Draft For Comment

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Project Number: **1104037.00**

Project Title: **HAF WIND ENERGY PROJECT**

Report: **002-R04-1104037**

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

Vineland Power
Stewards of sustainable energy.

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Appendices

REA Package Reference Tabs

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 West Lincoln 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 related activities. Monitoring plans, found in the Environmental Effects Monitoring 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 Bodies Reports"). The subsequent sections detail the results from a records review and a 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
- Maintenance building

The turbine layout and associated project components are illustrated in **Figure 1-5** 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 include the following:

- Official Plan Township of West Lincoln (November, 2006) reviewed in 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) Twenty Mile Creek Watershed Plan (2006) reviewed in April 2010;
- Niagara Peninsula Conservation Authority (NPCA) Watershed Regulation reviewed in 2010;
- Ontario Ministry of Natural Resources (MNR), Vineland. 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 West Lincoln

According to the Township of West Lincoln's Official Plan, the project location is found within a predominantly rural municipality comprised of agricultural lands, which are dominated by field crops such as corn and to a lesser extent, some grain crops. Mapping contained in the Township's Official Plan was reviewed to identify watercourses within 120 metres of the project location. Mapping identified water bodies within 120 metres of the project location as being Type 2 watercourses as per MNR classification standards.

2.2 Niagara Region

The Regional Policy Plan identified a number of natural areas and features in proximity to the project location including Twenty Mile Creek, woodlots, wetlands, wildlife and Environmentally Sensitive Areas.

Regional mapping is 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 it's designate.

2.3 Regulatory Designation Review

2.3.1 Niagara Region Conservation Authority (NPCA)

Niagara Peninsula 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). Records identified that turbine locations 1 and 2 are proposed within a Highly Vulnerable Aquifer area.

Currently the NPCA have not finalized the classification of municipal drains within the Project Area.

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. 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 drainage ditches also referred to as grass swale. Also, no crown owned waterbodies were identified within the project location, There are no lake trout lakes located within 300 meters of the project location.

2.4 Physical Setting

2.4.1 Watershed Summary

There are several tributaries of Twenty Mile Creek watersheds, which flow through a predominately agricultural landscape with some forest stands and tree lined areas situated

between farm fields. Four out of five proposed turbine locations are within 120 metres of this watershed. The following descriptions give an overview of the watershed, as well as an assessment of the fish habitat present. The sensitivity included in the overview uses the MNR classification system. Type1 classification 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 classification 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 presented in **Table 1.0**.

Twenty Mile Creek Watershed

Twenty Mile Creek watershed flows east to west within the site boundaries through predominately agricultural land. As a result of the surrounding land use, the waterways have poor bank stability and receive high volumes of runoff and sedimentation, thus deteriorating the quality of fish habitat. Many reaches of the tributaries have been channelized to accommodate agricultural land use; this limits stream morphology and increases the potential of runoff, erosion and sedimentation.

Throughout the study area the tributaries typically had very little flow and with stream morphology comprised almost entirely of flats. Riparian vegetation was dominated by grass species (*Poaceae sp.*) with minimal trees and shrubs at the field's parameters.

The MNR data for this watershed included Type 1 (highly sensitive) and Type 2 (moderately sensitive) classifications. Twenty Mile Creek itself is considered a Type 1 and Type II watercourse, and therefore has high to moderate sensitivity. The Type 1 ratings have been assigned by the MNR due to the presence of Grass Pickerel (*Esoxamericanusvermiculatus*) which is listed as Special Concern under the Federal *Species at Risk Act* and the Provincial *Endangered Species Act*. The Type 2 designation is the result of the habitat having below productive capacity due to reduced base flow. Limestone and isostatic rebound is causing base flow to leak underground, therefore reducing base flows in the creek.

The species typically found in this watershed are provided in **Table 1.0**. Based on the warmwater fish species present, the MNR has indicated that the project works should follow the warmwater timing restrictions, March 1 to June 30. 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 applies.

Table 1.0: Existing Fish Species Present Summary			
Watercourse	**Fish Community/Species Present**	**Habitat Sensitivity**	**Timing Restrictions**
Twenty Mile Creek	MNR: Banded Killifish, Black Crappie, Bluegill, Bluntnose Minnow, Brown Bullhead, Central Mudminnow, Creek Chub, Golden Shiner, Grass Pickerel, Green Sunfish, Johnny Darter, Largemouth Bass, Pumpkinseed, Rainbow Darter, Rock Bass, Tadpole Madtom, White Crappie, White Sucker, Yellow Perch. NPCA: Banded Killifish, Black Crappie, Bluegill, Bluntnose Minnow, Brown Bullhead, Central Mudminnow, Common Carp, Creek Chub, Fathead Minnow, Golden Shiner, Grass Pickerel, Green Sunfish, Johnny Darter, Largemouth Bass, Northern Pike, Pumpkinseed, Rock Bass, Sand Shiner, Tadpole Madtom, White sucker and Yellow Perch.	MNR: High to Moderate NPCA: High	MNR: March 1 – June 30 & September 1 – November 30 NPCA: March 1 – June 30

3.0 Site Investigation

Site investigations 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 investigations were completed on April 27th & 28th 2010 from 9:00am to 2:30 pm. Thefollowing sections are based on the site investigations completed by MH.

Weather conditions for the December 2nd, 2009 site investigation was overcast with high winds and an air temperate of 7^0C at 10:00 am. During 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 on December 2nd, 2009 and April 27th/28th, 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:

- Waterbody 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 watercourse 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.

Four of the five turbines are located within 120 meters of a marked watercourse; each of these waterways within the 120m buffer zone has been assessed **(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. The proposed paths for the underground collector routes and access roads have multiple crossings over marked tributaries of Twently Mile Creek.. Overall, many of the marked watercourses are intermittent streams, providing marginal fish habitat; application of standard 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. Characterisations 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
Turbine 1	Tributary of Twenty Mile Creek- Intermittent Stream	40 meters
Turbine 2	Tributary of Twenty Mile Creek- Intermittent Stream	34 meters
Turbine 3	Tributary of Twenty Mile Creek-Intermittent Stream	34 meters
Turbine 4	Tributary of Twenty Mile Creek acts as agricultural drainage – *non fish habitat*	51 meters
Turbine 5	Tributary of Twenty Mile Creek acts as agricultural drainage – *non fish habitat*	107 metres
Turbine 1 and 2 Access Road & Underground Collector Line (Crossing 1 & 2)	Tributary of Twenty Mile Creek- Intermittent Stream	0 meters
Underground Collector Line (Crossing 3)	Tributary of Twenty Mile Creek acts as agricultural drainage – *non fish habitat*	0 meters
Turbine 3 Access Road & Underground Collector Line (Crossing 4)	Tributary of Twenty Mile Creek acts as agricultural drainage – *non fish habitat*	0 meters

Access Road & Underground Collector Line (Crossing 5)	Tributary of Twenty Mile Creek acts as agricultural drainage – *non fish habitat*	0 meters
Underground Collector Line (Crossing 6)	Tributary of Twenty Mile Creek- acts as agricultural drainage – *non fish habitat*	0 meters
Underground Collector Line (Crossing 7)	Tributary of Twenty Mile Creek- acts as agricultural drainage – *non fish habitat*	0 metres
Turbine 4 Access Road and Underground Collector Line (Crossing 8 & 9)	Tributary of Twenty Mile Creek- acts as agricultural drainage – *non fish habitat*	0 metres

3.2.1 Streams within 120m of a Turbine

Turbine 1 is approximately 40 meters from a waterway.This intermittent stream flows through an agultural area which provided minimal riparian cover of grass species and a mixture of trees and shrubs. The instream vegetation consisted of grasses and cattail species (*Typhaceae sp.*), which grew very densely in some sections of the stream. The stream dimensions varied; stream widths were about 1.5 to 3 meters, and approximate depths of 0.02 to 0.05 meters. During field investigations the watercourse had no flow, slightly turbid, and the bottom substrate was of soft silt. Although this section of the waterway likely provides poor habitat for fish, the stream was well defined, water was present and it is a tributary of Twenty Mile Creek; therefore this tributary is deemed potential fish habitat. Any fish species present are likely warmwater species that are tolerant to perturbations **(See Figure 2).**

Turbine 1 is situated within 120 meters of the Lower Twenty Mile Creek Provincially Significant Wetland Complex. Refer to the ***Natural Heritage Assessment Report*** for further information regarding this wetland feature.

Turbine 2 is approximately 34 meters from a waterway (43°07'16"N 79°42'39"W). This intermittent stream was approximately 0.2 to 0.25 meters in depth and about 1 meter wide. The stream banks were highly unstable due to the lack of riparian vegetation, and active cultivation within approximately 1.5 meters of the stream's embankment. Due to the low gradient of the stream, and minimal water present; areas of the tributary had formed large shallow pools in the field. As a result of the surrounding land use and the local geology, the substrate in the stream was comprised of fine granular material including silt, clay and muck. This watercourse provides non-specialized fish habitat, for species that are tolerant to warm water temperatures, and poor water quality. This waterway is referred to later, as it is crossed by the tapline to Turbine 1 (Crossing 1 and 2) **(See Figure 2).**

Turbine 2 is situated within 120 meters of the Lower Twenty Mile Creek Provincially Significant Wetland Complex. Refer to the ***Natural Heritage Assessment Report*** for further information regarding this wetland feature.

