



NAPIER WIND PROJECT
WATER ASSESSMENT REPORT

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1.0 Introduction

1.1 PROJECT OVERVIEW

wpd Canada Corporation is proposing to develop, construct and operate the Napier Wind Project (the Project), with a total maximum installed contract nameplate capacity of 4.1 MW (FIT contract maximum of 5.4 MW), in the Township of Adelaide Metcalfe in Middlesex County in response to the Government of Ontario's initiative to promote the development of renewable energy in the province.

The Project will be located entirely within Middlesex County (Township of Adelaide Metcalfe) in Southwestern Ontario. The Project Area includes two properties located on the north side of Napperton Drive, approximately 6 km west of Strathroy. A map showing the Project Location is provided in **Appendix A, Figure 1**.

As described in the Project Description Report (PDR), since the Project commenced the Study Area has been revised. The Feeder Line was originally proposed along Kerwood Road with the connection point at the Corner of Munn St. & Kerwood Rd (the "Original" 120 m Zone of Investigation). The Feeder Line has since been removed from the Project (the Project will connect directly into the Grid at the switching station, as described below). This Report was originally initiated using the original 120 m Zone of Investigation. Text has been updated as appropriate to account for the revision. It is of note that with this revision, no REA water bodies are located within the 120 m Zone of Investigation. However, a number of water features exist within the 120 m Zone of Investigation that do not meet the definition of a water body presented in O.Reg. 359/09.

The basic components of the Project include two REpower MM92-2.05 MW wind turbine generators with a total maximum installed contract nameplate capacity of 4.1 MW (FIT contract maximum of 5.4 MW), step-up transformers located adjacent to the base of each turbine, a 27.6 kV underground and/or overhead collector system (with associated fibre-optic cabling), a switching station and turbine access roads. On private lands, the electrical power lines will be underground; it is not yet known if the lines in the municipal right of way will be aboveground or belowground. This will be finalized as part of the municipal consultation process. Temporary components during construction include work and storage areas at the turbine locations and along access roads and laydown areas.

The collector system will transport electricity generated from each turbine to a switching station located on private property at Napperton Road, where it will be tied directly into Hydro One Networks Inc.'s (HONI) Distribution Network.

This Water Assessment Report is intended to satisfy the requirements outlined within Ontario Regulation 359/09 and is to be submitted as a component of the Renewable Energy Approval (REA) application for the Project. The Project Study Area is not located within the Niagara

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Escarpment Plan, the Oak Ridges Moraine Conservation Plan Area or the Protected Countryside of the Greenbelt Plan.

Once the Project layout and locations of water bodies were confirmed, a water records review was conducted according to Section 30(1) of O. Reg. 359/09. Additionally, a general aquatic habitat assessment was conducted. A combination of background data and results of Stantec's 2011 surveys were used to determine the presence or absence of water bodies and fish habitat within the 120 m Zone of Investigation. Photographs of all water features were taken during field surveys and are included in **Appendix B**.

Locations where water bodies are present within the original 120 m Zone of Investigation are presented in **Appendix A, Figure 2**. The designation of various water features was agreed upon by the staff listed in Section 2.4 using field conditions at the time of the survey, data gathered during the records review, and the definition of a water body provided in O. Reg. 359/09.

1.2 REPORT REQUIREMENTS

A Water Assessment is a required component of a REA application, and includes a records review and site investigation to determine the presence and boundaries of water bodies as defined in O. Reg. 359/09 within the 120 m Zone of Investigation (assuming that no Lake Trout lakes that are at or above development capacity are identified within 300 m). If water bodies are identified within the 120 m Zone of Investigation, a Water Body Report must be prepared. As discussed above, since the commencement of the Project the Feeder Line has been removed and the Study Area and 120 m Zone of Investigation has been revised. No REA water bodies are located within the 120 m Zone of Investigation.

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

This Water Assessment Report is intended to satisfy the requirements outlined within O. Reg. 359/09 (s. 39 and 40) and is to be submitted as a component of the REA application. The documentation requirements of the Water Assessment Report and the Water Body Report as specified under O. Reg. 359/09 are summarized in **Table 1.1**.

