
APPENDIX C
Environmental Management and Protection Plan (EMPP)



*McLean's Mountain Wind Farm
Draft Environmental Management and Protection Plan*

**Supplementary Information for the Design and Operations Report
Under the Renewable Energy Approval (REA) Requirements, Ontario
Regulation 359/09 for Class 4 Wind Facility**

Final

Prepared by:

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A. INTRODUCTION

The Environmental Management and Protection Plan (“EMP” or “the Plan”) is intended to identify key project environmental information, instructions and mitigation measures specific to the McLean’s Mountain Wind Farm Project. This Plan fulfills the requirements of both: the Design and Operations Report as well as the Construction Report under the Ontario Regulation 359/09 – Renewable Energy Approval (REA) under the *Green Energy Act*. This Plan will ensure that the relevant permitting conditions, environmental mitigation and enhancement measures identified in the Environmental Screening Report/Environmental Impact Statement (“ESR”) and the Renewable Energy Approvals (REA) submission, the consenting permitting conditions and requirements of any legal agreements (including landowner agreements) are established and implemented in the pre-construction, construction and subsequent operation & maintenance phase of the wind farm.

This Plan is applicable to Northland Power Inc.’s (“NPI”)/ McLean’s Mountain Wind Limited Partnership (MMWLP) or the project owner’s (owners) employees working on the pre-construction, construction, and operation & maintenance phases of the McLean’s Mountain Wind Farm Project.

The Plan will be adhered to, the relevant section completed and the document signed off, issued and handed over to the relevant Manager (detailed below in brackets) at the end of the following stages:

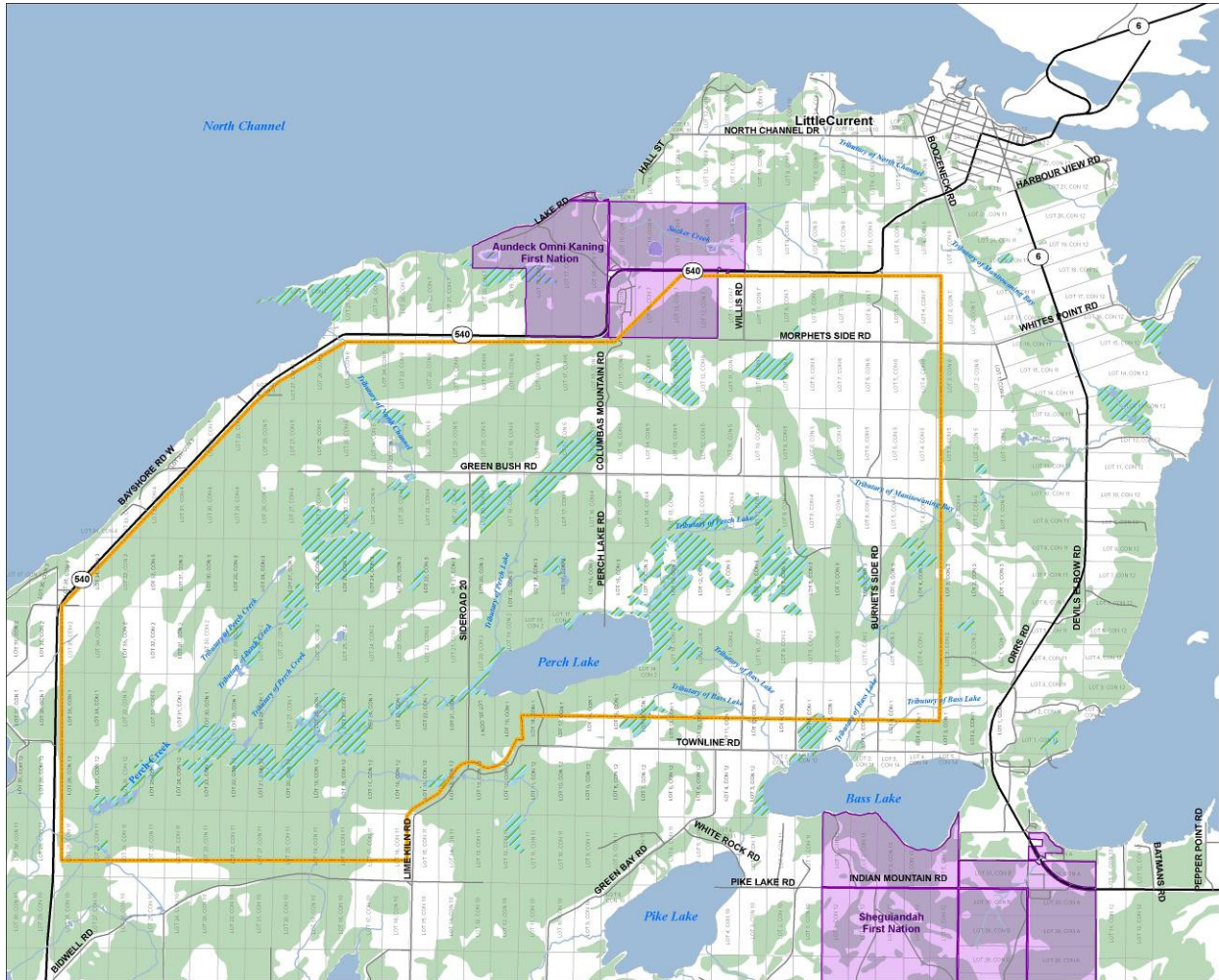
- *Pre-construction (Development Project Manager DPM) – Issue 01*
- *Construction (Construction Project Manager CPM) – Issue 02*
- *Operation (Operations Manager OM/Wind Farm Owner) – Issue 03*

This Plan also provides general guidance to the owner’s subcontractors on environmentally safe working procedures and standards for particular operations that are to be implemented during the construction phase of this wind project

B. PROJECT DESCRIPTION

NPI is proposing to develop and construct the McLean’s Mountain Wind Farm (“MMWF” or “the project”) to generate electricity in Ontario. The project is located approximately three (3) kilometers southwest of the Town of Little Current and lies within the Municipality of Northeastern Manitoulin and the Islands (“NEMI”), Ontario. The wind farm is expected to consist of approximately 24 wind turbines that will generate about 60 megawatt (MW) of electricity. Thirty (30) potential turbines sites have been studied and are being permitted although only 24 wind turbines will be constructed. In addition to the wind turbines, the project will require a 10.3 km 115 kV power transmission line to be constructed to the north-east of the study area to connect the MMWF to the Hydro One Transmission grid on Goat Island (located just north of Little Current). **Figure 1** presents the project location and study area.

**Figure 1:
Project Location**



The project components include:

- 24 wind turbines;
- 690V /34 kV pad-mount transformers;
- 34 kV collection system to link the wind turbines to the substation. While these lines are to be primarily above ground there will be sections of the line where buried cables would be preferable. The buried cable will extend out from the base of the wind turbine tower for a minimum distance of 100 meters.
- Transformer substation (to step up the electric output from 34 kV to 115 kV);
- A 10.3 km, 115 kV single circuit transmission line, including a submerged crossing to Goat Island;
- A switching station at the point of connection with the provincial grid;
- Turbine access roads;
- Four (4) meteorological towers (which are already installed and operating);
- Staging areas for assembly of wind turbines, only required during construction; and
- An Operations and Maintenance Building.

Foundations for the wind turbines shall be constructed with poured concrete. Construction is anticipated to take approximately 12 to 15 months.

At each wind turbine location, a lay-down area will be provided adjacent to the access road of sufficient area to permit any Turbine Equipment being delivered to the Crane Pad to be offloaded and stored pending erecting and installation of the same. Vegetation from this area will be cut short and a graded working area will be provided.

C. EMPLOYMENT & AUTHORITY OF ENVIRONMENTAL MONITOR

The owners will appoint an Environmental Monitor (“EM”) to observe all aspects of site construction work throughout the construction phase of the project.

