ca/regions/central/habitat/os-eo/prov-terr/index_e.htm**) to the DFO office in your area. This information is requested in order to evaluate the effectiveness of the work carried out in relation to this Operational Statement.

Measures to Protect Fish and Fish Habitat when Conducting Punch and Bore Crossings

1. A punch or bore crossing can be conducted at any time of the year provided there is not a high risk of failure and it does not require in-water activities such as machinery fording.

2. Design the punch or bore path for an appropriate depth below the watercourse to prevent the pipeline or cable from becoming exposed due to natural scouring of the stream bed.

3. While this Operational Statement does not cover the clearing of riparian vegetation, the removal of select plants may be necessary to access the construction site and to excavate the bell holes. This removal is to be kept to a minimum and within the utility right-of-way.

4. Install effective sediment and erosion control measures before starting work to prevent entry of sediment into the water body. Inspect them regularly during the course of construction and make all necessary repairs if any damage occurs.

5. Machinery fording the watercourse to bring equipment required for construction to the opposite side is limited to a one-time event (over and back) and should occur only if an existing crossing at another location is not available or practical to use. A *Temporary Stream Crossing* Operational Statement is also available.

- **5.1.** If minor rutting is likely to occur, stream bank and bed protection methods (e.g., swamp mats, pads) should be used provided they do not constrict flows or block fish passage.
- **5.2.** Grading of the stream banks for the approaches should not occur.
- **5.3.** If the stream bed and banks are steep and highly erodible (e.g., dominated by organic materials and silts) and erosion and degradation are likely to occur as a result of equipment fording, then a temporary crossing structure or other practice should be used to protect these areas.
- **5.4.** Time the one-time fording to prevent disruption to sensitive fish life stages by adhering to appropriate fisheries timing windows (see the *Ontario In-Water Construction Timing Windows*).
- **5.5.** Fording should occur under low flow conditions and not when flows are elevated due to local rain events or seasonal flooding.

6. Operate machinery on land above the ordinary high water mark (HWM) (see definition below) and in a manner that minimizes disturbance to the banks of the watercourse.

- **6.1.** Machinery is to arrive on-site in a clean condition and is to be maintained free of fluid leaks.
- **6.2.** Wash, refuel and service machinery and store fuel and other materials for the machinery away from the water to prevent any deleterious substance from entering the water.
- **6.3.** Keep an emergency spill kit on site in case of fluid leaks or spills from machinery.

7. Excavate bell holes beyond the HWM, far enough away from any watercourse to allow containment of any sediment or deleterious substances above the HWM.

- **7.1.** When dewatering bell holes, remove suspended solids by diverting water into a vegetated area or settling basin, and prevent sediment and other deleterious substances from entering the watercourse.
- **7.2.** Stabilize any waste materials removed from the work site (including bell holes) to prevent them from entering the watercourse. This could include covering spoil piles with biodegradable mats or tarps or planting them with grass or shrubs.
- **7.3.** After suitably backfilling and packing the bell holes, vegetate any disturbed areas (see Measure 11).

8. Monitor the watercourse to observe signs of malfunction during all phases of the work.

9. For the duration of the work, keep on-site and readily accessible, all material and equipment needed to contain and clean-up releases of sediment-laden water and other deleterious substances.

10. Develop a response plan that is to be implemented immediately in the event of a sediment release or spill of a deleterious substance. This plan is to include measures to: a) stop work, contain sediment-laden water and other deleterious substances and prevent their further migration into the watercourse; b) notify all applicable authorities in the area, including the closest DFO office; c) promptly clean-up and appropriately dispose of the sediment-laden water and deleterious substances; and d) ensure clean-up measures are suitably applied so as not to result in further alteration of the bed and/or banks of the watercourse.