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

Requirements	Completed	Section Reference
A person who proposes to engage in a renewable energy project shall conduct a water assessment, consisting of the following:		
1. A records review conducted in accordance with section 30.	✓	2.2, 4.0, 5.1
2. A site investigation conducted in accordance with section 31, including:		
31(4)(1). A summary of any corrections to the report.	✓	2.3
31(4)(2). Information relating to each water body.	✓	N/A
31(4)(3). A map showing boundaries, location/type and distances.	✓	Appendix A
31(4)(4). A summary of methods used to make observations for the purposes of the site investigation.	✓	2.3
31(4)(5). The name and qualifications of any person conducting the site investigation.	✓	2.4
31(4)(6)(i). The dates and times of the beginning and completion of the site investigation.	✓	2.3
If an investigation was conducted by visiting the site:		
31(4)(6)(ii). The duration of the site investigation.	✓	2.3
31(4)(6)(iii). The weather conditions during the site investigation	✓	2.3
31(4)(6)(iv). Field notes kept by the person conducting the site investigation.	✓	Appendix C
If an alternative investigation of the site was conducted:		
31(4)(7)(i). The dates of the generation of the data used in the site investigation.		N/A
31(4)(7)(ii). An explanation of why the person who conducted the alternative investigation determined that it was not reasonable to conduct the site investigation by visiting the site.		N/A
Requirements (Water Body)		
4. Report identifies and assesses any negative environmental effects of the project on a water body and on land within 30 metres of the water body.	N/A	N/A
5. Report identifies mitigation measures in respect of any negative environmental effects.	✓	6.0
6. Report describes how the environmental effects monitoring plan addresses any negative environmental effects.	✓	6.2
7. Report describes how the construction plan report addresses any negative environmental effects.	✓	6.1,

2.0 Methods

2.1 DEFINITION OF A WATER BODY

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

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

2.2 RECORDS REVIEW

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

According to Ministry of Natural Resources' (MNR) Land Information Ontario mapping (MNR, 2009), there are several watercourses within the original 120 m Zone of Investigation. Figures depicting the watercourses identified by MNR mapping are included in this report (**Figures 2, 3 Appendix A**), where “watercourses” and “waterbodies” are water features (including lakes, rivers, streams, etc.), as mapped by MNR. These water features may or may not meet the definition of a water body as described in Section 2.1. Potential additional waterbodies were also identified through a review of aerial photographs of the 120 m Zone of Investigation. Further information on these potential watercourses and waterbodies was obtained during the site investigations (as described in Section 2.3).

Information regarding significant species occurrences and species at risk was obtained from Fisheries and Oceans Canada's (DFO) Species at Risk Mapping (DFO, 2010) and from the MNR's Natural Heritage Information Centre (NHIC) (NHIC, 2011) online database.

No fish community data was available for the 120 m Zone of Investigation from the MNR. The St. Clair Region Conservation Authority (SCRCA) provided DFO Drain Classification mapping (SCRCA, 2004) and fish community data (SCRCA, 2010) for watercourses within the 120 m Zone of Investigation. The SCRCA Watershed Report Card for the Lower East Sydenham River (SCRCA, 2008) was also reviewed.

2.3 SITE INVESTIGATIONS

Site investigations were carried out according to Section 31 of O. Reg. 359/09. The investigations were conducted on November 28, 2011 as noted on the field records (see

Appendix C). The weather was cold and rainy during the site investigations, with a temperature of approximately 5°C.

The purpose of the site investigations was to:

- Determine whether any water bodies exist; and
- Identify the boundaries of any water body located within the 120 m Zone of Investigation.

While on site, the field crews used visual inspections to verify the presence or absence of potential water bodies within the 120 m Zone of Investigation.

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

2.4 QUALIFICATIONS

The following Stantec personnel were responsible for the identification of water bodies and for determining any implications associated with fish and fish habitat:

- Mark Pomeroy, B.Sc. – Fisheries Biologist
- Marc Faiella, Tech. Dipl., CEPIT - Aquatic Ecologist
- Katie Easterling, H.B.sc., Dipl., CEPIT - Aquatic Ecologist

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

3.0 Assessment of Water Features within the 120 m Zone of Investigation

As indicated in Section 2.3, the presence or absence of water bodies within the 120 m Zone of Investigation was assessed using the definition of a water body provided in O. Reg. 359/09. Based on the results of field investigations and the records review, there are no water bodies within the revised 120 m Zone of Investigation. A summary of water features assessed during field investigations are summarized in **Table 3.1** and illustrated in **Figure 2 (Appendix A)**. Photographs and field notes of these investigations are provided in **Appendices B and C**.