Records identified that turbine locations 1 and 2 are proposed within a Highly Vulnerable Aquifer area. However, it is anticipated, the construction, design and operation of the HAF 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 1 and 2. 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.

Turbine 3 is approximately 34 meters south of a tributary of Twenty Mile Creek. This marked waterway is considered a intermittent watercourse, with highly variable flows. The low gradient stream followed along the edge of an agricultural field with a substrate comprised of muck, silt and clay material. Instream and surrounding vegetation was dominated by grass species (*Poaceae sp.)*; however various species of shrubs and trees were present within the riparian area. In-stream grass species offered some cover and structure, however in general the stream lacked diverse morphology or fish habitat; as well, the water was highly turbid. The stream had shallow water throughout, approximately 0.05 to 0.1 meters in depth, and varied in width about 0.3 to 0.75 meters. As a result of the active agriculture practices in the area, this tributary had been highly influenced by sedimentation, runoff and channelization. The fish habitat at this location is considered poor, and likely only supports a warmwater fishery that is tolerant to perturbations **(See Figure 3).**

Turbine 4 is approximately 51 meters north of a marked tributary of Twenty Mile Creek (43°06'48"N 79°43'02"W). Investigation of the headwaters in the area determined that the tributary is not considered a watercourse in the vicinity of the proposed turbine. A subtle depression was present in the agricultural field; however it was dry, and actively cultivated. This area of low lying land is considered non-fish habitat **(See Figure 4).**

Tapline 4 is located within 120 meters of the Lower Twenty Mile Creek Provincially Significant Wetland Complex (PSW). Refer to the ***Natural Heritage Assessment Report*** for furter information regarding this wetland feature.

Turbine 5 is approximately 107 meters north from a marked tributary of Twenty Mile Creek. This same waterway is also within 120 meters of the tapline before it heads east to the turbine base. The stream followed the edge of abutting agricultural fields which was dominated by grasses both in-stream as well as riparian community. To the east of the proposed turbine, the stream flowed through a narrow tree line between the agricultural fields. The stream had little to no flow, and was primarily isolated pools of water. One area of the stream was highly disturbed due to farm machinery driving through the stream. In combination, the tire ruts in the stream and the low summer flows prevented a connection upstream and downstream of the farm access crossing. The surrounding land use was cultivated which increased the sediment load and runoff to the stream; and as a result the

water was highly turbid and the stream substrate was dominated by silt and clay. This watercourse is considered to provide poor fish habitat due to the lack of connectivity during low flows and the high levels of suspended solids as a result of the surrounding land use.

3.2.2 Stream Crossings by Underground Collector System and Access Roads

The tapline is approximately 6.0km in length and has the main electrical tapline traveling along Sixteen Road, with branches extending north and south to connect each turbine location. Access roads will follow the same path as the tapline, providing access to the site during construction and for the post construction operation requirements.

Crossing 1

The access road and underground collector system leading to turbine 1 crosses a waterway that is located approximately 40 meters south of the turbine. The surrounding land is actively cultivated, with some tree lined and naturally vegetated areas. Bank stability was poor in areas where the stream crossed an agricultural field; however where the stream followed near the edge of the agricultural field the banks became more stable. Where present, the buffer zone of vegetation between the stream margin and the area of cultivation was very narrow. This tributary of Twenty Mile Creek provides poor habitat for fish, as such fish species present are likely warmwater species that are tolerant to perturbations.

Crossing 2

On the connecting tapline to Turbine 1 & 2 a tributary of Twenty Mile Creek is crossed (43°07'15"N 79°42'43"W). This section of the stream is transecting a field, resulting in no riparian vegetation. This segment of the tributary has a slightly more defined stream than what was observed downstream close to the proposed Turbine 2 location. The tributary does not have large shallow pooled areas; instead flats dominate the streams morphology. The substrate is consistent with the downstream conditions, which include silt, clay, and muck. Similar to downstream conditions, the habitat is unspecialized and likely provides fish habitat to species tolerant to heavy sediment loads and warm water temperatures.

Crossing 3

Southwest of Turbine 3 on Sixteen Road the tapline would cross a marked tributary of Twenty Mile Creek (43°07'00"N 79°42'10"W). This crossing is an agricultural swale. No water was observed in the undefined, active agricultural swale to the south of Sixteen Road. North of Sixteen Road, the swale served primarily as the drainage ditch along the road and had poor habitat structure and cover. This crossing is not considered to provide fish habitat.

Crossing 4

North of Crossing 5 on the connecting line to Turbine 3 a marked waterway is crossed. At this location there was no waterway present, only an agricultural swale that was undefined and did not provide fish habitat.

Crossing 5

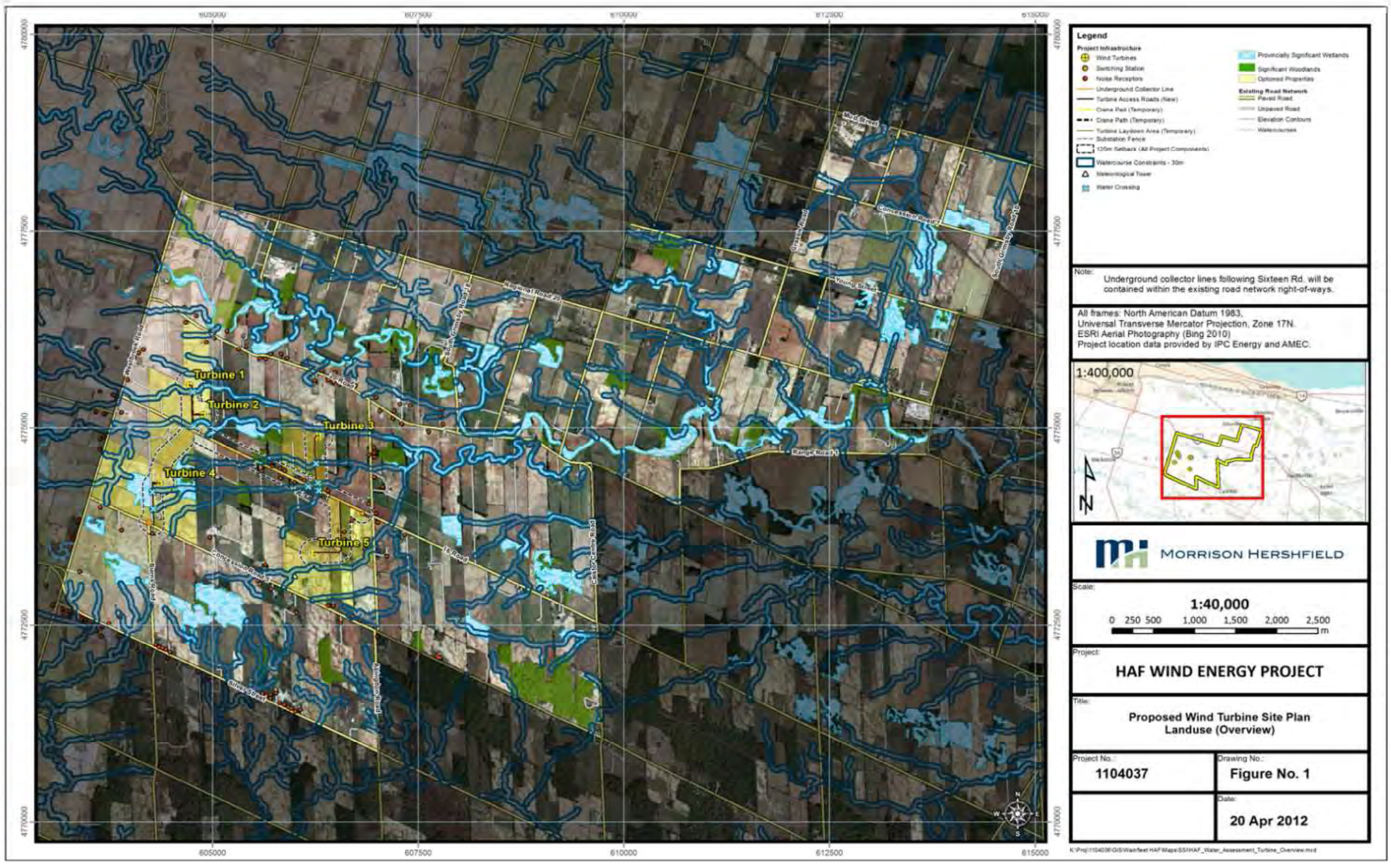
A marked tributary is crossed heading north on the connecting line to Turbine 3 (43°06'50"N 79°41'37"W). As this watercourse is located downstream of Crossing 6, field assessments confirmed that this crossing is considered a drainage swale and is not considered a watercourse.

Crossing 6 & 7

Heading northeast on Sixteen Road the tapline crosses two marked tributaries of Twenty Mile Creek: Crossing 6 43°06'49"N 79°41'42"W and Crossing 7 43°06'47"N 79°41'37"W. Both crossings were identified as dry grass swales that provided agricultural drainage during high flow events, but did not provide fish habitat.

