



8. ENVIRONMENTAL EFFECTS MONITORING PLAN

8.1 Environmental Monitoring Overview

The Environmental Effects Monitoring Plan (EEMP) discusses how negative environmental effects from the construction and operations phase of the project will be mitigated and how ongoing monitoring will ensure compliance with *Ontario Regulation 359/09*. This report section is supported by the EEMP in the Environmental Impact Study Report that describes project effects on natural heritage features and the associated monitoring activities that have been committed to. According to the Technical Guide to Renewable Energy Approvals, components of the EEMP include:

- A **summary of all potentially negative environmental effects** as given in the description of negative environmental effects in the Project Description Report
- **Performance objectives** in respect of each potential negative effect. Performance should be defined such that in achieving the objective the negative effect will be mitigated
- A description of all **mitigation strategies** planned to achieve performance objectives
- Where there is an ongoing risk of potential negative effects, a description of **how the project will be monitored** to ensure that mitigation strategies are meeting performance objectives
- **Contingency measures** that will be undertaken should monitoring reveal that any mitigation measures are failing.

The EEMP is supported by conclusions about environmental effects in earlier sections of this Design and Operations Report and other reports prepared as part of the REA submission, including:

- Project Description Report, which summarizes potential negative environmental effects
- Construction Plan Report, which details potential negative environmental effects from construction and installation activities
- Noise Study Report, which analyzes noise impacts on receptors
- Archaeological Reports and Cultural Self-Assessment Reports, which describe potential negative effects to archaeological activities during construction and installation activities
- Natural Heritage Assessment Report, which describe potential negative effects to significant natural heritage features within 120 metres of the project location during construction, operation and decommissioning



- Water Assessment Report, which describe potential negative effects to water bodies within 120 metres of the project location for construction, operation and decommissioning phases.

Several reports prepared for the REA submission include monitoring plans:

- Environmental Impact Study Report, part of the Natural Heritage Assessment, provides monitoring requirements related to natural features within 120 metres of the project location during construction, operation and decommissioning
- Water Assessment Report, which provides monitoring requirements for water bodies within 120 metres of the project location during construction, operation and decommissioning.

Table 10 describes mitigation measures and monitoring requirements where there is an ongoing risk of potential environmental effects during all project phases. Reference is made to monitoring plans contained in other reports discussed above. The EEMP for natural heritage features can be found in Section 10 of the Environmental Impact Study Report and is summarized in Table 9 of that report.

8.2 Independent Construction Compliance Monitoring (Environmental Monitor)

DWP will appoint a third party consultant to act as an Environmental Compliance Monitor (ECM) to observe all aspects of work throughout the project. The ECM will ensure that the commitments made throughout the REA, including the Natural Heritage Assessment and Environmental Effects Monitoring Plan are being observed and will ensure compliance with all site permits and mitigation measures required by local, provincial or national law or applicable Contracts.

The ECM will have authority to stop work in the location of the non-compliance and/or stop the activity causing the non-compliance, until such time as satisfactory measures are taken to stop continuing non-compliance. The County and each local municipality would receive a notification regarding the stop work order. The following are considered “stop work” criteria:

- Failure of best industry practices, that will be outlined in the Erosion and Sediment Control Plan to be prepared prior to Construction, which result in off-site sedimentation that violates provincial water discharge quality standards



- The failure of pollution prevention control measures designed to prevent the discharge of hazardous substances or oil in storm water discharges from the site which causes a release to the environment
- The presence of unidentified hazardous materials as evidenced by significant soil staining, odor, or oil in ground water
- Failure to take corrective action within an acceptable time period following a non-compliance with applicable permits and legislation, the Site Certification Agreement or restrictions in respect of archaeologically sensitive areas.

In the event of any work stoppage, or in response to any emergency situation, the Construction Compliance Monitor must promptly inform the owner's site management, who will inform the Owner, and any appropriate local authorities, either by phone, email or in person, as required. The Construction Compliance Monitor shall observe implementation of the corrective actions to determine whether and when compliance is achieved. As soon as compliance is achieved, the Construction Compliance Monitor shall withdraw the stop-work notice.

8.3 Post-Construction Monitoring

This monitoring plan has been designed to evaluate the predicted environmental impacts on birds and bats and to meet requirements set out in *Ontario Regulation 359/09*. Details regarding post-construction monitoring are located within the Environmental Impact Study Report. Environment Canada and the Ontario Ministry of Natural Resources (MNR) have been consulted to confirm this monitoring strategy.

