Draft For Comment

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Project Number: **1104036.00**

Project Title: **WAINFLEET WIND ENERGY PROJECT**

Report: **002-R03-1104036**

Title: **WATER ASSESSMENT AND IMPACTS REPORT**

Client: **IPC Energy**
2550 Argentia Road Suite 105
Mississauga, Ontario
L5N 5R1

Date: **April, 2012**

(Draft, For Public and Agency Review)

Prepared By Morrison Hershfield Limited

IPC ENERGY

Wainfleet
Clean energy for life.

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1.0 Introduction

Morrison Hershfield (MH) has been retained by IPC Energy to complete a Water Assessment and Impact Report as part of a Renewable Energy Approval ("REA") for a proposed wind farm located in the Township of Wainfleet in Niagara Region, Ontario. The project involves the development of 5 turbines with a hub height of 95m resulting in the total nameplate production of 9.0 Megawatts ("MW").

The water assessment report has been prepared to document the potential negative impacts on waterways as a result of construction, installation, use, operation, maintenance and decommissioning of the proposed facility. This report is required as some components of the project location will be located within 120 meters of a water body as by O.Reg. 359/09 ("the REA"). As such, mitigation measures will be proposed and described to address any potential negative impacts on waterbodies that may result from project activities. Monitoring plans, found in the Environmental Effects Monitroing Plan (EEMP) report of the REA application, have been established to evaluate the success of the proposed mitigation measures.

This water assessment was completed in accordance with Section 29, 30, and 31 of O.Reg. 359/09 and the Ministry of the Environment's (MOE's) Technical Bulletin ("Guidance for Preparing the Water Assessment and Water Body Reports"). The subsequent sections detail the results from a records review and site investigations completed by MH.

1.1 Project Location

Based on the REA Regulation requirements, assessments are to be conducted within 120m of the project location. The REA Regulation defines project location as: a part of land and all of part of any building or structure in, on or over which a person is engaging in or proposes to engage in the project and any air space in which a person is engaging in or proposes to engage in the project.

The major project components of the project include:

- Five (5) Vestas V-100 1.8 MW Wind Turbines
- An Underground Collector System
- Turbine Access Roads
- Temporary Construction Staging/Laydown Areas for the erection of wind turbines
- A Transformer Substation to connect to the Hydro One distribution system

The turbine layout and associated project components are illustrated in **Figure 1-3** of this report.

2.0 Records Review

In accordance with s. 30 of O. Reg. 359/09, the following records review was undertaken as part of this water assessment to determine if the project location is:

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

Morrison Hershfield completed a records review in 2010 and 2011 for water features located within the project area. The records reviewed included the following:

- Official Plan Township of Wainfleet (September, 2010);
- Amendment 187 to the Official Plan for the Niagara Region Planning Area (April 2008) reviewed in 2010;
- Regional Policy Plan for the Regional Municipality of Niagara (December, 2010) reviewed in 2011;
- Niagara Peninsula Conservation Authority (NPCA) Lake Erie North Shore Watershed Plan (2006) reviewed in April 2010;
- Niagara Peninsula Conservation Authority (NPCA) Watershed Regulation reviewed in 2010;
- Ontario Ministry of Natural Resources (MNR), Wainfleet. Lake trout management plans;
- Contact was made with the MNR by MH in 2010 for records of water bodies controlled by the MNR (i.e., cold water fish habitat);
- Background documents, reports and maps related to the physical setting of the Project Area reviewed in April 2010.

A summary of the MNR data is provided in **Appendix C**.

2.1 Township of Wainfleet

According to the Township of Wainfleet's Official Plan, the project location is mainly designated 'countryside' within the municpal structure. This countryside area is composed mainly of agricultural areas, with small areas of rural and specialty crop. The remainder of the project area is classified as 'natural heritage system'. The natural heritage system is composed of areas designated as Environmental Protection Area (EPA) and Environmental Conservation Area (ECA). These two areas include all natural heritage features within the Township including watercourses, wetlands, woodlands, and associated linkages. The

Township also identifies portions of Mill Race Creek and Casey Drain as municipal drains within 120 metres of the project location.

2.2 Niagara Region

The Regional Policy Plan identified a number of natural areas and features including the Welland River, Mill Race Creek, and Casey Drain. Several wetlands (Provincially Significant Lowbanks Backshore Wetland Complex) and woodlots were also identified.

Regional Mapping reviewed was based on Fish Habitat typing of watercourses provided by MNR. The fish habitat is categorized into one of three categories: critical, important, and marginal. Within the Regional Policy Plan, fish habitat is considered a key hydrologic feature and considered part of the Core Natural Heritage System. The Regional Policy Plan states that development and site alteration may be permitted within fish habitat if it will result in no net loss of the productive capacity of fish habitat as determined by the Department of Fisheries and Oceans or its designate (Environmental Screening Report for the Smithville Growth Management Study, 2008).

2.3 Regulatory Designation Review

2.3.1 Niagara Region Conservation Authority (NPCA)

Niagara Region Conservation Authority (NPCA) has jurisdiction over the regulated areas (O.Reg. 155/06), as provided by the Conservation Authorities Act. In accordance with NPCA (Source Water Protection Planning) turbine locations 4 and 5 are proposed within a Highly Vulnerable Aquifer area.

The NPCA has classifications for most of the municipal drain areas within the project location. The main branch of Casey Drain has been classified as Type C, while the east, west and north branches within 120 metres of the project location have been classified as Type F. Type C classification is given to permanent watercourses with a warmwater thermal regime and no sensitive species or communities present. Type F classification is given to intermittent or ephemeral watercourses. Many areas of Mill Race Creek have been designated as Type F municipal drains, while some areas remain unclassified.

2.3.2 Ministry of Natural Resources (MNR)

O.Reg. 155/06 ensures protection in or near water from proposed projects. Each watercourse is given a "Type" by the Ministry of Natural Resources and each type is associated with a respective setback requirement to ensure the protection of fish habitat from development activities. Type 1 Critical requires a minimum 30 meter natural buffer be maintained between any development and a Type 1 watercourse. Type 2 Important must maintain a minimum of 15 meter natural buffer between any development and a Type 2 watercourse. Type 3 Marginal requires a minimum of 15 meter natural buffer to be maintained between any development and a Type 3 watercourse. The entire Casey Drain watershed has been given a Type 2 habitat designation as it is considered to be 'ideal for enhancement or restoration projects'. The majority of the Mill Race Creek watershed is designated as Type 2 habitat. For the purposes of O.Reg.359/09, the REA, the natural buffer is 30 meters for all watercourses.

All water bodies identified within 120 metres of the project location are identified as warm water, permanent or intermittent streams and municipal drains. No crown owned waterbodies were identified within 120 metres of the project location. No lake trout lakes are located within 300 meters of the project location

2.4 Physical Setting

2.4.1 Watershed Summary

Within the Wainfleet study limits there are three watersheds; Welland River, Mill Race Creek, and Casey Drain. The waterways and drainage within these watersheds flow through predominately agricultural land, and are often channelized to accommodate the land use. As such, the waterways are often following marginal tree lines or cross through forest stands between agricultural fields.

The MNR classification system was used to identify the fish habitat type. Type I and Type II are used to identify the sensitivity. Type 1 is considered high sensitivity due to the area limiting the overall productive capacity, or the presence of sensitive fish species and/or habitat; these areas require a higher degree of protection. Examples include critical spawning and rearing areas for fish with stringent habitat requirements, migration routes and productive feeding areas. Type 2 is moderately sensitive, the habitat is important to the fish community but it is below its productive capacity; good opportunities for habitat compensation in these areas exist. Examples include feeding areas for adult fish and unspecialized spawning habitat. Type 3 are considered habitats that are marginal or highly degraded and do not contribute directly to fish productivity (i.e. channelized streams and artificially created drainage swales).

MNR and the NPCA provided fish species data which is provided for each watershed found in **Table 1.0**.

Welland River Watershed

Welland River is situated north of the Wainfleet project limits in Niagara Region, southern Ontario. The headwaters of the Welland River originate south of Hamilton, Ontario and drain into Niagara River. Mill Race Creek is an important tributary of Welland River, a waterway which flows through rural and urban communities and drains into Lake Erie. During the field investigation, Welland River was highly degraded likely as a result of agricultural activity and urban development. Destabilization of stream embankments, poor riparian communities in several locations has likely decreased the overall health of the watercourse.

Welland River was classified as a Type 1 watercourse by NPCA, a highly sensitive watercourse. Type 1 is considered high sensitivity due to the area limiting the overall productive capacity, or the presence of sensitive fish species and/or habitat; these areas require a higher degree of protection. In addition, NPCA recorded the presence of Grass Pickerel (*Esox americanus vermiculatus*) and River Redhorse (*Moxostoma carinatum*) which are listed as Special Concern under the Federal *Species at Risk Act* and the Provincial *Endangered Species Act*.

The restricted timing windows for all in-water works are March 1st to July 1st as indicated by the MNR. However, Grass Pickerel is a species of special concern provincially and federally, and is known to occasionally spawn in the fall. Therefore, additional restrictions from September 1 to November 30 also apply.

Mill Race Creek Watershed

Mill Race Creek has three main drainage branches on the east side of Highway 3 near Wainfleet and one drainage branch west of Highway 3 and Abbey Road. Mill Race Creek splits and flows south-east of Dixie Road. The channel then branches east of Malowany Road and continues to travel south-westerly where the channel forks for the fourth time just west of Highway 3 and Abbey Road.

This permanent watercourse flows through a landscape of agriculture fields. Segments of deciduous and coniferous trees are found along the edges of these fields. All investigated tributaries are situated within the study area where they flow through a landscape of gently rolling topography. The watercourse appears to have been excavated and channelized to flow within the existing ditch line west of Sideroad 22, and it likely functioned as a linear agricultural drain. Primarily the substrate consisted of fine granular material. Aquatic vegetation of various grasses (*Poaceae sp*.) and cattail species provided some instream habitat and cover. The riparian community was comprised of various shrubs, and grass species providing minimal overhead cover and shade input. This watercourse appeared to have unstable banks making it susceptible to erosion and sediment inputs. Channelization, intensive agriculture and insufficient riparian cover contribute to the poor fish habitat within this watershed.

Mill Race Creek was classified as a Type 2 watercourse by MNR, a moderately sensitive watercourse. The Type 2 designation is the result of the potential presence of sensitive species during certain times of the year as well the overall fish community is considered below potential due to habitat related issues. In addition, NPCA recorded the presence of Grass Pickerel (*Esox americanus vermiculatus*) which is listed as Special Concern under the Federal *Species at Risk Act* and the Provincial *Endangered Species Act*.

The restricted timing windows for all in-water works are March 1st to July 1st as indicated by the MNR. Although the section of the creek within the site boundaries is considered Type 2, there are sensitive species present within the watershed that must be protected.

Casey Drain Watershed

Casey Drain is located at the south end of the project limits, and drains into Lake Erie. During the field investigation, significant portions of Casey Drain consisted of an agricultural riparian community which contributed to the poor fish habitat cover, bank instability, and channelization of the watercourse. The intensive agriculture and insufficient riparian cover contribute to the poor fish habitat within this watershed. This waterway is susceptible to carrying higher sediment and chemical loads from agricultural activity.

MNR had no existing fishery data for Casey Drain; however, NPCA classified this watercourse to have low sensitivity despite the Type 2 classification. This Type 2 classification is due to the restoration potential of the watercourse and does not reflect its

present condition. The low sensitivity classification from NPCA is due to the species present and/or the absence of adequate coldwater habitat characteristics. As such, the restricted in-water works timing window of (March 1st to June 1st) as indicated by MNR will apply.

Table 1.0: Existing Fish Species Present Summary			
Watercourse	**Fish Community/Species Present**	**Habitat Sensitivity**	**Timing Restrictions**
Welland River	NPCA: banded killifish, bigmouth buffalo, black bullhead, black crappie, blackside darter, bluegill, bluntnose minnow, bowfin, brook silverside, brown bullhead, central mudminnow, channel catfish, common carp, common shiner, creek chub, emerald shiner, fathead minnow, freshwater drum, gizzard shad, golden redhorse, golden shiner, goldfish, grass pickerel, greater redhorse, green sunfish, Johnny darter, largemouth bass, logperch, mimic shiner, northern pike, pumpkinseed, quillback, rainbow smelt, rainbow trout, river redhorse, rock bass, round goby, rudd, shorthead redhorse, smallmouth bass, spottail shiner, striped shiner, tadpole madtom, tessellated darter, walleye, white bass, white crappie, white perch, white sucker, yellow bullhead, and yellow perch	NPCA: High	NPCA: March 1- July 1
Mill Race Creek	MNR: black bullhead, bluegill, brown bullhead, central mudminnow, common carp, golden shiner, goldfish, green sunfish, johnny darter, largemouth bass, northern pike, pumpkinseed, tadpole madtom, white crappie and yellow perch. NPCA: black bullhead, black crappie, brown bullhead, central mudminnow, common carp, fathead minnow, freshwater drum, golden shiner, grass pickerel, green sunfish, johnny darter, largemouth bass, northern pike, pumpkinseed, tadpole madtom, white	MNR: Moderate NPCA: Moderate	MNR: March 1 – July 1 NPCA: March 1 –July 1
Casey Drain	MNR: *no information available* NPCA: brown bullhead, pumpkinseed, emerald shiner, largemouth bass, goldfish, central mudminnow, golden shiner, fathead minnow, and bluntnose minnow.	NPCA: Low	NPCA: March 1 – June 1

3.0 Site Investigation

Site investigation of water features within 120 metres of the project location were conducted by **Ms. Kelly Sadlier** (Aquatic Ecosystems Biologist) and **Ms. Josephine Gilson** (Aquatic Ecosystems Biologist) on December 2nd, 2009 from 8:30 am to 2:30 pm. Follow-up vestigations were completed on April 27th & 28th 2010 from 9:00am to 2:30 pm. The following sections are based on the site investigations completed by MH.

