



**SUNCOR ENERGY CEDAR POINT
WIND POWER PROJECT**
WATER ASSESSMENT AND WATER
BODY REPORT

April 2013
Project No. 160960709

Prepared for:

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1.0 Introduction

1.1 PROJECT OVERVIEW

Suncor Energy Products Inc. (“Suncor”) is proposing to develop the Suncor Energy Cedar Point Wind Power Project (the Project) within the Town of Plympton-Wyoming, the Municipality of Lambton Shores, and Warwick Township all within Lambton County, Ontario. The proposed Project was awarded a Feed-In-Tariff (FIT) contract with the Ontario Power Authority (OPA) in July, 2011 for up to 100 MW (FIT Contract F-002175-WIN-130-601).

It is envisioned that the proposed Project will include up to 46 wind turbines. The proposed Project would also include access roads, meteorological towers (met towers), electrical collector lines, substation, and a 115 kV transmission line. Suncor has elected to assess and seek approval for some alternative Project configurations. The Renewable Energy Approval (REA) application process will consider up to nine (9) alternative turbine locations. Final selection of the turbine sites will be determined prior to Project construction and will be based on consultation activities, potential effects assessments, and detailed design / engineering work. Commercial operation is currently planned for December 2014.

The Project Location includes all land and buildings/structures associated with the Project and any air space in which the Project will occupy. This includes structures such as turbines, access roads and power lines that will be utilized throughout the life of the Project.

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

Once the Project layout was confirmed, a water records review and site assessment was conducted according to Section 30(1) of O. Reg. 359/09. Additionally, fish communities were sampled at selected water bodies within the Zone of Investigation and a general aquatic habitat assessment was conducted. A combination of background data and results of Stantec’s 2011 and 2012 surveys were used to determine the presence or absence of water bodies and fish habitat within the Zone of Investigation. Photographs of all water features investigated were taken during field surveys.

An overview of the Project Location and the watersheds encompassed by the study area is presented in **Figure 1.1**, while **Figure 1.2** displays an overview of the Project Location and Water Body Assessment Stations. Water bodies that are located within 120 m of the proposed Project Location are presented in **Figures 2.1 to 2.16** and summarized in **Table 3.1**. All water

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bodies identified within 120 m of the Project Location are located greater than 30 m from any turbine (measured from blade tip) and the Project’s Substation. The designation of features as water bodies was agreed upon by field staff using field conditions at the time of the survey and the definition of a water body provided in O. Reg. 359/09.

This Water Assessment and Water Body Report has been prepared in accordance with O. Reg. 359/09 (s. 39 and 40), the MOE document “Technical Guide to Renewable Energy Approvals”, “Technical Bulletin: Guidance for Preparing the Water Assessment and Water Body Reports” and the MNR’s APRD. The Project boundary is not located within the Niagara Escarpment Plan, the Oak Ridges Moraine Conservation Plan Area or the Protected Countryside of the Greenbelt Plan. Stormwater management (SWM) facilities will consist of a series of swales and ditches adjacent to the substation. No “wet” facility is proposed as the drainage area of hardened surfaces is less than 2 ha. Further discussion of the SWM is provided in the Design and Operations Report (Stantec, 2013a)

1.2 REPORT REQUIREMENTS

A Water Assessment includes a records review and site investigation to determine the presence and boundaries of water bodies as defined in O. Reg. 359/09 within 120 m of the Project Location (assuming that no Lake Trout lakes that are at or above development capacity are identified within 300 m). If water bodies are identified within 120 m of the Project Location, a Water Body Report must be prepared. A water body report is required for the project because “the construction, installation, or expansion of wind turbines, a transformer substation and/or prescribed associated, or ancillary equipment, systems or technologies in at least one project location is within 120 m of the average annual high water mark of a permanent or intermittent stream.”, as indicated in O. Reg. 359/09.

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

Table 1.1 summarizes the documentation requirements of the Water Assessment and Water Body Reports 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:		
1. A records review conducted in accordance with section 30.	✓	2.2, 4.0
2. A site investigation conducted in accordance with section 31, including:		

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

Requirements (Water Assessment)	Completed	Section Reference
31(4)(1). A summary of any corrections to the report.	✓	Section 4, Figures 2.1 to 2.10
31(4)(2). Information relating to each water body.	✓	4.2-4.17
31(4)(3). A map showing boundaries, location/type and distances.	✓	Appendix A (Figures 1, 2 and 3), Section 4 Summary Tables
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 D
If an alternative investigation of the site was conducted:		
31(4)(7)(i). The dates of the generation of the data used in the site investigation.		N/A
31(4)(7)(ii). An explanation of why the person who conducted the alternative investigation determined that it was not reasonable to conduct the site investigation by visiting the site.		N/A
Requirements (Water Body)		
4. Report identifies and assesses any negative environmental effects of the project on a water body and on land within 30 metres of the water body.	✓	4.17, 5.0
5. Report identifies mitigation measures in respect of any negative environmental effects.	✓	6.0
6. Report describes how the environmental effects monitoring plan addresses any negative environmental effects.	✓	7.0
7. Report describes how the construction plan report addresses any negative environmental effects.	✓	6.0, 7.1

2.0 Methods

2.1 DEFINITION OF A WATER BODY

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

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

2.2 RECORDS REVIEW

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

- Ontario Ministry of Natural Resources
- Land Information Ontario mapping database (LIO, 2012)
- St. Clair Region Conservation Authority (SCRCA)
- Lambton County Environmental Atlas

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

Figures depicting the watercourses and waterbodies identified by LIO mapping (MNR, 2009) are included in **Figures 2.1 through 2.10, Appendix A**, where "watercourses" and "waterbodies" are water features (including lakes, rivers, streams, etc.), as mapped by the MNR. These water features may or may not meet the definition of a water body as described in Section 2.1. Potential waterbodies were also identified through a review of aerial photographs of the 120 m Zone of Investigation. Further information on these potential water bodies was obtained during the site investigations (as described in Section 2.3).

The MNR provided background data regarding fish communities at a number of locations in the Zone of Investigation. The St. Clair Region Conservation Authority (SCRCA) provided the Department of Fisheries and Oceans (DFO) Drain Classification mapping and fish community data for watercourses within the Zone of Investigation. The only relevant data source available

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from Lambton County was the Lambton County Environmental Atlas. The Atlas did not identify any additional watercourses other than those already identified in the LIO database and is therefore not discussed further.

Corrections to the LIO watercourse layer are identified in Sections 4.1 to 4.16 and are illustrated in **Figures 2.1 to 2.10**.

2.3 SITE INVESTIGATIONS

Site investigations were carried out according to Section 31 of O. Reg. 359/09. The investigations were conducted on November 21-25 and November 28-29, 2011 and May 8-11, June 4-7, July 3-5, July 25, 2012, October 3-4, 2012, November 29, 2012 and December 3, 2012, as noted on the field records (see **Appendix D**). Table 2.1 summarizes the duration of the site investigations and the weather conditions preceding and during each field visit.

Table 2.1: Duration of Site Investigations and Weather Conditions*

Dates	Duration of Site Investigation (hours)	Daily Max Temperature (Range) °C	Weather Prior to Surveys
November 21 to 25, 2011	Nov 21 = 4 Nov 22 = 10 Nov 23 = 5 Nov 24 = 10 Nov 25 = 10	-1.5 – 12.5	During the two weeks preceding the field investigations, temperatures were relatively cool and a total of 42.4 mm of rain was recorded, the bulk of which fell on Nov 13-14 and November 22, 2011. During the investigations, the weather was cool, overcast and less than 1 mm of rain fell on Nov 24, 2011.
November 28 to 29, 2011	Nov 28 = 8 Nov 29 = 11	3 - 10	During the two weeks preceding the field investigations, the weather was cool and approximately 50 mm of rain was recorded, falling mainly on November 14, 22, 26 and 27, 2011. During the investigations, the weather was cool and wet with 66.1mm of precipitation falling over two days, resulting in high flows and bank-full water levels.
May 8 to 11, 2012	May 8 = 11.5 May 9 = 10.5 May 10 = 10.5 May 11 = 8	3.5 – 23.5	During the two weeks preceding the field investigations, the weather transitioned from cool to warm and approximately 42 mm of rain was recorded. During the investigations, the weather was warm and dry with minor precipitation (1mm) on May 8 and 9, 2012.
June 4 to 7, 2012	June 4 = 8 June 5 = 9 June 6 = 10 June 7 = 11.5	8 - 23	During the two weeks preceding the field investigations, the weather was very warm and approximately 38.4 mm of rain was recorded. During the investigations, the weather was warm and dry with minor precipitation (1mm) on June 4, 2012.
July 3 to 5, 2012	July 3 = 7.5 July 4 = 7.5 July 5 = 7.5	18.5 – 34.5	During the two weeks preceding the field investigations, the weather was hot and approximately 28.6 mm of rain was recorded. During the investigations, the weather was hot and dry with isolated thundershowers (5.6mm) on the afternoon of July 3, 2012.
July 25, 2012	July 25 = 10	11 - 29	During the two weeks preceding the field investigations, the weather was hot and approximately 8.8 mm of rain was recorded. During the investigations, the weather was hot and with isolated thundershowers (9.2mm) in the afternoon.
October 3 and 4, 2012	Oct 3 = 11.5 Oct 4 = 8	17 - 19	During the two weeks preceding the field investigations, the weather was mild and approximately 2.2 mm of rain

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Table 2.1: Duration of Site Investigations and Weather Conditions*

Dates	Duration of Site Investigation (hours)	Daily Max Temperature (Range) °C	Weather Prior to Surveys
			was recorded. During the investigations, the weather was warm with some rainfall (3.6 mm) recorded over the two days.
November 29 and December 3, 2012	Nov 29 = 11 Dec 3 = 12	1.5 - 15	During the two weeks preceding the field investigations, the weather was cool to mild and approximately 11.2 mm of rain was recorded. During the investigations, the weather was cool to mild with no precipitation recorded during the field investigations.

*Temperature and rainfall data from the Thedford Environment Canada Station (EC 2012).

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 during the records review; and
- Identify the boundaries of any water body located within 120 m of the Project Location.

Once the project layout was confirmed, the field crews conducted visual inspections to verify the presence or absence of potential water bodies within 120 m of the Project Location. In some cases, marshes or portions of other on-line wetland features meet the definition of a water body if they are part of a permanent or intermittent channel or seepage area. All other wetland types do not contain channels and therefore do not meet the definition of a water body under O. Reg. 359/09 and are addressed in the NHA/EIS. The presence or absence of water bodies was determined using methods and characteristics consistent with those presented in the *Technical Guide to Renewable Energy Approvals*, Chapter 8, Section 5.2.1 (MOE, 2011).

A general aquatic habitat assessment was conducted at water bodies identified within the 120 m Zone of Investigation and fish communities were sampled at representative locations. Fish were collected using either a Smith Root Model 12 or Model 24 backpack electrofisher or minnow traps and were sampled May 8-11, July 3-5, and October 3-4, 2012. In cases where one water body traversed several Project components, one or two representative locations were fished to determine the general species assemblage for the watercourse. Specific locations where fishing was completed are identified in **Appendix C**. A combination of background data and results of Stantec’s 2011 and 2012 surveys were used to determine the presence or absence of fish habitat within the 120 m Zone of Investigation.

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

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

- **Direct Fish Habitat – Seasonal** – intermittent watercourse (as per drain classification or field observation) that is directly connected to a downstream watercourse that supports fish or where Stantec surveys captured fish.
- **Indirectly Contributes to Fish Habitat** – intermittent flow (as per field observations) and although no fish were observed or captured, the channel contributes indirectly (e.g., allochthonous inputs, flow) to downstream reaches supporting fish.
- **Not Fish Habitat** – not directly connected to a downstream water feature that supports fish or where Stantec surveys captured fish.

2.4 QUALIFICATIONS

The following Stantec personnel were responsible for the identification of water bodies according to O. Reg. 359/09:

- Katie Easterling, B.Sc. (Hon), Dip., EPt – Aquatic Ecologist
- Joe Keene, M.Sc. – Aquatic Ecologist
- Nancy Harttrup, B.Sc. – Senior Aquatic Ecologist
- Mark Pomeroy, B.Sc – Aquatic Ecologist
- Marc Faiella, Dip. – Aquatic Ecologist
- Nathan Burnett, B.Sc, Dip. – Aquatic Ecologist

They were also responsible for identifying potential negative environmental effects of the project, both on and within 120 m of the identified water bodies.

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

3.0 Water Assessment and Water Bodies within the 120 m Zone of Investigation

As indicated in Section 2.2, the presence or absence of water bodies within the Zone of Investigation was assessed using the definition of a water body provided in O. Reg. 359/09. Based on the results of field investigations and the records review, water bodies within 120 m of the Project Location are summarized in **Table 3-1** and illustrated in **Figure 2.1 to 2.10 (Appendix A)**. Additional site characterization was not necessary as information collected during the records review and site investigations was sufficient to identify potential impacts and associated mitigation measures.

A total of 49 water features were classified as water bodies within the 120 m Zone of Investigation. Some of the surface water features identified on MNR mapping (e.g. watercourses) did not exist in the field or consisted of surficial drainage; therefore, these features were not classified as water bodies during Stantec's 2011 and 2012 field investigations. During the field investigations, there were no additional water bodies or lakes identified within 120 m of the Project Location other than those described in Sections 4.1 to 4.17. Corrections to the LIO watercourse layer are illustrated in **Figures 2.1 to 2.10**, with criteria for their exclusion as water bodies listed in **Table 3-1**. No lakes or seepage areas were identified during the records review or field investigations. Photographs and field notes of these investigations are provided in **Appendices B and D**, and a summary of electrofishing effort is provided in **Appendix C**.

Water bodies within the 120 m Zone of the Investigation are listed in **Table 3-2**, which also identifies Project components and reaches providing fish habitat based on Stantec's water body assessments (fish sampling and habitat assessment). With respect to project components, all turbine access roads include the installation of a collector line at the same location, unless otherwise noted. Water bodies that provide fish habitat are illustrated in **Figure 3.1 to 3.10 (Appendix A)**.

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

A review of draft sourcewater protection planning documents indicates that the Project Location is within the St. Clair Region Source Protection Area and the Ausable Bayfield Source Protection Area. According to the St. Clair Region Assessment Report (2011), there are two "Highly Vulnerable Aquifers" that overlap small areas of the 120 m Zone of Investigation. One large aquifer stretches northeast from Cow Creek to beyond Hickory Creek and a second smaller aquifer is situated around Shashwandah Creek near the intersection of Kinnaird and Proof Line. No project components are located within these highly vulnerable aquifers. The Project Location does not fall within any "Highly Vulnerable Aquifer" within the Ausable Bayfield

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Conservation Authority (ABCA 2011). The Project Location is situated primarily within areas classified as “low” and “medium” with respect to groundwater vulnerability (SCRSPA 2011 and ABCA 2011) (**Appendix A – Figure 4**). Existing sourcewater protection plans associated with the Conservation Authorities have not been approved; therefore there are no policies applicable to the proposed facility. Project activities within these areas are limited to staging and laydown. No Project components will be located within areas of groundwater vulnerability.