The EM will ensure that owners own environmental management system, as set down in **Section D. Environmental Monitoring**, is being observed and will ensure compliance with all site permits and mitigation measures required by local, provincial or national law or applicable Contracts.

Reporting: The EM will report on a weekly basis with respect to any environmental problems identified or discovered as well as corrective actions taken to resolve the problem. In the event of a noncompliance issue, the EM will work directly with those contractors and individuals involved to correct the violation. Weekly reports to be prepared and sent to the Owners and will include:

- *Period covered by the report;*
- *Construction Activities observed;*
- *Compliance with applicable SCA conditions; and,*
- *Details of any corrective action that becomes necessary.*

The EM will co-ordinate activities with the Archaeological Monitor who will be working in accordance with the requirements of the “Cultural Resources Construction Monitoring and Construction Plan”.

Stop Work Criteria: The EM 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 following are considered “stop work” criteria:

- *Failure of best industry practices which result in off-site sedimentation that violates applicable water 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 & 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 EM must promptly inform the owners site management, (who will inform the Owner), and any appropriate local authorities, either by phone or in person with facsimile (fax) confirmation as required. The EM shall observe implementation of the corrective actions to determine whether and when compliance is achieved. As soon as compliance is achieved the EM shall withdraw the stop-work notice.

D. ENVIRONMENTAL MONITORING

To aid all parties involved, an environmental checklist has been created (**Appendix A**). This covers all environmental risks commonly experienced during wind project construction. It is vital that this checklist is reviewed to ensure that all environmental risks for this particular project location are included.

The following sections refer to the numbered checklist and provide minimum requirements to address each environmental hazard.

E. OBJECTIVES AND PHILOSOPHY

NPI's reputation for developing, constructing and operating wind farms is well regarded and follow best practices to ensure that projects are compatible with existing land uses, minimize impact of the environment and are well accepted by local communities.

This EMP has been developed by Dillon Consulting Limited (“Dillon”) to provide the required protection measures for the activities associated with the construction, maintenance and operation phases of the McLean's Mountain Wind Farm, as such these are long term initiatives. The purpose of the EMP is to further expand on the environmental protection and management measures that were committed in Northland's McLean's

Mountain Wind Farm Environmental Screening Report/Environmental Impact Statement (ESR Dillon, July 2009) and the McLean Mountain Wind Farm Renewable Energy Approvals submission (Dillon, September 2011).

This EMP forms an integral component of all construction work to be done on this project. The purpose of the EMP is to:

- *Ensure that the Municipality of Northeastern Manitoulin and the Islands' ("NEMI") commitments to minimize environmental effects in general, and specific regulatory requirements, will be met;*
- *Provide concise and clear instructions regarding measures for protecting the environment and archaeological resources, and minimizing potential adverse environmental effects;*
- *Document environmental concerns and describe appropriate protection measures associated with Project construction;*
- *Provide a reference document for planning and/or conducting specific activities that may have an effect on the environment;*
- *Function as a training aid for environmental education and orientation; and,*
- *Communicate changes in the program through a revision process.*

Through field directives and advice offered by trained and experienced personnel, all users of the EMP will apply appropriate environmental protection practices. The EMP is a standalone document that provides guidance for the implementation of sound environmental protection practices, though it can be read in conjunction with other environmental regulatory documents such as the ESR (Dillon July, 2009) and Renewable Energy Approvals submission document (Dillon, July 2011) as well as other approval applications for further detail and background.

F. A LIVING PLAN

NPI recognizes the importance of the EMP and its execution during all phases of the project. Many of the commitments and construction measures discussed in the plan were done with the latest information and with best industry practices. NPI realizes that during the construction, operation and maintenance of the project new and innovative techniques may be developed which are more beneficial to the protection of the natural environment.

As such, the owners will encourage the investigation and use of these new techniques should they improve upon the ones discussed in the following EMP. This *Living* approach to the EMP will ensure that these new techniques can be used to improve our performance and to further mitigate any potential impacts to the natural environment.

1.0 ENVIRONMENTAL PROTECTION AND CONSTRUCTION MEASURES

Site development and road construction projects require a variety of construction practices to complete the work. Potential environmental interactions related to these construction practices are identified in this section. Environmental management measures, designed to reduce potential for environmental effects, are included within each subsection. General environmental protection measures are listed below.

1.1 General Measures

- *Environmentally sensitive areas will be staked out prior to work operations so that these areas are protected.*
- *Work will comply with conditions outlined in the Approval-to-Proceed and any associated permits/approvals.*
- *A Setback has been provided for the following natural or sensitive feature:*
 - *30 m Watercourse Setback;*
 - *120 m River/Stream Setback;*
 - *60 m Non Participating Lot Setback;*
 - *55 m Road Setback;*
 - *120 m Wetland Setback (in the majority of cases);*
 - *120 m Life Science ANSI Setback;*
 - *305 m Perch Lake Setback; and*
 - *550 m Residence Setback*
- *Work conducted in the vicinity of wetlands/watercourses will be conducted in a manner which ensures that erosion and sedimentation of wetlands/watercourses is minimized.*
- *Erodible soils will not remain exposed for longer than absolutely necessary. In areas where extensive erosion occurs (e.g., along steep slopes) or in environmentally sensitive areas, an active re-vegetation program will be implemented as soon as possible following disturbance to ensure rapid re-vegetation.*
- *Appropriate erosion control measures will be installed prior to conducting the work. Work will be completed as soon as possible, and will be suspended during and immediately after intense rainstorms and during periods of high runoff.*
- *The area of disturbance will be limited to that which is absolutely necessary to conduct the work.*
- *Necessary means will be undertaken to ensure that work does not intrude on property outside the project boundary. This may include staking out private property prior to work operations.*

Activity-specific environmental protection measures are provided in the following subsections.

1.2 Vegetation Clearing and Disposal

Outline of Procedure

Vegetation clearing consists of the removal and disposal of all trees, shrubs, fallen timber, logs and other surface litter within the work area as directed and designated by the plans/drawings or the Environmental Monitor. Vegetation clearing will be required for each turbine location including a lay-down area. Clearing of

a right-of-way will be required for some sections of the turbine access roads and sections of the 115 kV transmission line.

Principal Environmental Concerns

Cut vegetation piled near or in a watercourse could degrade aquatic habitat or obstruct fish passage. Other potential environmental effects include altering wildlife habitat. Over-cutting exposes remaining trees to an increased risk of blow down. Removal of forest or hedgerow vegetation can result in wind stress, desiccation, and increased soil erosion.

Environmental Management Measures

In addition to the general environmental protection measures described above, the following protection measures will minimize the potential environmental effects of vegetation clearing and disposal.

- *Clearing will be minimized to that necessary to construct and operate the proposed turbines, install collector lines and transmission lines and implement access roads.*
- *Best efforts will be made to schedule clearing of land outside of the sensitive bird breeding and nesting season, which is considered to be May 9 to July 23.*
- *Hedgerows will be left intact, where possible.*
- *Slash and any other construction material or debris will not be permitted to enter any watercourse.*
- *Slash will be piled outside the buffer zone of a wetland or watercourse (i.e., greater than 30 m from a wetland or watercourse) for subsequent chipping. In cases where maintaining a 30 m buffer around watercourses would interfere with the landowner's agricultural operations, temporary storage of slash may occur within the 30 m buffer but not within 10 m of a watercourse.*
- *Slash will not be burned.*

1.3 Ditching

Outline of Procedure

Ditching consists of excavation and grading to construct a new ditch or to re-establish an existing, deteriorated ditch. Ditching is undertaken to affect drainage and to correct deficiencies such as erosion, non-conformity in grade and restrictive vegetative growth that impedes drainage.

Principal Environmental Concerns

Where ditching is undertaken, potential runoff of sediment-laden water could result in effects on water quality, aquatic ecosystems or other environmentally sensitive areas.