Weather conditions for the December 2, 2009 site investigation were overcast with high winds and an air temperature of 7^0C at 10:00 am. The April 27th/28th, 2010 site investigations weather conditions were partly sunny with an air temperature of 9^0C at 10:00am. Complete field records are located in **Appendix B**.

Site investigations included an assessment of all water features located within 120 meters of the project location in accordance with the requirements of O. Reg. 359/09. The site investigation confirmed the following:

- If the results of the records review were correct or required correction;
- If additional water bodies exist, other than those identified within the records review;
- The boundaries of any water body within 120 meters of the project location; and
- The distance from the project location to the boundaries of any water body that was identified in the records review.

Electrofishing was not completed as part of the site investigations, as MNR would not permit additional sampling to be undertaken.

3.1 Methodology

An aquatic field survey was conducted December 2, 2009 and April 27/28, 2010 to produce a complete characterization of the watershed and watercourse conditions within 300 meters of the project location. Field investigations encompassed the following aquatic habitat parameters:

- Water body type (i.e. coldwater, warmwater);
- Habitat features (i.e. flow characteristics)/locations;
- Stream morphology (including riparian vegetation characteristics);
- Fish species present within the study area (including species at risk) provided by MNR;
- "Critical" or important habitat areas including potential spawning areas, good nursery cover, and feeding areas; and
- Potential impacts, habitat compensation or enhancement opportunities.

3.2 Results

Site investigations completed on December 2nd, 2009 and April 27th/28th, 2010 confirmed the location of all watercourses and drainage features identified as part of the records review, and are further discussed below. No seepage areas within 120 meters of the project location were identified during site investigations.

Only one of the five proposed turbines (Turbine 4) is located within 120 meters of an identified water body. The remaining turbine locations adhere to the 120 metre setback distance from identified water bodies **(See Figure 1).** The underground collector system and access driveway routes were assessed to identify wetlands, streams, and other water bodies within 120 meters of the project location. Overall, the intermittent streams identified within 120 metres of the project location provide marginal fish habitat and the application of mitigation techniques are expected to eliminate any potential environmental effects to surrounding water bodies.

Table 2.0 summarizes the project components identified to be in or within 120 meters of a water body. Characterizations of these features are presented below.

Table 2.0: Project Components in or within 120 meters of a Water body

Project Component	Water body	Approximate Distance
Switching Station	Agricultural Swale for surface drainage– *non fish habitat*	57 metres
Turbine 1 Access Road	Agricultural Swale for surface drainage– *non fish habitat*	25 meters
Underground Collector System	Feeder of Mill Race Creek – Intermittent stream	0 metres
Turbine 4	Casey Drain (west branch) – Intermittent stream	45 metres
Turbine 4 Access Road	Casey Drain (west branch) – Intermittent stream	90 metres

3.2.1 Stream Crossings by Underground Collector System

The underground collector system is approximately 4km in length extending from the Switching Station parallel to Sideroad 22 (unpaved road) on private property; routing south east onto an adjacent property; south to Concession Road; and then south onto Station Road to connect to Turbine 4 and 5 **(See Figure 1).**

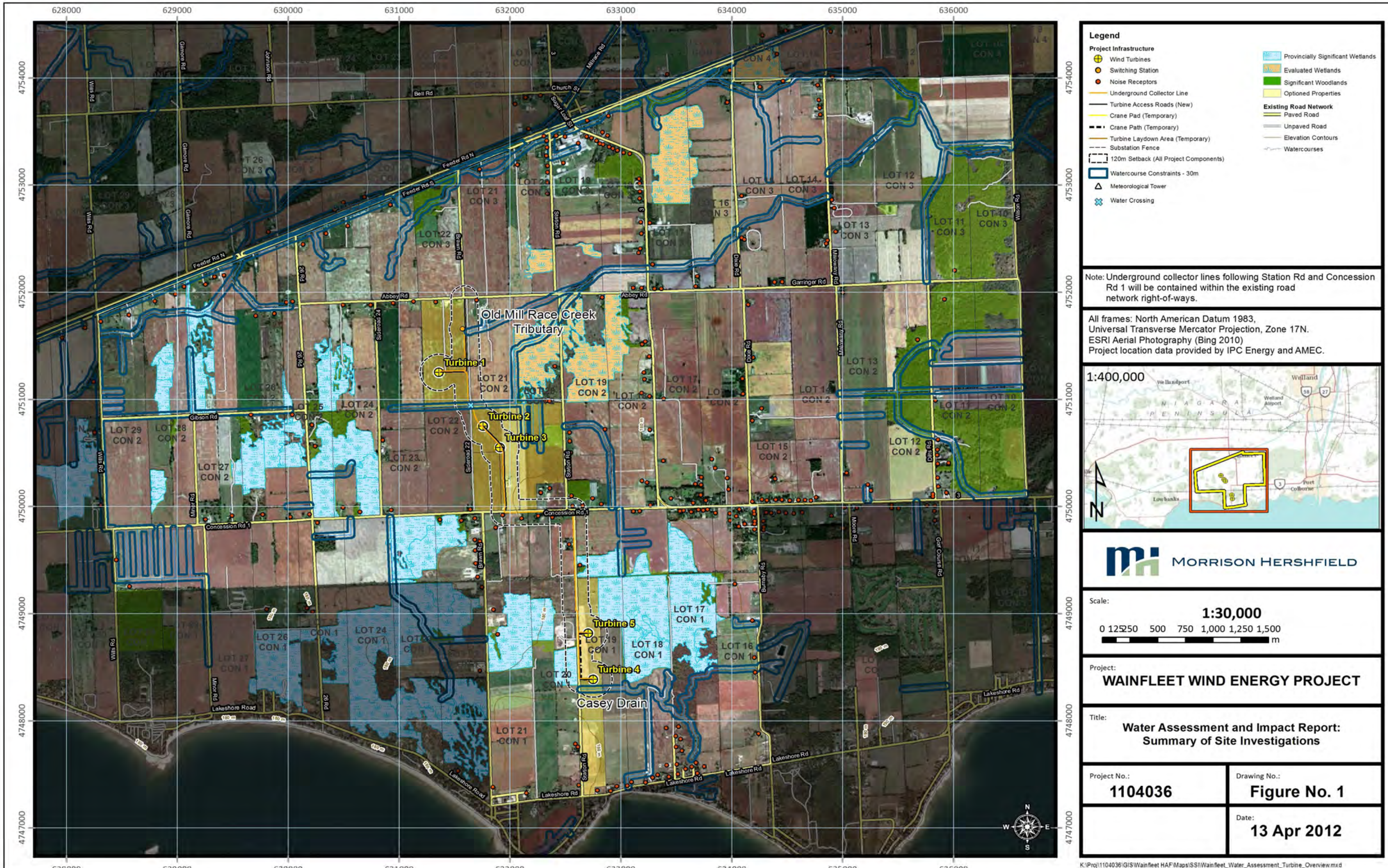
This collector system will cross one identified intermittent stream (42°53'37"N, 79°22'41"W). This channelized watercourse known as a Feeder of Mill Race Creek and part of the municipal drainage system is situated between agricultural fields. The channel is about 1.5-2m in width with minimal water present. The riparian community is limited to

grasses, sedges, cattails and low land shrub species. Substrate was comprised of fine granular material. A significant portion of the waterway was obscured by vegetation. The Feeder of Old Mill Race Creek intersects with another drainage system to the south which travels within the drainage ditch of Sideroad 22. This feeder is susceptible to carrying higher sediment and chemical loads from agricultural runoff. It is likely this culvert also conveys water during stormwater events and spring freshets. This section of Feeder of Mill Race Creek is considered potential fish habitat for warmwater baitfish species **(See Figure 2).**

3.2.2 Streams within 120m of a Turbine

Turbine 4 is approximately 45 metes from the west branch of Casey Drain (Refer to Figure 3). This seasonal drain originates east of Station Road and then drains into Lake Erie approximately 1800m downstream. In accordance with ArcView 9.0 Geographic Information System (GIS) mapping, significant portions of Casey Drain consist of an agricultural riparian community which contributed to the poor fish habitat cover, bank instability, and channelization of the watercourse. The intensive agriculture and insufficient riparian cover contribute to the poor fish habitat within this watershed. This waterway is susceptible to carrying higher sediment and chemical loads from agricultural activity. As this waterway is seasonal, it is not expected to provide habitat for fish species in the near vicinity of the proposed turbine location.