Table 3.1: Summary of Water Features within 120 m Zone of Investigation

Site Location	NWB Station (s)	Water Body	Not a Water Body Criteria						
			No Surface Feature Present	Grassed Waterway*/ Swale+	Temporary Channel for Surface Drainage*	Roadside Ditch*	Temporarily Poned Area Normally Farmed*	Dugout Pond*	Rock Chute *
Turbine R1	X		X						
Turbine R2	X		X						

*as per water body definition in O.Reg. 359/09
 +low lying area with no defined channel and not dominated by aquatic vegetation
 WB = meets the definition of a Water Body as per O.Reg 359/09
 NWB = does not meet the definition of a Water Body as per O.Reg 359/09

Based on a review of the document entitled “Inland Ontario Lakes Designated for Lake Trout Management” (MNR, 2006), there are no Lake Trout lakes that are at or above development capacity identified within 300 m of the Project Location.

Preliminary investigations suggest that two culvert installations will be required for the access roads and associated electrical collector lines for Turbine R2. One crossing already exists along Brown Road, however it has been assumed that improvements to this crossing will be required and one new crossing will be required. In the event that crossings are required; a permit would be obtained from the St. Clair Region Conservation Authority (SCRCA) and/or Fisheries and Oceans Canada. The above crossings are not considered to be defined as “water bodies” under REA, and therefore permits will be acquired as necessary outside the REA process.

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3.1 SUMMARY OF PREDICTED IMPACTS TO FISH HABITAT AND APPROVAL PROCESS

The federal *Fisheries Act* governs the protection of fish and aquatic habitat, including the harmful alteration, disruption or destruction (HADD) of fish habitat (Section 35), and the deposition of deleterious substances into fisheries waters (Section 36). DFO has signed agreements with 35 of the 36 Conservation Authorities in Ontario to review proposed projects under Section 35 of the *Fisheries Act*. The SCRCA has a Level 2 agreement with DFO; therefore, they can determine how the proponent can mitigate any potential impacts to fish and fish habitat. Based on the current Project layout, there are no water bodies within the 120 m Zone of Investigation. Additionally, it was determined that all water features identified on MNR's Land Information Ontario (LIO) mapping contribute indirectly to fish habitat. With the implementation of mitigation measures presented in Section 5.0, it is anticipated that the Project will result in no net effects to water bodies containing fish habitat or contributing indirectly to fish habitat. Therefore, it is not expected that DFO Authorization will be required.

4.0 General Overview of Potential Impacts

4.1 GENERAL CONSTRUCTION-RELATED IMPACTS

The potential impacts of Project construction activities to watercourses located within the 120 m of Zone of Investigation could include:

- Short-term increase in turbidity from runoff and soil erosion during construction; and
- Water quality and habitat disturbance effects to aquatic habitat.

4.2 COLLECTOR LINES

Potential impacts to water features related to the installation of collector lines are as follows:

- Erosion and sedimentation from site disturbance and dewatering;
- Collapse of the punch or bore hold under the stream;
- Disturbing riparian vegetation can reduce shoreline cover, shade and food production areas; and
- Machinery fording the stream can disturb bottom and bank substrates, disrupt sensitive fish life stages and introduce deleterious substances i.e. if equipment is not properly maintained.

5.0 Standard Mitigation Measures for Working around Watercourses

Standard mitigation measures used for works in and around water are summarized below. Specific details of the mitigation measures to be implemented would be determined through consultations with the local municipality, the SCRCA, and DFO. The extent of mitigation would be dependent on project details such as technical requirements, construction methods and schedule.

5.1 GENERAL MITIGATION MEASURES

There are many mitigation measures to protect watercourses from potential effects during the construction phase of a project. General mitigation measures for construction activities near a watercourse in the 120 m Zone of Investigation include:

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

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- If the sediment and erosion control measures are not functioning properly, no further work should occur until the sediment and/or erosion problem is addressed;
- All disturbed areas of the construction site should be stabilized immediately and re-vegetated as soon as conditions allow; and
- Sediment and erosion control measures should be left in place until all areas of the construction site have been stabilized.

5.2 MITIGATION MEASURES FOR TURBINE AND ACCESS ROAD CONSTRUCTION

The general mitigation measures presented are adequate to protect watercourses during construction of turbines and access roads. No additional specific mitigation measures are necessary.