Because large wind farm facilities are a relatively new addition to Ontario's infrastructure, large datasets with multiple years of study relating to environmental impacts do not exist to inform the accurate prediction of impacts. To address this uncertainty an adaptive monitoring and management plan has been developed. In the event that unexpected negative impacts occur, employment of this plan will allow for flexibility in the operation of the wind farm in an attempt to reduce these negative impacts and the likelihood of their future occurrence.

8.4 Cultural Heritage and Archaeological Resources Monitoring Plan

All work will cease in the immediate area of the discovery until such time as the Environmental Compliance Monitor, having consulted with provincial authorities, advises those involved as to the disposition of the discovery and authorizes a resumption of the work. Archaeological



materials encountered will be reported to the Environmental Compliance Monitor with the following information:

- Nature of activity resulting in the discovery
- Nature of the material discovered
- Precise location of the find
- Names of persons witnessing the discovery.

All heritage resources, including archaeological objects and sites of archaeological or historical interest or significance discovered on the site, will be deemed to be the property of the Crown and will not be disturbed. All precautions will be taken to prevent employees or other persons from removing any artifacts or damaging sites, as personnel may be held liable by prosecution for all contraventions. All human remains will be reported directly to the local police.

Please refer to the Archaeological Reports and Cultural Self-Assessment Reports, appended to the Construction Plan Report, for further details about environmental effects, mitigation and monitoring measures.

Table 10: Environmental Effects Monitoring Plan (for all project phases)

Potential Negative Effect	Performance Objective	Mitigation Strategy	Monitoring Plan
Cultural Heritage and Archaeological Features			
<ul style="list-style-type: none"> Protected Properties and Heritage Resources 	<ul style="list-style-type: none"> Minimize effects to cultural heritage features 	<ul style="list-style-type: none"> No specific mitigation activities required during the construction period None required during operations) 	<ul style="list-style-type: none"> See Cultural Heritage Self-Assessment Report; none required
<ul style="list-style-type: none"> Archaeological Resources 	<ul style="list-style-type: none"> Minimize effects to archaeological resources 	<ul style="list-style-type: none"> At T30 and T 42, temporary fencing will be put up along the outer limits of the identified find sites to prevent any accidental impact None required during operations) 	<ul style="list-style-type: none"> Should archaeological features be encountered during construction, cease the construction activity and notify MTCS immediately See Section 9.4 of this report Environmental Construction Monitor to ensure no access to fenced areas to protect archaeological resources
Natural Heritage Features			
<ul style="list-style-type: none"> Construction disturbance to significant natural features (e.g. wetlands) from: erosion and sedimentation effects and edge disturbance from construction equipment operation 	<ul style="list-style-type: none"> Minimize storm water run-off and erosion effects to significant natural features 	<ul style="list-style-type: none"> See EIS Report – Table 9 	<ul style="list-style-type: none"> Implement erosion and storm water management monitoring as per the monitoring commitments in Table 9 of the Natural Heritage EIS Report The Erosion Control Plan and associated monitoring is to be developed by the project constructor in advance of construction
<ul style="list-style-type: none"> Dust emissions during construction and from road use to access turbines for maintenance and contamination through accidental spills may cause disturbance to ANSI's, wetlands and vegetation 	<ul style="list-style-type: none"> No spills Minimize magnitude and duration of dust emissions from road use 	<ul style="list-style-type: none"> See Waste Management See Air Quality, Odour and Dust effect section 	<ul style="list-style-type: none"> See Waste Management See Air Quality, Odour and Dust effect section
<ul style="list-style-type: none"> Possible disturbance to use of adjacent bird habitat from construction activity and from operating turbines Possible disturbance to wildlife movement from human activity/vehicles 	<ul style="list-style-type: none"> Minimize disturbance to threatened and endangered species, wildlife and amphibians No wildlife road kills 	<ul style="list-style-type: none"> Avoid construction activity during sensitive wildlife breeding periods (see EIS Report – Table 9) Obtain all applicable permits for threatened and endangered species prior to project construction Maintenance vehicles restricted to primarily to daytime hours Vehicle speeds in project areas restricted to 30 km/h with signage See Noise, Local Traffic and Dust and Odour Emissions sections 	<ul style="list-style-type: none"> See Natural Heritage Environmental Impact Study Report (Section 10 – EEMP)
<ul style="list-style-type: none"> Mortality of birds and bats due to contact with wind turbines Reduction in breeding area 	<ul style="list-style-type: none"> Meet mortality threshold level as outlined in the Post Construction Monitoring Plan (PCMP) 	<ul style="list-style-type: none"> Project layout considered and minimized impacts to bird and bat habitat Turbines have been sited well spaced apart to allow passage around turbines Minimal strobe lighting to be used within Transport Canada requirements 	<ul style="list-style-type: none"> See Natural Heritage Environmental Impact Study Report (Section 10 – EEMP)
Surface and Groundwater			
<ul style="list-style-type: none"> Potential contamination from accidental spills may contaminate surface and groundwater, adversely affecting water quality 	<ul style="list-style-type: none"> No spills 	<ul style="list-style-type: none"> See Waste Management 	<ul style="list-style-type: none"> See Waste Management
<ul style="list-style-type: none"> Erosion and sedimentation due to surface water runoff from project construction and maintenance activities (e.g., access road repairs) may impact surface water quality 	<ul style="list-style-type: none"> No erosion or sediment transport from maintenance activities No increase to surface water turbidity during project operations 	<ul style="list-style-type: none"> An Erosion and Sediment Control Plan will be developed in advance of construction start. It will specify the specific mitigation measures to be implemented for the various project components Should siltation to a watercourse occur, activities would cease immediately until the situation is rectified as per the authority of the Environmental Monitor 	<ul style="list-style-type: none"> Implement erosion and storm water management monitoring as per the monitoring commitments in Table 9 of the Natural Heritage EIS Report The Erosion Control Plan and associated monitoring is to be developed by the project constructor in advance of construction