Turbine 4 and 5 are located in an area of high aquifer vulnerability as described in Figure 21 of the Township of Wainfleet Official Plan Review (April, 2010). However, it is anticipated, the construction, design and operation of the Wainfleet Wind Energy Project will not have any effects on ground water resources as there is no significant pollutant loading associated with the operation of the facility. Appropriate mitigation measures will be implemented to avoid potential impacts to groundwater quantity and quality within 120 metres of Turbine 4 and 5. In addition, should any spills of Petroleum, Oils or Lubricants (POL) occur at the project site the procedures identified in Section 4.1.4 of this report will be adhered to and the appropriate authorities will be notified immediately.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Project Infrastructure
Wind Turbines
Switching Station
Noise Receptors
Underground Collector Line
Turbine Access Roads (New)
Crane Pad (Temporary)
Crane Path (Temporary)
Turbine Laydown Area (Temporary)
Substation Fence
120m Setback (All Project Components)
Watercourse Constraints - 30m
Meteorological Tower
Water Crossing
Provincially Significant Wetlands
Evaluated Wetlands
Significant Woodlands
Optioned Properties
Existing Road Network
Paved Road
Unpaved Road
Elevation Contours
Watercourses
Note: Underground collector lines following Station Rd and Concession Rd 1 will be contained within the existing road network right-of-ways.
All frames: North American Datum 1983,
Universal Transverse Mercator Projection, Zone 17N.
ESRI Aerial Photography (Bing 2010)
Project location data provided by IPC Energy and AMEC.
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Scale:
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Title:
Water Assessment and Impact Report:
Summary of Site Investigations
Project No.:
1104036
Drawing No.:
Figure No. 1
Date:
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Old Mill Race Creek Tributary
Casey Drain
Turbine 1
Turbine 2
Turbine 3
Turbine 4
Turbine 5
Feeder Rd N
Feeder Rd S
Abbey Rd
Concession Rd 1
Gibson Rd
Lakeshore Road
Lakeshore Rd
Garringer Rd
Church St
Bell Rd
628000
629000
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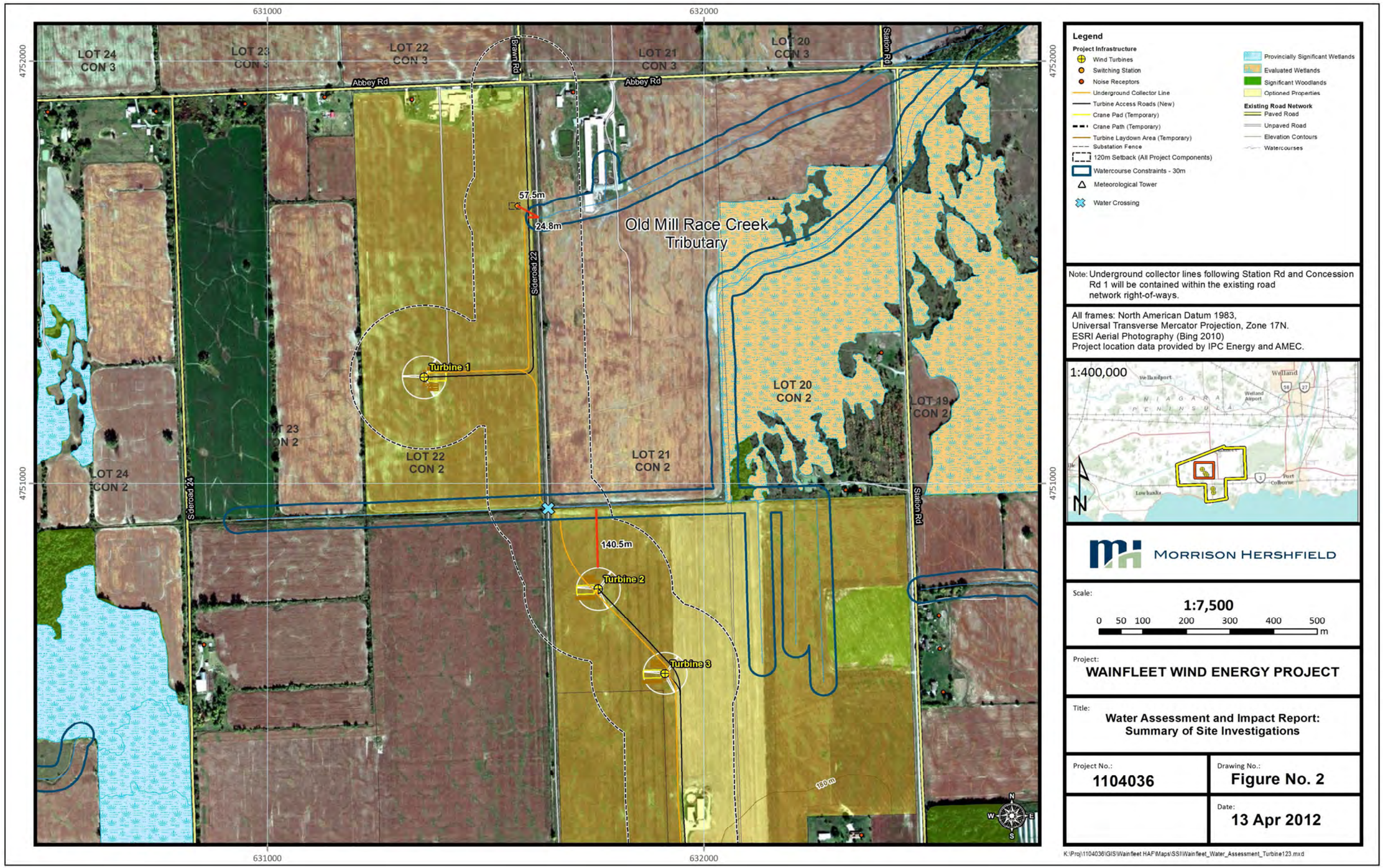
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Abbey Rd
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Old Mill Race Creek Tributary
Turbine 1
LOT 20 CON 2
LOT 19 CON 2
LOT 24 CON 2
LOT 22 CON 2
LOT 21 CON 2
Sideroad 24
140.5m
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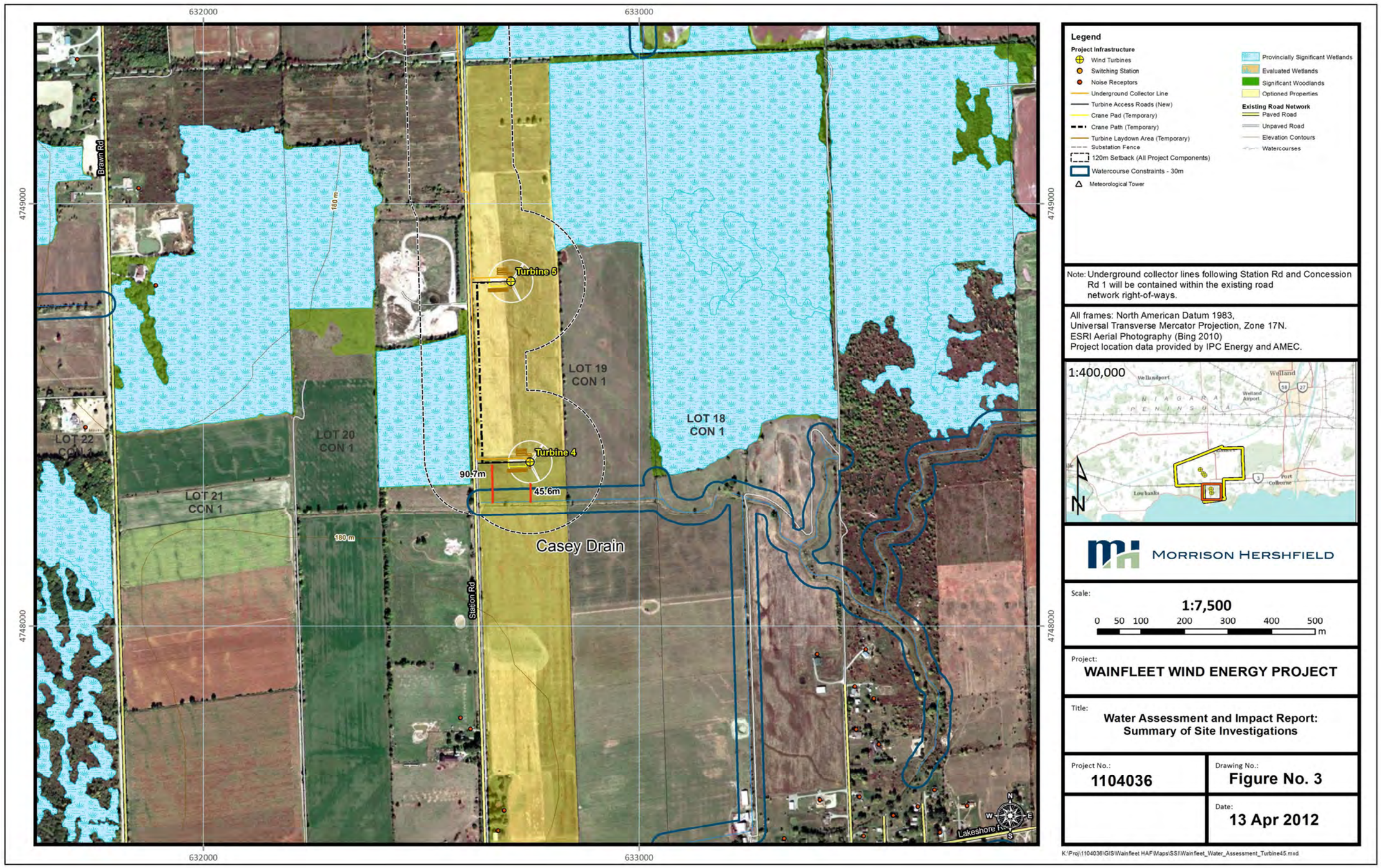
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Brawn Rd
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Turbine 5
LOT 19
CON 1
LOT 18
CON 1
LOT 22
CON 1
LOT 20
CON 1
Turbine 4
90.7m
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LOT 21
CON 1
180 m
Casey Drain
Station Rd
Lakeshore Rd
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Date:
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4.0 Water Impact Assessment

In accordance with Section 39 and 40 O. Reg 359/09, a water impact assesssmet has been prepared as some project components will be located in or within the 120 meter setback distance from an intermittent/perminant stream (Table 2). The potential impacts associated with the project location located within 120 metres of an intermittent stream during Site Prepartion, Construction, Operation and Decommissioning Phases are outlined in the following sections.

4.1 Potential Environmental Effects

4.1.1 Surface Water Quantity

Changing the existing surface cover associated with project works (i.e. access roads, underground collector system and turbine foundations) may affect runoff patterns within the Project Area. Potential short term impacts to runoff patterns may result from activites related to the interconnection of project turbines via underground cabling to the substation.

Mitigation

Vegitation cover will be restored after the installtion of the local collector system and trenches will be filled and revegetated. During the decommissioning phase, all disturbed lands will be returned to pre-existing conditions as agricultural fields. Access roads will be removed, at the landowners's request. It is anticipated the changes in runoff patterns will be negligible.

4.1.2 Erosion and Sedimentation

Potential increase of suspended sediment may affect water quality as a result of proposed project activites. Activities which may alter water quality include:

- Removal of vegetation in areas may increase erosion;
- Erosion of stockpiles;
- Areas where stormwater flows may increase erosion because of site development;
- Construction equipment may result in the placement of mud and debris on local roads;
- Construction areas and new gravel roads may result in the movement of fine material;
- Dismantling equipment may result in the placement of mud and debris on local roads; and
- Re-grading of the site will result in exposed soils.

Activities associated with the construction of new access roads and the installation of underground cabling (horizontal pressure directional drilling) may occur within 30 meters of a water feature, which may increase suspended sediments. In addition, during spring

freshets, and heavy rain events, generally increases sediment. When working under dry and frozen conditions, there will be no runoff from Project works; therefore, significant effects on suspended sediment concentrations are not expected.

Increase of suspended sediment may occur from the removal of vegetation from agricultural fields at the identified Turbine locations. During the decommissioning phase the removal of access roads, turbine foundations and switching station may also increase erosion and sediment loads to surrounding watercourses and local drainage ditches. However, the runoff from such project activities is anticipated to have minor effects on agricultural ditches.

Mitigation

Mitigation measures will be implented during all phases of the project (construction, operation and decommissioning) to reduce the effects of erosion and sedimentation to the Project Area. New access roads built to service the facility will be removed at the landowners request, upon decommissioning.

The following mitigation measures will be implemented to substantially reduce or eliminate erosion and sedimentation into the environment:

- Plan construction activities to minimize disturbed areas at any given time;
- Interception and diversion of stormwater runoff around distrubed areas;
- Stabilization of disturbed areas through grading and re-vegetation;
- Implanted buffer strips of vegetation between disturbed areas and watercourses;
- Minimization of off-site vehicle tracking of soil;
- Construction of appropriate stormwater and sediment ponds prior to any other construction activities;
- Restriction of water use for dust control only;
- Installation of temporary erosion control fencing prior to any grading or excavation to minimize silt migration from the Site and to delineate the limits of stripping and grading;
- Installation of erosion control fencing or sheeting over all stockpiles, manholes and catchbasins;
- Placement of geotextile fabric under catchbasin grates;
- Removal of accumulated sediment from control measures (ponds, fencing, etc.) at completion of construction or after significant accumulation;
- Keep sediment and erosion control measures in place until disturbed areas have been stabiized; and
- Minimize construciton during wet weather.

4.1.3 Direct Distrubance to a Intermittent or Perminant Stream

No inwater works are proposed for the Wainfleet Wind Energy Project. Impacts to identified waterbodies within 120 metres of the project may occur during site preparation and construction activies. Such activities could include the removal of riparian vegetation along stream embankments or compaction of stream banks from heavy equipment.

Mitigation

Horizontal pressure directional drilling will be utilized to install undergound cabiling under the Feeder of Old Mill Race Creek/Municipal drain at the proposed watercrossing identified in Figure 2 along Sideroad 22. Since no direct disturbance to this municipal drain/intermittend stream is proposed no significant environmental effects will be experienced.

4.1.4 Accidental Spills of Contaminants

Impacts to water and sediment quality may occur as a result of accidental spills in or within 120 meters of a water feature. Such spills may occur due to the following project related activities: horizontal pressure directional drilling, refuelling of equipment, operation of construction vehicles/machinery, the use of lubricating fluids within the turbines nachelle and the use of diesel fuel and oil to demolish the switching station all may pose threat to the water quatity of a water feature.

Mitigation

Mitigation measures will be impleted to reduce or eliminate the potential spills of contaminants. To minimize the potential environmental impact to the water and sediment quality the following mitigation measures will be implemented:

- Conducting refuelling and maintenance in designated areas outsite the 120 metre setback;
- Proper maintenance and inspection of vehicles and construction equipment for leaks;
- Maintain a supply of spill control materials on the site (i.e. absorbent material, absorbent booms); and
- Proper training of workers for spill prevention and containment.

Any accidental spills will be dealt with immediately in accordance with the MOE's Spills and Discharges Reporting Protocol as required by the *Ontario Environmental Protection Act* (s. 92 and s. 15).

4.1.5 Impact Assessment of Underground Crossings by Collector System

The installation of the underground collector system will require a water crossing of one intermittent stream (Feeder Mill Race Creek/Drain).

Mitigation

Horizontal Pressure Directional Drilling (HPDD) will be used in such instances. The use of HPDD has various environmental concerns which have been clearly outlined by the DFO and included in this report. Some associated risks include the use of machines and land clearing activity which may result in the accidental release of deleterious substances into the environment and erosion. The following section will further discuss these environmental risks and provide mitigation and monitoring strategies.

Petroleum, Oils and Lubricants

A variety of potential materials will be stored on site, or will be used to install the turbines and the underground collector system. Among these materials, petroleum products such as fuel, oil, and other lubricants will be required to operate and maintain the construction equipment. The federal standard for hazardous materials, Workplace Hazardous Materials Information System (WHMIS) will be applied for all applicable materials. This communication standard provides a system to properly, handle, store and control all hazardous or toxic materials. The precautions taken when following the WHMIS standards not only help to protect the workers, but it also aids in prevention of spills and accidental releases of materials.

Accidental uncontrolled release is the major concern with petroleum, oils and other lubricants. The resulting impacts can affect all aspects of the environment including; terrestrial, surface water, ground water, living biota, and the atmosphere. The accidental release of substances can greatly alter or destroy entire ecosystems, as well as negatively affect human health and safety. In particular, materials released near a watercourse have a high potential to negatively affect fish and fish habitat.

Mitigation

The following mitigation measures are to substantially reduce or eliminate the potential for an accidental release of petroleum, oil or lubricants into the environment.

Machinery Operation

- No heavy equipment is to enter a watercourse, water body, or wetland.
- Re-fuelling should occur at one designated site that is 30m from a watercourse or wetland.
- All equipment to be maintained offsite when possible, to minimize the quantity of hazardous materials required on-site. If service must occur on-site it must be 30m from a watercourse or wetland.

Storage

- Fuel transport will comply with the *Transportation of Dangerous Goods Act.*
- Fuel and diesel may be stored on-site in limited quantities for the operation of construction equipment.
- All petroleum, oil, and lubricants must be stored in a lockable, ventilated, steel container that is located 120m from any watercourse, water body, or wetland.