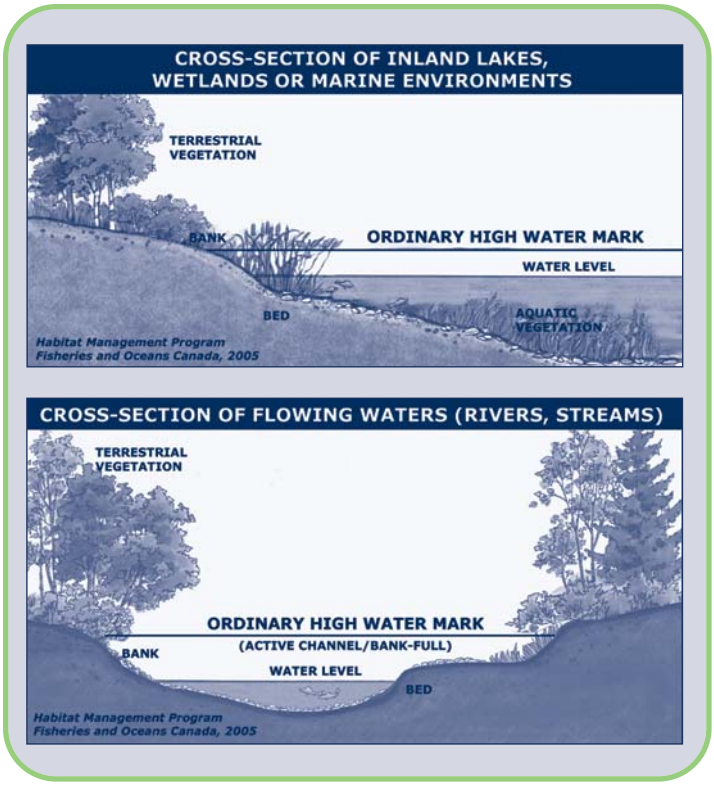
11. Vegetate any disturbed areas by planting and seeding preferably with native trees, shrubs or grasses and cover such areas with mulch to prevent erosion and to help seeds germinate. If there is insufficient time remaining in the growing season, the site should be stabilized (e.g., cover exposed areas with erosion control blankets to keep the soil in place and prevent erosion) and vegetated the following spring.

- **11.1.** Maintain effective sediment and erosion control measures until re-vegetation of disturbed areas is achieved.

Definition:

Ordinary high water mark (HWM) – The usual or average level to which a body of water rises at its highest point and remains for sufficient time so as to change the characteristics of the land. In flowing waters (rivers, streams) this refers to the “active channel/bank-full level” which is often the 1:2 year flood flow return level. In inland lakes, wetlands or marine environments it refers to those parts of the water body bed and banks that are frequently flooded by water so as to leave a mark on the land and where the natural vegetation changes from predominately aquatic vegetation to terrestrial vegetation (excepting water tolerant species). For reservoirs this refers to normal high operating levels (Full Supply Level).

For the Great Lakes this refers to the 80th percentile elevation above chart datum as described in DFO’s *Fish Habitat and Determining the High Water Mark on Lakes*.



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Peterborough, ON K9H 7S3
Telephone: (705) 750-0269
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401 King Street West
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1500 Paris Street, Unit 11
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Thunder Bay and Kenora
Fisheries and Oceans Canada
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Aussi disponible en français

http://www.dfo-mpo.gc.ca/oceans-habitat/habitat/modernizing-moderniser/epmp-pmpe/index_f.asp

DFO/2007-1329

TEMPORARY STREAM CROSSING

Fisheries and Oceans Canada
Ontario Operational Statement

Version 1.0

A temporary stream crossing consists of i) a one-time ford in flowing waters, ii) a seasonally dry streambed ford, or iii) a temporary bridge (e.g., Bailey bridge or log stringer bridge). Temporary stream crossings are employed for short term access across a watercourse by construction vehicles when an existing crossing is not available or practical to use. They are not intended for prolonged use (e.g., forest or mining haul roads). The use of temporary bridges or dry fording is preferred over fording in flowing waters due to the reduced risk of damaging the bed and banks of the watercourse and downstream sedimentation caused by vehicles. Separate Operational Statements are available for *Ice Bridges and Snow Fills* used for temporary access during the winter and for non-temporary *Clear Span Bridges*.

The risks to fish and fish habitat associated with temporary stream crossings include the potential for direct harm to stream banks and beds, release of excessive sediments and other deleterious substances (e.g., fuel, oil leaks), loss of riparian habitat and disruption to sensitive fish life stages.

Fisheries and Oceans Canada (DFO) is responsible for protecting fish and fish habitat across Canada. Under the *Fisheries Act* no one may carry out a work or undertaking that will cause the harmful alteration, disruption or destruction (HADD) of fish habitat unless it has been authorized by DFO. By following the conditions and measures set out below you will be in compliance with subsection 35(1) of the *Fisheries Act*.

The purpose of this Operational Statement is to describe the conditions under which it is applicable to your project and the measures to incorporate into your project in order to avoid negative impacts to fish habitat. You may proceed with your temporary stream crossing project without a DFO review when you meet the following conditions:

- the bridge is no greater than one lane in width, and no part of its structure is placed within the wetted portion of the stream,
- the work does not include realigning the watercourse,
- for fording in flowing waters and temporary bridges, the channel width at the crossing site is no greater than 5 metres from ordinary high water mark to ordinary high water mark (HWM) (see definition below),
- disturbance to riparian vegetation is minimized,
- the work does not involve dredging, infilling, grading or excavating the bed or bank of the watercourse,
- all crossing materials will be removed prior to the spring freshet, or immediately following project completion if this occurs earlier,
- fording involves a one time event (over and back) and will not occur in areas that are known fish spawning sites,
- the crossing will not result in erosion and sedimentation of the stream, or alteration (e.g., compaction or rutting) of the bed and bank substrates,
- the crossing does not involve installation of a temporary culvert, and
- you incorporate the *Measures to Protect Fish and Fish Habitat when Carrying Out a Temporary Stream Crossing* listed below.