5.3 MITIGATION MEASURES FOR OVERHEAD COLLECTOR LINES

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

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

According to the DFO Operational Statement, a proponent may proceed with an overhead line project without DFO review when the following conditions are met:

- Construction and/or placement of any temporary or permanent structures (e.g., islands, poles, crib works, etc.) are not required below the ordinary high water mark; and
- The Measures to Protect Fish and Fish Habitat when Constructing Overhead Lines outlined below are incorporated into the project (abbreviated from the Operational Statement):
 - Installing overhead lines under frozen conditions is preferable;
 - Machinery fording the watercourse to bring equipment required for construction to the opposite side of the watercourse should be limited to a one-time event (over and back). If the stream bed and banks are highly erodible (e.g., dominated by organic materials and silts) and significant erosion and degradation is likely to occur as a result of equipment fording, then a temporary crossing structure or other practices are to be used to protect these areas;
 - > Adhere to the MNR District timing windows (typical warmwater timing window for the Aylmer District is July 1 to March 15).

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- Operate machinery from outside of the water and in a manner that minimizes disturbance to the banks of the watercourse;
 - > Machinery is to arrive on site in a clean condition and is to be maintained free of fluid leaks;
 - > Wash, refuel and service machinery and store fuel and other materials for the machinery away from the water to prevent deleterious substances from entering the water; and
 - > Keep an emergency spill kit on site in case of fluid leaks or spills from machinery.
- Install effective sediment and erosion control measures before starting work to prevent entry of sediment into the watercourse. Inspect them regularly during the course of construction and until re-vegetation of disturbed areas is complete, and make all necessary repairs;
- The removal of select plants may be necessary to accommodate the overhead line. This removal should be kept to a minimum and should not be wider than the ROW;
- Stabilize any waste materials removed from the work site, above the ordinary high water mark to prevent them from entering any watercourse. Spoil piles could be contained with silt fence, flattened, covered with biodegradable mats or tarps, and/or planted with preferably native grass or shrubs;
- Vegetate any disturbed areas by planting and seeding preferably native trees, shrubs or grasses and cover such areas with mulch to prevent soil erosion and to help seeds germinate. If there is insufficient time in the growing season remaining for the seeds to germinate, stabilize the site (e.g., cover exposed areas with erosion control blankets to keep the soil in place and prevent erosion) and then vegetate the following spring; and
- Maintain effective sediment and erosion control measures until complete re-vegetation of disturbed areas is achieved.

5.4 MITIGATION FOR UNDERGROUND COLLECTOR LINES

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

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

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

A summary of mitigation measures is provided below:

Punch and Bore

- A punch or bore crossing can be conducted at any time of the year provided there is not a high risk of failure and it does not require in-water activities such as machinery fording.
- Design the punch or bore path for an appropriate depth below the watercourse to prevent the pipeline or cable from becoming exposed due to natural scouring of the stream bed.
- While this Operational Statement does not cover the clearing of riparian vegetation, the removal of select plants may be necessary to access the construction site and to excavate the bell holes. This removal is to be kept to a minimum and within the utility right-of-way.
- Install effective sediment and erosion control measures before starting work to prevent entry of sediment into the water body. Inspect them regularly during the course of construction and make all necessary repairs if any damage occurs.
- 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.
 - 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.
 - Grading of the stream banks for the approaches should not occur.
 - 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.
 - 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*).

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- Fording should occur under low flow conditions and not when flows are elevated due to local rain events or seasonal flooding.
- Operate machinery on land above the ordinary high water mark (HWM) (see definition below) and in a manner that minimizes disturbance to the banks of the watercourse.
 - Machinery is to arrive on-site in a clean condition and is to be maintained free of fluid leaks.
 - 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.
 - Keep an emergency spill kit on site in case of fluid leaks or spills from machinery.
- Excavate bell holes beyond the HWM, far enough away from any watercourse to allow containment of any sediment or deleterious substances above the HWM.
 - When dewatering bell holes, remove suspended solids by diverting water into a vegetated area or settling basin, and prevent sediment and other deleterious substances from entering the watercourse.
 - Stabilize any waste materials removed from the work site (including bell holes) to prevent them from entering the watercourse. This could include covering spoil piles with biodegradable mats or tarps or planting them with grass or shrubs.
 - After suitably backfilling and packing the bell holes, vegetate any disturbed areas.
- Monitor the watercourse to observe signs of malfunction during all phases of the work.
- For the duration of the work, keep on-site and readily accessible, all material and equipment needed to contain and clean-up releases of sediment-laden water and other deleterious substances.
- Develop a response plan that is to be implemented immediately in the event of a sediment release or spill of a deleterious substance. This plan is to include measures to:
 - a) stop work, contain sediment-laden water and other deleterious substances and prevent their further migration into the watercourse;
 - b) notify all applicable authorities in the area, including the closest DFO office;
 - c) promptly clean-up and appropriately dispose of the sediment-laden water and deleterious substances; and d) ensure clean-up measures are suitably applied so as not to result in further alteration of the bed and/or banks of the watercourse.
- 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.