Environmental Management Measures

In addition to the general environmental protection measures described above, the following protection measures will minimize the potential environmental effects of ditching:

- *Ditching will proceed in the upslope direction.*
- *Trapezoidal ditches result in less erosion of the ditch bottom and will be installed where space requirements allow. In cases where the available right-of-way is insufficient in width to achieve the desired cross-section, the alternative V-bottom ditch will be constructed.*
- *Where ditching takes place near a watercourse, no ditching will be done within 30 m of the watercourse. Vegetation located in this 30 m buffer area acts to filter any sediment laden runoff water prior to entering the watercourse.*
- *Within a week of doing ditching work, or as directed by the Environmental Monitor, all exposed soils will be either seeded with non-invasive, herbaceous, native species or receive straw/hay mulch application.*
- *Ditching will not be done within an existing ditch prior to July 1 or after September 30, unless a letter of advice has been obtained from the Department of Fisheries and Oceans.*
- *If ditching prior to July 1 or after September 30, mulch or an erosion control blanket (i.e., jute mat, erosion control mat) must be applied overtop of the seed.*
- *If seeding is not possible due to lateness of the season, the exposed soils will be completely covered for "overwintering" with either mulch or an erosion control blanket.*
- *Erosion control material will be removed during the following spring, and the area will be prepared for seeding.*
- *The Environmental Monitor will direct additional seeding or erosion control requirements within this 30 m zone, as appropriate.*
- *A check dam will be installed at the end of the ditch where it meets the Buffer Zone or other environmentally sensitive area. Additional erosion control structures will be installed further up the ditch as required or as directed by the Environmental Monitor.*
- *Natural drainage will be maintained whenever practical.*
- *Ditches will be directed into surrounding vegetation where possible, or a sediment collection pond, rather than emptying into a natural wetland/watercourse.*
- *Depending on the erosion potential or to ensure stabilization, the ditch may be hay mulched, hand seeded, hydro seeded or lined with an erosion control mat (i.e., jute mat and/or vegetative erosion control blanket).*
- *Rip-rap or an erosion control blanket designed for high flows will be used to line the bottom of ditches that have steep grades and/or excessive erosion as directed by the Environmental Monitor.*
- *Petroleum, septic wastes or otherwise contaminated material encountered in the ditch will be reported to the Environmental Monitor and to the Emergency Response.*

1.4 Grubbing, Stripping, and Excavation

Outline of Procedure

Grubbing refers to the removal of all stumps, roots, root mat and other debris, while stripping refers to the removal of topsoil. Materials excavation refers to the excavation of all other soil materials as included in earthworks, preparation of roadbed, site development, trenches, drains, borrow from adjacent land or pits, intersections, private entrances and other similar works. Soil will be stripped at the turbine foundation locations. Grading will be conducted on irregular surfaces, if any, to provide a safe and clean work surface.

Principal Environmental Concerns

The principal concern associated with these activities is the potential for erosion due to exposed soil areas and the associated sediment-laden runoff effects on water quality, aquatic ecosystems and environmentally sensitive areas.

Environmental Management Measures

In addition to the general environmental protection measures described above, the following protection measures will minimize the potential environmental effects of grubbing, stripping, and excavation:

- *Erosion control measures are to be in place prior to any grubbing activities if site conditions warrant or as directed by the Environmental Monitor.*
- *Topsoil and excavated overburden and bedrock will be stored in separate stockpiles for later use during rehabilitation.*
- *Dewatering of excavated areas will make use of measures to minimize and control the release of sediment laden water through the use of filtration through erosion control devices, settling ponds, straw bales, geotextiles or other devices as necessary.*
- *Water from dewatering will not be permitted to directly enter a watercourse or wetland.*
- *Watercourse culvert crossings as required for access roads for the turbine locations will span the watercourses in accordance with MOE and MNR practices.*

1.5 Disposal of Excavated Waste Materials

Outline of Procedure

Waste materials are generated during excavations involved with site development and road construction practices. Suitable excavation materials will be utilized in backfill and unsuitable excavated materials will be disposed of off-site at a licensed facility.

Principal Environmental Concerns

The principal concern associated with this activity is the potential for erosion of disposed materials and the associated sediment-laden runoff effects on water quality, aquatic ecosystems and environmentally sensitive areas.

Environmental Protection Measures

In addition to the general environmental protection measures described above, the following protection measures will minimize the potential environmental effects of the disposal of excavated waste materials. It is important to note that, once material is deemed to be waste material, it may become the property of the Contractor or other party. Where this occurs, these same protective measures are recommended to be followed by the user of the material once removed from the site:

- *If the excavated waste material is to remain in one disposal location for extended periods of time, appropriate protection measures will be taken such as stabilization of the material and/or perimeter sediment control.*
- *Excavated waste materials will not be disposed of in an environmentally sensitive area or in the Buffer Zone of a watercourse/wetland.*
- *Excavated materials will largely be used on original clearing sites, where appropriate.*

1.6 Infilling and Grading

Outline of Procedure

Infilling consists of placing soil and/or rock for site development and construction purposes. This includes preparation and construction of roadbeds, embankments, and slopes. Placing material in depressions to level them off helps to minimize ponding. Grading consists of shaping the unpaved road or site surface and is used to stabilize a surface, improve surface drainage and to provide for runoff in a controlled manner.

Principal Environmental Concerns

The principal concern associated with these activities is the potential for erosion due to exposed soil areas and the associated sediment-laden runoff effects on water quality, aquatic ecosystems and environmentally sensitive areas.

Environmental Management Measures

In addition to the general environmental protection measures described above, the following protection measures will minimize the potential environmental effects of infilling and grading:

- *When grassed areas are encountered during grading, every effort will be made to leave such grassed areas intact.*

- *Areas where little or no vegetation exists can be graded after a light rain when the surface is in an optimum state for compaction, but not after heavy rains which promote runoff conditions.*
- *The elevation of the in filled or graded area will be maintained higher than the ditch it is draining into.*

1.7 Culvert Installation and Stabilization

Outline of Procedure

Culvert construction will include the installation of a steel, concrete or plastic culvert, backfilling around the culvert, construction of the roadbed, and stabilization of culvert inlets and outlets.

Principal Environmental Concerns

The principal concerns associated with culvert installation and stabilization include the potential erosion of material around the culvert, sedimentation of the water, alteration of the hydraulic regime leading to streambed or bank scouring, and disruption of fish habitat and migration patterns.

Access roads will be approximately 10 m wide to accommodate the turbine erection cranes, maintenance vehicles and heavy equipment for larger repairs/replacements. In order to access the wind turbine sites, it will be necessary to construct access roads across various open drains. Some drains/watercourses will need to be crossed by the turbine access roads. Culverts of various sizes will be required to accommodate the crossing of the watercourses/drains by the access roads. In some cases to accommodate a wider turning radius for the cranes, larger culverts may be required in order to accommodate vehicular access and construction traffic across the drain while maintaining unimpeded flow within the drain.

There will be the need to cross the North Channel with a submarine cable to facilitate the transmission line connection. A navigable waterway will be traversed and a determination by Transport Canada will be sought prior to construction.