Crossing 9 & 10

The access roand and underground collector system leading to turbine 4 crosses a waterway that is located approximately 51 meters south of the turbine. The surrounding land is actively cultivated. No water was observed in the undefined, active agricultural swale. These crossings are not considered to provide fish habitat.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Turbine 3
Turbine 4
Turbine 5
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Project Infrastructure
Wind Turbines
Switching Station
Noise Receptors
Underground Collector Line
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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
Significant Woodlands
Optioned Properties
Existing Road Network
Paved Road
Unpaved Road
Elevation Contours
Watercourses
Note:
Underground collector lines following Sixteen Rd. will be contained within the existing road network right-of-ways.
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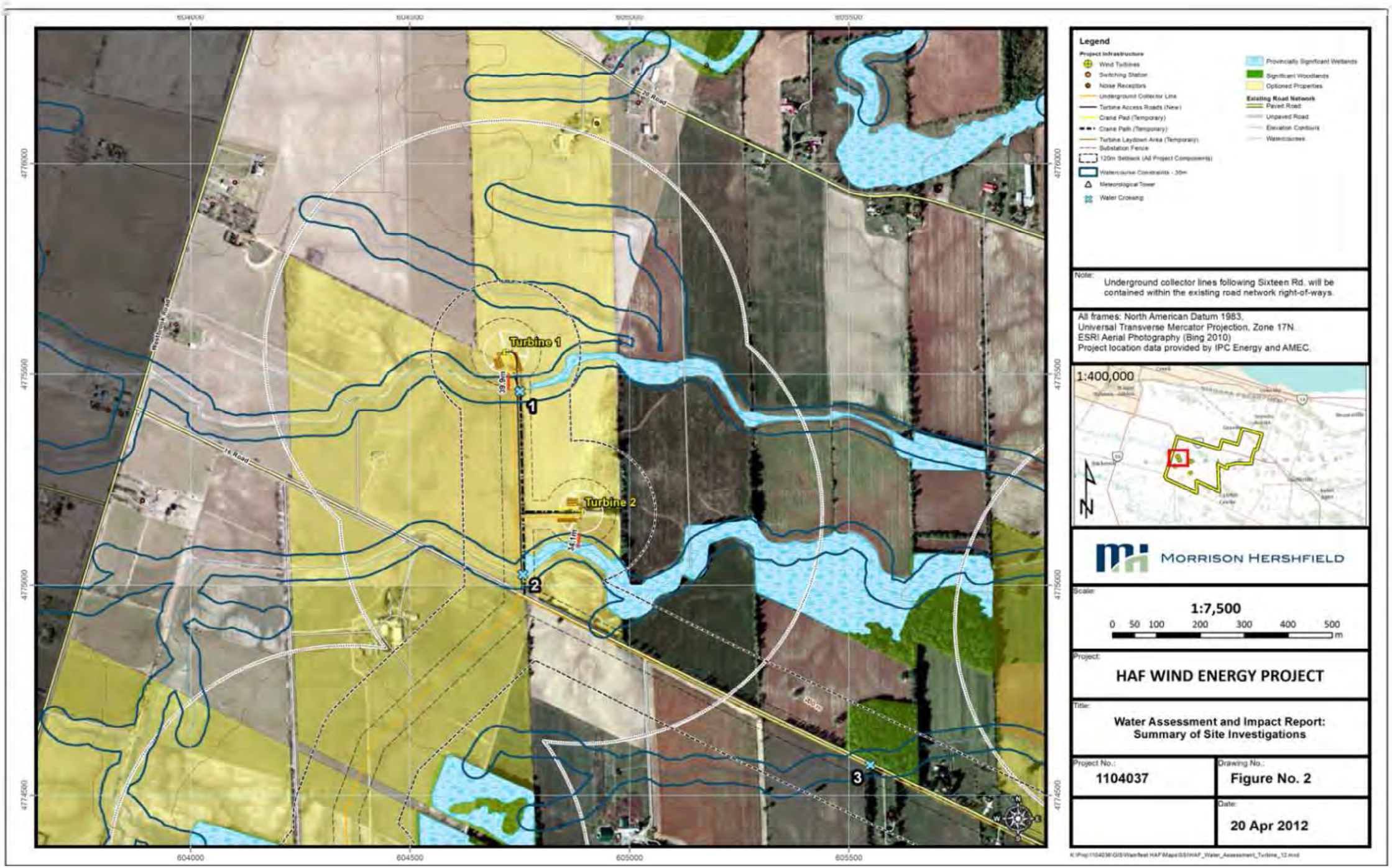
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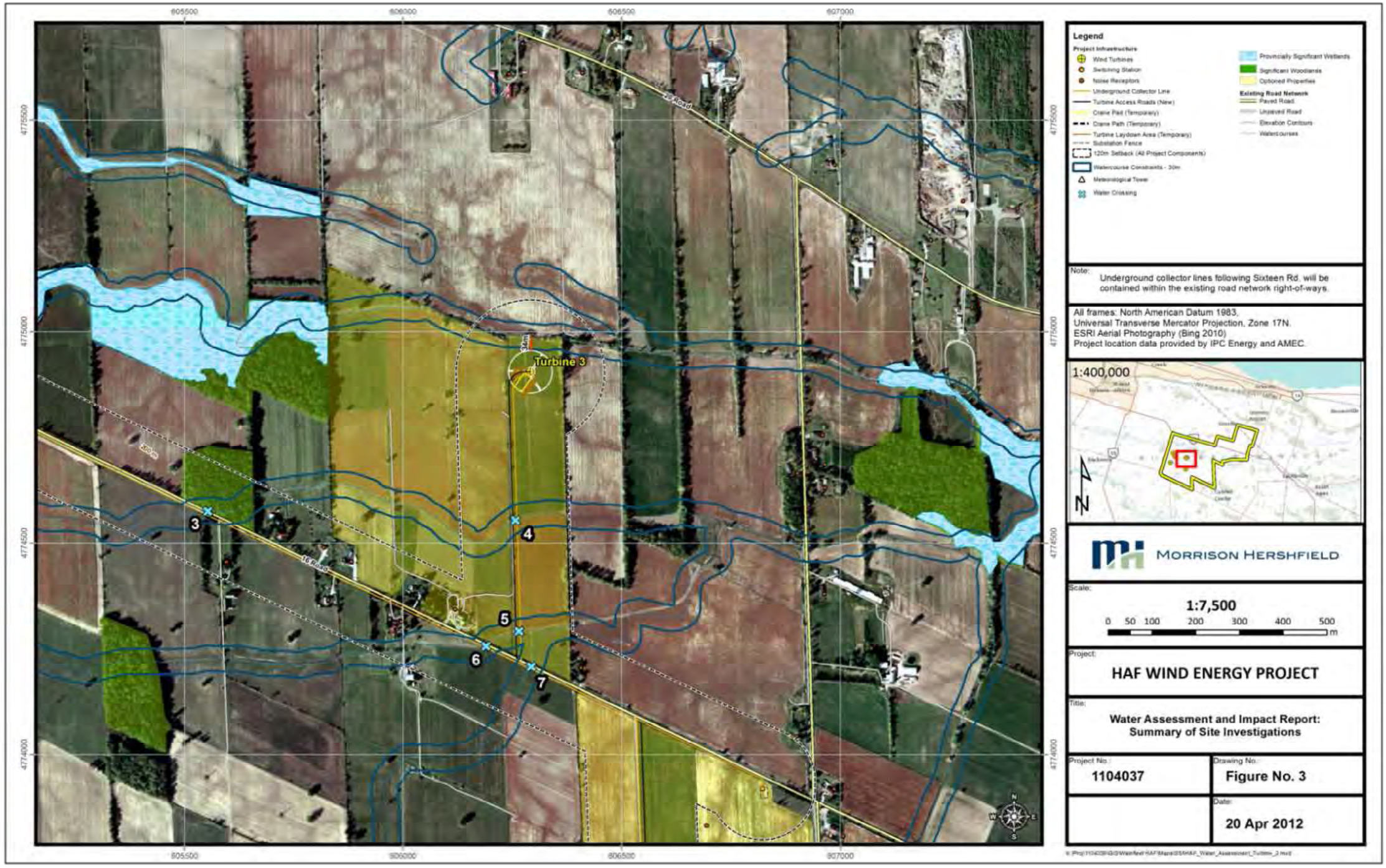
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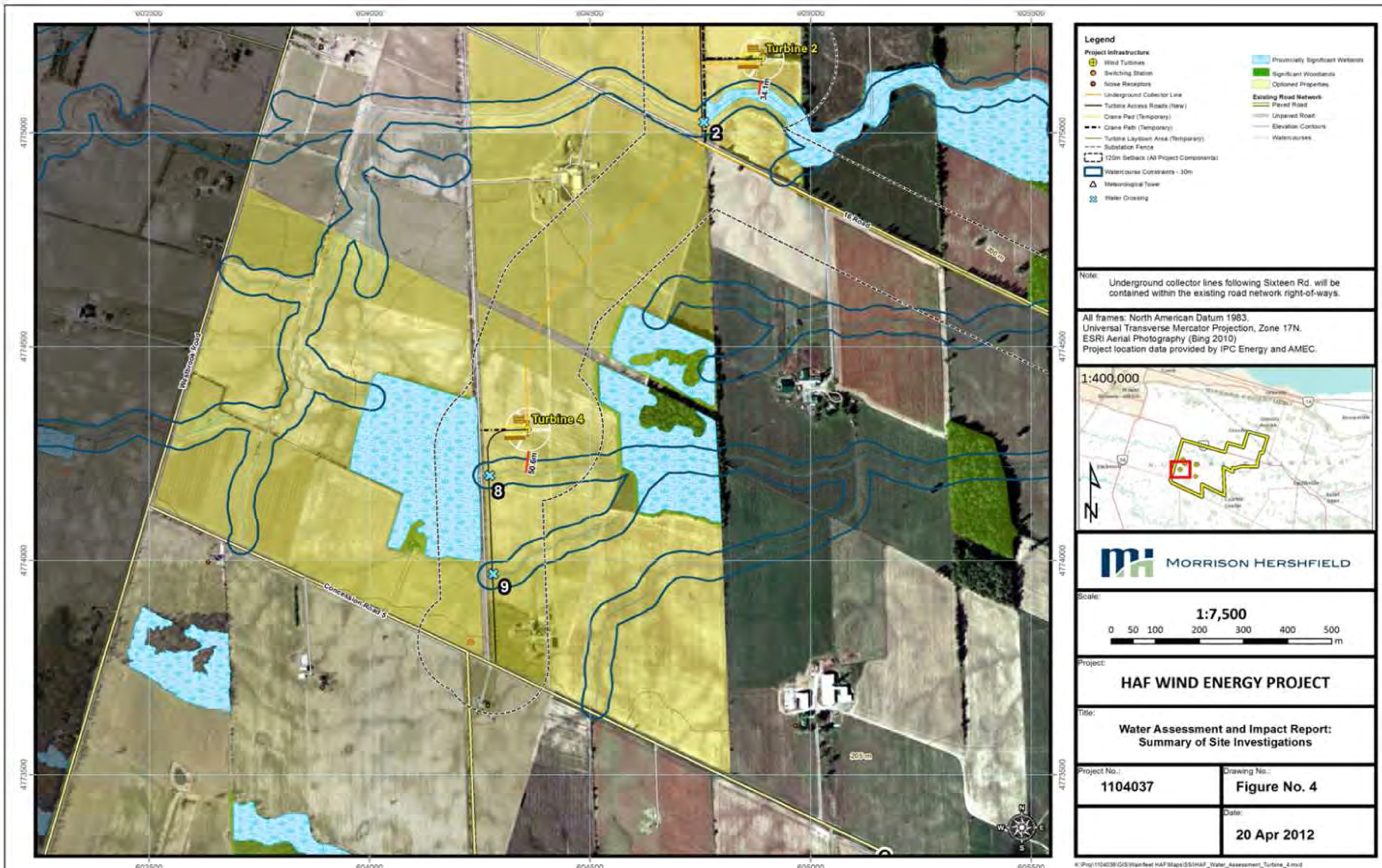
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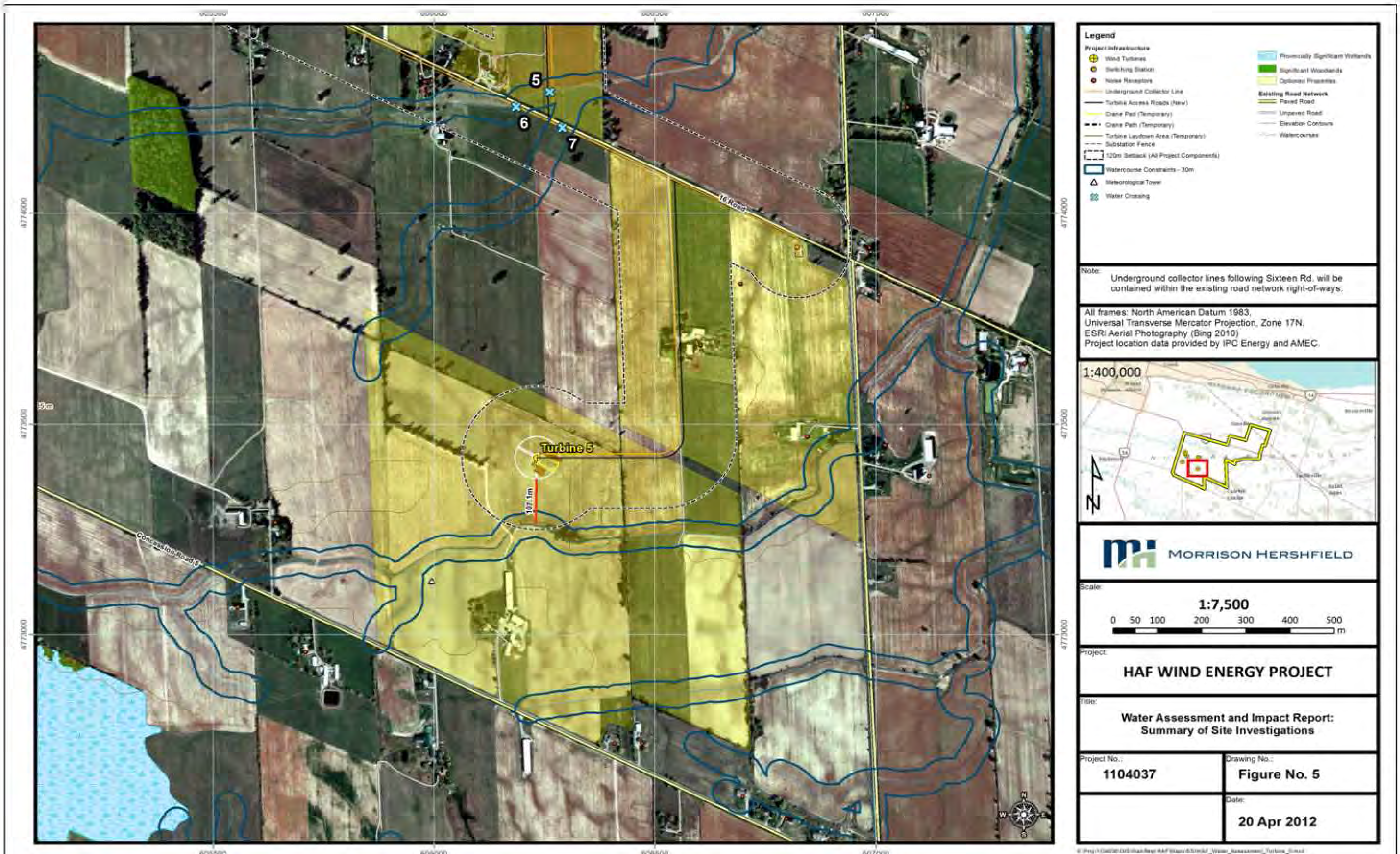
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Unpaved Road
Elevation Contours
Watercourses
Note: Underground collector lines following Sixteen Rd. will be contained within the existing road network right-of-ways.
All frames: North American Datum 1983, Universal Transverse Mercator Projection, Zone 17N. ESRI Aerial Photography (Bing 2010) Project location data provided by IPC Energy and AMEC.
1:400,000
MORRISON HERSHFIELD
Scale:
1:7,500
0 50 100 200 300 400 500 m
Project:
HAF WIND ENERGY PROJECT
Title:
Water Assessment and Impact Report: Summary of Site Investigations
Project No.:
1104037
Drawing No.:
Figure No. 5
Date:
20 Apr 2012