If you cannot meet all of the conditions listed above and cannot incorporate all of the measures listed below then your project may result in a violation of subsection 35(1) of the *Fisheries Act* and you could be subject to enforcement action. In this case, you should contact your Conservation Authority, or the DFO office in your area (see Ontario DFO office list) or Parks Canada if the project is located within its jurisdiction, including the Trent-Severn Waterway and the Rideau Canal, if you wish to obtain an opinion on the possible options you should consider to avoid contravention of the *Fisheries Act*. For activities carried out under the *Crown Forest Sustainability Act*, the requirements of this Operational Statement are addressed through an existing agreement and the Ontario Ministry of Natural Resources is the first point of contact.

You are required to respect all municipal, provincial and federal legislation that applies to the work being carried out in relation to this Operational Statement. The activities undertaken in this Operational Statement must also comply with the *Species at Risk Act* (SARA) (**www.sararegistry.gc.ca**). If you have questions regarding this Operational Statement, please contact one of the agencies listed above.

We ask that you notify DFO, preferably 10 working days before starting your work, by filling out and sending the Ontario Operational Statement notification form (**www.dfo-mpo.gc.ca/regions/central/habitat/os-eo/prov-terr/index_e.htm**) to the DFO office in your area. This information is requested in order to evaluate the effectiveness of the work carried out in relation to this Operational Statement.

Measures to Protect Fish and Fish Habitat when Carrying Out a Temporary Stream Crossing

1. Use existing trails, roads or cut lines wherever possible, as access routes to avoid disturbance to the riparian vegetation.

2. Locate crossings at straight sections of the stream, perpendicular to the bank, whenever possible. Avoid crossing on meander bends, braided streams, alluvial fans, or any other area that is inherently unstable and may result in the erosion and scouring of the stream bed.

3. While this Operational Statement does not cover the clearing of riparian vegetation, the removal of select plants may be necessary to access the construction site. This removal should be kept to a minimum and within the road or utility right-of-way. When practicable, prune or top the vegetation instead of uprooting.

4. Generally, there are no restrictions on timing for the construction of bridge structures or fording seasonally dry streambeds, as they do not involve in-water work. However, if there are any activities with the potential to disrupt sensitive fish life stages (e.g., fording of the watercourse by machinery) these should adhere to appropriate fisheries timing widows (see the *Ontario In-Water Construction Timing Windows*).

5. Machinery fording a flowing watercourse to bring equipment required for construction to the opposite side is limited to a one-time event (over and back) and is to occur only if an existing crossing at another location is not available or practical to use.

    5.1. If minor rutting is likely to occur, stream bank and bed protection methods (e.g., swamp mats, pads) should be used, provided they do not constrict flows or block fish passage.
    5.2. Grading of the stream banks for the approaches should not occur.
    5.3. If the stream bed and banks are steep and highly erodible (e.g., dominated by organic materials and silts) and erosion and degradation are likely to occur as a result of equipment fording, then a temporary bridge should be used in order to protect these areas.
    5.4. The one-time fording should adhere to fisheries timing windows (see Measure 4).
    5.5. Fording should occur under low flow conditions, and not when flows are elevated due to local rain events or seasonal flooding.

6. Install effective sediment and erosion control measures before starting work to prevent the entry of sediment into the watercourse. Inspect them regularly during the course of construction and make all necessary repairs if any damage occurs.

7. For temporary bridges also employ the following measures:

    7.1. Use only clean materials (e.g., rock or coarse gravel fill, wood, or steel) for approaches to the bridge (i.e., not sand, clay or organic soil) and install in a manner that avoids erosion and sedimentation.
    7.2. Design temporary bridges to accommodate any expected high flows of the watercourse during the construction period.
    7.3. Restore the bank and substrate to pre-construction condition.
    7.4. Completely remove all materials used in the construction of the temporary bridge from the watercourse following the equipment crossing, and stabilize and re-vegetate the banks.