Table 10: Environmental Effects Monitoring Plan (for all project phases)

Potential Negative Effect	Performance Objective	Mitigation Strategy	Monitoring Plan
Air Quality, Odour and Dust			
<ul style="list-style-type: none"> Emissions from equipment and vehicles may affect local air quality 	<ul style="list-style-type: none"> Minimize duration and magnitude of emissions No complaints from local residents 	<ul style="list-style-type: none"> Use well-maintained heavy equipment and machinery Minimize operation and idling of vehicles and equipment Maintenance workers would maintain and operate vehicles in a manner that reduces air emissions to the extent practical, including, avoiding idling times and performing regular maintenance on vehicles 	<ul style="list-style-type: none"> None Required – emissions from vehicles are expected to be negligible compared to background conditions
<ul style="list-style-type: none"> Dust emissions from operation of construction and maintenance vehicles may affect local air quality 	<ul style="list-style-type: none"> Reduce dust emissions to the greatest extent possible No complaints from local residents 	<ul style="list-style-type: none"> Minimize vehicle traffic on exposed soils Cover or otherwise contain loose materials that have potential to release airborne particulates during maintenance activities Suppress road dust with water if necessary 	<ul style="list-style-type: none"> Adherence to Complaints Resolution Process
Noise			
<ul style="list-style-type: none"> Noise emissions from wind turbines and transformer substations may cause sensory disturbance to nearby receptors 	<ul style="list-style-type: none"> Maintain noise emissions at non-project participating receptors at or below the required 40 dBA No complaints from local residents 	<ul style="list-style-type: none"> Adherence to setbacks from noise receptors in the project site plan Adherence to local noise by-laws Routine maintenance will minimize increased noise due to malfunctioning components Components not in compliance with noise requirements will be repaired Follow-up on any complaints received from nearby residents 	<ul style="list-style-type: none"> <i>Method</i> - Periodic maintenance of the wind turbines and substation(s) will ensure all are meeting provincial noise requirements. Undertake noise monitoring as per Ministry of Environment REA requirements <i>Monitoring Locations</i> - To be determined subject to MOE noise monitoring requirements <i>Frequency and Duration</i> - TBD based on MOE input <i>Rationale</i> - Auditory monitoring will confirm project continues to meet Provincial noise limits <i>Reporting Requirements</i> - Results of auditory monitoring will be provided to the MOE as required <i>Contingency Measures</i> – Modify turbine operation to meet noise limits. Implement resident's Complaints Resolution Process
<ul style="list-style-type: none"> Noise from construction and maintenance equipment and vehicles may cause disturbance to nearby residents 	<ul style="list-style-type: none"> Reduce noise from construction and maintenance activities as much as is practically possible No complaints from local residents 	<ul style="list-style-type: none"> Use well-maintained heavy equipment and machinery with mufflers Minimize operation and idling of vehicles and equipment Adhere to local noise by-laws during maintenance work 	<ul style="list-style-type: none"> Complaints Resolution Process
Land Use and Resources			
<ul style="list-style-type: none"> Disruption in the local viewscape from the presence of turbines and other components may be perceived as a negative environmental effect. Visibility of components will vary based on location 	<ul style="list-style-type: none"> Minimize potential for disruption of local viewscape No complaints from local residents 	<ul style="list-style-type: none"> The project layout considered ways to minimize the visual impact of the turbines DWP is currently undertaking a Visual Impact Assessment of the wind turbines from the Niagara Escarpment Turbine lighting will be in accordance with air traffic regulations, and lights will be aimed vertically at night to minimize visual disturbance. See Provincial and Local Infrastructure Landscaping will be considered for the transformer substations and O&M building to minimize visual impact 	<ul style="list-style-type: none"> Lighting will be directed towards the sky Possible to paint (green or straw coloured) the turbine bases so they blend in with surrounding environment. Will be discussed through further consultation activities with Melancthon Township and the public Complaint Resolution Process