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 streams 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 surronding the project location. Potential short term impacts to runoff patterns may result from activites related to the interconnection of project turbines via underground cabling to the substation and the construction of turbine access roads and foundations.

Mitigation

Vegitation cover will be restored after the installtion of the local collector system and trenches will be filled and revegetated. Lands used for temporary construction staging areas surround the turbine locations will resume agricultural activities. 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 within the Project Area. During the decommissioning phase the removal of access roads, turbine foundations and collector system 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; and
- Minimize construciton during wet weather.

Additional mitigation measures refer to Section 4.1.5 (Erosion Control).

4.1.3 Direct Distrubance to an Intermittent or Perminant Stream Direct

Impacts to a water feature may occur during site preparation and construction activies such as the removal of riparian vegetation along stream embankments or compaction of

stream banks from heavy equipment. Installation of culverts for access roads may also be required.

Mitigation

Horizontal pressure directional drilling will be utilized to install undergound cabiling under the tributaries of Twenty Mile Creek identified in Figures 1 and 3 along Sixteen Road. Since no direct disturbance to this 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 body. 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 of identified water bodies the following mitigation measures will be implemented:

- Conducting refuelling and maintenance in designated areas;
- 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). Additional mitigation measures refer to Section 4.1.5(Spills).

4.1.5 Impact Assessment of Underground Crossings by Collector System

The installation of the underground collector system will require water crossings of marked tributaries of Twenty Mile Creek. These tributaries are considered intermittent streams and agricultural swales.

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, waterbody, 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, waterbody, or wetland.
- The storage container will be equip 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 HAF study area was predominantly agricultural, with a mixture of pastureland and crops as well as urban development. Portions of Twenty Mile Creek watershed have been straightened/channelized, widened and sometimes deepened to increase land drainage and agricultural production or urban development. As such the watercourses are susceptible to negative impacts on fish habitat including: loss of riparian vegetation; increase in siltation; removal of stream 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.