8. Operate machinery in a manner that minimizes disturbance to the watercourse bed and banks.

    8.1. Protect entrances at machinery access points (e.g., using swamp mats) and establish single site entry and exit.
    8.2. Machinery is to arrive on site in a clean condition and is to be maintained free of fluid leaks.
    8.3. Wash, refuel and service machinery and store fuel and other materials for the machinery away from the water to prevent deleterious substances from entering the water.
    8.4. Keep an emergency spill kit on site in case of fluid leaks or spills from machinery.

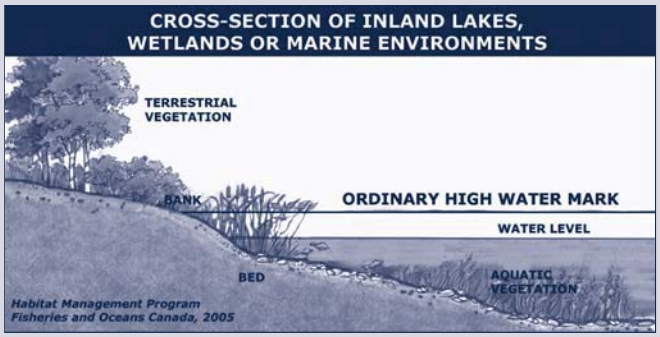
9. Stabilize any waste materials removed from the work site, above the HWM, to prevent them from entering any watercourse. This could include covering spoil piles with biodegradable mats or tarps or planting them with preferably native grass or shrubs.

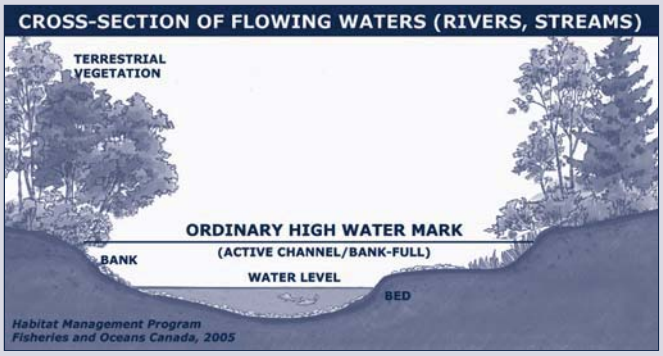
10. Vegetate any disturbed areas by planting and seeding preferably with native trees, shrubs or grasses and cover such areas with mulch to prevent soil erosion and to help seeds germinate. If there is insufficient time remaining in the growing season, the site should be stabilized (e.g., cover exposed areas with erosion control blankets to keep the soil in place and prevent erosion) and vegetated the following spring.

    10.1. Maintain effective sediment and erosion control measures until re-vegetation of disturbed areas is achieved.

Definition:

Ordinary high water mark (HWM) - The usual or average level to which a body of water rises at its highest point and remains for sufficient time so as to change the characteristics of the land. In flowing waters (rivers, streams) this refers to the “active channel/bank-full level” which is often the 1:2 year flood flow return level. In inland lakes, wetlands or marine environments it refers to those parts of the water body bed and banks that are frequently flooded by water so as to leave a mark on the land and where the natural vegetation changes from predominately aquatic vegetation to terrestrial vegetation (excepting water tolerant species). For reservoirs this refers to normal high operating levels (Full Supply Level).





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http://www.dfo-mpo.gc.ca/oceans-habitat/habitat/modernizing-moderniser/epmp-pmpe/index_f.asp

DFO/2007-1329

Appendix F

Curricula Vitae

Mark C. Pomeroy B.Sc.

Fisheries Biologist

Mark has 13 years experience with fisheries habitat and impact assessments, encompassing numerous habitat types including lakes, ponds, large rivers, warmwater and coldwater streams. Past employment with the Department of Fisheries and Oceans (DFO), Grand River Conservation Authority and St. Clair Region Conservation Authority contributes to Mark's extensive working experience with regulatory and approvals processes related to the Fisheries, Conservation Authorities and Drainage Acts. Mark has developed and implemented monitoring, mitigation, compensation and inventory processes. He has also been involved in several projects in a construction monitoring and inspection capicity, where he has resolved various issues related to Fisheries Act approvals and Species at Risk. He has also coordinated many large field sampling programs where data for a large number of varied parameters (such as water quality, fish habitat and community, sediment and benthos) were collected.