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Table 3.1: Subwatershed and Water bodies Summaries

Subwatershed/Water Body	WB Station(s)	NWB Station(s)	Waterbody Criteria+		Not a Water Body Criteria						
			Permanent/ Intermittent Watercourse	Seep+ +	No Surface Feature Present	Grassed Waterway*/ Swale#	Temporary Channel for Surface Drainage*	Roadside Ditch*	Temporarily Poned Area Normally Farmed*	Dugout Pond*	Rock Chute *
Bonnie Doon Creek											
Bonnie Doon Creek	27-3, 27-4		√								
Jardine Drain	27-1		√								
Bonnie Doon Creek-1		27-5				√					
Greendees Drain	25-2, 25-5		√								
30 Creek Drain											
30 Creek Drain	23-1		√								
Aberarder Creek											
Aberarder Creek	33-1, 32-1, 22-1, 22-5		√								
Watson Drain	26-1, 34-1		√								
Bannister Drain	34-2, 24-1, 62-2, 22-6		√								
Bannister Drain-1	62-3		√								
Galbraith Drain		45-1			√						
Byrnes-Sutton Drain	45-2		√								
Byrnes-Sutton Drain-1	45-3		√								
10th Concession Drain	46-2, 33-2		√								
Aberarder Railway Drain		32-4			√						
Aberarder Creek-1	32-3		√								
Unknown Drain	22-3, 22-2	22-3	√		√						
Unknown Drain 2		62-1			√						
Highland Creek											

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Table 3.1: Subwatershed and Water bodies Summaries

Subwatershed/Water Body	WB Station(s)	NWB Station(s)	Waterbody Criteria+		Not a Water Body Criteria						
			Permanent/ Intermittent Watercourse	Seep+ +	No Surface Feature Present	Grassed Waterway*/ Swale#	Temporary Channel for Surface Drainage*	Roadside Ditch*	Temporarily Poned Area Normally Farmed*	Dugout Pond*	Rock Chute *
Highland Creek	31-3, 21-1, 64-2		√								
James-Wilkonson Drain	31-2, 55-3	46-1, 55-2	√		√						
Hartley Drain	32-2, 31-1		√								
Highland Creek-1		64-1			√						
Cates Drain		31-4				√					
Kernohan-O'Donnel Drain	60-1, 55-1, 64-3		√								
Douglas Drain											
Douglas Drain	18-5, 18-1	56-1	√		√						
Hubbard Drain		18-2				√					
Douglas Drain-1	18-3		√								
Lithgow Drain		18-4			√						
Hickory Creek											
Hickory Creek	20-1, 19-2, 17-1, 17-5		√								
Todd Drain		52-2			√						
Todd Drain Branch		52-2			√						
McKinley Drain	19-1, 19-4		√								
Fisher Drain	20-2	20-2	√		√						
Sadler Drain		19-5			√						
Unknown Drain 2	19-3		√								
Unknown Drain 3		19-6			√						
Unknown Drain 4		17-6			√						

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Table 3.1: Subwatershed and Water bodies Summaries

Subwatershed/Water Body	WB Station(s)	NWB Station(s)	Waterbody Criteria+		Not a Water Body Criteria						
			Permanent/ Intermittent Watercourse	Seep+ +	No Surface Feature Present	Grassed Waterway*/ Swale#	Temporary Channel for Surface Drainage*	Roadside Ditch*	Temporarily Poned Area Normally Farmed*	Dugout Pond*	Rock Chute *
Anderson Drain											
Anderson Drain	16-5, 17-3, 17-2, 17-4		√								
Elliot Drain											
Elliot Branch Drain	16-4		√								
Elliot Drain	16-1, 16-2		√								
North Street Drain											
North Street Drain	16-3		√								
Woods Creek											
Woods Creek	10-1, 11-1, 14-2, 14-4		√								
Woods Creek-1	11-2		√								
McCallum Drain	52-1, 51-3		√								
Haney Drain	15-1		√								
Brush Drain	12-2, 12-1, 14-3, 12-3		√								
South Boundary Drain	51-2, 51-4		√								
South Boundary Drain-1	51-1		√								
South Boundary Drain-2		51-5			√						
Malley Drain	42-1		√								
James Creek Drain											
James Creek Drain	13-1, 14-1		√								

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Table 3.1: Subwatershed and Water bodies Summaries

Subwatershed/Water Body	WB Station(s)	NWB Station(s)	Waterbody Criteria+		Not a Water Body Criteria						
			Permanent/ Intermittent Watercourse	Seep+ +	No Surface Feature Present	Grassed Waterway*/ Swale#	Temporary Channel for Surface Drainage*	Roadside Ditch*	Temporarily Poned Area Normally Farmed*	Dugout Pond*	Rock Chute *
Beith Creek											
Frayne Drain	4-3, 5-4		√								
Wadsworth Drain	6-1, 6-2, 5-7		√								
Beith Creek Drain	5-2, 5-1, 5-3		√								
Shashawandah Creek											
Shashawandah Creek	9-2, 9-5, 3-1, 2-6, 3-2		√								
Russel Drain	9-1		√								
Ross Drain	4-1, 4-4		√								
Stewardson Drain	4-2, 4-5		√								
Duffus Drain											
Lusby Drain	2-5, 2-3, 2-2		√								
Duffus Drain	2-4, 2-1, 2-7		√								
Walden Drain	1-3		√								
Mud Creek											
Mud Creek	53-1, 53-4, 53-5		√								
Mud Creek-1		53-5				√					
10th Concession Drain	53-2, 53-3, 1-4		√								

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Table 3.1: Subwatershed and Water bodies Summaries

Subwatershed/Water Body	WB Station(s)	NWB Station(s)	Waterbody Criteria+		Not a Water Body Criteria						
			Permanent/ Intermittent Watercourse	Seep+ +	No Surface Feature Present	Grassed Waterway*/ Swale#	Temporary Channel for Surface Drainage*	Roadside Ditch*	Temporarily Poned Area Normally Farmed*	Dugout Pond*	Rock Chute *
Golden Creek											
Elliot-McBryan Drain	43-1		√								

*as per REA Definition O. Reg. 359/09

WB = meets the definition of a Water Body as per O. Reg. 359/09

NWB = does not meet the definition of a Water Body as per O. Reg. 359/09

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

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

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

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

* as per REA Definition O. Reg. 359/09

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Table 3.2: Master Summary Table of Waterbodies and Project Components

Water Body	WB Station(s)	NWB Station(s)	Crossing Class			Within 120 m					Fish Habitat		
			Access Road and Associated Collector Line ^a	Collector Line Only	Overhead Transmission Line	Turbine ^b	Access Road and Associated Collector Line ^a	Collector Line Only	Overhead Transmission Line	Substation/MET Tower	Direct Permanent (P) or Seasonal (S)	Indirect	
Bonnie Doon Creek													
Bonnie Doon Creek	27-3, 27-4			1								P	
Jardine Drain	27-1					T53	T53	Y				S	
Greendees Drain	25-2, 25-5		T51	2			T47 & T48					S	
30 Creek Drain													
30 Creek Drain	23-1					T47	T47	Y				P	
Aberarder Creek													
Aberarder Creek	33-1, 32-1, 22-1, 22-5			4								P	
Watson Drain*	26-1, 34-1						T50					S	
Bannister Drain	22-6, 34-2, 24-1, 62-2		T79	3		T80 & T79	T80	Y				P	
Bannister Drain-1	62-3					T79						S	
Byrnes-Sutton Drain	45-2		T46			T42	T72					S	
Byrnes-Sutton Drain-1	45-3						T46 & T72					S	
10th Concession Drain	46-2, 33-2		T42	1			T69	Y				S	
Aberarder Creek-1	32-3			1				Y				S	
Unknown Drain	22-3, 22-2	22-3	T41/T44									S	
Highland Creek													

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Table 3.2: Master Summary Table of Waterbodies and Project Components

Water Body	WB Station(s)	NWB Station(s)	Crossing Class			Within 120 m					Fish Habitat	
			Access Road and Associated Collector Line ^a	Collector Line Only	Overhead Transmission Line	Turbine ^b	Access Road and Associated Collector Line ^a	Collector Line Only	Overhead Transmission Line	Substation/MET Tower	Direct Permanent (P) or Seasonal (S)	Indirect
Highland Creek	31-3, 21-1, 64-2		T40	3				Y			P	
James-Wilkinson Drain	31-2, 55-3	46-1, 55-2		1			T40	Y			P	
Hartley Drain	32-2, 31-1			2		T43	T43	Y			S	
Kernohan-O'Donnell Drain	60-1, 55-1, 64-3			1			T81 and T76	Y			P	
Douglas Drain												
Douglas Drain	18-5, 18-1	56-1		2		T37 and T36	T36				S	
Douglas Drain-1	18-3			2							S	
Hickory Creek												
Hickory Creek	20-1, 19-2, 17-1, 17-5			3		T34	T34	Y			P	
McKinley Drain	19-1, 19-4			3							P	
Fisher Drain	20-2			1							S	
Unknown Drain 2	19-3		T35	2							S	
Anderson Drain												
Anderson Drain	16-5, 17-3, 17-2, 17-4		T34, T32 & T31			T32	T30					Y
Elliot Drain												
Elliot Branch Drain	16-4			2			T27	Y			S	
Elliot Drain	16-1, 16-2		T30	2		T30		Y			S	
North Street Drain												

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Table 3.2: Master Summary Table of Waterbodies and Project Components

Water Body	WB Station(s)	NWB Station(s)	Crossing Class			Within 120 m					Fish Habitat	
			Access Road and Associated Collector Line ^a	Collector Line Only	Overhead Transmission Line	Turbine ^b	Access Road and Associated Collector Line ^a	Collector Line Only	Overhead Transmission Line	Substation/MET Tower	Direct Permanent (P) or Seasonal (S)	Indirect
North Street Drain	16-3		T27	1		T27					S	
Woods Creek												
Woods Creek	10-1, 11-1, 14-2, 14-4		T21	1	2	T15, T17, T16 & T21	T17, T16	Y		MET Tower	P	
Woods Creek-1	11-2							Y	Y			Y
Malley Drain	42-1			1							S	
McCallum Drain	52-1, 51-3		T26	1			T20 & T29				S	
Haney Drain	15-1			1		T24	T24	Y		Substation	P	
Brush Drain	12-3, 12-2, 12-1, 14-3		T23	3	1	T19, T22, T21	T19, T25, T22, T21				S	
South Boundary Drain	51-2, 51-4			1		T20	T20	Y			S	
South Boundary Drain-1	51-1							Y			S	
James Creek Drain												
James Creek Drain	13-1, 14-1						T21				S	
Beith Creek												
Frayne Drain	4-3, 5-4			1	1						S	
Wadsworth Drain	6-1, 6-2, 5-7			1	3	T13	T13 and T10				S	
Beith Creek Drain	5-2, 5-1, 5-3		T13		1	T13	T10				S	
Shashawandah Creek												
Shashawandah Creek	9-2, 9-5, 3-1, 3-2,		T11 & T9	1	1	T11	T82	Y			P	

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Table 3.2: Master Summary Table of Waterbodies and Project Components

Water Body	WB Station(s)	NWB Station(s)	Crossing Class			Within 120 m					Fish Habitat	
			Access Road and Associated Collector Line ^a	Collector Line Only	Overhead Transmission Line	Turbine ^b	Access Road and Associated Collector Line ^a	Collector Line Only	Overhead Transmission Line	Substation/MET Tower	Direct Permanent (P) or Seasonal (S)	Indirect
	2-6											
Russel Drain	9-1						T11	Y			S	
Ross Drain	4-1, 4-4		T82		1	T7 & T82	T7	Y			S	
Stewardson Drain	4-2, 4-5			1	1						S	
Duffus Drain												
Lusby Drain	2-5, 2-3, 2-2		T6 & T4		1	T5	T5	Y		Y	S	
Duffus Drain	2-4, 2-7, 2-1			3	1	T2	T2				S	
Walden Drain	1-3		T1			T1		Y		Y	S	
Mud Creek												
Mud Creek	53-1, 53-4, 53-5				1						P	
10th Concession Drain	53-2, 53-3, 1-4				1		T2				P	
Golden Creek												
Elliot-McBryan Drain	43-1				3						S	

^a includes crane path

^b turbine plus associated laydown area

* Field investigations suggest that this is a straight trapezoidal channel containing water and is not tiled.

T53 - Turbine 53

4.0 Existing Conditions and Predicted Impacts

In the following sub-sections, available background data are provided for each subwatershed, followed by site-specific information regarding physical habitat and fish communities, as determined by Stantec in 2011 and 2012.

Potential impacts to fish habitat and general mitigation measures are provided for each site where fish habitat is present. In some cases, DFO Operational Statements may be applicable to 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 SCRCA, and/or DFO may result in site-specific construction methods and mitigation measures for some locations.

Listed generally west to east, the Project Location has been described according to the following 16 subwatersheds:

- Bonnie Doon Creek
- 30 Creek Drain
- Aberarder Creek
- Highland Creek
- Douglas Drain
- Hickory Creek
- Anderson Drain
- Elliot Drain
- North Street Drain
- Woods Creek
- James Creek Drain
- Beith Creek
- Shashawandah Creek
- Duffus Drain
- Mud Creek
- Golden Creek

Information on mapped water features that were not deemed to be water bodies is provided in photographs (**Appendix B**) and field notes (**Appendix D**) and summarized in **Table 3-1**. Within each subwatershed, only those water features occurring within 120 m of the Project Location and that were deemed to be water bodies, are summarized in Sections 4.1 to 4.18. None of the water bodies are within 30 m of the blade-tip of any turbine; distances from turbine blade tips to water bodies within 120 m are provided in **Figure 2.1 to 2.10**. Consistent with requirements set out in O. Reg. 359/09, distances shown in Figure 2 are calculated from the edge of the turbine blade sweep to the centerline of the nearest water body (as delineated by LIO and corrected via field investigations). For the purposes of determining distance to the average annual high water mark, the calculated distance was then corrected by subtracting half the value of the bankfull width.

4.1 BONNIE DOON CREEK SUBWATERSHED

4.1.1 Bonnie Doon Creek (Stations 27-3 and 27-4)

Bonnie Doon Creek is a permanent, warmwater, natural watercourse that flows generally northwest from Fisher Line to Lake Huron through a wooded riparian area surrounded by agricultural fields (SCRCA 2012).

Background fish community data collected at the crossing of Oil Heritage Road, south of Fisher Line, from SCRCA (1999) indicate the presence of the following 13 fish species in Bonnie Doon Creek:

- Black Bullhead Catfish
- Blackside Darter
- Bluntnose Minnow
- Brook Stickleback
- Central Mudminnow
- Common Carp
- Common Shiner
- Creek Chub
- Fathead Minnow
- Green Sunfish
- Johnny Darter
- Northern Redbelly Dace
- White Sucker

Electrofishing efforts by Stantec in May 2012 yielded 70 fish representing the following nine fish species (**Appendix C** – Stations 27-3 and 27-4):

- Creek Chub
- Bluegill
- Fathead Minnow
- Common Shiner
- White Sucker
- Johnny Darter
- Brook Stickleback
- Northern Redbelly Dace
- Blackside Darter

Within the Zone of Investigation, there is:

- One reach of Bonnie Doon Creek that has been designated as a water body and provides fish habitat is proposed to be crossed by collector line.

Habitat information at the locations identified in **Figure 3.1** is provided in **Table 4.1** along with references to potential impacts, mitigation measures and net effects.

4.1.2 Jardine Drain (Station 27-1)

Jardine Drain is a straight, trapezoidal channel that flows generally northwest from south of Fisher Line and north of Egremont Road through agricultural fields with little riparian vegetation before draining into Bonnie Doon Creek. Drain Classification mapping provided by SCRCA

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(SCRCA 2012) indicates that within the surveyed reach, Jardine Drain is a Class F drain (i.e., intermittent flow). Background fish community data were not available for Jardine Drain.

Electrofishing efforts by Stantec in May 2012 yielded 15 fish representing the following three fish species (**Appendix C – Stations 27-1 and 35-2**):

- Creek Chub
- White Sucker
- Brook Stickleback

Within the Zone of Investigation, there is:

- One reach of Jardine Drain has been designated as a water body that provides seasonal fish habitat and is within 120 m of Turbine 53 (T53) and its proposed access road. It is also within 120 m of a proposed collector line.

Habitat information at the location identified in **Figures 2.1 and 2.2** is provided in **Table 4.1** along with references to potential impacts, mitigation measures and net effects.

4.1.3 Greendees Drain (Stations 25-5 and 25-2)

Greendees Drain consists of a straight, trapezoidal channel that flows west through agricultural fields with little riparian vegetation along Aberarder Line and empties into Relief Drain. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that, within the surveyed reach, this channel is a Class F drain (i.e., intermittent flow). Background fish community data were not available for Greendees Drain.

Electrofishing efforts by Stantec in May 2012 yielded no catch and no fish were observed (**Appendix C – Station 25-2**).

Within the Zone of Investigation, there is:

- One reach of Greendees Drain that has been designated as a water body that provides seasonal fish habitat. It is proposed to be crossed by the access road to T51, crossed twice by a proposed collector line, and is within 120 m of the proposed access road to T47 and T48.

Habitat information at the location identified in **Figures 3.1 and 3.3** is provided in **Table 4.1** along with references to potential impacts, mitigation measures and net effects.

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Table 4.1: Summary of Characteristics, Proposed Activities, Impacts and Mitigation for Water Bodies Within the 120 m Zone of Investigation– Bonnie Doon Creek Subwatershed

Reach ID ^a	Site Description*	Proposed Activities ^d	Potential Impacts	Mitigation	Net Effects ^b
Bonnie Doon Creek	Permanent flow dominated by run morphology Bankfull width = 6.0-13.0 m Water depth = 15-50 cm Substrate = silt, sand, clay and gravel. Fished May 2012 Fish habitat	Collector line crossing of a water body providing fish habitat. (Figure 3.1)	With the exception of potential construction activities, collector line crossings should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4 and 5.6).	See Sections 6.1 and 6.6.	None expected
Jardine Drain	Seasonal flow dominated by run morphology Bankfull width = 4.0-6.0 m Water depth = 15-40 cm Substrate = clay and detritus. Fished May 2012 Seasonal fish habitat	T53, T53 access road and collector line to be located within 120 m of a water body providing fish habitat. (Figures 3.1 and 3.2)	With the exception of potential construction activities, collector line crossings, turbines and turbine access roads located within 120 m of a water body should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4 and 5.6).	See Section 6.1 and 6.6.	None expected
Greendees Drain	Seasonal flow dominated by run morphology Bankfull width = 3 m Water depth = 15 cm Substrate = clay, silt and detritus. Fished May 2012 Seasonal fish habitat	T51 access road crossing and two collector line crossings of a water body providing fish habitat. T47 and T48 access road to be located within 120 m of a water body providing fish habitat. (Figures 3.1 and 3.3)	Construction activities associated with the installation of the turbine access roads may affect the reach (e.g. Temporary increase in surface water turbidity due to runoff during construction. See Section 5.2) With the exception of potential construction activities, collector line crossings and turbine	See Sections 6.1, 6.2, 6.3, 6.4 and 6.6. DFO Operational Statement for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings may apply (Appendix E)	Installation of new access road culvert. Can likely be mitigated – unlikely that DFO authorization would be required.