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

High Pressure Directional Drill

- Use existing trails, roads or cut lines wherever possible, as access routes to avoid disturbance to the riparian vegetation.
- Design the drill path to an appropriate depth below the watercourse to minimize the risk of frac-out and to a depth to prevent the line from becoming exposed due to natural scouring of the stream bed. The drill entry and exit points are far enough from the banks of the watercourse to have minimal impact on these areas.
- 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.
- 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.
 - 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.
 - Grading of the stream banks for the approaches should not occur.
 - 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.
 - 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*).
 - Fording should occur under low flow conditions and not when flows are elevated due to local rain events or seasonal flooding.
- 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.
 - Machinery is to arrive on site in a clean condition and is to be maintained free of fluid leaks.
 - 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.
 - Keep an emergency spill kit on site in case of fluid leaks or spills from machinery.
 - Restore banks to original condition if any disturbance occurs.

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- 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.
 - 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.
- 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
 - 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.
 - 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.
 - Ensure clean up measures do not result in greater damage to the banks and watercourse than from leaving the drilling mud in place.
 - 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.
 - 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.
- 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.
 - Maintain effective sediment and erosion control measures until re-vegetation of disturbed areas is achieved.

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Standard Mitigation Measures for Working around Watercourses

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Dry Open-Cut

Mitigation measures to employ for dry open-cut crossings (dry watercourses) include (also see DFO Operational Statements in **Appendix D**):

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

Isolated Open-Cut (Dam and Pump Crossings)

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

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

6.0 Monitoring

6.1 CONSTRUCTION

Methodologies/Sampling Protocols (as per the Construction Plan Report)

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

Performance Objectives/Additional Actions (as per the Construction Plan Report)

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

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

Additionally, compensation strategies and/or permits from Fisheries and Oceans Canada and/or the SCRCA, as applicable, would likely include conditions of approval such as construction and post-construction monitoring. All such strategies and/or permits should be obtained prior to construction, and all such conditions and requirements would be implemented as appropriate.

6.2 OPERATION

(As per the Design and Operations Report)

The Environmental Effects Monitoring Plan for the Project is provided in the Design and Operations Report. Operation activities that have the potential to affect aquatic habitat includes accidental spills and/or leaks. Proper storage of materials (e.g. maintenance fluids) at off-site storage containers would greatly reduce the potential for accidental spills and/or leaks.

Appropriate remedial measures may be completed as necessary and additional follow-up monitoring conducted as appropriate in the event of an accidental spill and/or leak. The level of monitoring and reporting should be based on the severity of the spill/leak and may be discussed with the MOE (Spills Action Centre) and MNR.

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If *Fisheries Act* approvals are required from DFO, some monitoring may be required, and would be stated in the DFO Authorization. Monitoring typically includes photographic records during construction and for two years after the completion of construction to ensure survival of plantings and overall function of the installation. If significant habitat enhancement or compensation measures are required, monitoring may also include assessments of the fish community and habitat use.

7.0 Conclusions

The Napier Wind Project 'Water Assessment Report' has been prepared by Stantec for wpd Canada Corporation in accordance with Ontario Regulation 359/09. This report is one component of the REA application for the Project.

Based on the current Project layout, there are no REA water bodies or fish habitat within the 120 m Zone of Investigation. Since there are no water bodies and no fish habitat within the 120 m Zone of Investigation, it is anticipated that the Project will result in no net effects to water bodies containing fish habitat or contributing indirectly to fish habitat. This report has been prepared by Stantec for the sole benefit of wpd Canada Corporation, and may not be used by any third party without the express written consent of wpd Canada Corporation. The data presented in this report are in accordance with Stantec's understanding of the Project as it was presented at the time of reporting.

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