EDUCATION

Honours B.Sc. (Agriculture), University of Guelph / Natural Resources Management, Guelph, Ontario, 2000

Fisheries Assessment Specialist and Fisheries Contracts Specialist, MTO/DFO/OMNR Fisheries Protocol Course, Downsview, Ontario, 2006

Class 1 Electrofishing Certificate / Ministry of Natural Resources, Waterloo, Ontario, 2010

Ontario Freshwater Mussel Identification Workshop / Fisheries and Oceans Canada - Canada Centre for Inland Waters, Burlington, Ontario, 2007

PROJECT EXPERIENCE

Environmental Assessments

Pier 22 Environmental Assessment, Hamilton, Ontario (Aquatic Biologist)
Negotiated Fisheries Act approvals for improvements to Pier 22 lands. Improvement works included infill of watercourse reaches on the property. Additionally, contributed relevant input to federal environmental assessment process.

Bruce to Milton, Various, Ontario (Fisheries Biologist)
Planned, coordinated and assisted with execution of large-scale fisheries field program to assess potential impacts of proposed hydroelectric corridor reinforcement project and provided relevant input to the provincial environmental assessment process as well as the Fisheries Act and Conservation Authorities Act permitting processes. Managed data entry, analysis and completed reporting of aquatic resources sections. Coordination of multi-disciplinary team and regulatory agencies for acquisition of appropriate permits and approvals.

Yellow Falls Hydroelectric Project, Smooth Rock Falls, Ontario (Aquatic Biologist)
Planned, coordinated and assisted with execution of fisheries field program to assess potential impacts of proposed hydroelectric dam project. Facilitated acquisition of permits and approvals from relevant agencies. Assisted with fish, benthos, habitat, water and sediment sampling. Authored significant portions of the technical appendix related to aquatic study results.

Environmental Impact Assessments

Georgia Pacific Thorold Cycle 4 EEM, Thorold, Ontario (Aquatic Ecologist)
Assisted in field sampling of fish, benthos, water and sediment for federally regulated pulp and paper environmental effects monitoring.

Spruce Falls Cycle 4 EEM, Kapuskasing, Ontario (Aquatic Ecologist)
Assisted in field sampling of fish, benthos, water and sediment for federally regulated pulp and paper environmental effects monitoring.

Smooth Rock Falls Cycle 4 EEM, Smooth Rock Falls, Ontario (Aquatic Ecologist)
Assisted in field sampling of fish, benthos, water and sediment for federally regulated pulp and paper environmental effects monitoring.

Highway and Transportation

Detroit Windsor Truck Ferry Improvements (Design) (GWP 3071-06-00), Windsor, ON (Fisheries Biologist)
Provided aquatic community and habitat assessment services as well
as input regarding project design, construction staging and silt and sediment control planning. Acquired approvals under Fisheries Act and Conservation Authorities Act related to fish habitat.

** denotes projects completed with other firms*

Mark C. Pomeroy B.Sc.

Fisheries Biologist

Highway 24 Intersection Improvements, Cambridge, ON (Fisheries Biologist)
Provided fish rescue services. Performed environmental inspection duties related to implementation of the Fisheries Act compensation plan and resolution of onsite issues related to construction.

Detroit Windsor Truck Ferry Improvements (Contract Administration) (WP 3071-06-00), Windsor, ON (Fisheries Biologist)
Construction monitoring services related to Fisheries Act implications (fish removals, species at risk identification training for contract staff , staging and implementation design review), provision of advice regarding alternative staging/construction operations to prevent impacts to aquatic habitat/organisms.

Natural Resource Services

Municipal Drain Classification Program*, Various, Ontario (Drain Assessment Technician)
Planned and implemented large scale sampling protocol designed by DFO to assess the sensitivity of various municipal drains to disturbance. Sampling program encompassed all drains within the Grand River watershed and consisted of habitat, thermal and fish community characterization based on extensive field sampling. Analyzed substantial quantities of field data, summarized results and produced interim and final reports.

Fish Habitat Study*, Strathroy, Ontario (Biological Technician)
Planned and implemented field program to sample fish community in reservoirs managed by the St. Clair Region Conservation Authority. Responsible for writing final report concerning existing fish habitat status and providing recommendations based on field data. Participated in water quality and benthic community field sampling programs.

Various Environmental Assessments*, Sarnia, Ontario (Fish Habitat Biologist)
Assessed project proposals for impacts to fish habitat as defined in the Fisheries Act. Carried out screening level environmental assessments of proposed projects under the Canadian Environmental Assessment Act. Participated in outreach programs and inter-agency work groups regarding Species at Risk recovery.

Urban Land

Berczy Dam Removal, Markham, Ontario (Fisheries Biologist)
Provided fish rescue services, including resolution of issues related to Species at Risk.

Medway Sanitary Trunk Sewer Extension, London, Ontario (Fisheries Biologist)
Assisted with approvals application to DFO, MNR regarding pipeline crossing of Medway Creek and assessing potential impact to Species at Risk and fish habitat.