Twenty Mile Creek watershed supports 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 Twenty Mile Creek (March 1st-July 1st and September 1st – November 30th) to protect fish and fish habitat. In conjunction with timing windows the MNR management plan for the tributaries of Welland River watershed must also be considered for project works.

In conclusion, the environmental impact assessment determined the following negative environmental effects associated with the installation of underground collector system and construction of access roads for the HAF Wind Energy Project :

- 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 anticipate no negative residual effects will occur from the water crossings required for the HAF Wind Energy Project. 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.

Township of West Lincoln. 2010. Official Plan

Niagara Region. 2010. Regional Policy Plan

Niagara Peninsula Conservation Authority. 2006. Twenty Mile Creek Watershed Plan

APPENDIX A
Photographic Record

Waterway north of Turbine 3

Waterway north of Turbine 3 looking west.

Waterway north of Turbine 3

Waterway south of Turbine 2

Ponded water as the waterway crosses an agricultural field, south of Turbine 2

Waterway south of Turbine 2 looking west

South of Turbine 2 southwest towards Sixteen Road.

Waterway south of Turbine 2 looking south at Sixteen Road.

Downstream of Crossing # 8 and 9 looking southwest.

APPENDIX B
Field Notes

IPC Turbine Number & Location: WEST LINC / HAF #1

Date: April 27, 2010

Time: 10:15 AM

GPS Co-ordinates:

Comments:

1. Crosses Road 16 - have pictures from 1st visit.

2. Stagnant, highly veg, silt bottom, cattails 3m wide, 10-20cm wide

3. Tree line - ~ 300m from turbine

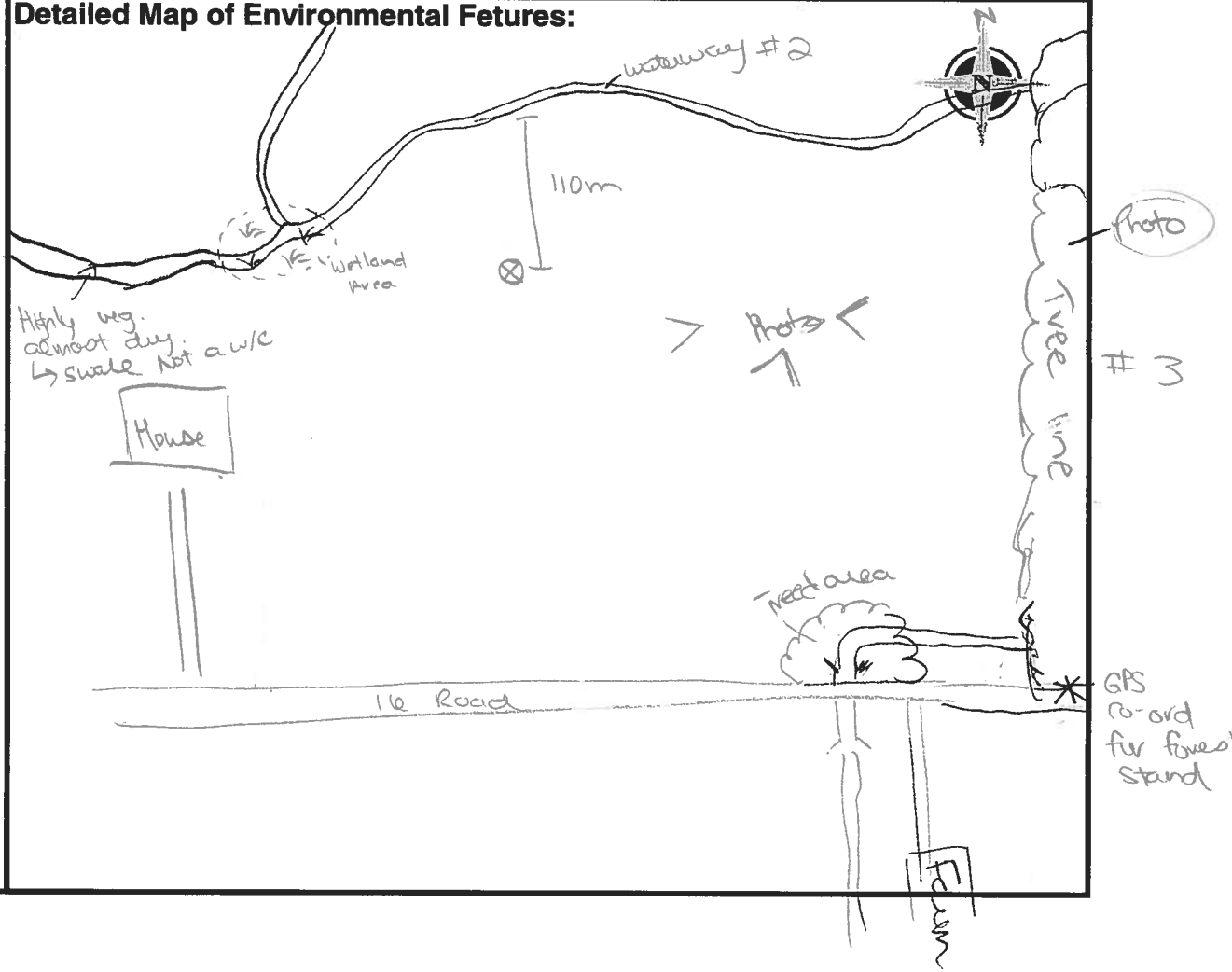
House ~ 80m away from turbine

W/C = watercourse.

Environmental Feature	Dist.(m) to Turbine	GPS Co-ord of Feature
Groundwater Evidence (120m)		
☐ Watercress		
☐ Iron Staining		
☐ Seepage		
☑ Forest Stand (30m) #3		17T 0604761 4774976
☑ Waterway (30m) 1st comment	300m	17T 0604503 4775112
✓ Waterway #2		

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

Detailed Map of Environmental Fetures:



IPC Turbine Number & Location: HAF #2	Environmental Feature	Dist.(m) to Turbine	GPS Co-ord of Feature
Date: April 27 /10	Groundwater Evidence (120m)		
Time: 10:55 AM	☐ Watercress		
GPS Co-ordinates:	☐ Iron Staining		
	☐ Seepage		
	☑ Forest Stand (30m) (#1)		17T 0604832 4775076
	✓ #3	77m	17T 0604864 4775179
	☑ Waterway (30m)	170m	

Comments:

#1. Shared treeline w turbine #4

#2. Bordered low area connected to waterway

#3 Tree line - thin, poplars

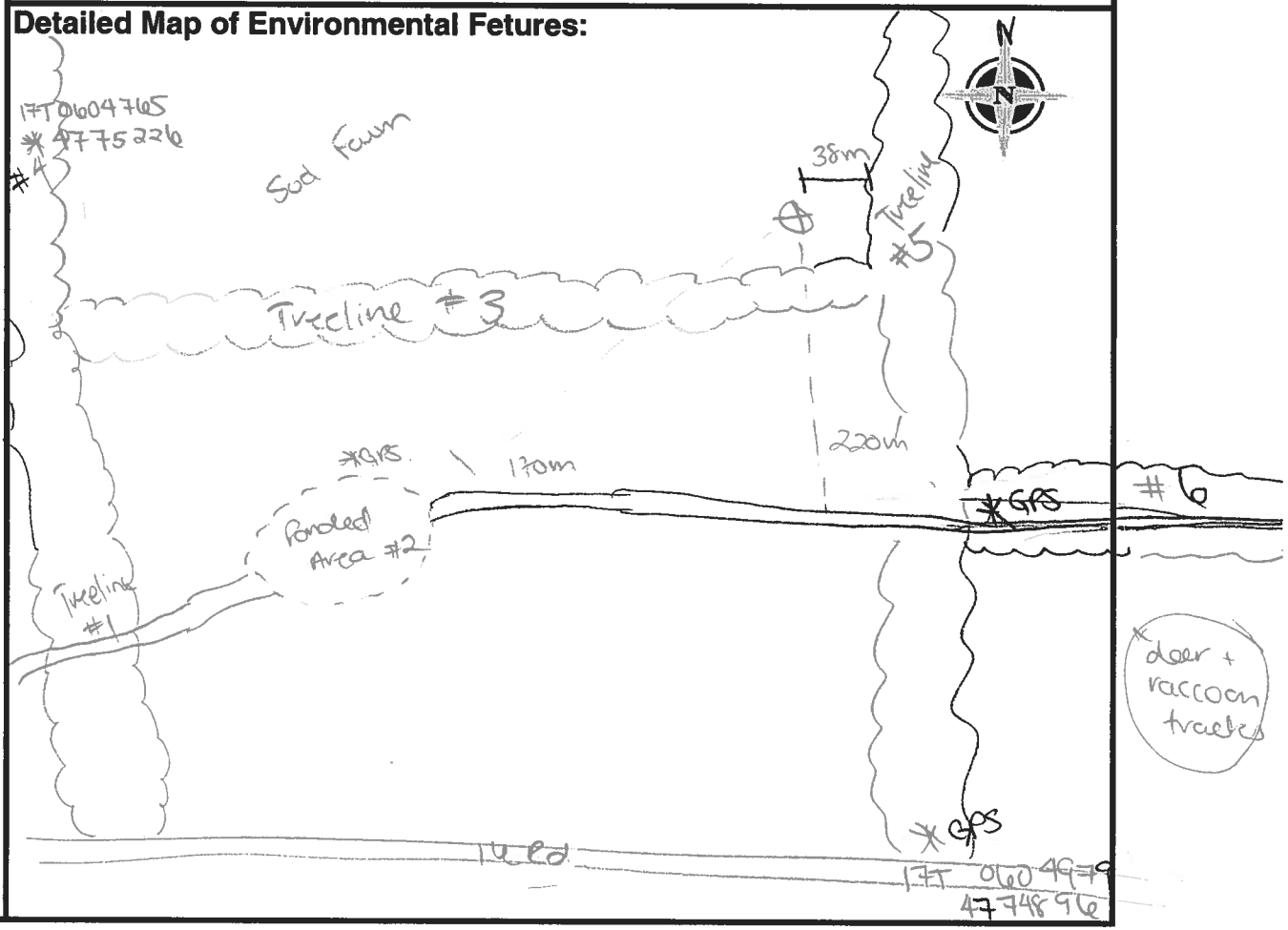
#4 Extension of tree line #1, fairly wide. diversity of trees. 160m from turbine * GPS point on FF