Table 10: Environmental Effects Monitoring Plan (for all project phases)

Potential Negative Effect	Performance Objective	Mitigation Strategy	Monitoring Plan
<ul style="list-style-type: none"> Increase in direct and indirect employment and local economic benefits from an increase in municipal taxes and landowner lease payments are positive impacts of the project 	<ul style="list-style-type: none"> Create positive effects on the local economy 	<ul style="list-style-type: none"> DWP will locally source all required goods and services from qualified local suppliers whenever possible. 	<ul style="list-style-type: none"> None required
Provincial and Local Infrastructure			
<ul style="list-style-type: none"> During project construction, there will be an increase in traffic on local roads. This could cause some delays to users of these roads. There will be a negligible increase in project related traffic during the operations and maintenance phase 	<ul style="list-style-type: none"> Minimize negative effects to Provincial and Municipal Infrastructure 	<ul style="list-style-type: none"> Local residents would be notified of unconventional load movements if they occur Any necessary permits would be obtained for unconventional loads Any damage to municipal infrastructure would be repaired See Section 5.9 of Construction Report for additional commitments 	<ul style="list-style-type: none"> Complaint Resolution Process Work with local municipality Project Construction Manager to ensure that only designated routes as outlined in the Transportation Plan are being used to access the project
<ul style="list-style-type: none"> Potential interference with TV or radio signals 	<ul style="list-style-type: none"> Minimize any disturbance effects to TV and radio signals 	<ul style="list-style-type: none"> DWP has consulted with all agencies and licensed providers to identify any likely effects to telecommunications networks 	<ul style="list-style-type: none"> Studies undertaken to ensure wind turbines will not affect TV and radio signals
<ul style="list-style-type: none"> Aeronautical obstruction 	<ul style="list-style-type: none"> Minimize the potential for obstruction to low flying aircraft 	<ul style="list-style-type: none"> Turbine lighting will conform to Transport Canada standards To reduce rural light pollution lights with the minimal allowable flash duration, narrow beam and would be synchronized NAV Canada has been consulted and has provided a letter of clearance for the wind farm. NavCan will be responsible for updating all aeronautical charts to reflect turbine locations 	<ul style="list-style-type: none"> <i>Method</i> - Routine maintenance of the turbines and replacement of any safety lighting in the event of malfunction. Integration with (SCADA) to ensure that the project critical controls, alarms and functions are properly coordinated for safe, secure and reliable operation <i>Monitoring Locations</i> - Various <i>Frequency and Duration</i> - On-going <i>Rationale</i> - Control and shut down <i>Reporting Requirements</i> - None <i>Contingency Measures</i> - Backup power supply for emergency
Waste Management			
<ul style="list-style-type: none"> Improper disposal of waste material may result in contamination to water resources and soil on and off the project site 	<ul style="list-style-type: none"> Ensure the proper disposal of waste material 	<ul style="list-style-type: none"> Removal of waste materials during construction and maintenance activities Designate and use areas for the transfer and limited temporary storage of hazardous materials and special wastes. These sites will be properly labelled and appropriately controlled, and will be located a minimum of 30 m from a wetland or watercourse No on-site dumping of waste material Collection of waste materials in a designated storage area of the O&M building 	<ul style="list-style-type: none"> <i>Method</i> - Designated waste disposal areas that are located well away from watercourses and sensitive soils <i>Monitoring Locations</i> - Visual inspection throughout the project site <i>Frequency and Duration</i> - On-going <i>Rationale</i> - To ensure that spill prevention and response measures are implemented <i>Reporting Requirements</i> - Refer to the Spills Response Measures in the Emergency Response Plan <i>Contingency Measures</i> - Refer to the Spills Response Measures in the Emergency Response Plan
<ul style="list-style-type: none"> Potential contamination of groundwater, surface water, soil and wetland features from accidental spills 	<ul style="list-style-type: none"> No accidental spills to occur 	<ul style="list-style-type: none"> Labelling and proper storage of hazardous substances in a designated storage area of the O&M building Septic tank for on-site washroom facilities to conform to the local building code Reporting of spills to the MOE's Spills Action Centre Spill kits provided during on-site maintenance activities Refuelling and equipment maintenance in designated areas 	<ul style="list-style-type: none"> <i>Method</i> - Visual inspection, On-going monitoring required in the event of contamination from an accidental spill or leak <i>Monitoring Locations</i> - Throughout the project site <i>Frequency and Duration</i> - On-going <i>Rationale</i> - To ensure that spill prevention and response measures are implemented <i>Reporting Requirements</i> - Refer to the Spills Response Measures in the Emergency Response Plan <i>Contingency Measures</i> - Refer to the Spills Response Measures in the Emergency Response Plan. Chemical and hazardous material protocols will be reviewed following an incident. Contaminated soils would be removed and replaced as required