Fox Hollow Subdivision, London, Ontario (Fisheries Biologist)
Facilitated acquisition of approvals from DFO for the realignment of the Heard Drain/Snake Creek and the installation of a stormwater management pond in relation to construction of the Fox Hollow Subdivision. Performed construction inspection services, resolved onsite implementation issues related to the Fisheries Act.

Fanshawe Park Road Widening, London, Ontario (Fisheries Biologist)
Facilitated acquisition of approvals from DFO for the realignment of Heard Drain/Snake creek during the expansion of Fanshawe Park Road. Performed construction inspection services, resolved onsite implementation issues related to the Fisheries Act.

** denotes projects completed with other firms*

Nancy A. Harttrup B.Sc.

Senior Fisheries Biologist

Nancy is a Project Manager with extensive experience collecting and analyzing data related to aquatic systems. Project experience includes aquatic impact assessments related to urban development, highway and pipeline construction, and aggregate extraction. Nancy has also managed environmental effects monitoring (EEM) programs for the mining and pulp and paper industries and has been involved in watershed studies, literature searches and analysis of benthic invertebrate and water quality data relative to environmental quality.

EDUCATION

B.Sc. (Honours), Co-op Biology, University of Waterloo, Waterloo, Ontario, 1986

PROJECT EXPERIENCE

Aquatic Ecology

Letter of Intent for DFO Authorization, Tributary of Baden Creek, Baden, Ontario (Task Manager/Biologist)

A stormwater management pond outfall in a new subdivision in the town of Baden resulted in the loss of fish habitat in a small tributary of Baden Creek. Mapping of the location was prepared and a general survey of watercourse conditions was conducted for approximately 1km downstream. Together with available background data on the main channel of Baden Creek, fish habitat data were summarized and used in the Letter of Intent (LOI) submitted to DFO for authorization of the project. The LOI included mitigation and compensation measures for the loss of fish habitat that resulted from the SWM outfall.

Letter of Intent for DFO Authorization, Strasburg Creek at Strasburg Road Extension, Kitchener, Ontario (Task Manager/Biologist)

The extension of Strasburg Road in the City of Kitchener required a new crossing of Strasburg Creek, which provides coldwater fish habitat. Detailed mapping of the creek was prepared and areas both upstream and downstream of the proposed crossing location were surveyed, documenting any locations that were blockages to fish migration or areas of high quality habitat. Additional data collected were a fish community inventory, summer water temperatures (hourly data by instream loggers) and a fall spawning survey. All fisheries and fish habitat data were summarized and used in the Letter of Intent (LOI) submitted to DFO for authorization of the project. The LOI included mitigation and compensation measures for the loss of fish habitat that resulted from the installation of the 40m long culvert.

Brant Mill Pond Fisheries Impact Assessment, Brant County, Ontario (Task Manager/Biologist)

A bridge replacement was required on a road crossing the outlet of Brand Mill Pond. The mill pond dam was structurally tied to the bridge, therefore a method was needed to reduce water pressure on the dam prior to bridge removal and replacement. Various construction scenarios were considered, including draining or partially draining the mill pond. A bathymetric survey of a mill pond was conducted to provide an indicator of the amount of available fish habitat in the pond (by depth) and the dominant substrate types in the pond. A document summarizing fish habitat conditions in the pond and possible impacts to fish habitat based on the selected construction method was submitted to GRCA for review.

Nancy A. Harttrup B.Sc.

Senior Fisheries Biologist

Benthic Invertebrate Community Survey in the Maitland River at Wingham, Wingham, Ontario (Project Manager)

Since 1998, Nancy has been the Project Manager for an ongoing benthic invertebrate survey in the Maitland River in Wingham, Ontario. The monitoring is an annual program that involves the collection of benthic invertebrate samples from the river as an indicator of the quality of aquatic habitat in the river adjacent to a closed landfill site. Since 1999, Nancy has been responsible for Project Management of the survey, the coordination of data collection, data analysis and reporting.

Fish Community Assessment and Habitat Inventory of Strasburg Creek near Doon Village Road, Kitchener, Ontario (Project Manager)

An aquatic habitat survey was conducted in Strasburg creek, mapping physical features such as substrates, stream morphology, and instream and riparian cover. The data were required as part of the natural environment inventory for the future alignment of Doon Mills Road. Subsequent to the initial survey, fish community data were also collected in the area. During the construction phase, Nancy also participated in the fish transfer of fish from the creek to the temporary diversion channel, prior to creek realignment.