#5 N. end v. sparse, S. of E/W Treeline #3 is much more dense 38-40m from turbine 17T 0604976 4775201

#6 Treeline + water course 17T 0605000 4774998 Taken near treeline #5 - v. little cover/veg.

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

Detailed Map of Environmental Fetures:



Moving → North (in sod farm)
North East (into corn field)

IPC Turbine Number & Location: HAF/W. Lincoln #3

Date: April 28/10

Time: 9.00 AM

GPS Co-ordinates:

Comments:

Accessed from 116 Rd (property agreement)

(T) - turbine location is in on a ridge in the marked area or to the west.

#1 - Waterway w/ flowing grasses in the channel
Wetted Width - 3m
channel width - 30cm
Depth ~ 10cm
-trees/shrubs only on S. side of str.

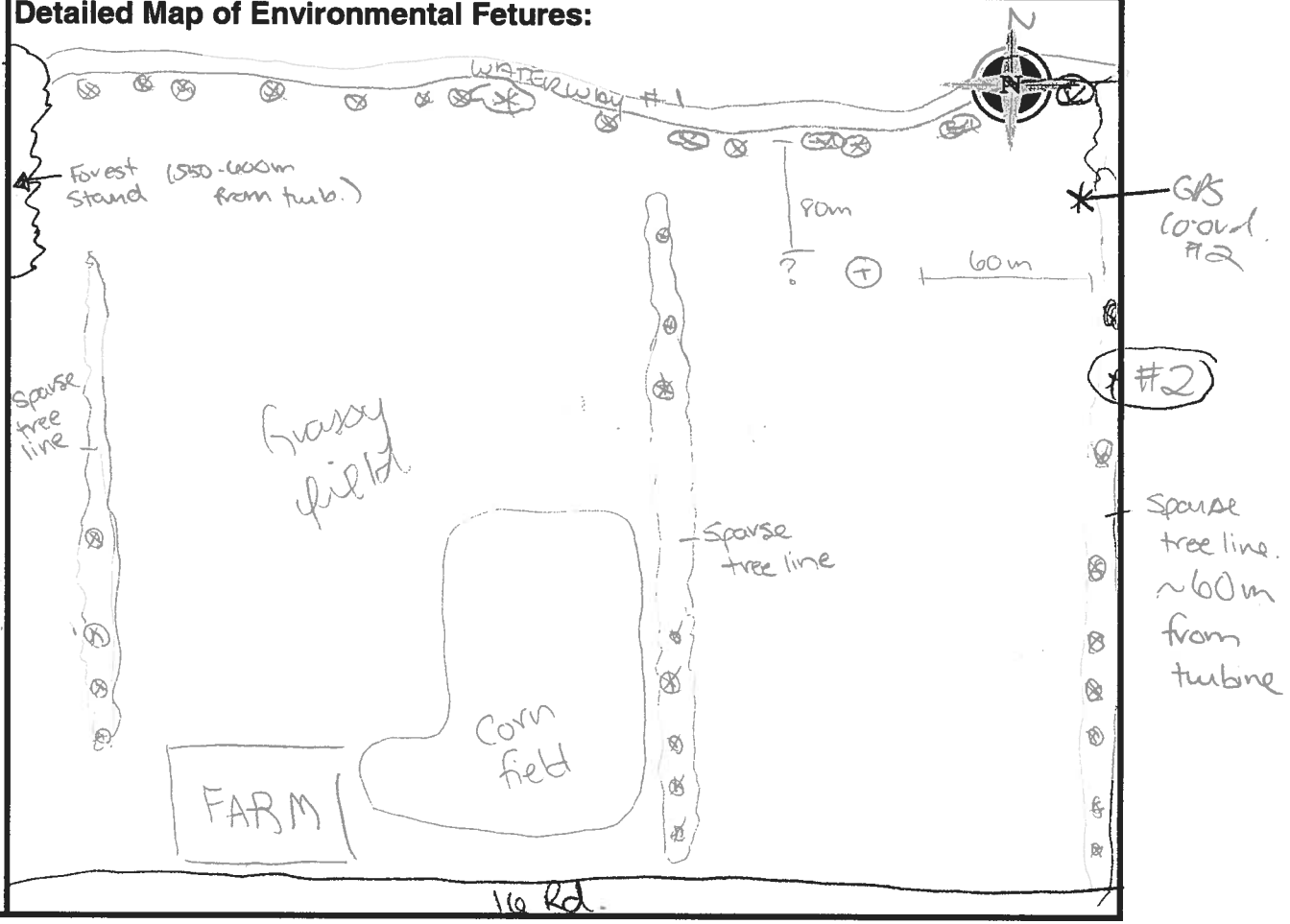
Forest stand to the west ~550-600m from turbine

#2 - Sparse tree line to east of turbine loc'n. - 60m
17T 0606359 4774909

Environmental Feature	Dist.(m) to Turbine	GPS Co-ord of Feature
Groundwater Evidence (120m)		
□ Watercress		
□ Iron Staining		
□ Seepage		
□ **Forest Stand (30m)**		
☑ **Waterway (30m)**	85m	17T 0606236 4774994

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

Detailed Map of Environmental Fetures:



IPC Turbine Number & Location: HAF - #4	Environmental Feature	Dist.(m) to Turbine	GPS Co-ord of Feature
Date: April 2, 2010	Groundwater Evidence (120m)		
Time: 12:40	☐ Watercress		
GPS Co-ordinates:	☐ Iron Staining		
	☐ Seepage		
	☐ Forest Stand (30m)		
	☐ Waterway (30m)		

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

Comments:

① ② forest stand - large + significant
deer prints / raccoons

(1A) 40m from proposed turbine - 17T 0604241 4774283

③ gas line - petroleum pipeline
103m 17T 0604252 4774175

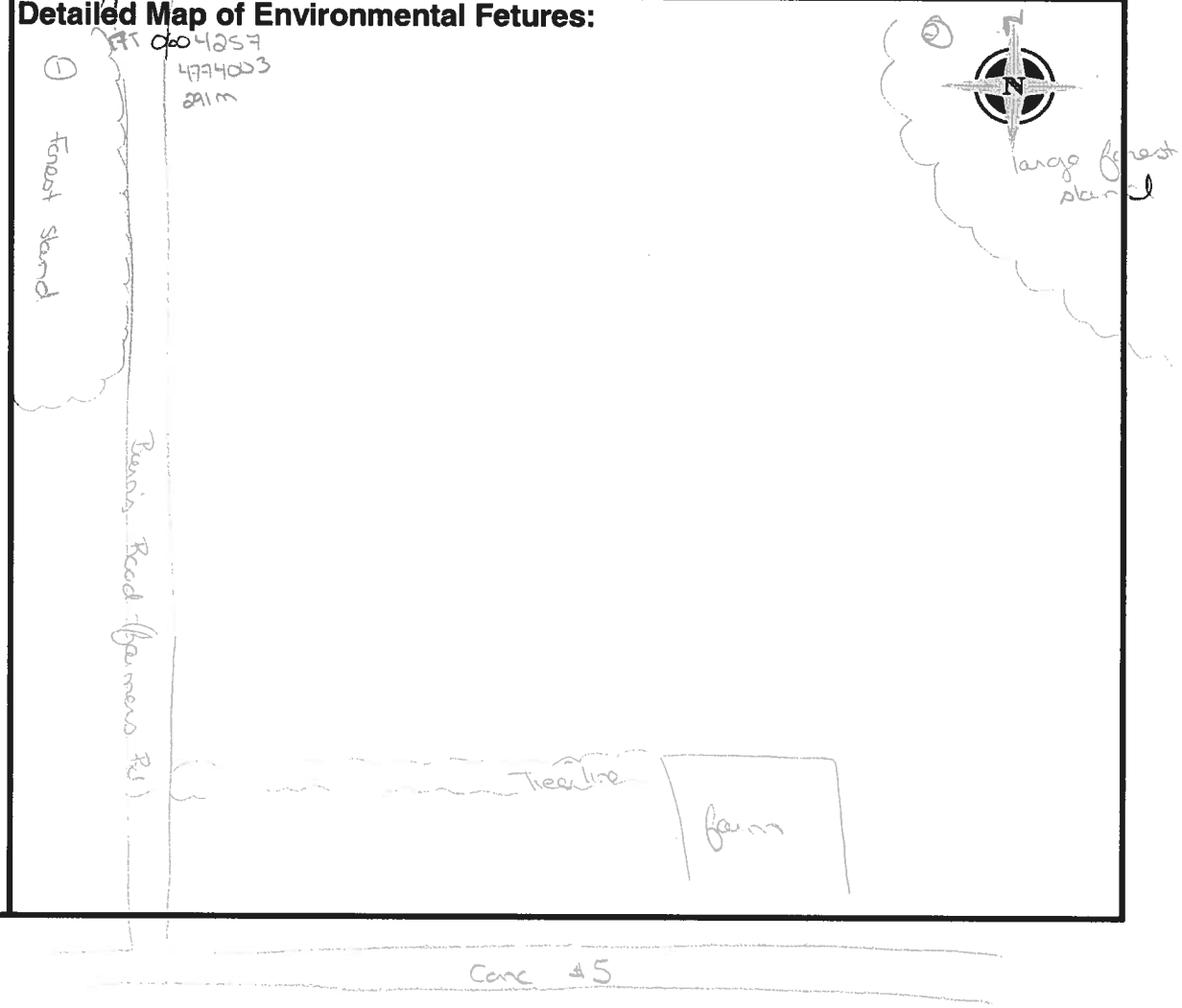
② 17 0604563 4774295
270m from proposed turbine