Environmental Management Measures

Where there is the potential for effects to watercourses including drains from the construction of the turbines and watercourse crossings, the following will be taken into consideration:

- *the Ontario MOE Stormwater Management Planning and Design Manual (2003);*
- *the Ontario Provincial Standards and Specifications (OPSS 182, 518 & 577);*
- *the Ontario MOE Stormwater Pollution Prevention Handbook (Part I); and the Part II – Pollution Prevention and Flow Reduction Measures Fact Sheets;*
- *the Ontario MNR Guidelines on Erosion Control for Urban Construction Sites (1989); and*
- *the MNR Technical Guidelines- Erosion and Sediment Control (1989).*

To provide source controls and minimize adverse impacts, the following drainage mitigation will be followed:

- *Minimize disturbance of existing vegetation outside ditching and grassed slopes where regrading is required;*
- *Minimize time exposure of un-vegetated soils;*
- *Maximize length of overland flow through to points where storm water leaves the site;*
- *Complete an erosion assessment on all new and existing ditches to determine the need for additional erosion protection;*
- *Top of bank barriers (e.g. silt fencing) are to be put in place for any construction activity that is in proximity to watercourses;*
- *Where ditch regrading is required, where appropriate, utilize flat bottom ditches in lieu of 'V' ditches to reduce velocities and erosion potential, promote peak flow attenuation and provide short-term storm water storage;*
- *Use of in-line erosion control measures such as erosion blanket, rip rap, straw bale, rock flow checks and vegetated buffers, thereby mitigating high flow velocities and excessive erosion/sedimentation;*
- *Stream banks are to be stabilized and restored to their pre-construction condition immediately following construction activity. This is particularly important in erosion prone areas such as steep sloped stream banks;*
- *Each watercourse crossing is to be assessed in advance and the most appropriate mitigative measures determined. Alternative watercourse crossing locations should be considered if the proposed crossing location appears to be particularly sensitive to erosion;*
- *Any stockpiled materials are to be stored and stabilized away from watercourses;*
- *Ensure all materials placed within the flood line are clean and free of silt and clay size particles. All materials must meet applicable regulations governing placement of fill in water bodies;*
- *Ensure that all materials and equipment used for the purpose of site preparation and the completion of any work is operated and stored in a manner that prevents any deleterious substance from entering the water;*
- *Refuelling and handling of potential hazardous substances are to be done away from watercourses;*
- *Sediment and erosion control measures are to be left in place until all disturbed areas have been stabilized;*
- *The sediment control plan be designed and implemented to mitigate impacts associated with construction of the project - to prevent suspended sediment, mud, debris, fill, rock dust, etc. from entering downstream watercourses. Areas disturbed by work must be minimized. Silt fences/curtains, sediment traps, check dams must be installed as appropriate;*
- *Measures are to be in place to minimize mud tracking by construction vehicles, and to ensure timely cleanup of any tracked mud, dirt and debris along local roads and areas outside of the immediate work area where the above sediment controls would not be in place;*
- *Work is to be suspended if excessive flows of sediment discharges occur, and, any appropriate action should be immediately taken to reduce sediment loading;*
- *If it is necessary to de-water foundation excavations, prior to its discharge to a watercourse, the water is to be discharged to a settling pond, filter bag, or vegetated buffer strip of adequate size, to filter out suspended sediment;*
- *Temporary mitigation measures are to be installed prior to commencement of any site clearing, grubbing, excavation, filling or grading works and maintained on regular basis, prior to and after*

runoff events. Any accumulated materials are to be cleaned out during maintenance and prior to their removal. All disturbed areas on land to be restored to natural conditions should be re-vegetated as soon as conditions allow preventing erosion, and restoring habitat functions. Land based measures must not be removed until vegetation has been re-established to a sufficient degree (or surface soils stabilized using other measures) so as to provide adequate erosion protection to disturbed work areas; and

- *Timbers spaced to allow water flow and then covered with mats will be used for wet water crossings. This process will not hinder or block natural water flow.*

In addition to the general environmental protection measures described above, the following protection measures will minimize the potential environmental effects of culvert installation and stabilization:

- *Culverts will be installed parallel to the watercourse, and located along a section of the watercourse that is straight and of uniform gradient.*
- *Culvert size and design will be based on peak flows, and will allow for sufficient depth of flow and appropriate water velocities for fish passage.*
- *Fill slopes will be stabilized to ensure that roadbed materials do not enter the watercourses.*
- *Gabions, rip rap, or rocks of sufficient size to prevent erosion, will be placed around culvert inlets and outlets.*
- *Gabions, rip rap, filter fabric, or rocks used for stabilization will completely cover road fill, gravel and other unstabilized materials around culvert inlets and outlets.*
- *Stabilization material will be clean and non erodible.*

1.8 Installation of Underground Collection Cables

Outline of Procedure

Electrical collection lines connecting the wind turbines to the substation will be overhead until within 100 m (or some suitable distance) of the turbine whereby an overhead to underground terminal pole will be placed and the underground electrical lines will be placed in trenches approximately 1 m deep where possible and covered with fill.

Principal Environmental Concerns

The principal concern associated with the installation of underground cables is the potential for erosion due to exposed soil areas and the effects of sediment-laden runoff on surface water quality. This could disturb fish habitat through the removal of riparian vegetation that provides shade, food and cover. There is also the potential for fuel and oil/lubricant spills, which could potentially contaminate nearby water bodies. Impacts related to spills are discussed in Section 4.1.

Environmental Management Measures

In addition to the general environmental protection measures described above, the following protection measures will provide the erosion control measures for streamside activities:

- *Any excavation or grading during the construction of the site will be conducted in a manner that ensures the minimum amount of disturbance necessary.*
- *Access roads will be used, where possible, for all equipment, including cable reels, line trucks, and tensioning equipment.*
- *Erosion and sedimentation control measures will be in place prior to any grubbing activity.*
- *In extremely erodible areas, hay or straw mulch will be used as required for protection.*
- *Silt or sediment control fences will consist of woven synthetic fiber fabric attached to wooden posts.*
- *Silt fences will not be used in watercourses.*
- *Where a vegetation buffer between erodible slopes and water bodies is less than 15 m, an engineered silt fence will be constructed to control silt runoff and the silt fence will be placed along the down gradient perimeter of the construction area.*
- *Replanting will occur upon completion of cable-laying operations to maintain bank stabilization.*

1.9 Handling, Storage, and Use of Aggregate Materials

Outline of Procedure

Handling of aggregate materials is required for the foundation construction of each turbine. Outdoor storage piles are often used in operations that use minerals in aggregate form, largely due to the need for frequent material transfers.

Principal Environmental Concerns

The principal concern associated with these activities is the potential for erosion due to exposed soil areas and the associated sediment-laden runoff effects on water quality, aquatic ecosystems and environmentally sensitive areas. Storage piles can be left uncovered and dust emissions may occur from disturbances to the piles. Handling, storage, and use of aggregate materials can result in any of the following environmental impacts:

- *Cross-contamination can occur if adjacent aggregate stockpiles are allowed to overlap.*
- *Underlying soil may be disturbed with the use of a front-end loader for moving aggregates from a stockpile.*
- *Mixing of aggregates can result from dumping the wrong size aggregate in a bin or pile.*
- *Leaves and other contaminants may also fall into the stockpile.*
- *Leakage can occur through or around bulkheads in storage bins.*
- *Vegetation may grow in the stockpile if left alone and unused for an extended period of time.*
- *Soil admixing, compaction, and stoniness can occur as a result of grading, heavy traffic, and excavation activities.*

Environmental Management Measures

These measures apply to the handling, storage and use of aggregate material. The following conditions apply:

- *Aggregate will not be stored within the buffer zone of a wetland or watercourse (i.e., aggregate will not be stored within 30 m of a wetland or watercourse). In circumstances where landowners will not permit the use of alternate locations the buffer zone will be reduced to a minimum of 10 m.*
- *All sand, aggregate, soil, or other materials in place or in stockpiles must be contained to prevent materials from producing dusty conditions and from cross contamination, as determined necessary by the Environmental Monitor.*
- *Sand and soil stockpiles will be bermed and sloped (and seeded with non-invasive, herbaceous, native species, if abandoned) to minimize runoff. If stockpiles are not needed immediately, temporary erosion and sediment control devices will be installed and regularly maintained.*
- *Stripping of topsoil separately from the subsoil, approximately 10-15 cm, will occur to minimize the potential for soil admixing.*
- *Soil compaction will be avoided by limiting the traffic flow on access roads.*
- *Stoniness will be avoided by removing any noticeable stone concentration to an approved location.*

1.10 Concrete Pouring Operations

Outline of Procedure

Concrete will be required to construct the foundations of the turbines, approximately 15-17 m in diameter, and 1-1.5 m thick. This section contains measures to minimize adverse effects that may result from concrete pouring activities.