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Table 4.1: Summary of Characteristics, Proposed Activities, Impacts and Mitigation for Water Bodies Within the 120 m Zone of Investigation– Bonnie Doon Creek Subwatershed

Reach ID ^a	Site Description*	Proposed Activities ^d	Potential Impacts	Mitigation	Net Effects ^b
			access road located within 120 m of a water body should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4 and 5.6).		

a see **Figures 3.1 to 3.3 (Appendix A)**

b assumes all mitigation measures are implemented and successful

c turbine access roads include the installation of a collector line at the same location

d proposed activities during construction, operation and decommissioning phases

*summary of the surveyed reach, electrofishing results provided in Appendix C

4.2 30 CREEK DRAIN SUBWATERSHED

4.2.1 30 Creek Drain (Station 23-1)

30 Creek Drain is a permanent, trapezoidal channel that flows generally northwest through a deciduous wooded area to empty into Lake Huron, south of Douglas Road and West of Lakeshore Road. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that, within the surveyed reach, 30 Creek Drain is a Class C drain (i.e., warmwater with no top predators). Background fish community data were not available for 30 Creek Drain.

Electrofishing efforts by Stantec in May 2012 yielded no catch and no fish were observed (**Appendix C** – Station 23-1).

Within the Zone of Investigation, there is:

- One reach of 30 Creek Drain that has been designated as a water body that provides fish habitat and is within 120 m of T47, the proposed access road to T47 and a collector line.

Habitat information at the locations identified in **Figure 3.3** is provided in **Table 4.2** along with references to potential impacts, mitigation measures and net effects.

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Table 4.2: Summary of Characteristics, Proposed Activities, Impacts and Mitigation for Water Bodies Within the 120 m Zone of Investigation – 30 Creek Drain Subwatershed

Reach ID ^a	Site Description*	Proposed Activities ^{c d}	Potential Impacts	Mitigation	Net Effects ^b
30 Creek Drain	Permanent flow dominated by flat morphology Bankfull width = 5.0 m Water depth = 15 cm Substrate = clay and detritus. Fished May 2012 Fish habitat	Turbine 47, Turbine 47 access road and a collector line to be located within 120 m of a water body providing fish habitat. (Figure 3.3)	With the exception of potential construction activities, turbines and turbine access roads located within 120 m of a water body should not affect fish and fish habitat (see Sections 5.1, 5.3,5.4 and 5.6).	See Sections 6.1 and 6.6 (Appendix E)	None expected

a see **Figure 3.3 (Appendix A)**

b assumes all mitigation measures are implemented and successful

c turbine access roads include the installation of a collector line at the same location

d proposed activities during construction, operation and decommissioning phases

*summary of the surveyed reach, electrofishing results provided in Appendix C

4.3 ABERARDER CREEK SUBWATERSHED

4.3.1 Aberarder Creek (Stations 33-1, 32-1, 22-1 and 22-5)

Aberarder Creek flows from Aberarder Road, northwest through agricultural fields and wooded areas to empty into Lake Huron. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that, within the surveyed reaches, upstream sections is a Class C drain (i.e., warmwater, with no top predators present) and downstream sections have been designated a Class E drain (i.e., warmwater, with top predators present).

Background fish community data collected at the crossing of Oil Heritage Road, south of Douglas Road, from SCRCA (1999) indicate the presence of the following seven fish species in Aberarder Creek:

- Bluntnose Minnow
- Brook Stickleback
- Common Shiner
- Creek Chub
- Johnny Darter
- Rainbow Darter
- White Sucker

Background fish community data collected at the crossing of Lakeshore Road, west of Oil Heritage Road, from SCRCA (1999) indicate the presence of the following 11 fish species in Aberarder Creek:

- Blackside Darter
- Bluntnose Minnow
- Brook Stickleback
- Common Carp
- Common Shiner
- Creek Chub
- Johnny Darter
- Rainbow Darter
- Smallmouth Bass
- Spottfin Shiner
- White Sucker

Electrofishing efforts by Stantec in May 2012 yielded 325 fish representing the following eight fish species (**Appendix C** – Stations 33-1, 32-1 and 22-1):

- Creek Chub
- Bluntnose Minnow
- Fathead Minnow
- Common Shiner
- White Sucker
- Johnny Darter
- Brook Stickleback
- Rainbow Darter

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Within the Zone of Investigation, there is:

- One reach of Aberarder Creek that has been designated as a water body that provides fish habitat and is proposed to be crossed by two collector lines.
- One reach of Aberarder Creek that has been designated as a water body that provides fish habitat and is proposed to be crossed by two collector lines.

Habitat information at the locations identified in **Figures 3.2 to 3.3** is provided in **Table 4.3** along with references to potential impacts, mitigation measures and net effects.

4.3.2 Watson Drain (Stations 34-1 and 26-1)

Watson Drain is a tributary of Aberarder Creek, generally flowing in a northwesterly direction through the southwest portion of the Project area, between Fisher Line and Aberarder Road that empties into Bannister Drain. Watson Drain flows through open agricultural areas and wooded areas that provide moderate riparian cover. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that, within the surveyed reaches, Watson Drain is tiled. Field observations indicate that it consists of a series of straight, open, trapezoidal channels with intermittent flow. Background fish community data were not available for Watson Drain.

Electrofishing efforts by Stantec in May 2012 yielded 15 fish representing the following three fish species (**Appendix C** – Stations 34-1 and 26-1):

- Creek Chub
- White Sucker
- Brook Stickleback

Within the Zone of Investigation, there is:

- One reach of Watson Drain that has been designated as a water body that provides seasonal fish habitat, is within 120 m of the proposed access road to T50.

Habitat information at the location identified in **Figures 3.1 to 3.3** is provided in **Table 4.3** along with references to potential impacts, mitigation measures and net effects.

4.3.3 Bannister Drain (Stations 22-6, 34-2, 24-1 62-2)

Bannister Drain flows generally northwest from Fisher Line into Aberarder Creek and consists of a trapezoidal channel with straightened and sinuous reaches flowing through open agricultural fields and along the edge of a wooded area. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that, within the surveyed reach, Bannister Drain is a Class C drain (i.e., warmwater, with no top predators present). Background fish community data were not available for Bannister Drain.

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Electrofishing efforts by Stantec in May 2012 yielded 81 fish representing the following seven fish species (**Appendix C** – Stations 34-2 and 24-1):

- Creek Chub
- Rainbow Darter
- White Sucker
- Brook Stickleback
- Fathead Minnow
- Johnny Darter
- Common Shiner

Within the Zone of Investigation, there is:

- One reach of Bannister Drain that has been designated as a water body that provides fish habitat is proposed to be crossed by a collector line and the access road to T79. The reach is also located within 120 m of T79, T80 and the access road to T80.
- One reach of Bannister Drain that has been designated as a water body that provides fish habitat is proposed to be crossed twice by a collector line.

Habitat information at the location identified in **Figures 3.2 to 3.3** is provided in **Table 4.3** along with references to potential impacts, mitigation measures and net effects.

4.3.4 Bannister Drain-1 (Stations 62-3)

Bannister Drain-1 consists of an incised channel flowing north through a hedgerow and into Bannister Drain. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that Bannister Drain-1 is an unclassified municipal drain. Background fish community data were not available for Bannister Drain-1.

Electrofishing efforts by Stantec in October 2012 could not be conducted as the channel was dry at the time.

Within the Zone of Investigation, there is:

- One reach of Bannister Drain-1 that has been designated as a water body that provides seasonal fish habitat located within 120 m of T79.

Habitat information at the location identified in **Figure 3.2** is provided in **Table 4.3** along with references to potential impacts, mitigation measures and net effects.

4.3.5 Byrnes-Sutton Drain (Station 45-2)

Byrnes-Sutton Drain is a trapezoidal channel that flows generally west from east of Uttoxeter Road to empty into Falconer-Ramsay Drain, west of Hillsboro Road. Byrnes-Sutton Drain flows primarily through open agricultural areas and along the edge of a wooded area. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that within the surveyed

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reach, Byrnes-Sutton Drain is a Class F drain (i.e., intermittent). Background fish community data were not available for Byrnes-Sutton Drain.

Electrofishing efforts by Stantec in May 2012 yielded 130 fish representing the following six fish species (**Appendix C – Station 45-2**).

- Creek Chub
- Bluntnose Minnow
- White Sucker
- Fathead Minnow
- Johnny Darter
- Common Shiner

Within the Zone of Investigation, there is:

- One reach of Byrnes-Sutton Drain that has been designated as a water body that provides seasonal fish habitat and is proposed to be crossed by the access road to T46. This same reach is also within 120 m of T42, and a proposed access road to T72.

Habitat information at the location identified in **Figure 3.2** is provided in **Table 4.3** along with references to potential impacts, mitigation measures and net effects.

4.3.6 Byrnes-Sutton Drain-1 (Station 45-3)

Byrnes-Sutton Drain-1 is a short section of straight, trapezoidal channel that flows between two agricultural fields north into Byrnes-Sutton Drain, west of Uttoxeter Road. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that Byrnes-Sutton Drain-1 is an Unclassified municipal drain. Field investigations suggest it has seasonal flow. Background fish community data were not available for Byrnes-Sutton Drain-1.

Electrofishing efforts by Stantec in May 2012 yielded six Creek Chub (**Appendix C – Station 45-3**).

Within the Zone of Investigation, there is:

- One reach of Byrnes-Sutton Drain-1 that has been designated as a water body that provides seasonal fish habitat and is within 120 m of the proposed access roads for T72 and T46.

Habitat information at the location identified in **Figure 3.2** is provided in **Table 4.3** along with references to potential impacts, mitigation measures and net effects.

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4.3.7 10th Concession Drain (Stations 46-2 and 33-2)

The 10th Concession Drain is a trapezoidal channel that flows west along the south side of Aberarder Road and empties into Aberarder Creek, east of Hilsboro Road. Riparian vegetation is minimal and consists of overhanging vegetation and the occasional tree. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that this channel is a Class F drain (i.e., intermittent). Background fish community data were not available for 10th Concession Drain.

Electrofishing efforts by Stantec in July 2012 could not be conducted as the channel was dry at the time.

Within the Zone of Investigation, there is:

- One reach of 10th Concession Drain that has been designated as a water body that provides seasonal fish habitat and is proposed to be crossed by the access road to T42 and proposed collector line. The reach is also within 120 m of the proposed access road to T69 and a collector line.

Habitat information at the location identified in **Figure 3.2** is provided in **Table 4.3** along with references to potential impacts, mitigation measures and net effects.

4.3.8 Aberarder Creek-1 (Station 32-3)

Aberarder Creek-1 is a short, straight, trapezoidal channel that flows northeast from Aberarder Line, across Hilsboro Road and empties into Aberarder Creek. Minimal riparian cover is provided by overhanging vegetation and a small wooded area. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that Aberarder Creek-1 is not classified and therefore suggests that it is not regulated under the *Drainage Act*. This water body is not shown in MNR's LIO mapping but was observed during field investigations. Water body mapping has been corrected to show this feature. Field investigations suggest it has seasonal flow. Background fish community data were not available for Aberarder Creek-1.

Electrofishing efforts by Stantec in May 2012 could not be conducted as the channel was dry at the time.

Within the Zone of Investigation, there is:

- One reach of Aberarder Creek-1 that has been designated as a water body that provides seasonal fish habitat and is proposed to be crossed by a collector line. This same reach is also within 120 m of a proposed collector line proposed along Aberarder Line.

Habitat information at the location identified in **Figures 3.2 to 3.3** is provided in **Table 4.3** along with references to potential impacts, mitigation measures and net effects.

4.3.9 Unknown Drain (Stations 22-3 and 22-2)

An unnamed tributary of Aberarder Creek, referred to as Unknown Drain, flows generally northwest from Hillsboro Road to Oil Heritage Road through open agricultural fields with minimal riparian cover. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that within the surveyed reach, Unknown Drain has been designated an Unclassified municipal drain. Field investigations suggest that this trapezoidal channel has seasonal warmwater flow. Background fish community data were not available for Unknown Drain.

Electrofishing efforts by Stantec in May 2012 yielded no catch (**Appendix C – Station 22-2**).

Within the Zone of Investigation, there is:

- One reach of Unknown Drain that has been designated as a water body that provides seasonal fish habitat and is proposed to be crossed by the access road to T41/T44.

Habitat information at the location identified in **Figure 3.3** is provided in **Table 4.3** along with references to potential impacts, mitigation measures and net effects.

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Table 4.3: Summary of Characteristics, Proposed Activities, Impacts and Mitigation for Water Bodies Within the 120 m Zone of Investigation – Aberarder Creek Subwatershed

Reach ID ^a	Site Description*	Proposed Activities ^{c d}	Potential Impacts	Mitigation	Net Effects ^b
Aberarder Creek	Permanent flow dominated by run morphology Bankfull width = 6.0-8.0 m Water depth = 30 cm Substrate = clay, boulder, cobble and detritus. Fished May 2012 Fish habitat	Four collector line crossings of a water body providing fish habitat. (Figures 3.2 to 3.3)	With the exception of potential construction activities, collector line crossings of a water body should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4 and 5.6).	See Sections 6.1, 6.3, 6.4 and 6.6. DFO Operational Statement for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings may apply (Appendix E)	None expected
Watson Drain	Seasonal flow dominated by run morphology Bankfull width = 3.5-5.0 m Water depth = 10-15 cm Substrate = silt, detritus and clay. Fished May 2012 Seasonal fish habitat	T50 access road to be located within 120 m of a water body providing fish habitat. (Figures 3.1 to 3.3)	With the exception of potential construction activities, turbine access roads located within 120 m of a water body should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4 and 5.6).	See Section 6.1 and 6.6	None expected
Bannister Drain	Permanent flow dominated by run morphology Bankfull width = 3.0-7.0 m Water depth = 10-30 cm Substrate = boulder, cobble, gravel, silt clay and detritus. Fished May 2012 Fish habitat	T79 access road crossing and three collector line crossings of a water body providing fish habitat. Collector line, T80, T79 and T80 access road to be located within 120 m of a water body providing fish habitat. (Figures 3.2 to 3.3)	Construction activities associated with the installation of the turbine access road may affect the reach (e.g. Temporary increase in surface water turbidity due to runoff during construction. See Section 5.2.) With the exception of potential construction activities, collector line crossings and turbine access roads located	See Sections 6.1, 6.2, 6.3, 6.4 and 6.6. DFO Operational Statement for Overhead Line Construction, Directional Drilling, Punch and Bore Crossings or Isolated or Dry Open-cut Stream crossings may apply (Appendix E)	Installation of new access road culvert. Can likely be mitigated – unlikely that DFO authorization would be required.

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Table 4.3: Summary of Characteristics, Proposed Activities, Impacts and Mitigation for Water Bodies Within the 120 m Zone of Investigation – Aberarder Creek Subwatershed

Reach ID ^a	Site Description*	Proposed Activities ^{c d}	Potential Impacts	Mitigation	Net Effects ^b
			within 120 m of a water body should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4 and 5.6).		
Bannister Drain-1	Seasonal flow that was dry at the time of the field investigation Bankfull width = 3 m Water depth = dry Substrate = sand, clay and detritus. Seasonal fish habitat	T79 to be located within 120 m of a water body providing fish habitat. (Figure 3.2)	With the exception of potential construction activities, turbine access roads located within 120 m of a water body should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4 and 5.6).	See Sections 6.1, 6.2 and 6.6	None expected
Byrnes-Sutton Drain	Seasonal flow dominated by flat morphology Bankfull width = 3.0 m Water depth = 25 cm Substrate = Silt, clay, gravel, cobble and boulder. Fished June 2012 Seasonal fish habitat	T46 access road crossing of a water body providing fish habitat. T42 and T72 access road to be located within 120 m of a water body providing fish habitat. (Figure 3.2)	Construction activities associated with the installation of the turbine access road may affect the reach (e.g. Temporary increase in surface water turbidity due to runoff during construction. See Section 5.2.) With the exception of potential construction activities, turbines and turbine access roads located within 120 m of a water body should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4 and 5.6).	See Sections 6.1, 6.2, 6.4 and 6.6. DFO Operational Statement for Directional Drilling, Punch and Bore Crossings or Dry Open-Cut Stream Crossings may apply (Appendix E)	Installation of new access road culvert. Can likely be mitigated – unlikely that DFO authorization would be required.
Byrnes-Sutton Drain-1	Seasonal flow dominated by pool morphology. Bankfull width = 1.75 m	T72 access road and T46 access road to be located within 120 m of a water body	With the exception of potential construction activities, turbines and	See Section 6.1 and 6.6	None expected

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Table 4.3: Summary of Characteristics, Proposed Activities, Impacts and Mitigation for Water Bodies Within the 120 m Zone of Investigation – Aberarder Creek Subwatershed