- no water course / or drainage feature

Recommendations → some approx 40m from hydro
move north* south*, east*
↳ needs to move west cause too close to ① forest stand

- Distance (north hydro)

Detailed Map of Environmental Fetures:



IPC Turbine Number & Location: #5 HAF / W LINCOLN

Date: april 27 2010

Time: 11:39

GPS Co-ordinates:

Comments:

- communication tower on ... (3) turbine site (temp) 274m from proposed site 17T 0606014 4773101
- Drainage feature → 229m (2) grass swale (no connection/no flow - turbid
- tree line 215m → not sign. (1) feature
- no watercourse -
- south/east - tree line & stagnant (4) drainage channel within 58m of proposed turbine site 17T 0606292 4773226
- (5) tree line 192m → 17T 0606119 4773237

Recommend → north - east ✱ from tree line (4) or north west

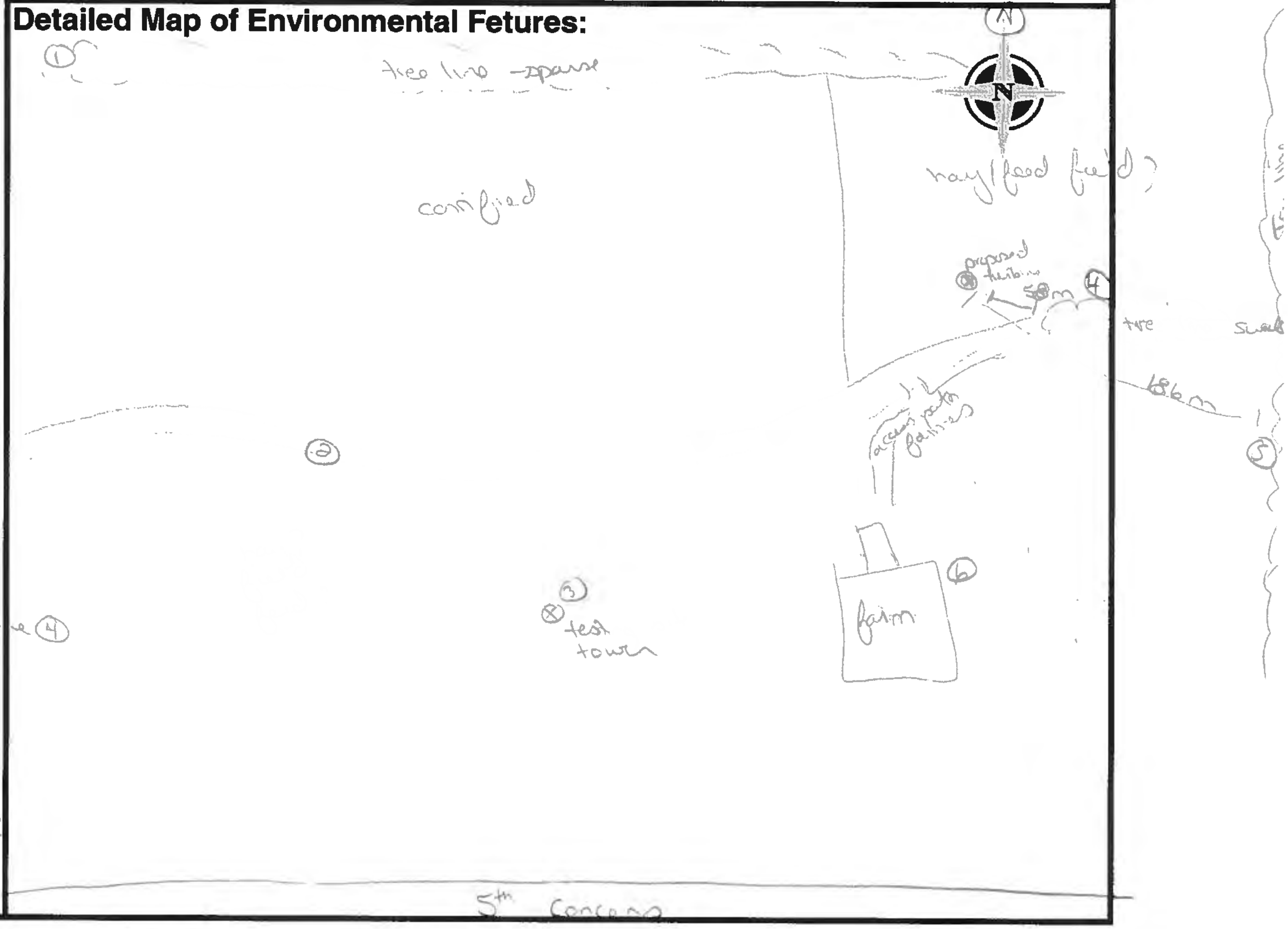
(6) farm barn (chicken approx 130m away)

- no problem appears for access Roads - may use farmers path

Environmental Feature	Dist.(m) to Turbine	GPS Co-ord of Feature
Groundwater Evidence (120m)		
□ Watercress		
□ Iron Staining		
□ Seepage		
□ **Forest Stand (30m)**		
□ **Waterway (30m)**		

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

Detailed Map of Environmental Fetures:



APPENDIX C
MNR Data

Fish & Fish Habitat Information:				
Data Point	Waterbody/course	Fish Community/Species Present	Habitat Sensitivity	Timing Restriction
See attached map for specific site locations (UTM locations on chart)	Twenty Mile Creek- above escarpment	Banded Killifish, Black Crappie, Bluegill, Bluntnose Minnow, Brown Bullhead, Creek Chub, Golden Shiner, Grass Pickerel, Green Sunfish, Johnny Darter, Largemouth Bass, Pumpkinseed, Rainbow Darter, Rock Bass, Tadpole Madtom, White Crappie, White Sucker, Yellow Perch - *Grass Pickerel is listed as "Special Concern"	**Type I and II habitat *** *see below* For Type 1 areas, Sensitive Species Present, Habitat Compensation potential high, specifics need to be developed. For Type II portion fish community below potential due to habitat related issues. Fractured Limestone and isostatic rebound are affecting the amount of baseflow in the channel upstream of Balls Falls. Flow is leaking underground.	March 1st to June 30th, Sept 1st to Nov 30th (* no instream work should be undertaken at this point of time)
See attached map for specific site locations (UTM locations on chart)	North Creek	Brown Bullhead, Central Mudminnow, Fathead Minnow, Grass Pickerel, Green Sunfish, *Grass Pickerel is listed as "Special Concern"	**Type I and Type II- headwaters are type II** -Sensitive Species may be present during all or certain times of the year. -Fish Community below potential due to habitat related issues., Habitat Compensation potential is good, specifics need to be developed.	March 1st to June 30th, Sep 1st to Nov 30th (* no instream work should be undertaken at this point of time)
See attached map for specific site locations (UTM locations on chart)	LittleWolf Creek	Bigmouth buffalo, Black bullhead, Black crappie, Blackside Darter, Bluntnose minnow, Brown bullhead, Catfish family, Central Mudminnow, Common Carp, Fathead minnow, Golden shiner, Grass Pickerel, Green Sunfish, Johnny Darter, Northern Pike, Pumpkinseed, Rock Bass, Sunfish family, Tadpole Madtom, White Crappie, White Sucker, Yellow Bullhead *Grass Pickerel is listed as "Special Concern"	**Type I and Type II**- headwaters are type II Sensitive Species Present, Habitat Compensation potential high, specifics need to be developed.	March 1st to July 1st (* no instream work should be undertaken at this point of time)
See attached map for specific site locations (UTM locations on chart)	Sinkhole Creek	Bluntnose Minnow, Creek Chub, Goldfish, Green Sunfish	**Type I and Type II-** headwaters are type II Sensitive Species may be present during all or certain times of the year. Fish Community below potential due to habitat related issues. Habitat Compensation potential is good, specifics need to be developed.	March 1st to June 30th, Sep 1st to Nov 30th (* no instream work should be undertaken at this point of time)