Principal Environmental Concerns

Liquid wastes from uncontrolled release of wash water which may contain hazardous materials such as cement, concrete additives and form oil. This wash water may be harmful to fish. Cement is alkaline and wash water from spoiled concrete or from the cleaning of the mixer trucks and pipe delivery systems can be expected to have high pH and high total suspended solids ("TSS") concentration. Similarly, spoiled concrete or wash water would contain additives and agents, some of which are toxic to aquatic species. Aggregates, particularly the finer sand fractions, washed from spoiled concrete or discharged in water to the environment may result in direct fish and wildlife mortality and/or habitat destruction.

Environmental Management Measures

The following measures are intended to minimize the potential for wash water and uncured concrete to enter water bodies:

- *Form oil may be used sparingly to allow forms to separate from concrete following curing.*

- *Only the chutes of concrete trucks will require on-site cleaning of wet concrete to permit their storage for transport. The volume of water used and extent of washing will be kept to a minimum.*
- *Washing of chutes on-site will occur at a designated location that will permit containment of the wash water in a settling pond away from any subsurface drains, streams or storm drains. If such a system cannot be located on-site, then the wash area should permit containment of the wash water so that it can be disposed of off-site at the ready mix plant.*
- *Washing of the drum at the end of a day's delivery will occur at the ready-mix concrete plant.*
- *No chemicals will be used in the washing of concrete trucks or forms on-site.*
- *Aggregate used in the production of concrete will not be stored on-site and concrete will not be produced on-site.*
- *In the event that water from the wash water containment area requires release to the environment, the effluent will be tested prior to release as required by applicable regulations.*
- *If concrete is mixed on site, drainage from the concrete production area and aggregate storage area, and wash water from the cleaning of batch plant mixers, mixer trucks, conveyors, and pipe delivery systems will be directed to a settling pond for control and treatment, as appropriate. Effluent will be treated as appropriate before release to receiving waters, or alternatively, effluent will be recycled for reuse after treatment. Solids which accumulate in a settling pond will be removed on a regular basis to ensure the settling pond remains effective.*

1.11 Surveying

Outline of Procedure

Surveying includes gathering all the information required for the design and identification of a property or the right-of-way of a specific section of road. This includes cutting centerline and cross-section offsets of sufficient width to provide a clear line of sight for survey equipment and access to the site for soils testing equipment.

Principal Environmental Concerns

Disturbance to terrestrial and watercourse/wetland habitats and species are the primary environmental concerns associated with surveying.

Environmental Management Measures

In addition to the general environmental protection measures described above, the following protection measures will minimize the potential environmental effects of surveying:

- *The cutting of survey lines will be kept to a minimum. Where possible, alternate areas not requiring cut lines will be used.*
- *Whenever possible, cutting lines to the boundary between treed and open areas will be avoided.*
- *Survey lines will be limited in width to that which is absolutely necessary for line of sight and not more than 1.5 m.*
- *As required, trees and shrubs will be cut no more than 300 mm above the ground.*

- *All trees not exactly on survey lines will be left standing and trees partly on line will be notched (notch not to exceed 1/3 tree diameter) instead of removal, to allow sighting.*
- *Trees will be felled in a way that damage to standing trees adjacent to the survey line is minimized. Trees will be felled away from and not into or over a wetland/watercourse.*
- *Slash will not be placed or left in wetlands/watercourses. Any debris material removed from a wetland/watercourse and adjacent areas will be disposed of, or placed in a manner such that it cannot enter a wetland/watercourse.*
- *Felled trees having a top diameter of 8 cm or more will be cut in lengths and piled for reuse as merchantable timber. Non-merchantable timber will be chipped and spread outside the buffer zone of a wetland or watercourse (i.e., greater than 30 m from a wetland or watercourse). In circumstances where landowners will not permit the use of alternate locations the buffer zone will be reduced to a minimum of 10 m.*
- *When surveying construction layouts, areas that will be cleared do not require strict adherence to the above, except trees, shrubs and areas to be saved or left natural as noted on the plans or marked in the field.*
- *Vehicles will yield the right-of-way to wildlife and no attempt to harass or disturb wildlife will be made by any person.*
- *There will be no cutting in areas designated as environmentally sensitive by the Environmental Monitor.*
- *ATVs will remain within the right-of-way except as approved by the Environmental Monitor.*
- *No heavy equipment or motorized vehicles will enter the areas designated as environmentally sensitive by the Environmental Monitor.*
- *The extent of activities in environmentally sensitive areas will be minimized, including the restriction of walking to established walking paths if available.*
- *Petroleum products will be handled, stored, and disposed of in a manner that will minimize the potential for spills.*
- *Fuelling of equipment will not occur within the Buffer Zone of a watercourse/wetland or other environmentally sensitive areas.*

1.12 Equipment Movement

Outline of Procedure

A variety of equipment is required to complete the many components of site development and road construction.

Principal Environmental Concerns

The environmental concerns associated with equipment movement are the potential impacts on aquatic ecosystems and water quality, as well as disturbance to environmentally sensitive areas.

Environmental Management Measures

In addition to the general environmental protection measures described above, the following protection measures will minimize the potential environmental effects of equipment movement:

- *Imported equipment will be thoroughly cleaned before it arrives into Ontario in order to prevent the introduction of exotic plant species.*
- *Equipment and vehicles will only operate on cleared right-of-ways or areas designated for construction activities in the Plans/Drawings.*
- *Routine maintenance of machinery will be performed off-site as much as possible. Some heavy equipment, such as the cranes, will be maintained on-site due to the challenges involved in moving the equipment.*
- *The Contractor will make daily inspections of hydraulic and fuel systems on machinery, and leaks will be repaired immediately. All leaks will be reported to the Environmental Monitor and the Construction Manager.*
- *Construction equipment will not enter Buffer Zones of wetlands/watercourses or environmentally sensitive areas.*
- *If there is soil (not rock) in the lay-down areas used for storage of turbine parts adjacent to the turbine foundations, the soil will be aerated and loosened after use to counteract the compaction caused by the equipment. The vegetation will be allowed to return to a natural state.*
- *Erosion control measures will be monitored during construction activities within the right-of-way and any areas associated with Project construction activities. Where damage to these erosion control measures is observed, they will be promptly repaired to prevent siltation of wetlands/watercourses or other environmentally sensitive areas.*

2.0 ENVIRONMENTAL PROTECTION MEASURES - MAINTENANCE ACTIVITIES

2.1 Structure Maintenance and Cleaning

Outline of Procedure

Repair and replacement of damaged or deteriorated superstructure and substructure components are undertaken as required to ensure their structural integrity. Cleaning is undertaken to prevent the accumulation of dirt and debris which may restrict normal movement on the structure and/or retain moisture or chemicals, leading to structural component deterioration. Potential activities could include cleaning, lubrication, and painting.

Principal Environmental Concerns

There is concern for aquatic species due to direct mortality and loss of aquatic habitat. The primary concern is the release of materials and siltation into the aquatic environment such as abrasives and protective coatings. Lubrication materials may contain petroleum compounds, which are potentially toxic to aquatic species.