- The storage container will be equiped with drip trays to capture any spilled substances.
- Spill decks will be used when transferring materials.
- Fire extinguishers and spill kits will be kept on-site at all times near the storage lockers and within reasonable distance of the operating construction equipment.
- Storage containers will be clearly identified with signage, and smoking will not be permitted within 50m of the storage container.
- Construction material, excess material, construction debris, and empty containers shall be stored at least 30m from the watercourse and watercourse banks to prevent their entry into the watercourse, and be removed frequently to a proper receiving facility.

Spills

- Any person or persons, who discover a leak or spill, if safe, should attempt to stop and contain the material.
- All spills or leaks must be reported to the on-site supervisor and the Ontario Ministry of Environment, Spills Action Centre, 1-800-268-6060.
- The Contractor has the responsibility of organizing and executing a spill containment and clean up plan in accordance with any regulatory bodies (where appropriate).
- Appropriate spill response materials must be on-site in an accessible location throughout the duration of the project, materials should include but are not limited to: absorbent materials and equipment (picks, shovels, stakes, buckets, empty drum).

Erosion Control

Sedimentation into surrounding waterways is one of the major concerns for any works, particularly those that involve land clearing and using heavy machinery. Erosion control is the primary method to prevent negative impacts to the surrounding waterbodies, therefore the following mitigation measures for all works should be implemented to prevent any further degradation of the waterways.

The introduction of sediment into the waterways from erosion is of concern due to the negative impacts on the aquatic ecosystem. High levels of sedimentation are potentially deadly for many aquatic species.

Mitigation

The following mitigation measures will be implemented to eliminate the impacts that are associated with sedimentation and erosion.

- Minimize vegetation removal.
- Sediment and erosion control measures will be left in place until vegetation growth is sufficient (80%).

  - Timely re-vegetation of exposed soils with native vegetation, both for temporary work areas and final grades (existing vegetation on embankments shall be maintained as long as possible and new slopes shall be stabilized within 30 days by seeding and mulching).
  - Sediment control fence to be installed along the stream margins to prevent the entry of sediment into the watercourse.
  - Temporary silt fence barrier along the perimeter of the designated work area to limit construction impacts on the watercourse.
- Conscientious design, installation and maintenance of sediment traps within construction area drainage swales for any dewatering.
- Installation and maintenance of appropriately designed flow check dams in all temporary and permanent drainage swales.
- Accumulated sediment in the control devices should be removed frequently to ensure the success device. The collected sediment should be removed and placed in an area at least 120m away from a waterway.
- Existing roads and farm access lanes will be used wherever possible.
- Any new stream crossings will be designed to reduce the loss of riparian habitat, maintain fish passage, and support high flow events.

Monitoring

Assessments of the areas that are re-vegetated will occur in the spring and fall once the construction is completed. The success of the native plantings and any long term erosion control measures will be monitored. If any failures are documented, seeds or plants will be installed in areas of re-vegetation that are unsuccessful. Any erosion control devices that are not performing as designed, will be re-designed and altered to provide proper erosion control.

Fish and Fish Habitat

Horizontal Pressure Directional Drilling

Using Horizontal Pressure Directional Drilling (HPDD) is the common practice for installing cables and pipes under streams. The process for using HPDD involves drilling a pilot bore hole underneath the watercourse, back-reaming the bore hole to the drill rig while pulling the pipe along through the hole. The process is lubricated by drilling mud, which is a mixture of fresh water and bentonite.

The risks associated with HPDD are primarily the escape of the lubricating fluid through either a spill, or the rupture of drilling mud to the surface. The collapse of a bore hole can force the drill mud to the surface causing a spill, or another concern is frac-out. Frac-out is the rupture of drilling mud to the surface as a result of high drilling pressure.

In addition, there is often damage to riparian vegetation due to the equipment being located close to waterway edges. This can also lead to erosion and sedimentation of the

waterway. Following erosion control methods, as well as planning a route that causes the least damage to riparian vegetation is effective to prevent negative environmental impacts.

In compliance with the *Fisheries Act*, the DFO has released an Operational Statement specifically for HPDD. The following are the measures set by the DFO to protect fish and fish habitat when using HPDD. A full copy of the Operational Statement is provided in Appendix E.

1. Use existing trails, roads or cut lines wherever possible, as access routes to avoid disturbance to the riparian vegetation.
2. Design the drill path to an appropriate depth below the watercourse to minimize the risk of frac-out and to a depth to prevent the line from becoming exposed due to natural scouring of the stream bed. The drill entry and exit points are far enough from the banks of the watercourse to have minimal impact on these areas.
3. While this Operational Statement does not cover the clearing of riparian vegetation, the removal of select plants may be necessary to access the construction site. This removal should be kept to a minimum and within the road or utility right-of-way.
4. Machinery fording the watercourse to bring equipment required for construction to the opposite side is limited to a one-time event (over and back) and should occur only if an existing crossing at another location is not available or practical to use. A *Temporary Stream Crossing* Operational Statement is also available.
    - 4.1. If minor rutting is likely to occur, stream bank and bed protection methods (e.g., swamp mats, pads) should be used provided they do not constrict flows or block fish passage.
    - 4.2. Grading of the stream banks for the approaches should not occur.
    - 4.3. If the stream bed and banks are steep and highly erodible (e.g., dominated by organic materials and silts) and erosion and degradation are likely to occur as a result of equipment fording, then a temporary crossing structure or other practice should be used to protect these areas.
    - 4.4. Time the one-time fording to prevent disruption to sensitive fish life stages by adhering to appropriate fisheries timing windows (see the *Ontario In-Water Construction Timing Windows*).
    - 4.5. Fording should occur under low flow conditions and not when flows are elevated due to local rain events or seasonal flooding.
5. Operate machinery on land above the ordinary high water mark (see definition below) and in a manner that minimizes disturbance to the banks of the watercourse.
    - 5.1. Machinery is to arrive on site in a clean condition and is to be maintained free of fluid leaks.
    - 5.2. Wash, refuel and service machinery and store fuel and other materials for the machinery away from the water to prevent any deleterious substance from entering the water.

- 5.3. Keep an emergency spill kit on site in case of fluid leaks or spills from machinery.
- 5.4. Restore banks to original condition if any disturbance occurs.

6. Construct a dugout/settling basin at the drilling exit site to contain drilling mud to prevent sediment and other deleterious substances from entering the watercourse. If this cannot be achieved, use silt fences or other effective sediment and erosion control measures to prevent drilling mud from entering the watercourse. Inspect these measures regularly during the course of construction and make all necessary repairs if any damage occurs.
    - 6.1. Dispose of excess drilling mud, cuttings and other waste materials at an adequately sized disposal facility located away from the water to prevent it from entering the watercourse.
7. Monitor the watercourse to observe signs of surface migration (frac-out) of drilling mud during all phases of construction.

Emergency Frac-out Response and Contingency Planning

8. Keep all material and equipment needed to contain and clean up drilling mud releases on site and readily accessible in the event of a frac-out.
9. Implement the frac-out response plan that includes measures to stop work, contain the drilling mud and prevent its further migration into the watercourse and notify all applicable authorities, including the closest DFO office in the area (see Ontario DFO office list). Prioritize clean up activities relative to the risk of potential harm and dispose of the drilling mud in a manner that prevents re-entry into the watercourse.
10. Ensure clean up measures do not result in greater damage to the banks and watercourse than from leaving the drilling mud in place.
11. Implement the contingency crossing plan including measures to either re-drill at a more appropriate location or to isolate the watercourse to complete the crossing at the current location. See *Isolated or Dry Open-cut Stream Crossings* Operational Statement for carrying out an isolated trenched crossing.
12. Stabilize any waste materials removed from the work site to prevent them from entering the watercourse. This could include covering spoil piles with biodegradable mats or tarps or planting them with preferably native grass or shrubs.
13. Vegetate any disturbed areas by planting and seeding preferably with native trees, shrubs or grasses and cover such areas with mulch to prevent erosion and to help seeds germinate. If there is insufficient time remaining in the growing season, the site should be stabilized (e.g., cover exposed areas with erosion control blankets to keep the soil in place and prevent erosion) and vegetated the following spring.
    - 13.1. Maintain effective sediment and erosion control measures until re-vegetation of disturbed areas is achieved.

The above noted mitigation measures are constraints of operation for all HPDD; however if another if there are unforeseen circumstances and another method is required for burying the taplines such as; punch or bore crossing, or isolated open-cut crossing the Operational Statement from DFO should be followed. The appropriate Operational Statements for the two aforementioned methods are: *Punch & Bore Crossings* and *Isolated or Dry Open-cut Stream Crossings* respectively.

Residual Impacts

Implementing the outlined techniques to prevent spills of oils and other petroleum substances, erosion, and HPDD frac-out and spills will prevent any negative residual effects. The measures will protect the surrounding environment, as well as the fish and fish habitat in adjacent waterways.

5.0 Conclusion

The land use within the Wainfleet study area was predominantly agricultural, with a mixture of pastureland and crops as well as urban development. Portions of Mill Race Creek and Casey Drain watersheds have been straightened/channelized, widened and sometimes deepened to increase land drainage and agricultural production or urban development. As such these watercourses are susceptible to negative impacts on fish habitat including: loss of riparian vegetation; increase in siltation; removal of channel morphology (pools, riffles, and runs), removal of in-stream vegetation for fish shelter and food supply and; loss of fish habitat following a significant flow reduction downstream. In addition, these watercourses are susceptible to receiving sediment and chemical loads from agricultural runoff, sometimes causing adverse impacts downstream. However, in conjunction with MNR fisheries management plans, potential enhancement measures can be implemented to improve the riparian habitat and in-stream quality of the watercourses.

Mill Race Creek and Casey Drain support a variety of fish species, including Grass pickerel which is listed as Special Concern under the Federal *Species at Risk Act* and the Provincial *Endangered Species Act*. To preserve the fish habitat in the region, all in-water works will need to follow appropriate mitigation measures and strictly follow the MNR timing windows for Mill Race Creek (March 1st-July 1st) and Casey Drain (March 1st-June 1st) to protect fish and fish habitat.

In conclusion, the water impact assessment determined the following negative environmental effects associated with the installation of the underground collector system and construction of access roads within the Wainfleet corridor include:

- Erosion and sedimentation;
- Potential for leaks and spills of hazardous material entering the soil or water resulting from improper storage or handling of deleterious substances; and
- Potential for the alteration, disruption or destruction of fish and/or fish habitat.

Following all recommended mitigation measures illustrated in this report; it is anticipated that no negative environmental effects will occur to watercourses identified within 120 metres of the project location.. In addition, monitoring plans are in place to ensure the success of the proposed mitigation measures has addressed all impacts.

6.0 References

MOE, 2011. *Technical Bulletin Guidance for Preparing the Water Assessment and Water Body Reports*.

OMNR, 2000.Niagara Regional Municipality Fish Habitat Types with Management Rationale. Niagara Area, Guelph District.

OMNR, Wainfleet. Lake Trout Management Plan

Township of Wainfleet. 2010. Official Plan

Niagara Region. 2010. Regional Policy Plan

Niagara Peninsula Conservation Authority. 2006. Lake Erie North Shore Watershed Plan

APPENDIX A
Photographic Record

Turbine 1 proposed location (spring)

Crossing 1 – Feeder of Old Mill Race Creek looking west; south of Turbine 1 (summer)

Crossing 1 – Feeder of Old Mill Race Creek looking west; south of Turbine 1 (spring)

Crossing 1 – Feeder of Old Mill Race Creek looking east; south of Turbine 1 (summer)

Crossing 1 – Feeder of Old Mill Race Creek looking east; south of Turbine 1 (spring)

Turbine 2 – Met Tower (winter)

Turbine 2 – Met Tower (spring)

Near Crossing 1 - Feeder of Old Mill Race Creek along Side Road 22 immediately west of Turbine 2 (winter)

Near Crossing 1 - Feeder of Old Mill Race Creek along Side Road 22 immediately west of Turbine 2 (spring)

Turbine 5 location- no associated watercourse; looking east (spring)

Turbine 4 – Looking east (winter)

Turbine 4 – Looking east (Spring)

Casey Drain – South of Turbine 4 looking towards Station Road (winter)

Casey Drain – South of Turbine 4 looking towards Station Road (spring)

Casey Drain – South of Turbine 4 looking east (spring)

APPENDIX B
Field Notes

IPC Turbine Number & Location: WAINFLEET #1	Environmental Feature	Dist.(m) to Turbine	GPS Co-ord of Feature
Date: APRIL 28 /10	Groundwater Evidence (120m)		
Time: 11:20 AM	☐ Watercress		
GPS Co-ordinates:	☐ Iron Staining		
	☐ Seepage		
	☐ Forest Stand (30m)		
	☐ Waterway (30m)		