Table 10: Environmental Effects Monitoring Plan (for all project phases)

Potential Negative Effect	Performance Objective	Mitigation Strategy	Monitoring Plan
Public Health and Safety			
<ul style="list-style-type: none"> Turbine collapse would present a serious risk to public health and safety 	<ul style="list-style-type: none"> No structural failure of the turbines or ancillary equipments 	<ul style="list-style-type: none"> Adherence to required setbacks Install, operate and maintain turbines according to applicable industry standards Use of lightning protection systems. See Provincial and Local Infrastructure 	<ul style="list-style-type: none"> <i>Method</i> - Routine turbine maintenance to ensure turbines are functioning properly Inspections of turbines to occur after extreme weather events and contingency measures such as turbine shutdown to be implemented in the event of structural damage <i>Monitoring Locations</i> - None <i>Frequency and Duration</i> - Annual turbine structural inspection <i>Rationale</i> - To ensure turbines are structurally sound <i>Reporting Requirements</i> - Annual turbine inspection report <i>Contingency Measures</i> - Turbines meet all required setbacks
<ul style="list-style-type: none"> Falling ice from turbine blades would present a risk to public health and safety 	<ul style="list-style-type: none"> Limit potential for ice throw to impact pedestrians and automobiles 	<ul style="list-style-type: none"> Adherence to required setbacks Automatic turbine shutdown due to weight imbalances Signage in areas where potential icing could occur Design of the turbine tower reduces ice accumulation 	<ul style="list-style-type: none"> <i>Method</i> - Routine turbine maintenance to ensure turbines are functioning properly Inspections of turbines after extreme weather events and contingency measures such as turbine shutdown would occur in the event of structural damage or icing of the turbine blades <i>Monitoring Locations</i> - Various <i>Frequency and Duration</i> - During freezing events <i>Rationale</i> - To prevent turbine ice throw <i>Reporting Requirements</i> - Operations Log <i>Contingency Measures</i> - Turbines meet all required setbacks. Turbines automatically shut down when weight imbalances are sensed on blades
<ul style="list-style-type: none"> Potential damage to wind turbines and ancillary infrastructure from extreme weather events 	<ul style="list-style-type: none"> No structural failure of the turbines or ancillary equipment 	<ul style="list-style-type: none"> Project components have been designed to withstand the effects of extreme weather events Install, operate and maintain turbines according to all applicable industry standards Failsafe devices are capable of shutting down turbines in the event of excessive wind or malfunction of turbine components 	<ul style="list-style-type: none"> <i>Method</i> - Inspections of turbines would occur after all extreme weather events and contingency measures such as turbine shutdown would be implemented in the event of structural damage. Routine turbine maintenance to ensure turbines are functioning properly <i>Monitoring Locations</i> - Various <i>Frequency and Duration</i> - During extreme weather events <i>Rationale</i> - To ensure turbines are structurally sound <i>Reporting Requirements</i> - Operations Log <i>Contingency Measures</i> - Turbines meet all required setbacks. Regular Maintenance on turbines