Environmental Management Measures

In addition to the general environmental protection measures described in Section 3.0, the following protection measures will minimize the potential environmental effects of structure maintenance and cleaning:

- *All waste generated in the removal of damaged and deteriorated components will be collected for proper disposal.*
- *All materials, where possible, will be reused. Non-salvageable materials will be disposed of at a provincially approved location.*
- *All necessary precautions will be taken to prevent discharge or loss of any harmful material or substance into a watercourse.*
- *All empty containers of paint, solvents, and cleaners will be disposed of in an appropriate manner at a provincially approved location.*
- *If sandblasting is required, it will be done in an off-site maintenance shop.*
- *If on-site sandblasting is necessary, screens or traps will enclose the area to be sandblasted. Sandblasting will be performed over a surface which allows the sand or residue to be collected upon completion of sandblasting (i.e. plastic or plywood).*
- *Sandblasting will not be performed in high wind conditions.*
- *Sensitive features (i.e. rare plants, watercourses, environmentally sensitive habitats) identified during construction will be protected during maintenance activities.*

2.2 Road Maintenance

2.2.1 Grading

Outline of Procedure

Grading is used to reshape unpaved roads to maintain a proper crown and remove ruts, potholes and washboard conditions. Grading helps to maintain proper drainage and keeps road surfaces stable.

Principal Environmental Concerns

Grading loosens the top of the exposed road, leaving more potential for erosion of the surface. If not conducted properly, grading can inhibit controlled drainage of runoff. Dust is generated during grading processes.

Environmental Management Measures

Grading measures as outlined earlier in this EMP will be implemented.

2.2.2 Ditch Maintenance and Shouldering

Outline of Procedure

Ditching is undertaken to affect drainage of the roadbed and to correct deficiencies such as erosion; nonconformity in grade, line, or cross section of ditch; water ponding on road; and restrictive vegetative growth that impedes drainage of the roadbed.

Principal Environmental Concerns

The principal concern associated with these activities is the potential for erosion due to exposed soil areas and the associated sediment-laden runoff effects on water quality, aquatic ecosystems and environmentally sensitive areas.

Environmental Management Measures

In addition to the general environmental protection measures described earlier in this EMP, the following protection measures will minimize the potential environmental effects of ditch maintenance and shouldering:

- *A Buffer Zone will be maintained between the end of ditching and all wetlands/watercourses.*
- *A check dam will be maintained at the end of the ditch (where the ditch meets the Buffer Zone). Additional erosion control structures will be installed further up the ditch as required.*
- *Natural drainage will be maintained whenever practical.*
- *Sediment deposited in the ditch will be removed when it reduces the capacity of the channel. Removed material and sediment will be disposed of at a location outside the Buffer Zone of a*

wetland/watercourse or other environmentally sensitive area, and such that it cannot wash into a wetland/watercourse.

- Suitable material will be used when needed to fill in washouts, depressions, and the like on foreslopes or backslopes. To ensure stabilization, the ditch may be hay mulched, hand seeded, hydroseeded or lined with jute matting, depending on the erosion potential.
- Petroleum contaminated material encountered in the ditch will be reported to the Environmental Monitor and the Construction Manager.
- Sensitive features (i.e. rare plants, watercourses, environmentally sensitive habitats) identified during construction will be protected during maintenance activities.

2.2.3 Surfacing

Outline of Procedure

For the purposes of this EMP, surfacing refers to the placement of aggregate on an unsealed road surface for stabilization or to restore grades, and to shape shoulders.

Principal Environmental Concerns

When handling and placing aggregate, there is potential for sedimentation of the aquatic environment and for dust impacts on air quality.

Environmental Management Measures

In addition to the general environmental protection measures, the following protection measures will minimize the potential environmental effects of surfacing:

- Any aggregate placement will be conducted in such a manner to ensure road surface drainage flows from the centre of the surface to the drainage control structures (i.e., ditching), as appropriate.
- Any aggregate materials placed must be compacted to reduce moisture penetration.
- As required, dust will be controlled.
- Sensitive features (i.e. rare plants, watercourses, environmentally sensitive habitats) identified during construction will be protected during maintenance activities.

2.3 Snow Removal

Outline of Procedure

Snow removal and application of sand and/or de-icing agents (i.e., salt) may be required during the winter months to maintain safe conditions for maintenance activities.

Principal Environmental Concerns

Excessive salt use can cause saline runoff into watercourses. Excessive sand use can contribute to sediment-laden runoff into watercourses and may cause blockages in drainage structures.

Environmental Management Measures

In addition to the general environmental protection measures described earlier in this EMP, the following protection measures will minimize the potential environmental effects of Snow Removal, Sanding and De-icing.

- *A service provider will be used for snow and ice removal on roads. Best Management Practices as described in Environment Canada's "Best Management Practices for Salt Use on Private Roads, Parking Lots and Sidewalks" will be followed.*
- *The use of sand, salt and combinations thereof, will be minimized to that which is necessary to ensure the safety of the maintenance staff. Sand application will be the primary means of maintaining safe driving conditions. Salt will only be used as necessary.*
- *Prior to salt application, as much snow as possible will be removed from the road through plowing.*
- *Salt application will be targeted to areas requiring treatment in order to minimize the volume of salt used and the amount of salt lost to adjacent areas.*
- *Snow removed from access roads and site surfaces will not be dumped within the Buffer Zone of a watercourse/wetland or other environmentally sensitive area.*

3.0 SPECIFIC ENVIRONMENTAL PROTECTION MEASURES

3.1 Erosion Control

The study area contains many small lakes and streams. In general, the majority of watercourses flowing off McLean's Mountain within the study area flow to the Sucker Creek and/or the Perch Creek systems, which both flow to the North Channel of Lake Huron. Watercourses flowing easterly from the east side of McLean's Mountain flow toward Strawberry Channel. On the south side of the study area, westerly watercourses generally flow toward the North Channel via Perch Lake and easterly watercourses generally flow toward Bass Lake near Sheguiandah.

It will be necessary to cross several watercourses with the turbine access roads and electrical lines. For the roads crossings, culverts will need to be installed so as to not obstruct the flow of water from access road construction. Various sized culverts will be required to accommodate the crossing of the watercourses/drains by the access roads. In some cases to accommodate a wider turning radius for the cranes, larger culverts may be required.

There is also the potential for the movement of construction equipment across the water courses and erosion effects from construction activity in the vicinity of surface water (e.g. to construct the 115 kV transmission line). These temporary disturbances may include downstream sediment transport and bed and bank disturbance and will be minimized as much as possible through the selection of the appropriate crossing techniques and culvert design determined in consultation with the DFO and MNR.

There will be the need to cross the North Channel with a submarine cable to facilitate the transmission connection. A navigable waterway will be traversed and a determination by Transport Canada will be sought prior to construction.

Mitigation Measures

Timing: Attempts will be made to construct new crossings and improve existing drain crossings when the ditch is dry. For applicable coldwater watercourses, crossings will be consistent with the coldwater timing restrictions. For ditches which have standing water at the time of construction, in stream sediment control will be installed prior to any construction equipment initiating work. These features should be removed immediately following completion of all in stream or stream bank disturbance, including installation of the culvert and revetment. Vegetation removal should be kept to a minimum to provide bank stability following culvert installation.

Sediment: Adequate sediment and erosion control during construction along with re-vegetation of disturbed areas will be necessary to avoid potential effects of construction to downstream habitat. Sediment and erosion control systems should be maintained repaired and not removed until the site is suitably stabilized.

Equipment: All equipment for culvert installation should arrive on site in a clean condition and maintained to prevent fluid leaks (gas, oil, lubricants, hydraulic fluids). All equipment should operate on the land with

minimal disturbance to the ditch banks. Refueling, servicing, equipment maintenance and associated materials for equipment operation should be stored away from the ditch bank with appropriate containment systems in the event of accidental spills.

Placement: Culverts should be embedded in the substrate, a minimum 10% embedment of the pipe diameter below the drain bottom, to ensure there is no loss of habitat through the culvert section. The culvert will eventually silt into match upstream and downstream grades as this area is extremely flat. In an open water course setting, culverts will provide refuge in low flow and cover from predators for any of the resident fish population.

Approvals: Any work within waterways that contain fish habitat or potential fish habitat will require a letter of advice notifying the Department of Fisheries and Oceans when work is to be initiated and completed.