Radius of Detailed Site Survey: ☐ 200m ☐ 300m ☐ 350m

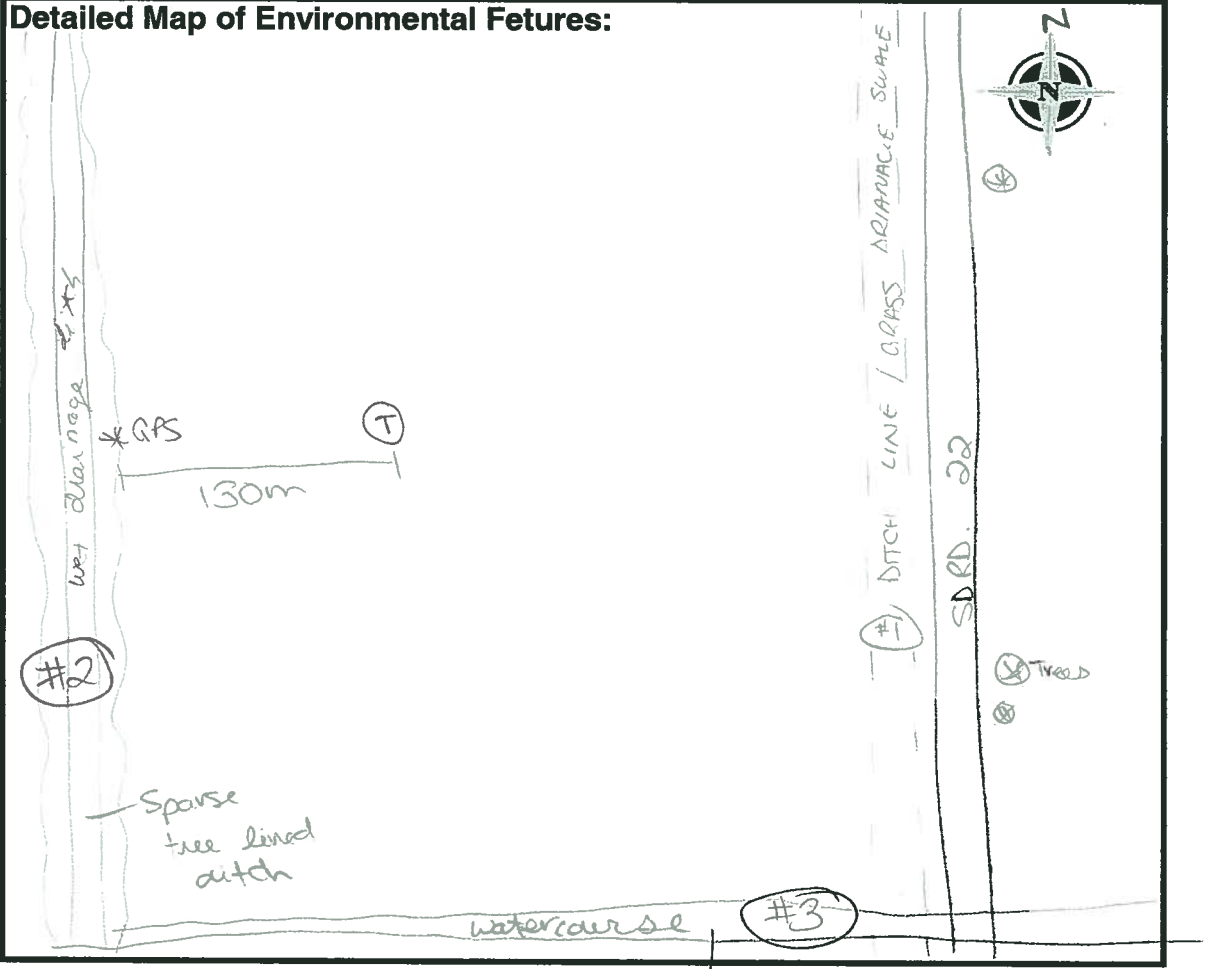
Comments:

#1 - Waterway is 270m from turbine

#2 Shrubs + some trees along drainage ditch some H2O in ditch.
17T 0631224 4751172

#3 Watercourse crosses the rd - GPS + photo's taken for Turbine #3 (north of Turb. #3)

Detailed Map of Environmental Fetures:



GPS Co-ords from #3 (N. of turbine)

Draft For Comment

IPC Turbine Number & Location: WAINFLEET #2 & #3	Environmental Feature	Dist.(m) to Turbine	GPS Co-ord of Feature
Date: APRIL 28/10	Groundwater Evidence (120m)		
Time: 11:00 AM	☐ Watercress		
GPS Co-ordinates:	☐ Iron Staining		
	☐ Seepage		
	☐ Forest Stand (30m)		
	☐ Waterway (30m)		

Radius of Detailed Site Survey: ☐ 200m ☐ 300m ☐ 350m

Comments:

① watercourse flows parallel to Side Rd 22. - H2O present, cattails in it (south), 4H11 H2O / min flow, channelized. little riparian community - high influence of agricultural activity - agricultural swale

② side Rd 22 - not accessible common traffic - farm use 118m from proposed site 17T 0631646 4750665

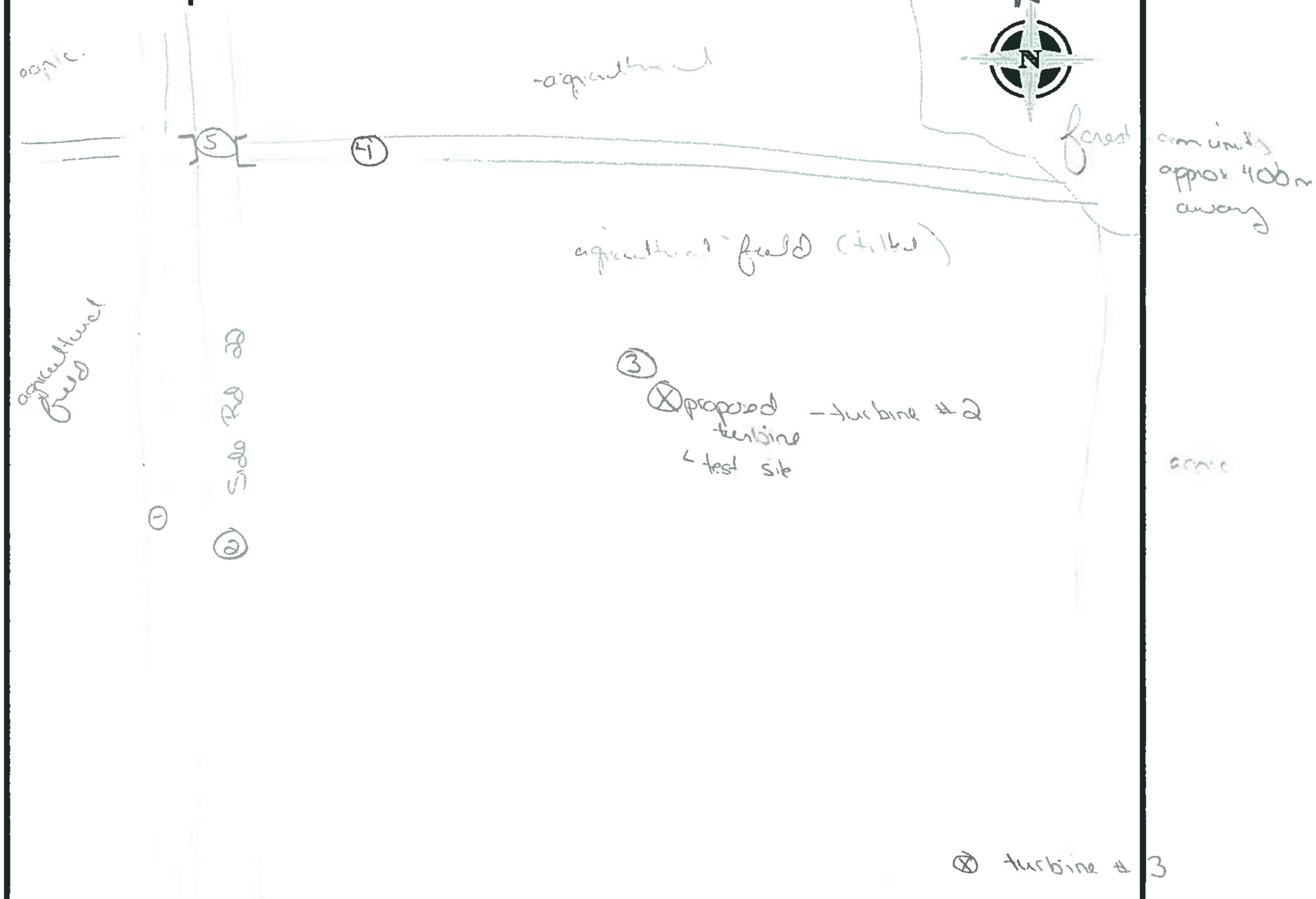
③ testing site (standing)

⑤ 17T 0631639 4750943 cross section of where side Rd. 22 + H2O course meets. approx. 351m (+-) from site

④ H2O course flowing - channelized 2 m width - grasses + cattail lined. silt substrate & algae

Recommendations
- alt more east + north + south

Detailed Map of Environmental Fetures:



Conc. 1

IPC Turbine Number & Location: WAINFLEET #5	Environmental Feature	Dist.(m) to Turbine	GPS Co-ord of Feature
Date: APRIL 28/10	Groundwater Evidence (120m)		
Time: 1:00 pm	☐ Watercress		
GPS Co-ordinates:	☐ Iron Staining		
	☐ Seepage		
	☐ Forest Stand (30m)		
	☐ Waterway (30m)		

Comments:

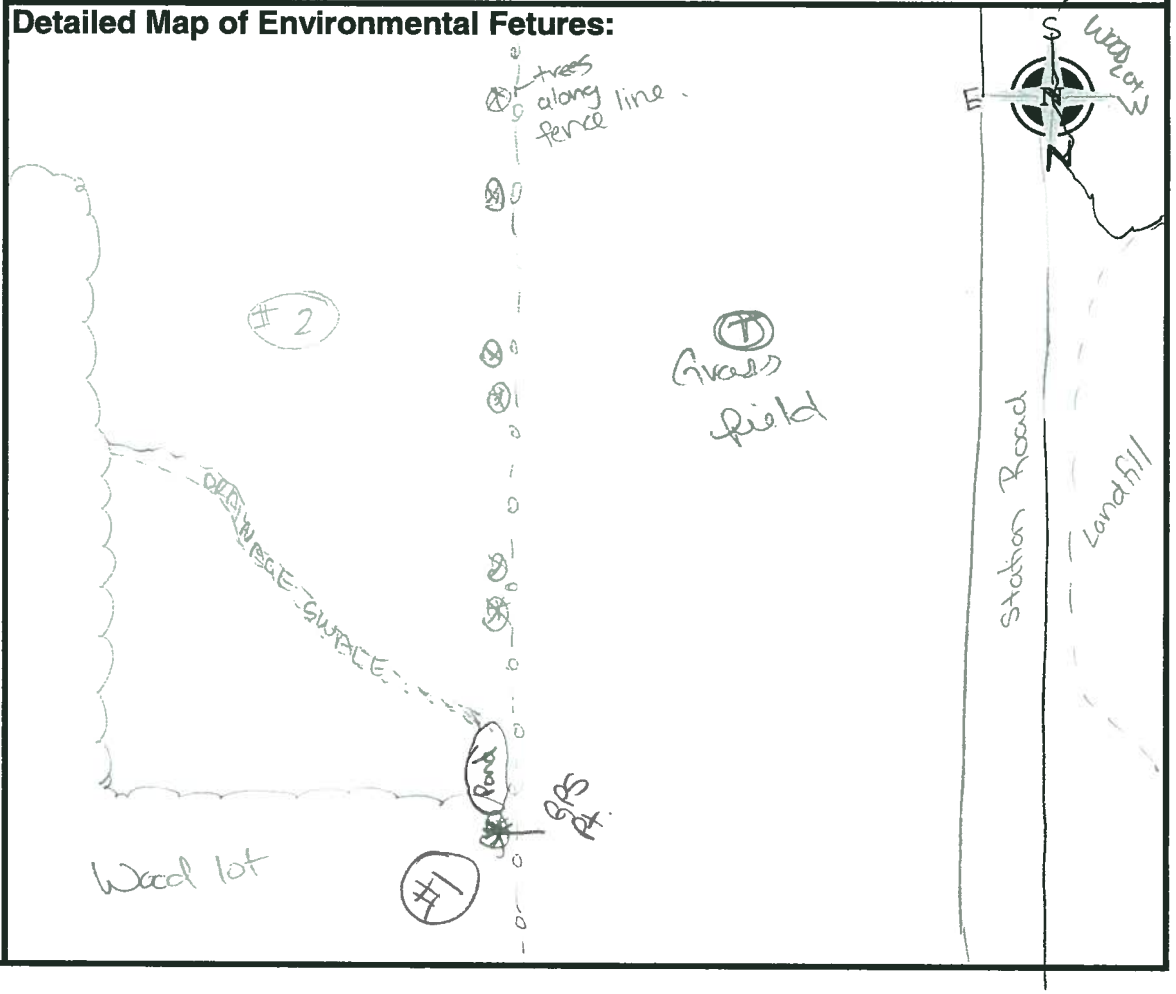
SD.RD. #20 is 170m from the turbine

#1 - Woodlot NE of turbine 187m from Turbine loc'n.
17T 0632816
4748890

#2 Field is quite wet
- many low lying areas
- drainage swale from pond

Radius of Detailed Site Survey: ☐ 200m ☐ 300m ☐ 350m

Detailed Map of Environmental Fetures:



IPC Turbine Number & Location: WAINFLEET #4	Environmental Feature	Dist.(m) to Turbine	GPS Co-ord of Feature
Date: APRIL 28/10	Groundwater Evidence (120m)		
Time: 1:20 PM	□ Watercress		
GPS Co-ordinates:	□ Iron Staining		
	□ Seepage		
	□ Forest Stand (30m)		
	□ Waterway (30m)		