Fish and Fish Habitat Survey of four watercourses crossing Highway 401 near Cambridge, Ontario, Evaluation of Highway 401 and 8 Access and Interchange Improvements, Kitchener and Cambridge, Ontario (Task Manager, Field Crew Leader)

As a part of a Preliminary Design study for interchange improvements along Highway 401 between the Grand River and Speed River, Nancy conducted field surveys and an existing conditions report for these watercourses and two other small watercourses that cross the Highway 401 in the Cambridge area. The final Preferred Plan only had changes proposed for the Highway 8 and 401 interchange, potentially affecting aquatic resources in the Grand River. The study involved the collection of background data, detailed habitat mapping and the collection of fish community data, however the Grand River site was not sampled as part of this project. Reporting included a preliminary assessment of aquatic habitat impacts, and a summary of recommended mitigation measures based on the Preferred Plan for highway widening.

Fish and Fish Habitat Survey of four watercourses near Highway 11 near Allensville, Ontario - Evaluation of Highway 11 Access and Interchange Improvements, Huntsville, Ontario (Task Manager/Fisheries Assessment Specialist)

As a part of a Preliminary Design study for access and interchange improvements along Highway 11 south of Huntsville, Nancy conducted field surveys and prepared an existing conditions report for four watercourses that cross or are adjacent to the Highway 11 Study Area. The study involved the collection of background data, detailed habitat mapping and the collection of fish community data. Reporting included a preliminary assessment of aquatic habitat impacts, and a summary of recommended mitigation measures based on the Preferred Plan for access improvements.

** denotes projects completed with other firms*

Nancy A. Harttrup B.Sc.

Senior Fisheries Biologist

Fish and Fish Habitat Survey of the Mattawishkwia River; Highway 11 Replacement of the Mattawishkwia River Bridge at Hearst, Ontario (Task Manager, Fisheries Assessment Specialist)

As a part of a Preliminary Design study for the replacement of the Mattawishkwia River bridge, Nancy managed field surveys and prepared an Impact Assessment Report for the project. The study involved the collection of background data, detailed habitat mapping and the collection of fish community data following the 2006 Protocol. Reporting included a preliminary assessment of aquatic habitat impacts based on the Preferred Plan, and mitigation measures to protect fish habitat in the river during construction.

Fish and Fish Habitat Survey of watercourses near Highway 11; Access Review on Highway 11 from Powassan to Callander, Ontario (Task Manager, Fisheries Assessment Specialist)

As a part of a Preliminary Design study for access and interchange improvements along Highway 11 between Powassan and Callander, Nancy conducted field surveys and prepared an existing conditions report for watercourses that cross or are adjacent to the Highway 11 Study Area. The study involved the collection of background data, detailed habitat mapping and the collection of fish community data following the 2006 MTO/DFO/OMNR Fisheries Protocol. Reporting included a preliminary assessment of aquatic habitat impacts, and a summary of recommended mitigation measures based on the Preferred Plan for access improvements.

Fish and Fish Habitat Survey of watercourses near Highway 11; Highway 11 Access Review at High Falls Road/Holiday Park Drive near Bracebridge, Ontario (Task Manager, Fisheries Assessment Specialist)

As a part of a Preliminary Design study for interchange improvements on Highway 11 at Bracebridge, Nancy is conducted field surveys and an existing conditions report for watercourses in the Study Area. The study involved the collection of background data, detailed habitat mapping and the collection of fish community data at locations potentially affected by the Preferred Plan. Data collection and reporting followed the requirements of the 2006 MTO/DFO/OMNR Fisheries Protocol Reporting included a preliminary assessment of aquatic habitat impacts, and a summary of recommended mitigation measures based on the Preferred Plan for highway access and service roads.

Fish and Fish Habitat Surveys along Highway 66 and 624 near Larder Lake; Rehabilitation of Highway 66 and 624, Ontario (Task Manager, Fisheries Assessment Specialist)

As a part of a Detail Design study for the Rehabilitation of Highways 66 and 624 (District of Timiskaming) Nancy managed the field surveys and reporting for this project. Limited background data were available for the study area. Field data collection and reporting followed the 2006 MTO/DFO/OMNR Protocol and reporting included impact assessments for the numerous watercourses in the study area. Impact assessments were based the proposed work required at each culvert (eg. rehabilitation, replacement) which subsequently lead to the completion of appropriate forms and submissions to DFO.

** denotes projects completed with other firms*

Nancy A. Harttrup B.Sc.

Senior Fisheries Biologist

Fish and Fish Habitat Surveys watercourses along Highway 40 near Chatham, Chatham, Ontario (Task Manager, Fisheries Assessment Specialist)

As a part of a Detail Design study for rehabilitation of Highway 40 south of Chatham, Nancy conducted field surveys and prepared an Impact Assessment Report for watercourses that cross Highway 40 between Highway 401 and the Thames River. The study involved the collection of background data, detailed habitat mapping and the collection of fish community data. Reporting included an assessment of aquatic habitat impacts, and mitigation measures to protect fish habitat in the watercourses during construction.