Reach ID ^a	Site Description*	Proposed Activities ^{c d}	Potential Impacts	Mitigation	Net Effects ^b
	Water depth = 5 cm Substrate = silt, muck and clay. Fished June 2012 Seasonal fish habitat	providing fish habitat. (Figure 3.2)	turbine access roads located within 120 m of a water body should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4 and 5.6).		
10 th Concession Drain	Seasonal flow, dry, Bankfull width = 3.0 m Water depth = dry Substrate = clay and sand. Could not be fished July 2012 Seasonal fish habitat	T42 access road crossing and collector line crossing of a water body providing fish habitat. T69 access road and collector line to be located within 120 m of a water body providing fish habitat. (Figure 3.2)	Construction activities associated with the installation of the turbine access road may affect the reach (e.g. Temporary increase in surface water turbidity due to runoff during construction. See Section 5.2.) With the exception of potential construction activities, turbine access roads and collector lines located within 120 m of a water body should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4 and 5.6).	See Sections 6.1, 6.2, 6.3, 6.4 and 6.6. DFO Operational Statement for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings may apply (Appendix E)	Installation of new access road culvert. Can likely be mitigated – unlikely that DFO authorization would be required.
Aberarder Creek-1	Seasonal flow dominated by run morphology Bankfull width = 1.5 m Water depth = 10 cm Substrate = clay and detritus. Fished May 2012 Seasonal Fish habitat	Collector line crossing of a water body providing fish habitat. Collector line to be located within 120 m of a water body providing fish habitat. (Figures 3.2 to 3.3)	With the exception of potential construction activities, collector line crossings and collector lines located within 120 m of a water body should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4 and 5.6).	See Sections 6.1, 6.3, 6.4 and 6.6. DFO Operational Statement for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings may apply	None expected

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Table 4.3: Summary of Characteristics, Proposed Activities, Impacts and Mitigation for Water Bodies Within the 120 m Zone of Investigation – Aberarder Creek Subwatershed

Reach ID ^a	Site Description*	Proposed Activities ^{c d}	Potential Impacts	Mitigation (Appendix E)	Net Effects ^b
Unknown Drain	Seasonal flow dominated by pool morphology Bankfull width = 3.5 m Water depth = 10 cm Substrate = clay and detritus. Fished May 2012 Seasonal fish habitat	The access road for T41/T44 to cross a water body providing fish habitat. (Figure 3.3)	Construction activities associated with the installation of the turbine access road may affect the reach (e.g. Temporary increase in surface water turbidity due to runoff during construction. See Section 5.2.) With the exception of potential construction activities, turbine access roads located within 120 m of a water body should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4 and 5.6).	See Sections 6.1, 6.2, 6.3, 6.4 and 6.6. DFO Operational Statement for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings may apply (Appendix E)	Installation of new access road culvert. Can likely be mitigated – unlikely that DFO authorization would be required.

a see Figures 3.1 to 3.3 (Appendix A)

b assumes all mitigation measures are implemented and successful

c turbine access roads include the installation of a collector line at the same location

d proposed activities during construction, operation and decommissioning phases

*summary of the surveyed reach, electrofishing results provided in Appendix C

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4.4 HIGHLAND CREEK SUBWATERSHED**4.4.1 Highland Creek (Stations 31-3, 21-1 and 64-2)**

Highland Creek is a permanent, natural watercourse that meanders from Brush Road to Lake Huron. Riparian cover varies from abundant in wooded areas to minimal in the open agricultural fields. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that Highland Creek is a natural channel from Forest Road west to the confluence with Kernohan O'Donnell Drain just southeast of Douglas Road and Hillsboro Road and is a Class C (i.e., permanent flow, warmwater with no top predators) municipal drain downstream to Lake Huron. Background fish community data were not available for Highland Creek.

Electrofishing efforts by Stantec in June 2012 yielded 69 fish representing the following 6 fish species (**Appendix C** – Stations 31-3 and 21-1):

- Johnny Darter
- Bluntnose Minnow
- White Sucker
- Common Shiner
- Rainbow Darter
- Creek Chub

Within the Zone of Investigation, there is:

- One reach of Highland Creek that has been designated as a water body that provides fish habitat and is proposed to be crossed by a collector line;
- One reach of Highland Creek that has been designated as a water body that provides fish habitat and is proposed to be crossed by the T40 access road and crossed twice by a proposed collector line. The reach is also within 120 m of a proposed collector line.

Habitat information at the locations identified in **Figures 3.3 to 3.4** is provided in **Table 4.4** along with references to potential impacts, mitigation measures and net effects.

4.4.2 James-Wilkinson Drain (Station 31-2 and 55-3)

James-Wilkinson Drain is a tributary of Highland Creek, generally flowing in a northwesterly direction from Aberarder Road to the confluence near Hillsboro Road. Open agricultural fields are interspersed with moderate riparian cover, provided by the surrounding trees, shrubs and overhanging vegetation. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that James-Wilkinson Drain is a Class C (i.e., permanent flow, warmwater with no top predators) municipal drain. Background fish community data were not available for this drain.

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Electrofishing efforts by Stantec in June 2012 yielded 15 fish representing the following 2 fish species (**Appendix C** – Stations 31-2):

- Brook Stickleback
- Creek Chub

Within the Zone of Investigation, there is:

- One reach of James-Wilkinson Drain that has been designated as a water body that provides fish habitat and is crossed by a proposed collector line. It is also within 120 m of the proposed access road to T40 and a proposed collector line.

Habitat information at the location identified in **Figures 3.3 and 3.4** is provided in **Table 4.4** along with references to potential impacts, mitigation measures and net effects.

4.4.3 Hartley Drain (Station 32-2 and 31-1)

Hartley Drain is a straight, trapezoidal channel flowing west to Hillsboro Road and north to the confluence with Highland Creek. Thick watercress was present at various locations within the surveyed reaches, including a large patch downstream of Station 32-2. Minimal riparian vegetation is provided by the nearby trees, shrubs and overhanging vegetation. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that Hartley Drain is a Class F (i.e., intermittent flow) municipal drain. Background fish community data were not available for Hartley Branch Drain.

Electrofishing efforts by Stantec in June 2012 yielded no catch (**Appendix C** – Stations 32-2 and 31-1).

Within the Zone of Investigation, there is:

- One reach of Hartley Drain that has been designated as a water body that provides seasonal fish habitat and is proposed to be crossed twice by a collector line. The reach is located within 120 m of T43, the access road to T43 and a collector line.

Habitat information at the location identified in **Figure 3.3** is provided in **Table 4.4** along with references to potential impacts, mitigation measures and net effects.

4.4.4 Kernohan-O'Donnell Drain (Station 55-1, 60-1 and 64-3)

Kernohan-O'Donnell Drain is a trapezoidal channel that meanders through open agricultural fields northwest to the confluence with Highland Creek. Drain classification mapping provided by SCRCA (SCRCA 2012) indicates that Kernohan-O'Donnell Drain is a Class C (i.e warmwater with no top predator present) municipal drain. Background fish community data were not available for Kernohan-O'Donnell Drain.

Electrofishing efforts by Stantec in October 2012 yielded 64 Creek Chub (**Appendix C – Stations 60-1**).

Within the Zone of Investigation, there is:

- One reach of Kernohan-O'Donnell Drain that has been designated as a water body that provides permanent fish habitat and is proposed to be crossed by a collector line. The reach is located within 120 m of the access roads to T81 and T76 and within 120 m of a proposed collector line.

Habitat information at the location identified in **Figure 3.4** is provided in **Table 4.4** along with references to potential impacts, mitigation measures and net effects.

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Table 4.4: Summary of Characteristics, Proposed Activities, Impacts and Mitigation for Water Bodies Within the 120 m Zone of Investigation – Highland Creek Subwatershed

Reach ID ^a	Site Description*	Proposed Activities ^d	Potential Impacts	Mitigation	Net Effects ^b
Highland Creek	Permanent flow dominated by pool and run morphology Bankfull width = 5-10 m Water depth = 20-70 cm Substrate = Sand, clay, gravel, detritus, silt and cobble Fished June 2012 Fish habitat	T40 access road to cross a water body providing fish habitat. 3 collector line crossings of a water body providing fish habitat. Collector line within 120 m of a water body providing fish habitat. (Figures 3.3 to 3.4).	Construction activities associated with the installation of the turbine access road may affect the reach (e.g. Temporary increase in surface water turbidity due to runoff during construction. See Section 5.2.) With the exception of potential construction activities, collector line crossings should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4 and 5.6).	See Sections 6.1, 6.2, 6.3,6.4 and 6.6. DFO Operational Statement for Overhead Line Construction, Directional Drilling, Punch and Bore Crossings and Isolated Open-Cut Stream Crossings may apply (Appendix E)	Installation of new access road culvert. Can likely be mitigated – unlikely that DFO authorization would be required.
James-Wilkinson Drain	Permanent flow dominated by run morphology Bankfull width = 4 m Water depth = 7 cm Substrate = Clay, silt, sand and gravel Fished June 2012 Fish habitat	Collector line to cross a water body providing fish habitat. T40 access road and collector line to be located within 120 m of a water body providing fish habitat. (Figures 3.3 and 3.4).	With the exception of potential construction activities, collector line crossings and turbine access roads located within 120 m of a water body should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4 and 5.6).	See Sections 6.1, 6.3, 6.4 and 6.6. DFO Operational Statement for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings may apply (Appendix E)	None expected
Hartley Drain	Seasonal flow that is dominated by run and pool morphology Bankfull width = 4 m Water depth = 15-25 cm Substrate = Clay, silt and detritus Fished June 2012 Seasonal Fish habitat	2 collector line crossings of a water body providing fish habitat. T43, T43 access road and collector line to be located within 120 m of a water body providing fish	With the exception of potential construction activities, collector line crossings, turbines and turbine access roads located within 120 m of a water body should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4 and 5.6).	See Sections 6.1, 6.3, 6.4 and 6.6 DFO Operational Statement for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings may	None expected

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Table 4.4: Summary of Characteristics, Proposed Activities, Impacts and Mitigation for Water Bodies Within the 120 m Zone of Investigation – Highland Creek Subwatershed

Reach ID ^a	Site Description*	Proposed Activities ^d	Potential Impacts	Mitigation	Net Effects ^b
		habitat. (Figure 3.3).		apply (Appendix E)	
Kernohan O-Donnell Drain	Permanent flow that dominated by run morphology Bankfull width = 6-8 m Water depth = 3-50 cm Substrate = Clay, silt, much, marl, sand, cobble and gravel Fished October 2012 Fish habitat	One collector line crossing of a water body providing fish habitat. T81 access road, T76 access road and a collector line to be located within 120 m of a water body providing fish habitat. (Figure 3.4).	With the exception of potential construction activities, collector line crossings and turbine access roads located within 120 m of a water body should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4 and 5.6).	See Sections 6.1, 6.3, 6.4 and 6.6. DFO Operational Statement for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings may apply (Appendix E)	None expected

a see Figures 3.3 through 3.4 (Appendix A)

b assumes all mitigation measures are implemented and successful

c turbine access roads include the installation of a collector line at the same location

d proposed activities during construction, operation and decommissioning phases

*summary of the surveyed reach, electrofishing results provided in Appendix C

4.5 DOUGLAS DRAIN SUBWATERSHED

4.5.1 Douglas Drain (Station 18-5 and 18-1)

Douglas Drain is a trapezoidal channel that flows northwest from Uttoxeter Road to Lake Huron. Minimal to moderate riparian cover is provided by the surrounding trees, shrubs and overhanging vegetation. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that this channel is a Class F municipal drain (i.e., intermittent flow). Background fish community data were not available for Douglas Drain.

Electrofishing efforts by Stantec in May 2012 yielded one Creek Chub (**Appendix C – Station 18-1**).

Within the Zone of Investigation, there is:

- One reach of Douglas Drain that has been designated as a water body that provides seasonal fish habitat and is proposed to be crossed by two collector lines. The reach is also within 120 m of T37, T36 and the access road to T36.

Habitat information at the locations identified in **Figure 3.5** is provided in **Table 4.5** along with references to potential impacts, mitigation measures and predicted net effects.

4.5.2 Douglas Drain-1 (Station 18-3)

Douglas Drain-1 flows along the south side of Lakeshore Road, connecting to Douglas Drain on the west side of Hillsboro Road. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that this straight, trapezoidal channel lined with is not classified and therefore suggests that it is not regulated under the *Drainage Act*. This water body is not shown in MNR's LIO mapping but was observed during field investigations. Water body mapping has been corrected to show this feature. Field investigations suggest that flow is seasonal in this drain. Minimal riparian cover is provided by the occasional tree, shrub and overhanging vegetation. Background fish community data were not available for Douglas Drain-1.

Electrofishing could not be conducted by Stantec in May 2012 as the channel was dry at the time.

Within the Zone of Investigation, there is:

- One reach of Douglas Drain-1 that has been designated as a water body that provides seasonal fish habitat and is proposed to be crossed twice by a collector line.

Habitat information at the locations identified in **Figure 3.5** is provided in **Table 4.5** along with references to potential impacts, mitigation measures and predicted net effects.

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Table 4.5: Summary of Characteristics, Proposed Activities, Impacts and Mitigation for Water Bodies Within the 120 m Zone of Investigation – Douglas Drain Subwatershed

Reach ID ^a	Site Description*	Proposed Activities ^{c d}	Potential Impacts	Mitigation	Net Effects ^b
Douglas Drain	Seasonal flow dominated by run morphology Bankfull width = 5 m Water depth = 20 cm Substrate = clay, cobble and detritus. Fished May 2012 Seasonal Fish habitat	2 collector lines to cross a water body providing fish habitat. T37, T36 and T36 access road to be located within 120 m of a water body providing fish habitat. (Figure 3.5).	With the exception of potential construction activities, collector line crossings, turbines and turbine access roads located within 120 m of a water body should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4 and 5.6).	See Sections 6.1, 6.3,6.4 and 6.6. DFO Operational Statement for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings may apply (Appendix E)	None expected
Douglas Drain-1	Seasonal flow dominated by pool morphology Bankfull width = 3 m Water depth = 3 cm Substrate = clay and detritus. Fished May 2012 Seasonal Fish habitat	Collector lines to cross a water body providing fish habitat. (Figure 3.5).	With the exception of potential construction activities, collector line crossings should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4 and 5.6).	See Sections 6.1, 6.3, 6.4 and 6.6. DFO Operational Statement for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings may apply (Appendix E)	None expected

a see **Figure 3.5 (Appendix A)**

b assumes all mitigation measures are implemented and successful

c turbine access roads include the installation of a collector line at the same location

d proposed activities during construction, operation and decommissioning phases

*summary of the surveyed reach, electrofishing results provided in Appendix C

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4.6 HICKORY CREEK SUBWATERSHED**4.6.1 Hickory Creek (Stations 20-1, 19-2, 17-1 and 17-5)**

Hickory Creek is a permanent, natural watercourse that flows generally northwest from Elarton Road to Lake Huron (LIO 2012). Minimum to abundant riparian vegetation is provided by the adjacent trees and shrubs or deciduous wooded area. Background fish community data were not available for Hickory Creek. Electrofishing efforts by Stantec in June 2012 yielded 335 fish representing the following 11 fish species (**Appendix C** – Stations 20-1, 19-2, 17-1):

- Brown Trout
- Rainbow Trout
- Johnny Darter
- Bluntnose Minnow
- Blackside Darter
- Rock Bass
- White Sucker
- Common Shiner
- Rainbow Darter
- Iowa Darter
- Creek Chub

Within the Zone of Investigation, there is:

- One reach of Hickory Creek that has been designated as a water body that provides fish habitat and is proposed to be crossed twice by a collector line and is located within 120 m of T34 and the access road to T34; and,
- One reach of Hickory Creek that has been designated as a water body that provides fish habitat and is crossed by a proposed collector line. This same collector line is located within 120 m of other sections of Hickory Creek.

Habitat information at the locations identified in **Figures 3.5 to 3.6** is provided in **Table 4.6** along with references to potential impacts, mitigation measures and net effects.

4.6.2 McKinley Drain (Station 19-1 and 19-4)

McKinley Drain is a large tributary of Hickory Creek generally flowing in a northwesterly direction through the central portion of the Project boundary. The drain flows through open agricultural fields and a deciduous wooded area. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that McKinley Drain is a Class C (i.e., permanent flow, warmwater with no top predators) municipal drain from the confluence of McKinley Branch Drain downstream to Hickory Creek. Background fish community data were not available for McKinley Drain.

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Electrofishing efforts by Stantec in June 2012 yielded 47 fish representing the following four fish species (**Appendix C** – Stations and 19-1):

- Creek Chub
- Common Shiner
- Rainbow Darter
- White Sucker

Within the Zone of Investigation, there is:

- One reach of McKinley Drain that has been designated as a water body that provides fish habitat and is proposed to be crossed three times by a collector line.

Habitat information at the location identified in **Figure 3.5** is provided in **Table 4.6** along with references to potential impacts, mitigation measures and net effects.

4.6.3 Fisher Drain (Station 20-2)

The majority of Fisher Drain is piped or tiled through open agricultural fields. A short reach consisting of a defined channel flows north into Hickory Creek at Hubbard Line. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that Fisher Drain is a Class F (i.e., intermittent flow) municipal drain. Background fish community data were not available for Fisher Drain.

Electrofishing could not be conducted by Stantec in June 2012 due to restricted land access.

Within the Zone of Investigation, there is:

- One reach of Fisher Drain that has been designated as a water body that provides seasonal fish habitat and is proposed to be crossed by a collector line.

Habitat information at the location identified in **Figure 3.5** is provided in **Table 4.6** along with references to potential impacts, mitigation measures and net effects.