Radius of Detailed Site Survey: □ 200m □ 300m □ 350m

Comments:

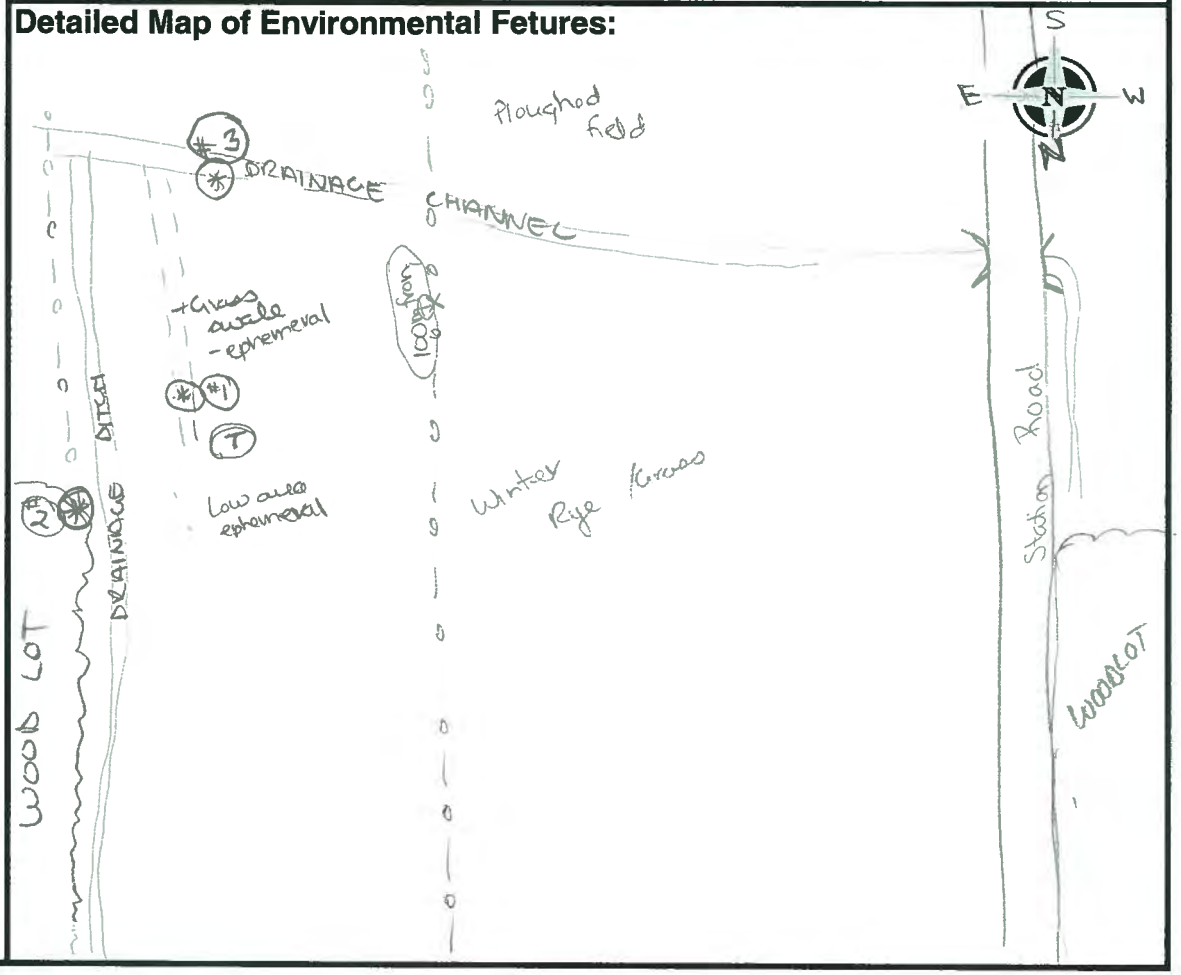
Rd. is 310m from Turbine #1

#1 - GPS Coord. of grass swale 11m S. of (T)
17T 0632939
4748355

#2 - Edge of woodlot closest to turbine 105m.
17T 0633031
4748369

#3 Drainage channel E/W closest is from GPS 17T 0632991
4748296

Detailed Map of Environmental Fetures:

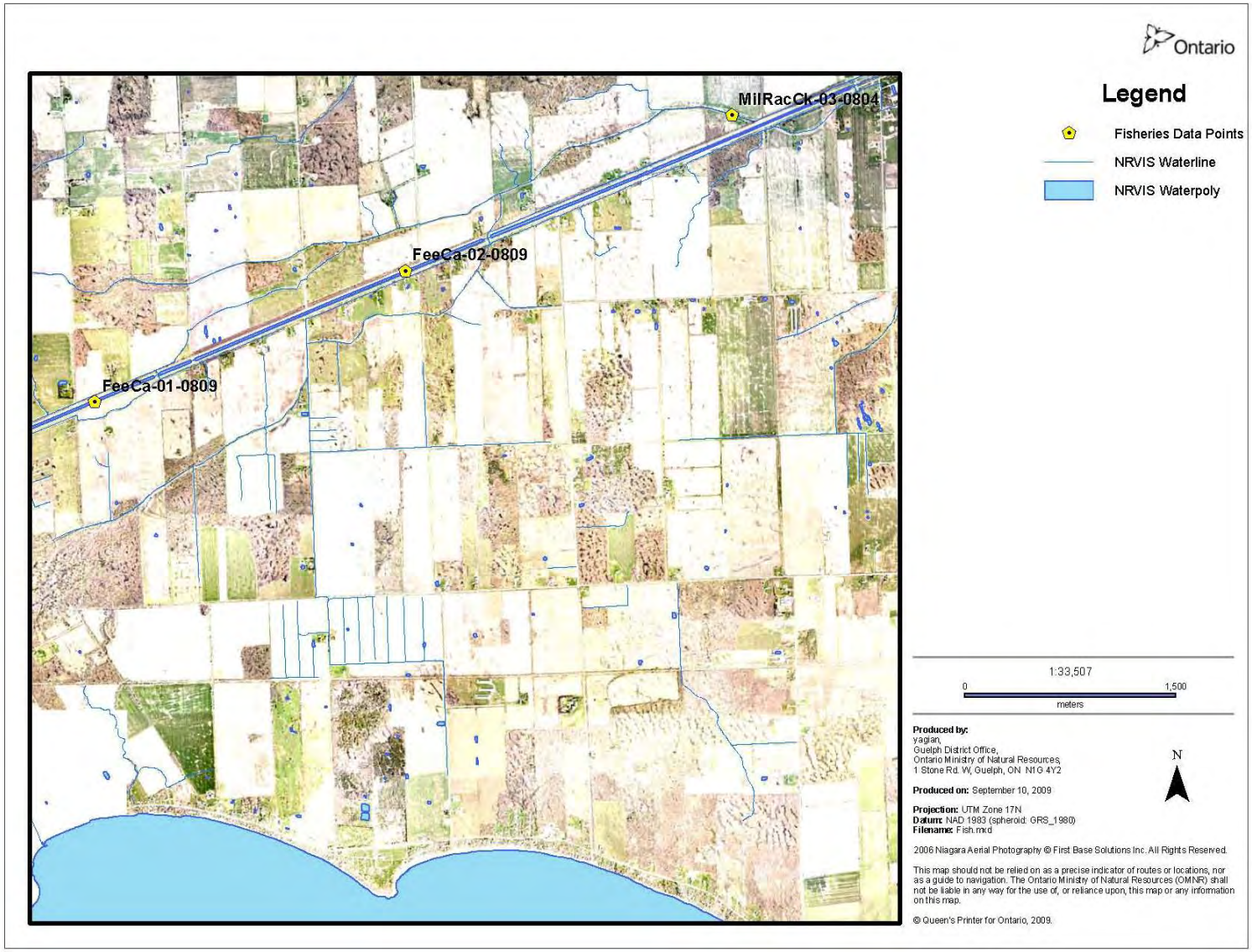


APPENDIX C
MNR Data

Wainfleet Study Area

Common Name	Scientific Name	GPS Coordinates & Station	FeeCa-01-0809 626771, 4751187	FeeCa-02-0809 628982, 4752122	MillRacCk-03-0804 631308, 4753228
Bullhead Species	*Ameiurus spp.*				4
Black Bullhead	*Ameiurus melas*		4	6	8
Bluegill	*Lepomis macrochirus*		2		
Brown Bullhead	*Ameiurus nebulosus*		5	4	58
Central Mudminnow	*Umbra limi*			12	24
Common Carp	*Cyprinus carpio*				5
Fathead Minnow	*Pimephales promelas*			3	
Golden Shiner	*Notemigonus cryoleucas*		24	31	13
Goldfish	*Carassius auratus*		300		
Green Sunfish	*Lepomis cyanellus*			32	94
Johnny Darter	*Etheostoma nigrum*				2
Largemouth Bass	*Micropterus salmoides*		1	2	1
Northern Pike	*Esox lucius*				1
Pumpkinseed	*Lepomis gibbosus*		13		40
Tadpole Madtom	*Noturus gyrinus*				21
White Crappie	*Pomoxis annularis*		6		
Yellow Perch	*Perca flavescens*		10		

Chart shows fish species captured at each survey site (UTM coordinates for each site listed in chart)



Map of Fisheries Survey Stations within the Highlighted Wainfleet Bog Area

APPENDIX D
Correspondence with Regulatory Agencies

Correspondence

Don't need any software, just go in windows explorer and manually change the extension from .zippy to .zip. then unzip using winzip or winrar.

From: Josephine Gilson [mailto:JGilson@morrisonhershfield.com]
Sent: Monday, April 19, 2010 11:21 AM
To: Lee, Jeff
Subject: RE: Hydrology Information

Hi Jeff,
I was just trying to use the data you sent, but I am unsure how to convert the .zippy file to a .zip file, do you need specific software?
Thanks,
Josephine

From: Lee, Jeff [mailto:jlee@npca.ca]
Sent: Friday, March 19, 2010 9:23 AM
To: Campbell, Jayme; Josephine Gilson
Subject: RE: Hydrology Information

Josephine;

Here is the requested data in ESRI grid format. The file is a compressed zip file for which the extension was changed from .zip to .zippy. please change file extension to .zip before unzipping. If you have any questions do not hesitate to contact me.

Cheers,

Jeff

From: Campbell, Jayme
Sent: Thursday, March 18, 2010 11:06 AM
To: 'Josephine Gilson'
Cc: Lee, Jeff
Subject: RE: Hydrology Information

Josephine,

Here is the data license agreement.
Jeff Lee will forward you the data files tomorrow morning.

Jayme D. Campbell, P.Eng.
Hydrogeologist/Engineer
Niagara Peninsula Conservation Authority
250 Thorold Road West, 3rd Floor
Welland, Ontario

L3C 3W2
Phone: 905-788-3135 ext.261
Fax: 905-788-1121
www.npca.ca
www.sourceprotection-niagara.ca

From: Josephine Gilson [mailto:JGilson@morrisonhershfield.com]
Sent: Thursday, March 18, 2010 9:09 AM
To: Campbell, Jayme
Subject: RE: Hydrology Information

Jayme,
Yes, those two maps would work wonderfully! Thank you for the warning, but these will at least provide us with a good start.
How large are the files? If they are too big for email then I can look into our FTP site and if it can be used.
Thanks again for your help,
Josephine

From: Campbell, Jayme [jcampbell@npca.ca]
Sent: Wednesday, March 17, 2010 3:55 PM
To: Josephine Gilson
Subject: RE: Hydrology Information

Josephine,
Would the ArcGIS files for these two maps meet your needs?
Caveat is these are done mostly from MOE water well records and are coarse in scale, i.e. you'd best complete your own local-scale mapping from some field investigation.

Jayme D. Campbell, P.Eng.
Hydrogeologist/Engineer
Niagara Peninsula Conservation Authority
250 Thorold Road West, 3rd Floor
Welland, Ontario
L3C 3W2
Phone: 905-788-3135 ext.261
Fax: 905-788-1121
www.npca.ca
www.sourceprotection-niagara.ca

From: Josephine Gilson [mailto:JGilson@morrisonhershfield.com]
Sent: Tuesday, March 16, 2010 7:19 AM
To: Campbell, Jayme
Subject: Hydrology Information

Good Morning,

I am interested in obtaining some hydrologic data for two sites, one in West Lincoln and the other in Wainfleet Townships. The two sites are proposed for wind turbine farms with 5 -7 turbines on each site. The client has requested that we complete a groundwater seepage study, and I was hoping to obtain a shape file of the high-water table levels for each area. The maps attached to this email indicate the locations of the sites (HAF is the West Lincoln Twp site) which are both quite large areas of land.
If you could please confirm that you have obtained this email and if you will be able to provide me with this information I would greatly appreciate it. Please do not hesitate to email or phone me if you have any further questions or concerns.
Kind Regards,

Josephine A. Gilson, B.Sc.
Aquatic Ecosystem Biologist
jgilson@morrisonhershfield.com

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People • Culture • Capabilities

Suite 600, 235 Yorkland Blvd. | Toronto, ON M2J 1T1
Dir: 416 499 3110 x1367 | Fax: 416 499 9658
morrisonhershfield.com

From: Barrett, Ian [mailto:ibarrett@npca.ca]
Sent: Monday, March 15, 2010 3:06 PM
To: Josephine Gilson
Cc: Campbell, Jayme
Subject: RE: Hydrology Information

Hi Josephine,

I would recommend contacting Jayme Campbell in our office. Jayme is our Hydrogeologist and would be able to answer any groundwater related questions you may have.