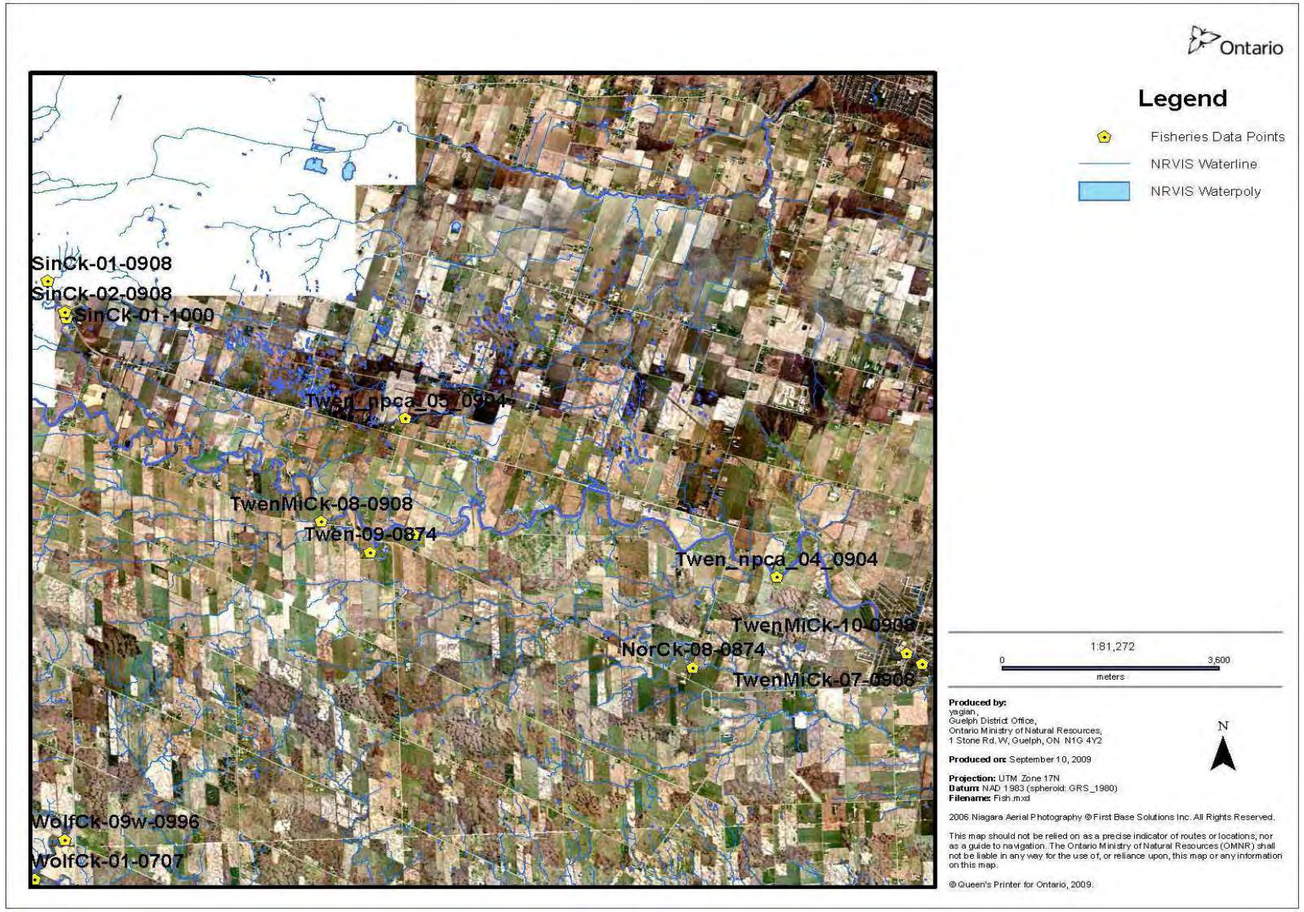
Definition of MNR terms :

Type I- high sensitivity, these areas limit the overall productive capacity, sensitive fish species and/ or habitat are present, these areas require a high degree of protection

Type II- moderate sensitivity- habitat is important to fish community but is below its productive capacity, habitat compensation potential is good.

West Lincoln Site - HAF

		Twenty Mile Creek							North Creek	Little Wolf Creek		Sinkhole Creek		
Common Name	Scientific Name	GPS Coordinates & Station	TwenMiCk-08-0908	Twen-09-08074	Twen-05-0874	Twen_npca_05_0904	Twen_npca_04_0904	TwenMiCk-10-0908	TwenMiCk-07-0908	NorCk-08-0874	LWolfCk-01-0907	WolfCk-09w-0996	SinCk-01-1000	SinCk-02-0908	SinCk-01-0908
			608424, 4774934	609245, 4774384	609956, 4774704	609827, 4776797	615991, 4773934	618151, 4772559	618404, 4772373	614604, 4772304	603462, 4768793	604163, 4769201	604194, 4778607	604170, 4778717	603888, 4779266
Banded Killifish	*Fundulus diaphanus*							6	74						
Bigmouth Buffalo	*Ictiobus cyprinus*										1				
Black Bullhead	*Ameiurus melas*										394				
Black Crappie	*Pomoxis nigromaculatus*			1		8	3				13				
Blackside Darter	*Percina maculata*											1			
Bluegill	*Lepomis macrochirus*					1	1								
Bluntnose Minnow	*Pimephales notatus*		33		10	2	32	82	20		13	18		4	1
Brook Stickleback	*Culaea inconstans*														
Brown Bullhead	*Ameiurus nebulosus*			2		1				9	8				
Catfish Family	*Ictaluridae*										7				
Central Mudminnow	*Umbra limi*								1	3	3				
Common Carp	*Cyprinus carpio*										2				
Creek Chub	*Semotilus atromaculatus*							43	4					1	
Fathead Minnow	*Pimephales promelas*									3					
Golden Shiner	*Notemigonus crysoleucas*		17	3		3	6				23				
Goldfish	*Cassius auratus*													1	
Grass Pickerel	*Esox americanus vermiculatus*		16	3						3	4				
Green Sunfish	*Lepomis cyanellus*			8	19			47	38	13	23	1			74
Johnny Darter	*Etheostoma nigrum*		1	1	5		3	4	32		6	5			
Largemouth Bass	*Micropterus salmoides*		2					1	2						
Northern Pike	*Esox lucius*										4				
Pumpkinseed	*Lepomis gibbosus*					1	5				100	9			
Rainbow Darter	*Etheostoma caeruleum*							3	7						
Rock Bass	*Ambloplites rupestris*		1				1	4	9			5			
Sunfish Family	*Centrarchidae*										191				
Tadpole Madtom	*Noturus gyrinus*		1		1						110	1			
White Crappie	*Pomoxis annularis*		2								19				
White Sucker	*Catostomus commersoni*						1	3				1			
Yellow Bullhead	*Ameiurus natalis*										5				
Yellow Perch	*Perca flavescens*			2											



Ontario

Legend

- Fisheries Data Points
- NRVIS Waterline
- NRVIS Waterpoly

1:81,272

0 3,600

meters

N

Produced by:
yaglan,
Guelph District Office,
Ontario Ministry of Natural Resources,
1 Stone Rd. W, Guelph, ON N1G 4Y2

Produced on: September 10, 2009

Projection: UTM Zone 17N
Datum: NAD 1983 (spheroid: GRS_1980)
Filename: Fish.mxd

Map of Fisheries Survey Stations in Vineland/ West Lincoln

APPENDIX D
Correspondence

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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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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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
morrisonhershfield.com

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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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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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

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

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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People • Culture • Capabilities
Suite 600, 235 Yorkland Blvd. | Toronto, ON M2J 1T1
Dir: 416 499 3110 x1367 | Fax: 416 499 9658
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

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

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.

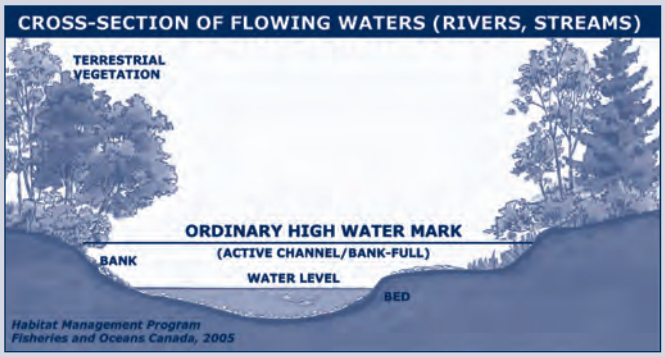
- **13.1.** Maintain effective sediment and erosion control measures until re-vegetation of disturbed areas is achieved.

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*.



FISHERIES AND OCEANS CANADA OFFICES IN ONTARIO

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Aussi disponible en français

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

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