4.6.4 Unknown Drain 2 (Station 19-3)

Unknown Drain 2 consists of an incised channel situated along the south side of Hubbard Line, eventually crossing over to run north along the east side of Elmsley Road. Riparian vegetation is almost non-existent in this open agricultural area. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that this channel is Unclassified. This water body is not shown in MNR's LIO mapping but was observed during field investigations. Water body mapping has been corrected to show this feature. Background fish community data were not available for Unknown Drain 2.

Electrofishing could not be conducted by Stantec in May 2012 as the channel was dry at the time of the survey. Based on Stantec field data, the flow regime of this watercourse is deemed seasonal.

Within the Zone of Investigation, there is:

- One reach of Unknown Drain 2 that has been designated as a water body that provides seasonal fish habitat and is proposed to be crossed by two proposed collector line and the access road to T35.

Habitat information at the location identified in **Figure 3.5** is provided in **Table 4.6** along with references to potential impacts, mitigation measures and net effects.

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Table 4.6: Summary of Characteristics, Proposed Activities, Impacts and Mitigation for Water Bodies Within the 120 m Zone of Investigation – Hickory Creek Subwatershed

Reach ID ^a	Site Description*	Proposed Activities ^{c,d}	Potential Impacts	Mitigation	Net Effects ^d
Hickory Creek	Permanent flow dominated by run morphology Bankfull width = 6-10 m Water depth = 30-50 cm Substrate = clay, sand, gravel, silt and cobble Fished June 2012 Fish habitat	3 collector line crossings of a water body providing fish habitat. T34, access road to T34 and a collector line to be located within 120 m of a water body providing fish habitat. (Figures 3.5 to 3.6).	With the exception of potential construction activities, collector line crossings, turbines and collector lines located within 120 m of a water body should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4 and 5.6).	See Sections 6.1, 6.3, 6.4 and 6.6. DFO Operational Statement for Overhead Collector Line, Directional Drilling or Punch and Bore Crossings may apply (Appendix E)	None expected
McKinley Drain	Permanent flow dominated by pool and run morphology Bankfull width = 2 m Water depth = 15-30 cm Substrate = Sand, silt and clay Fished June 2012 Permanent Fish habitat	3 collector line crossings of a water body providing fish habitat. (Figure 3.5)	With the exception of potential construction activities, collector line crossings should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4 and 5.6).	See Sections 6.1, 6.3, 6.4 and 6.6. DFO Operational Statement for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings may apply (Appendix E)	None expected
Fisher Drain	Seasonal flow dominated by run morphology Bankfull width = 1.5 m Water depth = 20 cm Substrate = silt, clay and gravel Seasonal Fish Habitat	Collector line to cross a water body providing fish habitat. (Figure 3.5).	With the exception of potential construction activities, collector line crossings should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4 and 5.6).	See Sections 6.1, 6.3, 6.4 and 6.6. DFO Operational Statement for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings may apply (Appendix E)	None expected

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Table 4.6: Summary of Characteristics, Proposed Activities, Impacts and Mitigation for Water Bodies Within the 120 m Zone of Investigation – Hickory Creek Subwatershed

Reach ID ^a	Site Description [*]	Proposed Activities ^{c,d}	Potential Impacts	Mitigation	Net Effects ^d
Unknown Drain 2	Seasonal flow that was dry at the time of the field investigation Bankfull width = 3 m Water depth = dry Substrate = Sand, clay and silt Seasonal Fish habitat	T35 access road and two collector lines to cross a water body containing fish habitat. (Figures 3.5)	Construction activities associated with the installation of the turbine access road may affect the reach (e.g. Temporary increase in surface water turbidity due to runoff during construction. See Section 6.1.) With the exception of potential construction activities, collector lines should not affect fish and fish habitat. (see Sections 5.1, 5.3, 5.4 and 5.6).	See Sections 6.1, 6.2, 6.3 and 6.6. DFO Operational Statement for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings may apply (Appendix E)	Installation of new access road culvert. Can likely be mitigated – unlikely that DFO authorization would be required.

a see **Figures 3.5** through **3.6 (Appendix A)**

b assumes all mitigation measures are implemented and successful

c turbine access roads include the installation of a collector line at the same location

d proposed activities during construction, operation and decommissioning phases

*summary of the surveyed reach, electrofishing results provided in Appendix C

4.7 ANDERSON DRAIN SUBWATERSHED

4.7.1 Anderson Drain (Station 16-5, 17-3, 17-2 and 17-4)

Anderson Drain consists of a straight, trapezoidal channel that flows northwest along the south side of Townsend Line through open agricultural areas. According to background mapping, it does not appear to be directly connected to other water features. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that this channel is a Class F (i.e., intermittent) municipal drain. Field investigations suggest it has seasonal flow and is lined with thick cattails. Background fish community data were not available for Anderson Drain.

Electrofishing could not be conducted by Stantec in June 2012 as the channel was dry at the time of the site visit.

Within the Zone of Investigation, there is:

- One reach that has been designated as a water body that contributes indirectly to fish habitat and is crossed by the T34 access road, T32 access road and T31 access road. The reach is within 120 m of T32 and the access road to T30.

Habitat information at the location identified in **Figures 3.5 to 3.6** is provided in **Table 4.7** along with references to potential impacts, mitigation measures and net effects.

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Table 4.7 Summary of Characteristics, Proposed Activities, Impacts and Mitigation for Water Bodies Within the 120 m Zone of Investigation – Anderson Drain Subwatershed

Reach ID ^a	Site Description*	Proposed Activities ^{c d}	Potential Impacts	Mitigation	Net Effects ^b
Anderson Drain	Seasonal flow dominated by pool and run morphology Bankfull width = 1.5 m Water depth = 8 cm Substrate = Clay and detritus Indirect fish habitat	T34, T32 and T31 access roads to cross a water body indirectly contributing to fish habitat T32 and T30 access road to be located within 120 m of a water body indirectly contributing to fish habitat. (Figures 3.5 to 3.6).	Construction activities associated with the installation of the turbine access roads may affect the reach (e.g. Temporary increase in surface water turbidity due to runoff during construction. See Section 5.2.) With the exception of potential construction activities, collector line crossings, turbines and turbine access roads located within 120 m of a water body should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4 and 5.6).	See Sections 6.1, 6.2, 6.4 and 6.6.	Installation of new access road culvert. Can likely be mitigated – unlikely that DFO authorization would be required.

a see **Figure 3.5 to 3.6** (Appendix A)

b assumes all mitigation measures are implemented and successful

c turbine access roads include the installation of a collector line at the same location

d proposed activities during construction, operation and decommissioning phases

*summary of the surveyed reach, electrofishing results provided in Appendix C

4.8 ELLIOT DRAIN SUBWATERSHED

4.8.1 Elliot Branch Drain (Stations 16-4)

Elliot Branch Drain consists of a straight, trapezoidal channel generally flowing in a northwesterly direction through open agricultural fields. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that this channel is Unclassified. Field investigations suggest it has seasonal flow. Background fish community data were not available for Elliot Branch Drain.

Electrofishing efforts by Stantec in June 2012 yielded no catch (**Appendix C – Stations 16-4**). However, due to a connection to downstream fish habitat, it is classified as seasonal habitat.

Within the Zone of Investigation, there is:

- One reach of Elliot Branch Drain that has been designated as a water body that provides seasonal fish habitat and is proposed to be crossed twice by a collector line and is within 120 m of the access road to T27 and a collector line.

Habitat information at the location identified in **Figure 3.6** is provided in **Table 4.8** along with references to potential impacts, mitigation measures and net effects.

4.8.2 Elliot Drain (16-1 and 16-2)

Elliot Drain is a tributary of Lake Huron, generally flowing in a northwest direction from Townsend Line. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that this straight, trapezoidal channel is a Class F Municipal Drain (i.e., intermittent). Riparian vegetation is almost non-existent along the surveyed reaches and the channel supports dense cattails. Background fish community data were not available for Elliot Drain.

Electrofishing efforts by Stantec in June 2012 yielded no catch (**Appendix C – Stations 16-1 and 16-2**); however, due to a connection to downstream fish habitat, it is classified as seasonal habitat.

Within the Zone of Investigation, there is:

- One reach of Elliot Drain that has been designated as a water body that provides seasonal fish habitat and is crossed by the proposed access road to T30 and twice by a proposed collector line. The reach is located within 120 m of T30 and a proposed collector line.

Habitat information at the locations identified in **Figures 3.5 and 3.6** is provided in **Table 4.8** along with references to potential impacts, mitigation measures and net effects.

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Table 4.8: Summary of Characteristics, Proposed Activities, Impacts and Mitigation for Water Bodies Within the 120 m Zone of Investigation – Elliot Drain Subwatershed

Reach ID ^a	Site Description*	Proposed Activities ^{c,d}	Potential Impacts	Mitigation	Net Effects ^b
Elliot Branch Drain	Seasonal flow dominated by pool morphology Bankfull width = 2 m Water depth = 60 cm Substrate = Clay and detritus Fished June 2012 Seasonal Fish habitat	2 collector line crossings of a water body providing fish habitat. T27 access road and a collector line to be located within 120 m of a water body providing fish habitat. (Figure 3.6).	With the exception of potential construction activities, collector line crossings and turbine access roads located within 120 m of a water body should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4 and 5.6).	See Sections 6.1, 6.2, 6.3, 6.4 and 6.6. DFO Operational Statement for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings may apply (Appendix E)	None expected
Elliot Drain	Seasonal flow dominated by run morphology Bankfull width = 3 m Water depth = 10-15 cm Substrate = Clay and a little cobble Fished June 2012 Seasonal Fish habitat	T30 access road to cross a water body providing fish habitat. 2 collector line crossings of a water body providing fish habitat. T30 and a collector line to be located within 120 m of a water body providing fish habitat. (Figures 3.5 and 3.6).	Construction activities associated with the installation of the turbine access roads may affect the reach (e.g. Temporary increase in surface water turbidity due to runoff during construction. See Section 5.2.) With the exception of potential construction activities, collector line crossings and turbines located within 120 m of a water body should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4 and 5.6).	See Sections 6.1, 6.2, 6.3, 6.4 and 6.6. DFO Operational Statement for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings and/or Isolated/Dry Open-Cut Crossings may apply (Appendix E)	Installation of new access road culvert. Can likely be mitigated – unlikely that DFO authorization would be required.

a see **Figures 3.5 and 3.6** (Appendix A)

b assumes all mitigation measures are implemented and successful

c turbine access roads include the installation of a collector line at the same location

d proposed activities during construction, operation and decommissioning phases

*summary of the surveyed reach, electrofishing results provided in Appendix C

4.9 NORTH STREET DRAIN SUBWATERSHED

4.9.1 North Street Drain (Station 16-3)

North Street Drains consists of a straight, trapezoidal channel that flows northwest along the south side of Townsend Line towards Lake Huron. Riparian vegetation ranges from minimal through the open agricultural fields to moderate through the deciduous wooded areas. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that this channel is a Class F drain (i.e. intermittent flow). Background fish community data were not available for North Street Drain.

Electrofishing efforts by Stantec in June 2012 yielded two Brook Stickleback (**Appendix C – Stations 16-3**).

Within the Zone of Investigation, there is:

- One reach that has been designated as a water body that provides seasonal fish habitat and is crossed by the access road to T27 and a proposed collector line. The reach is located within 120 m of proposed T27.

Habitat information at the location identified in **Figure 3.6** is provided in **Table 4.9** along with references to potential impacts, mitigation measures and net effects.

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Table 4.9: Summary of Characteristics, Proposed Activities, Impacts and Mitigation for Water Bodies Within the 120 m Zone of Investigation – North Street Drain Subwatershed

Reach ID ^a	Site Description*	Proposed Activities ^{c,d}	Potential Impacts	Mitigation	Net Effects ^b
North Street Drain	Seasonal flow dominated by run and flat morphology Bankfull width = 3-5 m Water depth = 10-20 cm Substrate = Clay and detritus Fished June 2012 Seasonal fish habitat	T27 access road to cross a water body providing fish habitat. 1 collector line crossing of a water body providing fish habitat. T27 to be located within 120 m of a water body providing fish habitat. (Figure 3.6).	Construction activities associated with the installation of the turbine access roads may affect the reach (e.g. Temporary increase in surface water turbidity due to runoff during construction. See Section 5.2.) With the exception of potential construction activities, collector line crossings, turbines located within 120 m of a water body should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4 and 5.6).	See Sections 6.1, 6.2, 6.3, 6.4 and 6.6. DFO Operational Statement for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings and Isolated/Dry Open-Cut Crossings may apply (Appendix E)	Installation of new access road culvert. Can likely be mitigated – unlikely that DFO authorization would be required.

a see **Figure 3.6** (Appendix A)

b assumes all mitigation measures are implemented and successful

c turbine access roads include the installation of a collector line at the same location

d proposed activities during construction, operation and decommissioning phases

*summary of the surveyed reach, electrofishing results provided in Appendix C

4.10 WOODS CREEK SUBWATERSHED

4.10.1 Woods Creek (Stations 10-1, 11-1, 14-2, 14-4)

Woods Creek is a permanent watercourse with variable characteristics, ranging from reaches with natural channel morphology to reaches that have been straightened. The creek flows through open agricultural areas and wooded areas that provide minimal cover to abundant cover, respectively. Background fish community data were not available for Woods Creek. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates this watercourse is a Class C municipal drain (i.e. warm water with no top predators).

Electrofishing efforts by Stantec in June 2012 yielded 68 fish representing the following eight fish species (**Appendix C – 10-1, 11-1, 14-2**):

- Creek Chub
- Fathead Minnow
- Brook Stickleback
- Common Shiner
- Common Carp
- White Sucker
- Blacknose Dace
- Rainbow Darter

Within the Zone of Investigation, there is:

- One reach of Woods Creek that has been designated as a water body that provides fish habitat and is crossed by the access road to T21, proposed collector line and a proposed transmission line. The reach is also within 120 m of a MET tower.
- One reach of Woods Creek that has been designated as a water body that provides fish habitat and is crossed by a transmission line and is within 120 m of T17, T15, T16 and the access roads to T17, T15 and T16.

Habitat information at the locations identified in **Figures 3.6 and 3.8** is provided in **Table 4.10** along with references to potential impacts, mitigation measures and net effects.

4.10.2 Woods Creek-1 (Stations 11-2)

Woods Creek-1 is a straightened, trapezoidal channel flowing west from Rawlings Road along the south side of Cedar Point Line. Riparian cover is almost non-existent in this short channel. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that this cattail lined channel is not regulated under the *Drainage Act*. This water body is not shown in MNR's LIO mapping but was observed during field investigations. Water body mapping was corrected to show this feature. Field investigations suggest it has seasonal flow. It does not appear to be directly connected to Woods Creek and likely provides indirect fish habitat. Background fish community data were not available for Woods Creek-1.

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Electrofishing could not be conducted by Stantec in June 2012 due to insufficient water depth at the time of the survey (i.e., isolated, shallow pools with reaches of dry channel).

Within the Zone of Investigation, there is:

- One reach of Woods Creek-1 that has been designated as a water body that contributes indirectly to fish habitat and is located within 120 m of a proposed collector line and transmission line.

Habitat information at the locations identified in **Figure 3.8** is provided in **Table 4.10** along with references to potential impacts, mitigation measures and net effects.

4.10.3 Malley Drain (Station 42-1)

Malley Drain is a straightened, trapezoidal channel flowing north from Jura Line and west across Kinnaird Road to its confluence with South Boundary Drain. Riparian vegetation consists of a moderate density of trees and shrubs. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that this channel is designated as a Class F (i.e., intermittent flow) municipal drain and the watercourse was dry at the time Stantec's field investigation (October, 2012). Background fish community data were not available for Malley Drain.

Electrofishing was not conducted by at this site, however, due to its direct connection with Woods Creek, a similar warmwater fish community can be assumed.

Within the Zone of Investigation, there is:

- One reach of Malley Drain that has been designated as a water body that provides seasonal fish habitat and is crossed by a proposed collector line

Habitat information at the locations identified in **Figure 3.7** is provided in **Table 4.10** along with references to potential impacts, mitigation measures and net effects.

4.10.4 McCallum Drain (Stations 52-1 and 51-3)

McCallum Drain is a tributary of South Boundary Drain, consisting of a trapezoidal channel flowing north along Elarton Road with minimal riparian cover provided by the overhanging vegetation. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that this channel has been designated a Class F (i.e., intermittent flow) municipal drain. Background fish community data were not available for McCallum Drain.

Electrofishing could not be conducted by Stantec in July 2012 as the channel was mostly dry at the time (i.e., only small, isolated pools of water were present in the channel).

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Within the Zone of Investigation, there is:

- One reach of McCallum Drain that has been designated as a water body that provides seasonal fish habitat and is crossed by the access road to T26 and crossed a proposed collector line. The reach is located within 120 m of the access roads to T20 and T29.

Habitat information at the location identified in **Figure 3.7** is provided in **Table 4.10** along with references to potential impacts, mitigation measures and net effects.

4.10.5 Haney Drain (Station 15-1)

Haney Drain is a relatively large tributary of Woods Creek, generally flowing in a northwesterly direction in the northern section of the Project Location. The surrounding open agricultural fields provide minimal riparian cover for the watercourse. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that Haney Drain is designated a Class C (i.e., warm water with no top predators) municipal drain. Background fish community data were not available for Haney Drain.