Ian

Ian Barrett, M.Sc.
Aquatic Biologist
Niagara Peninsula Conservation Authority
250 Thorold Road West, 3rd Floor
Welland, ON

L3C 3W2
Phone 905-788-3135 Ext. 229
Fax 905-788-1121

From: Josephine Gilson [mailto:JGilson@morrisonhershfield.com]
Sent: Monday, March 15, 2010 12:54 PM
To: Barrett, Ian
Subject: Hydrology Information

Hi Ian,
I am looking for contact information for someone within NPCA for someone that could provide me with hydrological data, primarily the high water table mapping (preferably in a GIS compatible shape file). In addition to the fisheries study, the client has asked us to look for any groundwater seeps within the site boundary during field visits, hence the request.
Thanks for your help.
Josephine

From: Barrett, Ian [mailto:ibarrett@npca.ca]
Sent: Tuesday, March 02, 2010 3:50 PM
To: Josephine Gilson
Subject: RE: Fisheries Information

Hi Josephine,

I have filled in the attached table as best as possible. Since the location of sites could not be specified, I have included information for the watersheds where works may take place. The species listed in the table do not occur in all watercourses identified in your study areas, however this is the best available information based on the detail provided.

Let me know if you have any questions.

Ian

Ian Barrett, M.Sc.
Aquatic Biologist
Niagara Peninsula Conservation Authority
250 Thorold Road West, 3rd Floor
Welland, ON
L3C 3W2
Phone 905-788-3135 Ext. 229
Fax 905-788-1121

From: Josephine Gilson [mailto:JGilson@morrisonhershfield.com]
Sent: Monday, March 01, 2010 10:35 AM
To: Barrett, Ian
Cc: Kelly Sadlier
Subject: Fisheries Information

Good Morning Ian,

I am just putting together my current fisheries information to incorporate into a report for the client, and I am interested in how the data request for the two sites is coming along and the anticipated completion date.
I understand from your last correspondence that you would have preferred road intersections; however, as the turbine locations are currently to-be-determined I am unable to provide that kind of detail, I only have the general site boundaries where the turbines will be located somewhere within the limits. Since both projects are only in the preliminary stages, the locations on the Wainfleet map are only proposed and have not been confirmed.
If you could let me know if can still process my request as well as the anticipated completion date I would greatly appreciate it. If you have any further questions or concerns please do not hesitate to contact me. Thank you in advance.

Regards,

Josephine A. Gilson, B.Sc.
Aquatic Ecosystem Biologist
jgilson@morrisonhershfield.com

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Suite 600, 235 Yorkland Blvd. | Toronto, ON M2J 1T1
Dir: 416 499 3110 x1367 | Fax: 416 499 9658
morrisonhershfield.com

From: Josephine Gilson
Sent: Wednesday, February 17, 2010 7:44 AM
To: 'Barrett, Ian'
Subject: RE: Fisheries Information

Good Morning Ian,

The mapping that I provided in the original email has entire general area where the turbines will potentially be located, as for the exact location of each turbine that is currently undefined. As there is no exact locations determined currently, and as per the clients request I am interested in all the water bodies within the study area. I apologize for not attaching the template for the data table, it has been included with this email. Thank you very much for your help on this matter.

Kind Regards,

Josephine A. Gilson, B.Sc.
Aquatic Ecosystem Biologist
jgilson@morrisonhershfield.com

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From: Barrett, Ian [mailto:ibarrett@npca.ca]
Sent: Tuesday, February 16, 2010 2:56 PM
To: Josephine Gilson
Subject: RE: Fisheries Information

Hello Josephine,

I have reviewed the mapping outlining the study areas and it is unclear where your sites are located. I can locate some of the sites in the Wainfleet area, but there is no indication of where your sites are located in West Lincoln. In order to process the request, I will need more accurate mapping indicating the location of proposed works. The locations can be either municipal address or roadway intersection.

Also, in the letter accompanying your request you referred to a table which was to be completed. I was not able to find any table within your correspondence. Can you include the table with the revised mapping/details?

Let me know if you have any questions.

Ian

Ian Barrett, M.Sc.
Aquatic Biologist
Niagara Peninsula Conservation Authority
250 Thorold Road West, 3rd Floor
Welland, ON
L3C 3W2
Phone 905-788-3135 Ext. 229
Fax 905-788-1121

From: Josephine Gilson [mailto:JGilson@morrisonhershfield.com]
Sent: Thursday, February 11, 2010 3:00 PM
To: Barrett, Ian
Subject: Fisheries Information

Good Afternoon Mr. Ian Barrett

I am contacting you in regards to a data request for fisheries information at two locations, one near Wainfleet and the other near Vineland. Please see the attached formal request and mapping.

I would greatly appreciate confirmation that you have received this request, and if possible an estimated date of completion.

If you require any further information please do not hesitate to contact me.

Kind Regards,

Josephine A. Gilson, B.Sc.
Aquatic Ecosystem Biologist
jgilson@morrisonhershfield.com

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Josephine

Sorry about the delay,

I've heard back from Anne and for the fisheries data you are referring to, the date is the last two digits of the Sample Station Name. So for example, 0809 means August 2009.

If you have any other questions, please let me know.

Cheers,

April

April Nix
Planning Intern
Ministry of Natural Resources, Guelph District
1 Stone Road West
Guelph ON, N1G 4Y2
(P) 519-826-4939
(F) 519-826-6849
email: april.nix@ontario.ca

From: Stone, Mike (MNR)
Sent: March 23, 2010 9:30 AM
To: Yagi, Anne (MNR)
Cc: Nix, April (MNR)
Subject: FW: Fisheries Data - Energy Application

Hi Anne. I gather David may be off on a contract break. He recently provided the attached as part of an information request. The consultant is looking for sample dates. Can you advise if this information is available.

Thanks,
Mike

From: Stone, Mike (MNR)
Sent: March 23, 2010 9:11 AM
To: Denyes, David (MNR)
Cc: Nix, April (MNR)
Subject: FW: Fisheries Data - Energy Application

Hello David,

Please see the consultant's request for further details on the information you previously provided. Can you please respond to the consultant indicating whether or not this information is available. If you could please cc April and I on any response you provide that would be appreciated.

Thanks,
Mike

--
Mike Stone
District Planner
Ministry of Natural Resources
Guelph District

From: Josephine Gilson [mailto:JGilson@morrisonhershfield.com]
Sent: March 18, 2010 9:32 AM
To: Stone, Mike (MNR)
Subject: Fisheries Data - Energy Application

Good Morning Mike,
Please see the below email. If you could let me know if this is something you can help me with I would greatly appreciate it.
Kind Regards,

Josephine A. Gilson, B.Sc.
Aquatic Ecosystem Biologist
jgilson@morrisonhershfield.com

Suite 600, 235 Yorkland Blvd. | Toronto, ON M2J 1T1
Dir: 416 499 3110 x1367 | Fax: 416 499 9658
morrisonhershfield.com

From: Josephine Gilson
Sent: Thursday, March 18, 2010 9:27 AM
To: April.Nix@ontario.ca
Subject: FW: Fisheries Data Request

Good Morning April,
I have recently been working with David Deneyes to aquire information for two sites one in West Lincoln and the other in Wainfleet Twp. The attached is the information that David suppolied me with, however I was hoping that you could provide me with the date for each sample occurance that is sited in the table (i.e. the date of each source of data in the table). This is additinal information that I did not previously request from David. I am interested as we are trying to obtain a Scientific Collectors Permit and would like to know how recent the sample data is.
If you have any question or concerns please do not hesitate to contact me. I would appreciate if you could please confirm that you recieved this email, as well as an estimated time that you can provide me with the requested details.

Kind Regards,

Josephine A. Gilson, B.Sc.
Aquatic Ecosystem Biologist
jgilson@morrisonhershfield.com

Suite 600, 235 Yorkland Blvd. | Toronto, ON M2J 1T1
Dir: 416 499 3110 x1367 | Fax: 416 499 9658
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From: Denyes, David (MNR) [David.Denyes@ontario.ca]
Sent: Thursday, February 11, 2010 2:17 PM
To: Josephine Gilson
Cc: Nix, April (MNR)
Subject: RE: Fisheries Data Request

Hello Josephine,

Here is the fisheries data that you requested for the Wainfleet and Vineland Study areas. I've attached site maps with the coordinates so you know where each station was located. I'm also working on creating wetland maps for these areas. I can send that information to you, shortly!

David Denyes

From: Josephine Gilson [mailto:JGilson@morrisonhershfield.com]
Sent: February 11, 2010 1:56 PM
To: Denyes, David (MNR)
Cc: Kelly Sadlier
Subject: RE: Fisheries Data Request

Good Afternoon David,

I am contacting you to inquire about the data request I sent in mid January for two wind turbine sites, one in Wainfleet area and the other in Vineland area (original email is below). Could you please provide me with an estimate when you will be able to send the requested information?

Thank you in advance,

Josephine A. Gilson, B.Sc.
Aquatic Ecosystem Biologist
jgilson@morrisonhershfield.com

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morrisonhershfield.com

From: Denyes, David (MNR) [mailto:David.Denyes@ontario.ca]
Sent: Friday, January 15, 2010 8:38 AM
To: Josephine Gilson
Subject: RE: Fisheries Data Request

Hello Josephine,

I'm confirming that I have received your fisheries information request. You can expect to have a response back from me within 20 days. However, I will try to have the MNR data request completed sooner then that.

David

From: Josephine Gilson [mailto:JGilson@morrisonhershfield.com]
Sent: January 14, 2010 10:37 AM
To: Denyes, David (MNR)
Cc: Kelly Sadlier
Subject: Fisheries Data Request

Good Morning Mr. Deneys,

I am contacting you in regards to a data request for fisheries information at two locations, one near Wainfleet and the other near Vineland. Please see the attached documentation and mapping.

I would greatly appreciate confirmation that you have received this request, and if possible an estimated date of completion.

If you require any further information please do not hesitate to contact me.

Kind Regards,

Josephine A. Gilson, B.Sc.
Aquatic Ecosystem Biologist
jgilson@morrisonhershfield.com

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You need to speak directly with Anne. She will not allow the permit to be issued until she knows why you need additional data.

Beverly Stevenson
F&W Technical Specialist
519-482-3361

From: Josephine Gilson [mailto:JGilson@morrisonhershfield.com]
Sent: March 18, 2010 9:05 AM
To: Stevenson, Beverly (MNR)
Subject: RE: Fish application?

Hi Beverly,
I am aware that there is exisitng fisheries data for the area and I have already been in contact with the MNR and NPCA and recieved the existing fisheries data. In addition to existing data we will be collecting our own data in the field and therefore we will need a Scientific Collection Permit.

Thank you for your help on this,
Josephine Gilson

From: Stevenson, Beverly (MNR) [beverly.stevenson@ontario.ca]
Sent: Thursday, March 18, 2010 8:45 AM
To: Josephine Gilson
Subject: RE: Fish application?

Hi Josephine

I have spoken to the area biologist regarding the application. She has existing fish data for that area. Please contact Anne Yagi at 905-562-1196 or anne.yagi@ontario.ca to see if the data that already exists is sufficient for your needs or not.

Beverly Stevenson
F&W Technical Specialist
519-482-3361

From: Josephine Gilson [mailto:JGilson@morrisonhershfield.com]
Sent: March 12, 2010 3:02 PM
To: Stevenson, Beverly (MNR)
Subject: RE: Fish application?

Beverly,
The VHS survey and application are attached to this email. I totally missed the application the first time around - thanks for the reminder!
If there is anything else you need please let me know!
Thanks

Josephine A. Gilson, B.Sc.
Aquatic Ecosystem Biologist
jgilson@morrisonhershfield.com

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Dir: 416 499 3110 x1367 | Fax: 416 499 9658
morrisonhershfield.com

From: Stevenson, Beverly (MNR) [mailto:beverly.stevenson@ontario.ca]
Sent: Friday, March 12, 2010 1:11 PM
To: Josephine Gilson
Subject: RE: Fish application?

I should have looked at your application package first. Can you also complete the application form? It wasn't in the e-mail that Anne sent to me.

Beverly Stevenson
F&W Technical Specialist

519-482-3361

From: Stevenson, Beverly (MNR)
Sent: March 12, 2010 1:09 PM
To: 'JGilson@morrisonhershfield.com'
Subject: RE: Fish application?

Hi Josephine

Could you please forward a copy of the map to me? It must be less than 10 megs to make it through our e-mail system. Also, you are required to complete a VHS risk assessment. See the attached form.

Beverly Stevenson
F&W Technical Specialist
519-482-3361

From: Yagi, Anne (MNR)
Sent: March 12, 2010 12:44 PM
To: Stevenson, Beverly (MNR)
Subject: FW: Fish application?