Fish and Fish Habitat Surveys watercourses near Highway 26 at Camperdown, Camperdown, Ontario (Task Manager, Fisheries Assessment Specialist)

As a part of a Preliminary Design study for intersection improvements along Highway 26 near Camperdown, Nancy conducted field surveys and prepared an existing conditions report for three watercourses that cross Highway 26 in the vicinity of Grey Road 40 and Camperdown Road. The study involved the collection of background data, detailed habitat mapping and the collection of fish community data. Reporting included a preliminary assessment of aquatic habitat impacts, and a summary of recommended mitigation measures based on the Preferred Plan for intersection improvements.

Galt Country Club - Letter of Intent for DFO Authorization, Cambridge, Ontario (Task Manager/Biologist)

The re-design of a golf course fairway at the Galt Country Club resulted in changes to fish habitat in a golf course pond located in the floodplain and connected to the Grand River. Information regarding available data on fish species in the Grand River and detailed plans regarding changes to the pond were prepared as a Letter of Intent (LOI) and submitted to DFO for authorization of the project. The LOI included details of the existing and proposed pond areas and depths, illustrating that the new pond would actually provide more potential fish habitat than before. Additional habitat enhancements were added to the plan to provide underwater structure to fish that utilized the new pond.

Mill Creek Surface Water Monitoring Program, Guelph, Ontario (Project Manager, Fisheries Biologist)

To assess potential impacts on Mill Creek (a tributary to the Grand River), a long-term Surface Water Monitoring Program (SWMP) was initiated to monitor water quality, brown trout (Salmo trutta) populations, water levels and stream temperatures over time. During the 10-years involved in this project, Nancy's duties included project management, the coordination of annual spawning surveys, population surveys as well as water quality sampling. Annual reports included the compilation of annual fisheries data and the integration of fisheries data with groundwater and surface water data into a comprehensive monitoring report.

Receiver Biomonitoring in Canagagigue Creek, Elmira, Ontario (Project Manager)

Since 1998, Nancy has been the Project Manager for an ongoing Biomonitoring Program in Canagagigue Creek in Elmira, ON. The monitoring is now a biannual program that sees the collection of benthic invertebrate, sediment and fish community data in the creek. The program is a condition of the C of A for discharge of treated groundwater to the creek. Since 1999, Nancy has been responsible for Project Management of the survey, the coordination of data collection, data analysis and reporting.

Wilmot Centre Trout Spawning Surveys, Waterloo (Wilmot Centre), Ontario (Project Manager)

Annual brook trout spawning surveys have been completed in a small coldwater creek in Wilmot Centre in the vicinity of groundwater wells that provide drinking water to the supply Regional Municipality of Waterloo. The program is part of the Wilmot Centre monitoring program and looks at annual brook trout spawning activity in the creek as an indicator of the quantity and quality of suitable habitat. Brook trout depend on areas of groundwater upwelling for spawning purposes therefore the health of the fishery is related to groundwater levels in the area.

Natural Sciences & Heritage Resources

Letter of Intent for DFO Authorization, Galt Country Club, Cambridge, Ontario

** denotes projects completed with other firms*

Letter of Intent for DFO, Ninth Line Tributary, TACC Construction Ltd., Markham, Ontario

Long-term Monitoring and Reporting of Brown Trout Spawning Activity, Populations and Surface Water Quality in a Coldwater Stream Adjacent to an Active Gravel Pit (1993 to2003) - Dufferin Aggregates (Project Manager)

Numerous Aquatic Habitat Impact Assessments Related to Residential Development, Pipeline Construction, Road Construction and Alterations (Aquatic Biologist)

Wastewater

Cycle 1 Environmental Effects Monitoring: Project Management, Field Studies and Data Analysis, Domtar Packaging, Trenton, Ontario (Aquatic Biologist)

Cycle 1 Environmental Effects Monitoring: project management, field studies and data analysis, Domtar Packaging, Norampac Inc., Red Rock, Ontario (Aquatic Biologist / Project Manager)

Cycle 1, 2 and 3 Environmental Effects Monitoring: Project Management, Field Studies and Data Analysis, Domtar Fine Papers, Cornwall, Ontario (Aquatic Biologist)

Cycle 2 and 3 Environmental Effects Monitoring: Project Management and Data Analysis, Provincial Papers Inc., Cascades Fine Papers Group, Thunder Bay, Ontario (Project Manager)