Electrofishing efforts by Stantec in June 2012 yielded 10 fish representing the following three fish species (**Appendix C – 15-1**):

- Brook Stickleback
- Creek Chub
- Blacknose Dace.

Within the Zone of Investigation, there is:

- One reach of Haney Drain that has been designated as a water body that provides fish habitat and is crossed by a proposed collector line and located within 120 m of a Substation, collector line, T24 and the access road to T24.

Habitat information at the location identified in **Figure 3.6** is provided in **Table 4.10** along with references to potential impacts, mitigation measures and net effects.

4.10.6 Brush Drain (Station 12-3, 12-2, 12-1 and 14-3)

This narrow, trapezoidal channel is situated just north of the town of Forest and flows northwest to Woods Creek. Abundant watercress was observed at various points within the surveyed reaches and minimal riparian cover is provided by the occasional riparian tree and shrub. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that Brush Drain is designated a Class F (i.e., intermittent flow) municipal drain. Background fish community data were not available for Brush Drain.

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Electrofishing efforts by Stantec in June 2012 yielded 72 fish representing the following three fish species (**Appendix C** – 12-2, 12-1, and 14-3):

- Brook Stickleback,
- Creek Chub and
- Fathead Minnow

Additionally, numerous schools of young-of-year (YOY) Brook Stickleback were observed.

Within the Zone of Investigation, there is:

- One reach of Brush Drain that has been designated as a water body that provides seasonal fish habitat and is crossed three times by a proposed collector line, is crossed by the access road to T23 and is crossed by a proposed transmission line (one of either alternate or primary route transmission line route.). The reach is located within 120 m of T19, T22 and T21, the access roads to T19, T25, T22 and T21 and the Substation.

Habitat information at the location identified in **Figure 3.6** is provided in **Table 4.10** along with references to potential impacts, mitigation measures and net effects.

4.10.7 South Boundary Drain (Station 51-2 and 51-4)

South Boundary Drain is a trapezoidal channel flowing northwest through open agricultural fields near Townsend Line and north from Elarton Road to Woods Creek. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that South Boundary Drain is designated a Class F (i.e., intermittent flow) municipal drain. Background fish community data were not available for South Boundary Drain.

Electrofishing could not be conducted by Stantec in July 2012 as the channel was dry at the time of the survey. However, during periods of high flow, it is likely accessible by fish from Woods Creek.

Within the Zone of Investigation, there is:

- One reach of South Boundary Drain that has been designated as water body that provides seasonal fish habitat and is crossed by a proposed collector line and is located within 120 m of a collector line, T20 and the access road to T20.

Habitat information at the locations identified in **Figure 3.7** is provided in **Table 4.10** along with references to potential impacts, mitigation measures and net effects.

4.10.8 South Boundary Drain-1 (Station 51-1)

South Boundary Drain-1 is a trapezoidal channel flowing west through open agricultural fields along Townsend Line, converging with South Boundary Drain just west of the intersection of

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Kinnaird Road. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that South Boundary Drain-1 is designated a Class F (i.e., intermittent flow) municipal drain.

Background fish community data were not available for South Boundary Drain-1.

Electrofishing could not be conducted by Stantec in July 2012 as the channel was dry at the time. However, during periods of high flow, it is likely accessible by fish from Woods Creek and South Boundary Drain.

Within the Zone of Investigation, there is:

- One reach of South Boundary Drain-1 that has been designated as water body that provides seasonal fish habitat and is located within 120 m of a proposed collector line.

Habitat information at the locations identified in **Figure 3.7** is provided in **Table 4.10** along with references to potential impacts, mitigation measures and net effects.

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Table 4.10: Summary of Characteristics, Proposed Activities, Impacts and Mitigation for Water Bodies Within the 120 m Zone of Investigation – Woods Creek Subwatershed

Reach ID ^a	Site Description*	Proposed Activities ^{c,d}	Potential Impacts	Mitigation	Net Effects ^b
Woods Creek	Permanent flow consisting of flat, run and pool morphology Bankfull width = 4-6 m Water depth = 5-30 cm Substrate = Sand, clay, gravel, silt, boulder, detritus, cobble Fished June 2012 Fish habitat	T21 access road to cross a water body providing fish habitat. One collector line crossing of a water body providing fish habitat. Two transmission line crossings of a water body providing fish habitat. T15, T16, T16 access road, T17, T17 access road, T16, collector line and MET tower to be located within 120 m of water body providing fish habitat. (Figures 3.6 and 3.8).	Construction activities associated with the installation of the turbine access road may affect the reach (e.g. Temporary increase in surface water turbidity due to runoff during construction. See Section 5.2.) With the exception of potential construction activities, collector line and transmission line crossings, MET towers, turbines and turbine access roads located within 120 m of a water body should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4 and 5.6).	See Sections 6.1, 6.2, 6.3, 6.4 and 6.6. DFO Operational Statement for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings and Isolated/Dry Open-Cut Crossings may apply (Appendix E)	Installation of new access road culvert. Can likely be mitigated – unlikely that DFO authorization would be required.
Woods Creek-1	Seasonal flow that was dry at the time of the field investigation. Bankfull width = 2.5 m Water depth = dry	Collector line and transmission line located within 120 m of a water body contributing	With the exception of potential construction activities, collector line and transmission line located within 120 m of a	See Section 6.1 and 6.6	None expected

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Table 4.10: Summary of Characteristics, Proposed Activities, Impacts and Mitigation for Water Bodies Within the 120 m Zone of Investigation – Woods Creek Subwatershed

Reach ID ^a	Site Description*	Proposed Activities ^{c d}	Potential Impacts	Mitigation	Net Effects ^b
	Substrate = Sand and clay Indirect fish habitat	indirectly to fish habitat. (Figure 3.8).	water body should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4 and 5.6).		
Malley Drain	Seasonal flow that was dry at the time of the field investigation. Bankfull width = 5 m Water depth = dry Substrate = Sand, Clay and silt Seasonal fish habitat	Collector line crossing of a water body providing seasonal fish habitat. (Figure 3.7).	With the exception of potential construction activities, collector line crossings of a water body should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4 and 5.6).	See Sections 6.1, 6.2, 6.3, 6.4 and 6.6. DFO Operational Statement for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings may apply (Appendix E)	None expected
McCallum Drain	Seasonal flow that was dry at the time of the field investigation Bankfull width = 3-4 m Water depth = dry Substrate = silt and marl Seasonal Fish habitat	T26 access road to cross a water body providing fish habitat. One collector line crossing of a water body providing fish habitat. T20 and T29 access road to be located within 120 m of a water body providing fish habitat. (Figure 3.7).	Construction activities associated with the installation of the turbine access roads may affect the reach (e.g. Temporary increase in surface water turbidity due to runoff during construction. See Section 5.2.) With the exception of potential construction activities, collector line crossings and turbine access roads located within 120 m of a water body should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4 and 5.6).	See Sections 6.1, 6.2, 6.3, 6.4 and 6.6. DFO Operational Statement for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings and Isolated/Dry Open-cut Crossings may apply (Appendix E)	Installation of new access road culvert. Can likely be mitigated – unlikely that DFO authorization would be required.
Haney Drain	Permanent flow	One collector line	With the exception of	See Sections 6.1,	None expected

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Table 4.10: Summary of Characteristics, Proposed Activities, Impacts and Mitigation for Water Bodies Within the 120 m Zone of Investigation – Woods Creek Subwatershed

Reach ID ^a	Site Description*	Proposed Activities ^{c d}	Potential Impacts	Mitigation	Net Effects ^b
	dominated by run morphology Bankfull width = 4 m Water depth = 15 cm Substrate = clay, silt, gravel and cobble Fished June 2012 Fish habitat	crossing of a water body providing fish habitat. T24, T24 access road, a collector line and a Substation to be located within 120 m of a water body providing fish habitat. (Figure 3.6).	potential construction activities, collector line crossings, turbines, turbine access roads and a substation located within 120 m of a water body should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4, 5.5 and 5.6).	6.3, 6.4 and 6.6. DFO Operational Statement for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings may apply (Appendix E)	
Brush Drain	Seasonal flow dominated by run and pool morphology Bankfull width = 3-6 m Water depth = 10-20 cm Substrate = Clay, detritus, cobble and sand Seasonal Fish Habitat	T23 access road to cross a water body providing fish habitat. 3 collector line crossings and one transmission line crossing (primary or alternate route) of a water body providing fish habitat. T19, T19 access road, T21, T21 access road, T22, T22 access road, T25 access road to be located within 120 m of a	Construction activities associated with the installation of the turbine access road may affect the reach (e.g. Temporary increase in surface water turbidity due to runoff during construction. See Section 5.2.) With the exception of potential construction activities, collector line and transmission line crossings, turbines, turbine access roads located within 120 m of a water body should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4, 5.5 and 5.6).	See Sections 6.1, 6.2, 6.3, 6.4 and 6.6. DFO Operational Statement for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings may apply (Appendix E)	Installation of new access road culvert. Can likely be mitigated – unlikely that DFO authorization would be required.

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Table 4.10: Summary of Characteristics, Proposed Activities, Impacts and Mitigation for Water Bodies Within the 120 m Zone of Investigation – Woods Creek Subwatershed

Reach ID ^a	Site Description*	Proposed Activities ^{c d}	Potential Impacts	Mitigation	Net Effects ^b
		water body providing fish habitat. (Figure 3.6).			
South Boundary Drain	Seasonal flow that was dry at the time of the field investigation Bankfull width = 3.5-4 m Water depth = dry Substrate = Silt, marl, sand and clay Seasonal Fish habitat	One collector line crossing of a water body providing fish habitat. T20 and T20 access road and a collector line to be located within 120 m of water body providing fish habitat. (Figure 3.7)	With the exception of potential construction activities, collector line crossings, turbines and turbine access roads located within 120 m of a water body should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.5 and 5.6).	See Sections 6.1, 6.3, 6.4 and 6.6. DFO Operational Statement for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings and Isolated and/or Dry Open-Cut Crossings may apply (Appendix E)	None expected
South Boundary Drain-1	Seasonal flow that was dry at the time of the field investigation Bankfull width = 2 m Water depth = dry Substrate = silt and marl Seasonal Fish habitat	Collector line to be located within 120 m of water body providing fish habitat. (Figure 3.7)	With the exception of potential construction activities, collector lines located within 120 m of a water body should not affect fish and fish habitat (see Section 5.1 and 5.6).	See Sections 6.1 and 6.6. (Appendix E)	None expected

a see **Figures 3.6 through 3.8 (Appendix A)**

b assumes all mitigation measures are implemented and successful

c turbine access roads include the installation of a collector line at the same location

d proposed activities during construction, operation and decommissioning phases

*summary of the surveyed reach, electrofishing results provided in Appendix C

4.11 JAMES CREEK DRAIN SUBWATERSHED**4.11.1 James Creek Drain (Station 13-1 and 14-1)**

James Creek Drain flows northwest from Fuller Road to Lake Huron in the northern portion of the Project Location and consists of a straight, trapezoidal channel with watercress observed at Stations 13-1 and 14-1. Due to a change in the project layout, these stations are no longer within 120 m of the Project Location; however, Station 14-1 is located just north of Figure 2.6, along Fuller Road and Station 13-1 is located along Lakeshore Road, between Proof Line and Cedar Point Line. Minimal riparian vegetation is provided by the occasional tree and shrub that lines the channel. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that this channel is a Class F (i.e., intermittent flow) municipal drain. Background fish community data were not available for James Creek Drain.

Electrofishing efforts by Stantec in June 2012 yielded 68 Brook Stickleback (**Appendix C – 13-1 and 14-1**). Additionally, numerous YOY Brook Stickleback were observed within the surveyed reaches.

Within the Zone of Investigation, there is:

- One reach of James Creek Drain that has been designated as a water body that provides seasonal fish habitat and is located within 120 m of T21 access road.

Habitat information at the location identified in **Figure 2.6** is provided in **Table 4.11** along with references to potential impacts, mitigation measures and net effects.

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Table 4.11: Summary of Characteristics, Proposed Activities, Impacts and Mitigation for Water Bodies Within the 120 m Zone of Investigation – James Creek Drain Subwatershed

Reach ID ^a	Site Description*	Proposed Activities ^{c d}	Potential Impacts	Mitigation	Net Effects _b
James Creek Drain	Seasonal flow dominated by pool morphology Bankfull width = 3-4 m Water depth = 10 cm Substrate = Clay and detritus Fished June 2012 Seasonal fish habitat	T21 access road to be located within 120 m of a water body providing fish habitat. (Figure 3.6).	With the exception of potential construction activities, turbine access roads located within 120 m of a water body should not affect fish and fish habitat (see Section 5.1 and 5.6).	See Sections 6.1 and 6.6	None expected

a see **Figure 3.6** (Appendix A)

b assumes all mitigation measures are implemented and successful

c turbine access roads include the installation of a collector line at the same location

d proposed activities during construction, operation and decommissioning phases

*summary of the surveyed reach, electrofishing results provided in Appendix C

4.12 BEITH CREEK SUBWATERSHED

4.12.1 Frayne Drain (Stations 5-4 and 4-3)

Frayne Drain is a straightened, trapezoidal watercourse flowing through open agricultural fields north from Proof Line to Thompson Line and west to Beith Creek. Background fish community data were not available for Frayne Drain. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates this watercourse is a Class F (i.e. intermittent flow) municipal drain.

Electrofishing efforts by Stantec in June 2012 yielded 13 fish consisting of Creek Chub and Brook Stickleback (**Appendix C – 5-4 and 4-3**).

Within the Zone of Investigation, there are:

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

Habitat information at the locations identified in **Figure 2.9** is provided in **Table 4.12** along with references to potential impacts, mitigation measures and net effects.

4.12.2 Wadsworth Drain (Station 6-1, 6-2, 5-5 and 5-7)

Wadsworth Drain is a tributary of Beith Creek, flowing north from Rawlings Road, just south of Proof Line and consists of a trapezoidal channel lined with thick cattails and occasional watercress (observed at Stations 6-1 and 5-7). Riparian cover is minimal to non-existent, provided by the occasional tree or shrub. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that this channel is a Class F (i.e., intermittent flow) municipal drain. Background fish community data were not available for Wadsworth Drain.

Electrofishing efforts by Stantec in June 2012 yielded 10 Brook Stickleback (**Appendix C – 6-1 and 6-2**).

Within the Zone of Investigation, there is:

- One reach of Wadsworth Drain that has been designated as a water body that provides seasonal fish habitat and is crossed by a proposed collector line and three times by a proposed transmission line. The reach is located within 120 m of T13 and the access road to T13 and T10.

Habitat information at the location identified in **Figure 2.8 and 2.9** is provided in **Table 4.12** along with references to potential impacts, mitigation measures and net effects.

4.12.3 Beith Creek Drain (Stations 5-2, 5-1 and 5-3)

Beith Creek Drain flows north through open agricultural fields from Proof Line to Thompson Line where it converges with Beith Creek. Drain Classification mapping provided by SCRCA

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(SCRCA 2012) indicates that this straightened, trapezoidal channel is a Class F (i.e., intermittent flow) municipal drain. Watercress was observed at various points within the surveyed reaches, suggesting the presence of possible groundwater inputs. Background fish community data were not available for Beith Creek Drain.

Electrofishing efforts by Stantec in June 2012 yielded 33 fish representing the following four fish species (**Appendix C – 5-3**):

- Creek Chub
- Fathead Minnow
- Brook Stickleback
- White Sucker.

Within the Zone of Investigation, there is:

- One reach of Beith Creek Drain that has been designated as a water body that provides seasonal fish habitat and is crossed by the access road to T13 and a proposed transmission line. The reach is located within 120 m of T13 and the access road to T10.

Habitat information at the location identified in **Figure 2.8** is provided in **Table 4.12** along with references to potential impacts, mitigation measures and net effects.

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Table 4.12: Summary of Characteristics, Proposed Activities, Impacts and Mitigation for Water Bodies Within the 120 m Zone of Investigation – Beith Creek Subwatershed

Reach ID ^a	Site Description*	Proposed Activities ^{c d}	Potential Impacts	Mitigation	Net Effects ^b
Frayne Drain	Seasonal flow consisting of pool and run morphology Bankfull width = 2-3 m Water depth = 7-30 cm Substrate = Silt, clay, muck and detritus Fished June 2012 Seasonal Fish habitat	Transmission line and collector line to cross a water body providing fish habitat. (Figure 3.9).	With the exception of potential construction activities, transmission line crossings should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4 and 5.6).	See Sections 6.1, 6.3 and 6.6. DFO Operational Statement for Overhead Line Construction may apply (Appendix E)	None expected
Wadsworth Drain	Seasonal flow that dominated by run and pool morphology Bankfull width = 2-4 m Water depth = 2-10 cm Substrate = Clay, detritus, silt and muck Seasonal Fish habitat	Collector line and 3 transmission lines to cross a water body providing fish habitat. T13 and T13 access road to be located within 120 m of a water body providing fish habitat. (Figures 3.8 and 3.9).	With the exception of potential construction activities, collector line and transmission line crossings, turbines located within 120 m of a water body should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4 and 5.6).	See Sections 6.1, 6.3, 6.4 and 6.6. DFO Operational Statement for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings and Isolated/Dry Open-Cut Crossings may apply (Appendix E)	None expected
Beith Creek Drain	Seasonal flow dominated by pool morphology Bankfull width = 4-6 m Water depth = 5-20 cm Substrate = Clay, detritus, sand, silt and muck Fished June 2012 Seasonal Fish habitat	T13 access road to cross a water body providing fish habitat. Transmission line to cross a water body providing fish habitat. T10 access road and T13 to be located within 120 m of a water body	Construction activities associated with the installation of the turbine access road may affect the reach (e.g. Temporary increase in surface water turbidity due to runoff during construction. See Section 5.2.)	See Sections 6.1, 6.2, 6.3, 6.4 and 6.6. DFO Operational Statement for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings and Isolated/Dry	Installation of new access road culvert. Can likely be mitigated – unlikely that DFO authorization would be required.