It was sent to me. Except for a map which was too big to send. Have them send it to you directly

Anne Yagi
Management Biologist
Niagara Area Office/Guelph District
4890 Victoria Ave North
Vineland Station ON
L0R 2E0
Phone: 905 562-1196
Fax: 905 562-1154
E-mail: anne.yagi@ontario.ca

From: Josephine Gilson [mailto:JGilson@morrisonhershfield.com]
Sent: March 12, 2010 11:03 AM
To: Yagi, Anne (MNR)
Cc: Kelly Sadlier
Subject:

Good Morning,

Pleased see the attached correspondence and supporting documentation.

Kind Regards,

Josephine A. Gilson, B.Sc.
Aquatic Ecosystem Biologist
jgilson@morrisonhershfield.com

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Hello Josephine,

I have attached a copy of the Fisheries Management plans for the two study areas. These apply to the watershed and not a specific tributary (ie Welland River West, 20 Mile Creek). I have attached the data for 40 Mile Creek as well. Most of this data is historic and the locations were vague. Also, today (March 5) is the last day of my contract. If you have any more questions about the data you will have to contact Anne Yagi. She can be reached at anne.yagi@ontario.ca or by phone at 905 -562- 1196.
Thanks!

David

From: Josephine Gilson [mailto:JGilson@morrisonhershfield.com]
Sent: March 5, 2010 11:24 AM
To: Denyes, David (MNR)
Subject: RE: Fisheries Data Request

Hello David,
I apologize, but I have one more question :)
One tributary which is part of the 40 Mile Creek Watershed falls within the site boundaries for the Vineland location, however there is no information provided in your previous info package. Would it be possible to get info for the 40 Mile Creek Watershed?
I'm sorry to bug you again - hopefully this is the last time!!
Have a good weekend!
Josie Gilson

From: Denyes, David (MNR) [mailto:David.Denyes@ontario.ca]
Sent: Thursday, March 04, 2010 4:20 PM
To: Josephine Gilson
Subject: RE: Fisheries Data Request

Hello Josephine,

You were correct in that Sinkhole creek was classified as Type 1 fish habitat because of its connection to Twenty Mile Creek. A healthy population of Grass Pickerel were found within the 20 Mile Creek system and they may also inhabit Sinkhole creek at certain times of the year because of this direct linkage. Sinkhole creek is a feeder tributary of the Twenty Mile Creek System. The headwater areas of sinkhole creek are classified as type II habitat. I'm also working on the MNR Fisheries management plans for these two study areas and will send this to you shortly.

David Denyes

From: Josephine Gilson [mailto:JGilson@morrisonhershfield.com]
Sent: March 4, 2010 11:59 AM
To: Denyes, David (MNR)
Subject: RE: Fisheries Data Request

Hello David,
I am reviewing the data you sent, and I have a question pertaining to the Sinkhole Creek Watershed. It has been classified as Type I and Type II, and I am uncertain as to why it has been classified as Type I. The species captured are not listed provincially or federally and are common species. Is the classification based on the connection to Twenty Mile Creek?
Thanks so much for your help!
Josie

From: Denyes, David (MNR) [mailto:David.Denyes@ontario.ca]
Sent: Thursday, February 11, 2010 2:18 PM
To: Josephine Gilson
Cc: Nix, April (MNR)
Subject: RE: Fisheries Data Request

Hello Josephine,

Here is the fisheries data that you requested for the Wainfleet and Vineland Study areas. I've attached site maps with the coordinates so you know where each station was located. I'm also working on creating wetland maps for these areas. I can send that information to you, shortly!

David Denyes

From: Josephine Gilson [mailto:JGilson@morrisonhershfield.com]
Sent: February 11, 2010 1:56 PM
To: Denyes, David (MNR)
Cc: Kelly Sadlier
Subject: RE: Fisheries Data Request

Good Afternoon David,

I am contacting you to inquire about the data request I sent in mid January for two wind turbine sites, one in Wainfleet area and the other in Vineland area (original email is below). Could you please provide me with an estimate when you will be able to send the requested information?

Thank you in advance,

Josephine A. Gilson, B.Sc.
Aquatic Ecosystem Biologist
jgilson@morrisonhershfield.com

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morrisonhershfield.com

From: Denyes, David (MNR) [mailto:David.Denyes@ontario.ca]
Sent: Friday, January 15, 2010 8:38 AM
To: Josephine Gilson
Subject: RE: Fisheries Data Request

Hello Josephine,

I'm confirming that I have received your fisheries information request. You can expect to have a response back from me within 20 days. However, I will try to have the MNR data request completed sooner then that.

David

From: Josephine Gilson [mailto:JGilson@morrisonhershfield.com]
Sent: January 14, 2010 10:37 AM
To: Denyes, David (MNR)
Cc: Kelly Sadlier
Subject: Fisheries Data Request

Good Morning Mr. Deneys,

I am contacting you in regards to a data request for fisheries information at two locations, one near Wainfleet and the other near Vineland. Please see the attached documentation and mapping.

I would greatly appreciate confirmation that you have received this request, and if possible an estimated date of completion.

If you require any further information please do not hesitate to contact me.

Kind Regards,

Josephine A. Gilson, B.Sc.
Aquatic Ecosystem Biologist
jgilson@morrisonhershfield.com

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Josephine:
I trust that we will be provided with a much more formal opportunity to be involved in the site selection process over the coming months.
You should be aware that the Region's Natural Heritage features will not be the most current mapping. New PSW mapping is being completed by MNR as we speak. Therefore, please ensure to contact MNR for the most recent mapping.
Please feel free to contact us in the future. I look forward to being kept informed on this process.
Sincerely,
Brian Treble

From: Adam Huycke
To: 'Josephine Gilson' <JGilson@morrisonhershfield.com>
Cc: Brian Treble
Sent: Mon Mar 15 15:17:51 2010
Subject: RE: Records Review for a Renewable Energy Project

Good Afternoon Josephine:

Please except this email as the Township's Planning Department's response to your request for information. Township Planning Staff are of the understanding that the Region of Niagara will be providing you with information regarding the natural feature that exist within you study area. Should you require any further assistance from Planning Staff please do not hesitate to ask.

Sincerely,

Adam Huycke, B.A. (Hons.), CPT,
Planning Technician
Secretary Treasurer of the Committee of Adjustment
Township of West Lincoln
318 Canborough Street
P.O. Box 400
Smithville, ON
L0R 2A0
Phone: 905-957-3346
Fax: 905-957-3219

From: Brian Treble
Sent: March 11, 2010 10:21 AM

To: 'Josephine Gilson'
Cc: Adam Huycke; Trevor Hall
Subject: RE: Records Review for a Renewable Energy Project

Josephine:
I hereby confirm receipt of your email.
I would anticipate that we should be able to have your information request filled by early next week.
Finally, our Director of Public Works and Engineering is Trevor Hall (thall@westlincoln.ca). Please feel free to contact him by email or phone 905-957-3396.
Brian

Brian Treble
Director of Planning and Building
Township of West Lincoln
318 Canborough Street
P.O. Box 400
Smithville, Ontario
L0R 2A0
Phone: 905-957-3346
Fax: 905-957-3219
btreble@westlincoln.ca

From: Josephine Gilson [mailto:JGilson@morrisonhershfield.com]
Sent: Thursday, March 11, 2010 9:19 AM
To: Brian Treble
Cc: Kelly Sadlier
Subject: Records Review for a Renewable Energy Project

Good Morning Mr. Brian Treble,

I am contacting you in regards to obtaining a records review for a site within the West Lincoln Township that has been proposed for a wind farm. The data request is to fulfill the requirements of the Renewable Energy Approvals (REA) Regulation, which indicates that we must contact the planning board to obtain information.
In particular I am interested if the project site contains; any natural features and/or areas of scientific interest (earth science).
I have attached a map of the site location for your reference. The five proposed turbines will be located within the site boundaries, however the exact locations are yet to be determined as more information is required.
In addition, the REA Regulation requests that we contact the local roads board, if you have any information as to whom I could contact in regards to road works, that would be great.

I would greatly appreciate a brief email to confirm that you have received this email, as well as an estimated time of delivery for the information. If you have any questions or concerns please do not hesitate to contact me via email or

phone. Thank you very much for your time and I look forward to hearing from you.

Josephine A. Gilson, B.Sc.
Aquatic Ecosystem Biologist
jgilson@morrisonhershfield.com

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APPENDIX E
DFO Operational Statements

Draft For Comment

HIGH-PRESSURE DIRECTIONAL DRILLING

Fisheries and Oceans Canada
Ontario Operational Statement

Version 3.0

For the purpose of this Operational Statement, the term High-Pressure Directional Drilling (HPDD) means trenchless methods of crossing a watercourse using pressurized mud systems. HPDD is used to install cables and pipelines for gas, telecommunications, fibre optics, power, sewer, oil and water lines underneath watercourses and roads. This method is preferable to open-cut and isolated crossings since the cable or pipeline is drilled underneath the watercourse with very little disturbance to the bed or banks. HPDD involves drilling a pilot bore hole underneath the watercourse towards a surface target, back-reaming the bore hole to the drill rig while pulling the pipe along through the hole. This process typically uses the freshwater gel mud system composed of a mixture of clean, freshwater as the base, bentonite (clay-based drilling lubricant) as the viscosifier and synthetic polymers.

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

One of the risks associated with HPDD is the escape of drilling mud into the environment as a result of a spill, tunnel collapse or the rupture of mud to the surface, commonly known as “frac-out”. A frac-out is caused when excessive drilling pressure results in drilling mud propagating toward the surface. The risk of a frac-out can be reduced through proper geotechnical assessment practices and drill planning and execution. The extent of a frac-out can be limited by careful monitoring and having appropriate equipment and response plans ready in the event that one occurs. HPDD can also result in excessive disturbance of riparian vegetation and sedimentation and erosion due to operation of equipment on the shoreline or fording to access the opposite bank.

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

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

- the crossing technique will not damage the stream bed and thereby negatively impact fish or fish habitat,
- the crossing is not a wet open-cut crossing,
- you have an emergency frac-out response plan and a contingency crossing plan in place that outline the protocol to monitor, contain and clean-up a potential frac-out and an alternative method for carrying out the crossing, and
- you incorporate the *Measures to Protect Fish and Fish Habitat when High-Pressure Directional Drilling* listed below in this Operational Statement.

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

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

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

Measures to Protect Fish and Fish Habitat when High-Pressure Directional Drilling

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

2. Design the drill path to an appropriate depth below the watercourse to minimize the risk of frac-out and to a depth

Canada

to prevent the line from becoming exposed due to natural scouring of the stream bed. The drill entry and exit points are far enough from the banks of the watercourse to have minimal impact on these areas.

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

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

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

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

- **5.1.** Machinery is to arrive on site in a clean condition and is to be maintained free of fluid leaks.
- **5.2.** Wash, refuel and service machinery and store fuel and other materials for the machinery away from the water to prevent any deleterious substance from entering the water.
- **5.3.** Keep an emergency spill kit on site in case of fluid leaks or spills from machinery.
- **5.4.** Restore banks to original condition if any disturbance occurs.

6. Construct a dugout/settling basin at the drilling exit site to contain drilling mud to prevent sediment and other deleterious substances from entering the watercourse. If this cannot be achieved, use silt fences or other effective sediment and erosion control measures to prevent drilling mud from entering the watercourse. Inspect these measures regularly during the course of construction and make all necessary repairs if any damage occurs.

- **6.1.** Dispose of excess drilling mud, cuttings and other waste materials at an adequately sized disposal facility located away from the water to prevent it from entering the watercourse.

7. Monitor the watercourse to observe signs of surface migration (frac-out) of drilling mud during all phases of construction.

Emergency Frac-out Response and Contingency Planning

8. Keep all material and equipment needed to contain and clean up drilling mud releases on site and readily accessible in the event of a frac-out.

9. Implement the frac-out response plan that includes measures to stop work, contain the drilling mud and prevent its further migration into the watercourse and notify all applicable authorities, including the closest DFO office in the area (see Ontario DFO office list). Prioritize clean up activities relative to the risk of potential harm and dispose of the drilling mud in a manner that prevents re-entry into the watercourse.

10. Ensure clean up measures do not result in greater damage to the banks and watercourse than from leaving the drilling mud in place.

11. Implement the contingency crossing plan including measures to either re-drill at a more appropriate location or to isolate the watercourse to complete the crossing at the current location. See *Isolated or Dry Open-cut Stream Crossings* Operational Statement for carrying out an isolated trenched crossing.

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

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

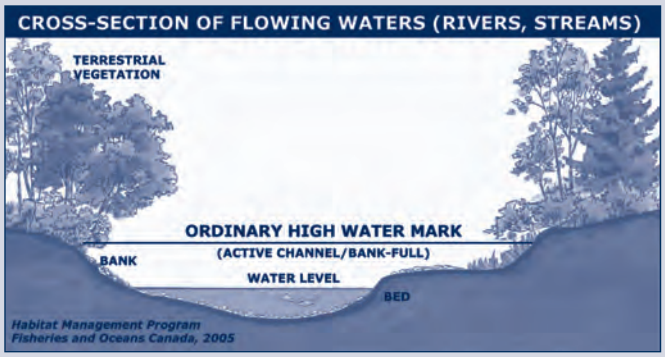
- **13.1.** Maintain effective sediment and erosion control measures until re-vegetation of disturbed areas is achieved.

Definition:

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

vegetation (excepting water tolerant species). For reservoirs this refers to normal high operating levels (Full Supply Level).

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



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