Outline of Procedure

During construction, site preparation work and use of heavy construction vehicles at the site will result in exposed solids, susceptible to erosion. Control of erosion and potential sedimentation of receiving water bodies is one of the most critical environmental management concerns for this Project. Erosion control is first priority in preventing these impacts. The amount and duration of exposed soil will be kept to a minimum. Erosion control methods will be applied where there is the potential for erosion due to rain, flowing water, steep slopes, and highly erodible soils. Preventing erosion at the source reduces the amount of sediment that needs to be managed by downstream sediment control measures. It is also important that sediment controls are in place to prevent sediment from leaving the site.

Principal Environmental Concerns

Exposed soil will result from site preparation activities such as clearing, grubbing, grading and ditching. Precipitation, flowing water, steep slopes, or highly erodible soils will increase the potential for erosion. The principal environmental concern is the associated sediment-laden runoff and the resulting effects on water quality, aquatic ecosystems and environmentally sensitive areas such as wetlands.

Environmental Management Measures

In addition to the general environmental protection measures described earlier in this EMP, the following protection measures will provide the erosion control measures.

General

Where there is the potential for effects to watercourses including drains from the construction of the turbines and watercourse crossings, the following will be taken into consideration:

- *the Ontario MOE Stormwater Management Planning and Design Manual (2003);*
- *the Ontario Provincial Standards and Specifications (OPSS 182, 518 & 577);*

- *the Ontario MOE Stormwater Pollution Prevention Handbook (Part I); and the Part II – Pollution Prevention and Flow Reduction Measures Fact Sheets; the Ontario MNR Guidelines on Erosion Control for Urban Construction Sites (1989); and*
- *the MNR Technical Guidelines- Erosion and Sediment Control (1989).*

To provide source controls and minimize adverse impacts, the following drainage mitigation will be followed:

- *Minimize disturbance of existing vegetation outside ditching and grassed slopes where re-grading is required;*
- *Minimize time exposure of un-vegetated soils;*
- *Maximize length of overland flow through to points where stormwater leaves the site;*
- *Complete an erosion assessment on all new and existing ditches to determine the need for additional erosion protection;*
- *Top of bank barriers (e.g. silt fencing) are to be put in place for any construction activity that is in proximity to watercourses;*
- *Where ditch re-grading is required, where appropriate, utilize flat bottom ditches in lieu of 'V' ditches to reduce velocities and erosion potential, promote peak flow attenuation and provide short-term storm water storage;*
- *Use of in-line erosion control measures such as erosion blanket, rip rap, straw bale, rock flow checks and vegetated buffers, thereby mitigating high flow velocities and excessive erosion/sedimentation;*
- *Stream banks are to be stabilized and restored to their pre-construction condition immediately following construction activity. This is particularly important in erosion prone areas such as steep sloped stream banks;*
- *The watercourse crossing is to be assessed in advance and the most appropriate mitigative measures determined. Alternative watercourse crossing locations should be considered if the proposed crossing location appears to be particularly sensitive to erosion;*
- *Any stockpiled materials are to be stored and stabilized away from watercourses;*
- *Ensure all materials placed within the flood line are clean and free of silt and clay size particles. All materials must meet applicable regulations governing placement of fill in water bodies;*
- *Ensure that all materials and equipment used for the purpose of site preparation and the completion of any work is operated and stored in a manner that prevents any deleterious substance from entering the water;*
- *Refuelling and handling of potential hazardous substances are to be done away from watercourses;*
- *Sediment and erosion control measures are to be left in place until all disturbed areas have been stabilized;*
- *The sediment control plan be designed and implemented to mitigate impacts associated with construction of the project - to prevent suspended sediment, mud, debris, fill, rock dust, etc. from entering downstream watercourses. Areas disturbed by work must be minimized. Silt fences/curtains, sediment traps, check dams must be installed as appropriate;*
- *Measures are to be in place to minimize mud tracking by construction vehicles, and to ensure timely cleanup of any tracked mud, dirt and debris along local roads and areas outside of the immediate work area where the above sediment controls would not be in place;*

- *Work is to be suspended if excessive flows of sediment discharges occur, and, any appropriate action should be immediately taken to reduce sediment loading;*
- *If it is necessary to de-water foundation excavations, prior to its discharge to a watercourse, the water is to be discharged to a settling pond, filter bag, or vegetated buffer strip of adequate size, to filter out suspended sediment (this activity would require a Certificate of Approval under the OWRA from MOE. In addition, should dewatering activities exceed a rate of 50,000 litres per day, a PTTW would be required as well);*
- *Temporary mitigation measures are to be installed prior to commencement of any site clearing, grubbing, excavation, filling or grading works and maintained on regular basis, prior to and after runoff events. Any accumulated materials are to be cleaned out during maintenance and prior to their removal. All disturbed areas on land to be restored to natural conditions should be re-vegetated as soon as conditions allow preventing erosion and restoring habitat functions. Land based measures must not be removed until vegetation has been re-established to a sufficient degree (or surface soils stabilized using other measures) so as to provide adequate erosion protection to disturbed work areas;*
- *The OMNR in-water construction-timing window (July 1 to September 30) should be implemented for the summer months when work can be completed in the dry or when resident fish communities in permanent systems have completed their annual reproductive activities; and*
- *Compensation measures, where required, should involve riparian plantings, bank stabilization through bioengineering, or the construction of in-stream fish habitat features and/or the removal of blockages/barriers (this is a possibility along the shoreline at the mouths of some tributaries).*

The majority of road crossings over small creeks and/or drains are handled by installing an appropriately-sized culvert by open cutting creek/drain beds to properly install at an acceptable elevation to ensure proper fluvial function and fish passage. Standard mitigation measures to address typical negative impacts resulting from construction activities of these kinds are presented above.

For reference, please refer to the Department of Fisheries and Oceans' ("DFO") Operational Statements for "Overhead Line Construction" and "Isolated or Dry Open-Cut Stream Crossings" for more detailed information on environmental mitigation and protection appropriate to these types of watercourse crossing. Provided the listed conditions in the Operational Statements are met, review and approval by DFO is not likely required.

The aquatic features within the study area are generally a mixture of natural and altered channel systems, low-lying wet pockets/wetlands and overland swales and drainage ditches. Many of them are considered coldwater systems; however, a few are significantly degraded by unrestricted cattle access and poorly installed/degraded road/farm path culverts.

Structures/Products

- *Silt or sediment control fences will consist of woven synthetic fibre fabric attached to wooden posts.*
- *Erosion control structures or check dams will be constructed in accordance with Ontario Provincial Standards for Roads and Public Works in partnership with the Ontario Ministry of Transportation (MTO).*
- *In extremely erodible areas, hay or straw mulch will be used as required for protection.*
- *Erosion and sedimentation control measures will be in place prior to any grubbing activity.*
- *Erosion control structures will be installed as directed by the Environmental Monitor, Site Supervisor or Construction Manager.*
- *Silt fences will not be used to control sedimentation within a ditch or watercourse.*
- *Where erosion control within a drainage ditch is required, geotextile wrapped straw bales will be installed to provide a check dam and prevent downstream sedimentation. Some rock fill or rip rap may be installed of the downstream side of the check dam to secure the structure during heavy rainfall events.*

Maintenance

- *The Contractor will maintain the erosion control structures in a functional condition as long as necessary to contain sediment from run-off, from time of installation until a sufficient vegetative cover growth (>90% cover) has been established.*
- *All erosion control structures and sediment control fences will be inspected before, during and following each rainfall event and at least daily during periods of prolonged rainfall. Any damage arising from major storm events will be repaired as soon as possible to the satisfaction of the Site Supervisor.*
- *Retained sediment will be removed when it has accumulated to a level of half the height of the fence/barrier and disposed at least 30 m away from any wetland or watercourse in a manner that prevents it from entering a wetland or watercourse. In circumstances where landowners will not permit the use of alternate locations the buffer zone will be reduced to a minimum of 10 m.*

3.2 Air Quality and Dust Control

Outline of Procedure

The construction phase of the project consists mainly of heavy construction work. There can be significant dust generation that may have a substantial temporary impact on local air quality. Dust emissions often vary substantially on a daily basis at construction-sites depending on the level of activity, the specific operations, and the prevailing meteorological conditions. In addition, to a lesser degree emissions during construction will be associated with combustion gases from heavy vehicles, which produce particulate-containing exhaust consisting of a variety of contaminants. The typical contaminants associated with construction activities include carbon monoxide (CO), nitrogen oxides (NO_x), carbon (CO₂), hydrocarbons (HC), total suspended particulate (TSP), and fine and respirable particulates (PM₁₀ and PM_{2.5}).