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Table 4.12: Summary of Characteristics, Proposed Activities, Impacts and Mitigation for Water Bodies Within the 120 m Zone of Investigation – Beith Creek Subwatershed

Reach ID ^a	Site Description*	Proposed Activities ^{c d}	Potential Impacts	Mitigation	Net Effects ^b
		providing fish habitat. (Figure 3.8) .	With the exception of potential construction activities, collector line and transmission line crossings, turbines, turbine access roads and transmission lines located within 120 m of a water body should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4 and 5.6).	Open-Cut Crossings may apply (Appendix E)	

a see **Figures 3.8 and 3.9 (Appendix A)**

b assumes all mitigation measures are implemented and successful

c turbine access roads include the installation of a collector line at the same location

d proposed activities during construction, operation and decommissioning phases

*summary of the surveyed reach, electrofishing results provided in Appendix C

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4.13 SHASHAWANDAH CREEK SUBWATERSHED**4.13.1 Shashawandah Creek (Stations 9-2, 9-5, 3-1, 3-2 and 2-6)**

Shashawandah Creek is a permanent watercourse, with the upstream reaches (Stations 9-2 and 9-5) consisting of trapezoidal channels and the lower reaches (Stations 3-1 and 2-6) displaying a natural, meandering morphology. Watercress was observed at Station 3-2. Riparian cover ranges from minimal to abundant, and is a mix of open agricultural fields and small wooded areas. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that Shashawandah Creek is a Class C (i.e. warm water with no top predators) municipal drain. Background fish community data were not available for Shashawandah Creek.

In addition to hundreds of YOY cyprinids, electrofishing efforts by Stantec in June 2012 yielded 121 fish representing the following nine fish species (**Appendix C – 9-2, 3-1 and 2-6**):

- Creek Chub
- Johnny Darter
- Common Shiner
- Bluntnose Minnow
- Pumpkinseed
- Blackside Darter
- White Sucker
- Northern Pike

Within the Zone of Investigation, there is:

- One reach of Shashawandah Creek that has been designated as a water body that provides fish habitat and is crossed by the access road to T11 and the access road to T9. It is located within 120 m of T11 and a proposed collector line.
- One reach of Shashawandah Creek that has been designated as a water body that provides fish habitat and is proposed to be crossed by a collector line and transmission line. This same reach is within 120 m of the access road to T82.

Habitat information at the locations identified in **Figures 2.8 and 2.9** is provided in **Table 4.13** along with references to potential impacts, mitigation measures and net effects.

4.13.2 Russel Drain (Station 9-1)

Russel Drain is a large tributary of Shashawandah Creek, generally flowing north from Army Camp Road to Cedar Point Line through a deciduous wooded area. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that this trapezoidal channel is designated a Class F (i.e., intermittent flow) municipal drain. Background fish community data were not available for Russel Drain.

Electrofishing efforts by Stantec in June 2012 yielded 14 fish representing the following four fish species (**Appendix C – 9-1**):

- Creek Chub
- Pumpkinseed
- White Sucker
- Northern Pike

Within the Zone of Investigation, there is:

- One reach of Russel Drain that has been designated as a water body that provides seasonal fish habitat and is located within 120 m the access road to T11 and a proposed collector line.

Habitat information at the location identified in **Figure 2.8** is provided in **Table 4.13** along with references to potential impacts, mitigation measures and net effects.

4.13.3 Ross Drain (Station 4-1 and 4-4)

Ross Drain is a straightened, trapezoidal channel generally flowing north through open agricultural fields from Proof Line to Shashawandah Creek. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that Ross Drain is a Class F (i.e., intermittent flow) municipal drain. Background fish community data were not available for Ross Drain.

Electrofishing efforts by Stantec in June 2012 yielded not catch.

Within the Zone of Investigation, there is:

- One reach of Ross Drain that has been designated as a water body that provides seasonal fish habitat and is proposed to be crossed by the access road to T82 and a transmission line. The reach is located within 120 m of T7 and T82, the access road to T7 and a proposed collector line.

Habitat information at the location identified in **Figure 2.9** is provided in **Table 4.13** along with references to potential impacts, mitigation measures and net effects.

4.13.4 Stewardson Drain (Station 4-2 and 4-5)

This straightened, trapezoidal channel flows north from Proof Line to Shashawandah Creek through open agricultural areas and adjacent to small wooded areas. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that Stewardson Drain is a Class F (i.e., intermittent flow) municipal drain. Background fish community data were not available for Stewardson Drain.

Electrofishing efforts by Stantec in June 2012 did not capture any fish.

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Within the Zone of Investigation, there is:

- One reach of Stewardson Drain that has been designated as a water body that provides seasonal fish habitat and is proposed to be crossed by a transmission line and a collector line.

Habitat information at the location identified in **Figure 2.9** is provided in **Table 4.13** along with references to potential impacts, mitigation measures and net effects.

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Table 4.13: Summary of Characteristics, Proposed Activities, Impacts and Mitigation for Water Bodies Within the 120 m Zone of Investigation – Shashawandah Creek Subwatershed

Reach ID ^a	Site Description*	Proposed Activities ^{c,d}	Potential Impacts	Mitigation	Net Effects ^b
Shashawandah Creek	Permanent flow consisting of run and pool morphology Bankfull width = 6-8 m Water depth = 5 cm Substrate = Clay, silt, muck and cobble Fished June 2012 Fish habitat	T11 and T9 access roads to cross a water body providing fish habitat. Collector line and transmission line to cross water body providing fish habitat. T11, T82 access road and collector line to be located within 120 m of water body providing fish habitat. (Figures 3.8 and 3.9).	Construction activities associated with the installation of the turbine access road may affect the reach (e.g. Temporary increase in surface water turbidity due to runoff during construction. See Section 5.2.) With the exception of potential construction activities, collector line and transmission line crossings, turbines located within 120 m of a water body should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4 and 5.6).	See Sections 6.1, 6.2, 6.3, 6.4 and 6.6. DFO Operational Statement for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings and Isolated/Dry Open-Cut Crossing may apply (Appendix E)	Installation of new access road culvert. Can likely be mitigated – unlikely that DFO authorization would be required.
Russel Drain	Seasonal flow dominated by run morphology Bankfull width = 4.5 m Water depth = 50 cm Substrate = Clay and detritus Fished June 2012 Seasonal Fish habitat	T11 access road and a collector line to be located within 120 m of a water body providing fish habitat. (Figure 3.8).	With the exception of potential construction activities, collector line turbine access roads located within 120 m of a water body should not affect fish and fish habitat (see Section 5.1 and 5.6).	See Sections 6.1 and 6.6	None expected
Ross Drain	Seasonal flow dominated by pool morphology Bankfull width = 6 m Water depth = 30 cm Substrate = silt and clay Fished June 2012 Seasonal Fish habitat	T82 access road and transmission line to cross a water body providing fish habitat. T7 and T82, T7 access road and a collector line to be located within 120 m of a water body providing fish habitat. (Figure 3.9).	Construction activities associated with the installation of the turbine access road may affect the reach (e.g. Temporary increase in surface water turbidity due to runoff during construction. See Section 5.2.) With the exception of potential construction activities, collector line and transmission line crossings, turbines, turbine	See Sections 6.1, 6.3, 6.4 and 6.6. DFO Operational Statement for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings and Isolated/Dry Open-Cut Crossings may apply (Appendix E)	None expected

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Table 4.13: Summary of Characteristics, Proposed Activities, Impacts and Mitigation for Water Bodies Within the 120 m Zone of Investigation – Shashawandah Creek Subwatershed

Reach ID ^a	Site Description*	Proposed Activities ^{c,d}	Potential Impacts	Mitigation	Net Effects ^b
			access roads and collector lines located within 120 m of a water body should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4 and 5.6).		
Stewardson Drain	Seasonal flow dominated by run and pool morphology Bankfull width = 4-6 m Water depth = 20-30 cm Substrate = Clay and detritus Fished June 2012 Seasonal Fish Habitat	Collector line and Transmission line to cross a water body providing fish habitat. (Figure 3.9).	With the exception of potential construction activities, collector line and transmission line crossings should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4 and 5.6).	See Sections 6.1, 6.3, 6.4 and 6.6. DFO Operational Statement for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings and Isolated/Dry Open-Cut Crossings may apply (Appendix E)	None expected

a see Figures 3.8 through 3.9 (Appendix A)

b assumes all mitigation measures are implemented and successful

c turbine access roads include the installation of a collector line at the same location

d proposed activities during construction, operation and decommissioning phases

*summary of the surveyed reach, electrofishing results provided in Appendix C

4.14 DUFFUS DRAIN SUBWATERSHED

4.14.1 Lusby Drain (Stations 2-5, 2-3 and 2-2)

Lusby Drain is straightened, trapezoidal channel flowing north and then west along Thompson Line and then north to Duffus Drain. A moderate degree of riparian cover is provided by the adjacent trees and shrubs. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates the watercourse is a Class F (i.e. intermittent flow) municipal drain. Background fish community data were not available for Lusby Drain.

Electrofishing efforts by Stantec in June 2012 yielded a total of three fish consisting of Fathead Minnow and Brook Stickleback (**Appendix C – 2-5, 2-3 and 2-2**). Additionally, hundreds of YOY Brook Stickleback were observed within the surveyed reaches.

Within the Zone of Investigation, there is:

- One reach of Lusby Drain that has been designated as a water body that provides seasonal fish habitat and is crossed by a proposed transmission line, crossed by the access road to T6 and the access road to T4. The reach is also located within 120 m of T5, the access road to T5, a proposed collector line and a MET tower.

Habitat information at the locations identified in **Figure 2.9** is provided in **Table 4.14** along with references to potential impacts, mitigation measures and net effects.

4.14.2 Duffus Drain (Station 2-4, 2-7 and 2-1)

Duffus Drain is a straightened, trapezoidal watercourse, generally flowing northwest to Upperwash Road and then northeast to Lake Huron. Watercress was observed just downstream from the culvert at Station 2-1 and the adjacent tree line provides minimal riparian cover. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that within the 120 m Zone of Investigation, Duffus Drain is a Class F (i.e., intermittent flow) municipal drain from Thompson Line to east of Kinnaird. Background fish community data were not available for Duffus Drain.

Electrofishing efforts by Stantec in June 2012 yielded 73 fish consisting of the following six species (**Appendix C – 2-4, 2-1 and 1-1**):

- Fathead Minnow
- Creek Chub
- Brook Stickleback
- Central Mudminnow
- Northern Redbelly Dace
- Pumpkinseed

Within the Zone of Investigation, there is:

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- One reach of Duffus Drain that has been designated as a water body that provides seasonal fish habitat and is crossed three times by a proposed collector line and once by a proposed transmission line. The reach is located within 120 m of T2 and the access road to T2.

Habitat information at the location identified in **Figures 2.19 to 2.10** is provided in **Table 4.14** along with references to potential impacts, mitigation measures and net effects.

4.14.3 Walden Drain (Stations 1-3)

Walden Drain is a straightened, trapezoidal channel, generally flowing north through Ravenswood Line. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that Walden Drain has been designated a Class F (i.e., intermittent flow) municipal drain. Background fish community data were not available for Walden Drain.

Electrofishing efforts by Stantec in June 2012 did not capture any fish.

Within the Zone of Investigation, there is:

- One reach of Walden Drain that has been designated as a water body that provides seasonal fish habitat and is crossed by the access road to T1. The reach is located within 120 m of T1 and a proposed collector line and a MET tower.

Habitat information at the location identified in **Figure 2.10** is provided in **Table 4.14** along with references to potential impacts, mitigation measures and net effects.

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Table 4.14: Summary of Characteristics, Proposed Activities, Impacts and Mitigation for Water Bodies Within the 120 m Zone of Investigation – Duffus Drain Subwatershed

Reach ID ^a	Site Description*	Proposed Activities ^{c,d}	Potential Impacts	Mitigation	Net Effects ^b
Lusby Drain	Seasonal flow consisting of pool and run morphology Bankfull width = 3.5-6 m Water depth = 30-60 cm Substrate = Clay, detritus Fished June 2012 Seasonal Fish habitat	T4 access road and T6 access road to cross a water body providing fish habitat. Transmission line to cross a water body providing fish habitat. T5, T5 access road, Met Tower and a collector line to be located within 120 m of a water body providing fish habitat. (Figure 3.9).	Construction activities associated with the installation of the turbine access roads may affect the reach (e.g. Temporary increase in surface water turbidity due to runoff during construction. See Section 5.2.) With the exception of potential construction activities, transmission line crossings, turbines, turbine access roads, Met Tower and collector lines located within 120 m of a water body should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4, 5.5 and 5.6).	See Sections 6.1, 6.2, 6.3, 6.4 and 6.6. DFO Operational Statement for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings and Isolated/Dry Open-Cut Crossing may apply (Appendix E)	Installation of new access road culvert. Can likely be mitigated – unlikely that DFO authorization would be required.
Duffus Drain	Seasonal flow that dominated by run and pool morphology Bankfull width = 4 m Water depth = 50 cm Substrate = Clay and detritus Fished June 2012 Seasonal Fish habitat	3 Collector lines and transmission line to cross a water body providing fish habitat. T2 and T2 access road to be located within 120 m of a water body providing fish habitat. (Figures 3.9 to 3.10).	With the exception of potential construction activities, collector line and transmission line crossings, turbines and turbine access roads located within 120 m of a water body should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4 and 5.6).	See Sections 6.1, 6.3, 6.4 and 6.6. DFO Operational Statement for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings and Isolated/Dry Open-Cut Crossing may apply (Appendix E)	None expected
Walden Drain	Seasonal flow dominated by pool and run morphology Bankfull width = 4-6 m Water depth = 10-15 cm Substrate = Detritus Fished June 2012 Seasonal Fish habitat	T1 access road to cross a water body providing fish habitat. T1, Met Tower and a collector line to be located within 120 m of a water body providing fish habitat. (Figure 3.10).	Construction activities associated with the installation of the turbine access roads may affect the reach (e.g. Temporary increase in surface water turbidity due to runoff during construction. See Section 5.2.)	See Sections 6.1, 6.2, 6.3, 6.4 and 6.6. DFO Operational Statement for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings and Isolated/Dry Open-Cut	Installation of new access road culvert. Can likely be mitigated – unlikely that DFO authorization would be required.

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Table 4.14: Summary of Characteristics, Proposed Activities, Impacts and Mitigation for Water Bodies Within the 120 m Zone of Investigation – Duffus Drain Subwatershed

Reach ID ^a	Site Description [*]	Proposed Activities ^{c,d}	Potential Impacts	Mitigation	Net Effects ^b
			With the exception of potential construction activities, collector line crossings, turbines and Met Towers located within 120 m of a water body should not affect fish and fish habitat (see Sections 5.1, 5.3, 5.4, 5.5 and 5.6).	Crossings may apply (Appendix E)	

a see **Figures 3.9 to 3.10 (Appendix A)**

b assumes all mitigation measures are implemented and successful

c turbine access roads include the installation of a collector line at the same location

d proposed activities during construction, operation and decommissioning phases

*summary of the surveyed reach, electrofishing results provided in Appendix C

4.15 MUD CREEK SUBWATERSHED

4.15.1 Mud Creek (Stations 53-1, 53-4 and 53-5)

Mud Creek is a permanent, naturally meandering watercourse that flows north across Thompson Line through wooded areas and open agricultural fields. Drain Classification mapping provided by Land Information Ontario (LIO) (LIO 2012) indicates watercourse is a Class C (i.e. warm water with no top predators) municipal drain. Background fish community data were not available for Mud Creek.

Electrofishing efforts by Stantec in June 2012 yielded 20 fish consisting of the following seven species (**Appendix C – 53-1**):

- Johnny Darter
- Common Shiner
- White Sucker
- Creek Chub
- Iowa Darter
- Northern Redbelly Dace
- Rainbow Trout

Within the Zone of Investigation, there is:

- One reach of Mud Creek that has been designated as a water body that provides fish habitat and is crossed by a proposed transmission line (either the primary or alternate route).

Habitat information at the locations identified in **Figure 2.10** is provided in **Table 4.15** along with references to potential impacts, mitigation measures and net effects.

4.15.2 10th Concession Drain (Station 53-2, 53-3 and 1-4)

The 10th Concession Drain is a tributary of Mud Creek that generally runs north along the east side of Army Camp Road and consists of a straight, trapezoidal channel with sparse overhanging riparian vegetation. Drain Classification mapping provided by SCRCA (SCRCA 2012) indicates that this channel is a Class C (i.e., warm water with no top predators present) municipal drain. Background fish community data were not available for 10th Concession Drain.

Electrofishing efforts by Stantec in June 2012 yielded one Brook Stickleback. Numerous YOY Brook Stickleback were observed within the surveyed reaches (**Appendix C – 53-2 and 1-4**).

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Within the Zone of Investigation, there is:

- One reach of 10th Concession Drain that has been designated as a water body that provides fish habitat and is crossed by the proposed transmission line (either the primary or alternate route) and is within 120 m of the access road to T2.

Habitat information at the location identified in **Figure 2.10** is provided in **Table 4.15** along with references to potential impacts, mitigation measures and net effects.

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Table 4.15: Summary of Characteristics, Proposed Activities, Impacts and Mitigation for Water Bodies Within the 120 m Zone of Investigation – Mud Drain Subwatershed

Reach ID ^a	Site Description*	Proposed Activities ^{c,d}	Potential Impacts	Mitigation	Net Effects ^b
Mud Creek	Permanent flow consisting of pool and run morphology Bankfull width = 5-8 m Water depth = 15 cm Substrate = Clay, silt, sand, gravel and cobble Fished June 2012 Fish habitat	1 Transmission line (either primary or alternate route) to cross a water body providing fish habitat. (Figure 3.10).	With the exception of potential construction activities, transmission line crossings should not affect fish and fish habitat (see Sections 5.1, 5.3 and 5.6).	See Sections 6.1, 6.3 and 6.6. DFO Operational Statement for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings may apply (Appendix E)	None expected
10 th Concession Drain	Permanent flow that dominated by pool morphology Bankfull width = 2.5-5 m Water depth = 3-60 cm Substrate = Clay, silt, muck and detritus Fish habitat	1 Transmission line (either primary or alternate route) to cross a water body providing fish habitat. T2 access road to be located within 120 m of a water body providing fish habitat. (Figure 3.10).	With the exception of potential construction activities, transmission line crossings and turbine access roads located within 120 m of a water body should not affect fish and fish habitat (see Sections 5.1, 5.3 and 5.6).	See Sections 6.1, 6.3 and 6.6. DFO Operational Statement for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings may apply (Appendix E)	None expected

a see **Figure 3.10 (Appendix A)**

b assumes all mitigation measures are implemented and successful

c turbine access roads include the installation of a collector line at the same location

d proposed activities during construction, operation and decommissioning phases

*summary of the surveyed reach, electrofishing results provided in Appendix C

4.16 GOLDEN CREEK SUBWATERSHED

4.16.1 Elliot-McBryan Drain (Stations 43-1)

Elliot-McBryan Drain is a straightened, trapezoidal channel with minimal riparian vegetation. The drain flows north along Ridge Road to converge with Golden Creek at Lakeshore Road. Drain Classification mapping provided by LIO (LIO 2012) indicates Elliot-McBryan Drain is a Class F (i.e. intermittent) municipal drain. Background fish community data were not available for Elliot-McBryan Drain.

Electrofishing could not be conducted by Stantec in June 2012 as the channel was dry at the time of the survey.

Within the Zone of Investigation, there is:

- One reach of Elliot-McBryan Drain that has been designated as a water body that provides seasonal fish habitat and is crossed three times by a proposed transmission line.

Habitat information at the locations identified in **Figure 2.10** is provided in **Table 4.16** along with references to potential impacts, mitigation measures and net effects.

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Table 4.16: Summary of Characteristics, Proposed Activities, Impacts and Mitigation for Water Bodies Within the 120 m Zone of Investigation – Golden Creek Subwatershed

Reach ID ^a	Site Description*	Proposed Activities ^{c d}	Potential Impacts	Mitigation	Net Effects _b
Elliot-McBryan Drain	Seasonal flow consisting of run morphology at the time of the fall 2011 survey. Bankfull width = 2 m Water depth = 30 cm Substrate = Clay and detritus Seasonal Fish habitat	3 Transmission lines to cross a water body providing fish habitat. (Figure 3.10).	With the exception of potential construction activities, transmission line crossings should not affect fish and fish habitat (see Sections 5.1, 5.3 and 5.6).	See Sections 6.1, 6.3 and 6.6. DFO Operational Statement for Overhead Line Construction (Appendix E)	None expected

a see **Figure 3.10 (Appendix A)**

b assumes all mitigation measures are implemented and successful

c turbine access roads include the installation of a collector line at the same location

d proposed activities during construction, operation and decommissioning phases

*summary of the surveyed reach, electrofishing results provided in Appendix C

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4.17 SUMMARY OF PREDICTED IMPACTS TO FISH HABITAT AND APPROVAL PROCESS

4.17.1 Project Impacts

Based on the current Project layout, it may be necessary to acquire additional approvals from DFO under the federal *Fisheries Act*, due to culvert installations. Approvals may include the need for *Fisheries Act* Authorization if DFO deems impacts to fish habitat to be substantial. Based on previously submitted REA applications, it is likely that Project-related impacts to aquatic habitat can be mitigated and that DFO can issue a Letter of Advice confirming that proposed mitigation measures will prevent net effects to fish and fish habitat.

Locations where *Fisheries Act* approval may be necessary include sites where new roads and culverts are proposed, as well as locations where Project activities require that the size or orientation of existing road culverts is substantially altered. **Table 4.17** presents a list of the 23 locations where culvert crossings are proposed at water bodies.

At the time of report preparation, the need for a Permit To Take Water (PTTW) has not been identified, as discussed in the Design and Operation Report.

Table 4.17: Summary of Water Bodies and Locations of Potential Net Effects (as per Tables 4-1 to 4-16)

Subwatershed/Reach ID	Fish Habitat Type	
	Direct	Indirect
Bonnie Doon Creek		
Greendees Drain (1 crossing)	√	
Aberarder Creek		
Bannister Drain (1 crossing)	√	
Byrnes-Sutton Drain (1 crossing)	√	
10 th Concession Drain (1 crossing)	√	
Unknown Drain (1 crossing)	√	
Highland Creek		
Highland Creek (1 crossing)	√	
Douglas Drain		
Douglas Drain (1 crossing)	√	
Hickory Creek		
Unknown Drain 2 (1 crossing)	√	
Anderson Drain		
Anderson Drain (3 crossings)		√
Elliot Drain		
Elliot Drain (1 crossing)	√	
North Street Drain		
North Street Drain (1 crossing)	√	
Woods Creek		
Woods Creek (1 crossing)	√	
McCallum Drain (1 crossing)	√	

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Table 4.17: Summary of Water Bodies and Locations of Potential Net Effects (as per Tables 4-1 to 4-16)

Subwatershed/Reach ID	Fish Habitat Type	
	Direct	Indirect
Brush Drain (1 crossing)	√	
Beith Creek		
Beith Creek Drain (1 crossing)	√	
Shashawandah Creek		
Shashawandah Creek (2 crossings)	√	
Ross Drain (1 crossing)	√	
Duffus Drain		
Lusby Drain (2 crossings)	√	
Walden Drain (1 crossing)	√	

The conclusions of no net effects (**Tables 4.1 to 4.16**) assume that negative effects associated with turbine construction, overhead and underground collector line installation can be mitigated. It may then be possible to use DFO Operational Statements (see **Appendix E**) for the construction of these components. 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 DFO may result in site-specific construction methods and mitigation measures for some locations. In such cases, additional sites may require review by the DFO, and details of construction methods, etc. should be submitted for agency review.

4.17.2 Cumulative Effects

Provided all mitigation measures are implemented properly, Tables 4.1 to 4.16 in Section 4 indicate that there are no net effects expected as a result of the construction, operation and decommissioning phases of the Project; therefore, there are no cumulative effects anticipated as a result of Project activities.

5.0 General Overview of Potential Impacts to Water Bodies

Below is a summary of potential impacts of the Project to water bodies that may occur during construction, operation and decommissioning. Further details regarding construction, operation and decommissioning impacts and mitigation can be found in the Construction Plan Report and Decommissioning Plan Report (Stantec 2013b).

5.1 CONSTRUCTION AND DECOMMISSIONING – GENERAL IMPACTS

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

- Short-term increase in turbidity from runoff and soil erosion during construction;
- Loss of shade;
- Reduced bank stability;
- Reduced allochthonous inputs; and
- Water quality and habitat disturbance effects to aquatic habitat.

5.2 CONSTRUCTION AND DECOMMISSIONING - CULVERTS AND ACCESS ROADS

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

- Disturbance to aquatic biota and habitat;
- 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, installed, and removed such that there is no:

- Restriction of flows through the culvert resulting in upstream pooling;
- Erosion at the culvert inlets and outlets;
- Barrier to fish passage to upstream environments; and
- Changes to flow that result in increased erosion.

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5.3 CONSTRUCTION AND DECOMMISSIONING - OVERHEAD COLLECTOR/TRANSMISSION LINES

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

5.4 CONSTRUCTION AND DECOMMISSIONING - UNDERGROUND COLLECTOR LINES

Potential impacts to fish and fish habitat related to the installation and removal of underground collector 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 i.e. equipment is not properly maintained.

5.5 CONSTRUCTION AND DECOMMISSIONING - SUBSTATION/MET TOWER/STORMWATER MANAGEMENT SYSTEM

The potential for effects on watercourses exists from soil erosion resulting from unavoidable removal of stabilizing vegetative cover during construction and decommissioning activities. Erosion can cause sediment transport to nearby watercourses and a short-term increase in surface water turbidity, including associated impacts to fish and fish habitat. Due to the rural and agricultural land uses within the Project Location, the watercourses are not highly sensitive to temporary disturbances. However, the potential effects to watercourses depend on the specific characteristics of each watercourse (e.g. flow regime, water velocity, bed substrates, bank conditions, local soils and the extent and duration of exposure).

Some materials, such as fuel, lubricating oils and other fluids associated with electrical equipment operation and maintenance have the potential for release to the environment in the event of accidental spills. Any effects of a spill would be short term in nature provided standard spill containment procedures are implemented.

Area drainage from the transformer substation will be accomplished through swales/ditches adjacent to the substation that will collect and convey runoff from the substation area and the associated access road. The total drainage area associated with the substation and access road "hard" surfaces is less than 2 ha and therefore a "wet" water quality control pond (i.e. one containing a permanent pool) is inappropriate, as per the MOE *SWM Planning and Design*

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Guidelines Manual (2003). In addition to the conveyance of runoff, the swales will also provide water quality control, which is a suitable stormwater management practice for such an area according to the MOE guidelines. Potential construction and decommissioning-related impacts would be limited to those identified in Section 5.1.

5.6 OPERATIONAL PHASE

Operation activities for all Project components that have the potential to affect aquatic habitat includes accidental spills and/or leaks. Proper storage of materials (e.g. maintenance fluids) at off-site storage containers would greatly reduce the potential for accidental spills and/or leaks. Any effects of a spill would be short term in nature provided standard spill containment procedures are implemented.

6.0 General Overview of Potential Impacts

Standard mitigation measures used for works in and around water are summarized below. Specific details of the mitigation measures to be implemented would be determined through consultations with the local municipality, the SCRCA, and DFO. The extent of mitigation would be dependent on project details such as technical requirements, construction methods and schedule. Further details regarding construction, operation and decommissioning impacts and mitigation can be found in **Table 3.1** of the Construction Plan Report and Decommissioning Plan Report (Stantec 2013b).

6.1 CONSTRUCTION AND DECOMMISSIONING - GENERAL MITIGATION MEASURES

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

- All in-water work would be completed within MNR timing windows to protect local fish populations during their spawning and egg incubation periods. A typical construction timing window for warmwater streams in the Aylmer District is July 1 to March 15.
- All materials and equipment used for the purpose of site preparation and Project construction/decommissioning shall be operated and stored in a manner that prevents any deleterious substance (e.g., petroleum products, silt, etc.) from entering the water:
 - Any stockpiled materials should be stored and stabilized away from the water;
 - Refueling and maintenance of construction equipment should occur a minimum of 100 m from a water body;
 - As appropriate, spills should be reported to the MOE Spills Action Centre;
 - Any part of equipment entering the water should be free of fluid leaks and externally cleaned/degreased to prevent any deleterious substance from entering the water; and
 - Only clean material, free of fine particulate matter should be placed in the water.
- Sediment and erosion control measures should be implemented prior to construction and decommissioning, and maintained during the construction/decommissioning phase to prevent entry of sediment into the water:
 - Silt fencing and/or barriers should be used along all construction/decommissioning areas adjacent to natural areas;
 - No equipment should be permitted to enter any natural areas beyond the silt fencing during construction/decommissioning;

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- All sediment and erosion control measures should be inspected at least weekly and during and immediately following rainfall events to ensure that they are functioning properly and are maintained and/or upgraded as required;
- Topsoil stockpiles should be sufficiently distant from watercourses to preclude sediment inputs due to erosion of stored soil materials;
- If the sediment and erosion control measures are not functioning properly, no further work should occur until the sediment and/or erosion problem is addressed;
- All disturbed areas susceptible to erosion/sediment transport will be stabilized and re-vegetated as required upon completion of work and restored to a pre-disturbed state or better; and
- Sediment and erosion control measures should be left in place until all areas of the construction/decommissioning site have been stabilized.

6.2 CONSTRUCTION AND DECOMMISSIONING - CULVERT CROSSINGS

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

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

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

During decommissioning, culverts will be removed during the appropriate in-water construction window (July 1 to March 15) and the streambed will be restored using natural material to match characteristics in adjacent reaches.

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

Temporary Isolation

- Cofferdams (e.g., aqua-dams, sand bags, concrete blocks, steel or wood wall, clean rip-rap, sheet pile or other appropriate designs) can be used to separate the in-water work site from flowing water.

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

6.3 CONSTRUCTION AND DECOMMISSIONING - OVERHEAD COLLECTOR/TRANSMISSION LINES

The DFO has prepared an Operational Statement for overhead line construction (Ontario Operational Statement Habitat Management Program: Overhead Line Construction – see **Appendix E**). This Operational Statement provides measures to protect fish and fish habitat when undertaking this type of construction activity.

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

According to the DFO Operational Statement for Overhead Line Construction, a proponent may proceed with an overhead line project without DFO review when the conditions listed in the Operational Statement are met (Appendix E). The Operational Statement includes mitigation measures for the construction of overhead lines. The same mitigation measures should be applied during the decommissioning phase of the project.

6.4 CONSTRUCTION AND DECOMMISSIONING - UNDERGROUND COLLECTOR LINES

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

- High Pressure Directional Drilling
- Punch and Bore Crossings
- Isolated Dry or Open-Cut Stream Crossings

Each of the above Operational Statements includes a list of conditions under which they may be applied. Mitigation measures are also included and should be implemented to protect fish and fish habitat.

In addition to measures identified in the Operational Statements, an Emergency Spill Kit should be available on-site in the event of leaks from machinery. Mitigation measures for Isolated Dry or Open-Cut stream crossing should be applied during the decommissioning phase of the project.

6.5 CONSTRUCTION AND DECOMMISSIONING – SUBSTATION/MET TOWER/STORMWATER MANAGEMENT SYSTEM

General mitigation measures to prevent impacts to aquatic organisms and their habitat are presented in Section 6.1. No further measures are necessary to prevent impacts during the construction, operation and decommissioning of the substation, MET towers, and the stormwater management system.

6.6 OPERATIONAL PHASE

Proper storage of materials (e.g. maintenance fluids) at off-site storage containers will reduce or eliminate the potential for accidental spills and/or leaks. An Emergency Spill Kit should be available at all times in the event of potential leaks from machinery.

7.0 Monitoring

7.1 CONSTRUCTION AND DECOMMISSIONING

Methods/Sampling Protocols

To address commitments made in the Environmental Effects Monitoring Plan (EEMP) presented in the Construction Plan Report and Decommissioning Plan Report (Stantec, 2013b), the following methods/protocols should be followed.

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

The Environmental Monitor will:

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

Performance Objectives/Additional Actions

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

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

Specific details of monitoring programs are outside the scope of REA, and are finalized during the *Fisheries Act* and Conservation Authority permitting. Compensation strategies and/or permits from DFO and/or the Conservation Authorities, as applicable, may include conditions of

approval such as construction and post-construction monitoring. All such strategies and/or permits should be obtained prior to construction, and all such conditions and requirements would be implemented as appropriate.

7.2 OPERATION

The Environmental Effects Monitoring Plan (EEMP) for the Project is provided in the Design and Operations Report. The EEMP indicates that during operation, proper storage of materials (e.g. maintenance fluids) at off-site storage containers would greatly reduce the potential for accidental spills and/or leaks, and therefore reduce or eliminate potential impacts to aquatic habitat and aquatic organisms.

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 would be discussed with the MOE (Spills Action Centre) and MNR.

8.0 Conclusions

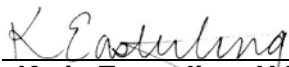
The Suncor Energy Cedar Point Wind Power Project 'Water Assessment and Water Body Report' has been prepared by Stantec for Suncor Energy Products Inc. in accordance with Ontario Regulation 359/09. This report is one component of the REA application for the Project.

Locations where water bodies are present within 120 m of a proposed Project Location are presented in **Figures 2.1 to 2.10** and summarized in **Table 3-2**. 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 a total of 19 water bodies where fish habitat is present, (**Table 4-19**). Review by the SCRCA/DFO is recommended due to culvert crossings and collector line installation associated with turbine access roads.

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


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