Principal Environmental Concerns

The on-site construction activities could impact ambient air quality due to vehicular emissions. There are a variety of activities that can lead to the generation of contaminant emissions, primarily of particulate matter, on the construction-site. The primary potential sources include exhaust gas emissions due to incomplete combustion from diesel compression engine, road dust, wind erosion on storage piles, material handling, material transport; and truck loading / truck unloading. There are also emissions of combustion gases and products of incomplete combustion from the exhaust of on-site vehicles and equipment. The table below shows typical output ranges of emissions from diesel engines, depending on the age and technology of the engines.

Typical Emissions from Diesel Engines (Nett Technologies)

CO vppm	HC vppm	PM vppm		NO_x vppm	SO₂ vppm
5 - 1,500	20 - 400	0.1	0.25	50 - 2,500	10 - 150

Environmental Management Measures

The following measures will be implemented, to the extent possible, to control air emissions from construction activities:

- *Use well-maintained heavy equipment and machinery, preferably fitted with muffler/exhaust system baffles, engine covers;*
- *Motorized equipment should meet design specifications for emission controls and conform to provincial Drive Clean standards where appropriate;*
- *Comply with operating specifications for heavy equipment and machinery;*
- *Minimize operation and idling of gas-powered equipment and vehicles, in particular, during smog advisories – this is to be strictly monitored;*
- *Minimize vehicular traffic on exposed soils and stabilize high traffic areas with clean gravel surface layer or other suitable cover material;*
- *Minimize mud tracking by construction vehicles along access routes and areas outside of the immediate work site, and ensure timely cleanup of any tracked mud, dirt and debris;*
- *Cover or otherwise contain loose construction materials that have potential to release airborne particulates during transport, installation or removal; and*
- *Spray water to minimize the release of dust from gravel and exposed soils. Use environmentally-friendly chemical dust suppressants (e.g. Petro-Canada's Dust Suppressant Fluid 65 [DSF65]) only where necessary on problem areas.*

3.3 Noise Control

Outline of Procedure

Noise generated at the site during construction activities, will be largely attributable to operation of heavy construction vehicles as well as activities associated with turbine assembly and site preparation. This section contains measures to minimize noise emissions that may result from construction activities.

Principal Environmental Concerns

The construction phase of the proposed wind farm has the potential to be a noise source, contributing to the ambient acoustic environment of the region. This noise is mainly produced from the operation of construction equipment and vehicular activity. Construction activities will result in noise emissions in the surrounding environment. Noise associated with operation of heavy equipment will be in the range of 80-90 dBA at the source. Unmitigated, these noise emissions can disturb wildlife and may also interfere with the enjoyment of property for residents in the area.

Environmental Management Measures

The following measures will be implemented, to the extent possible, to control noise from construction activities:

- *All site activities will be carefully planned and performed in such a manner that noise is minimized.*
- *The frequency and/or duration of noise producing activities will be minimized wherever possible.*
- *All heavy construction equipment will be maintained in accordance with the manufacturer's specifications and equipped with appropriate mufflers and other noise control equipment to minimize noise where appropriate.*
- *Contractors will comply with the restrictions on hours of work for the site as determined by any applicable bylaws.*
- *All Project vehicles will be properly maintained and muffled to reduce noise emissions.*
- *The Contractor will ensure idling of construction vehicles is limited.*
- *The routing of truck traffic through residential areas will be controlled during the maximum period of activity.*
- *If complaints arise due to noise from truck traffic, acceptable alternate routing may be evaluated by the Contractor and the Municipality and implemented accordingly.*

3.4 Lighting Control

Outline of Procedure

Lights may be associated with equipment operation requirements and general lighting of work areas.

Principal Environmental Concerns

Excessive light emissions may cause a public disturbance in the vicinity of the project area, particularly during regular public off-work hours. Some lighting can also affect migratory paths of birds and lead to increased bird mortalities.

Environmental Management Measures

- *Minimum amount of aviation lighting required by Transport Canada ("TC") should be used, and TC should be consulted to see if white strobe lights with a minimum number of flashes per minute can be used.*
- *Strong lights, such as sodium vapor lights which are often used for security at substation buildings, should be avoided or shielded.*
- *Building lights will be positioned such that the direction of light is opposite to that of any residences, where possible.*
- *Where nuisance to local residents is an issue, scheduling of specific activities may be directed by the Environmental Monitor.*
- *Area lighting will be positioned and directed so as not to cause glare to approaching traffic.*
- *Building and area lighting will be directed toward the ground wherever possible.*

4.0 ENVIRONMENTAL PROTECTION MEASURES - MATERIALS, EQUIPMENT, FACILITIES

4.1 Petroleum, Oils, Lubricants, and Other Hazardous Materials

Outline of Procedure

A variety of potentially hazardous materials will be in use or stored for construction and maintenance activities for the proposed wind farm. Potentially hazardous materials routinely used include: *POLs, hydraulic fluids, acetylene, paints and solvents*. The procedures and requirements of the WHMIS program will be in place to protect employees and are generally applicable to the protection of the environment. These WHMIS procedures and requirements reinforce the proper handling, storage, and control of hazardous or toxic materials thereby reducing the potential for accidental release and consequent potential environmental effects.

Principal Environmental Concerns

The major concern regarding the use of these substances is their uncontrolled release to the environment through accidental spillage, and subsequent adverse effects on terrestrial, aquatic and marine habitat and species, soil, groundwater quality and human health and safety. The following protection measures are intended to minimize the potential for any POL spills on soil, vegetation, surface water, and groundwater.

Storage of Petroleum, Oil, Lubricant and Chemical Handling

All necessary precautions to prevent and minimize the spillage, misplacement or loss of fuels and other hazardous materials shall be taken. All Acts and Regulations pertaining to special substances shall be followed.

The delivery, storage, use and disposal of these hazardous materials will be handled only by trained personnel in accordance with government laws and regulations. The following precautions will be taken in handling POLs and chemicals:

- *The transport of fuel will be conducted in compliance with the Transportation of Dangerous Goods Act.*
- *Mobile fuelling trucks will be used to minimize the requirements for onsite storage of POLs.*
- *Diesel fuel and gasoline may be stored on site in limited quantities. Drums as required for one day's use will be on site, and drums will be delivered on a daily basis. Fuel drums will be stored upright on a deck with drip trays for the collection of spilled substances.*
- *Where possible, vehicle maintenance will be performed off site, at a nearby commercial fuelling station, in order to minimize the amount of lubricants and oils stored on site. On-site POL storage will be in a ventilated, lockable steel container. The container will be equipped with galvanized steel drip trays for the collection of spilled substances.*
- *The on-site POL storage container shall be located on level terrain, at least 100 m from any water body or wetland.*
- *Spill decks will be used for transferring products to smaller containers.*

- *No POL storage will occur in sensitive areas (e.g., near wetlands, watercourses or wells).*
- *Fire extinguishers and a spill kits will be located near POL storage areas.*
- *POL storage areas will be identified by signs, and "No Smoking" signs will be displayed at all POL storage sites and refueling areas.*
- *Smoking will not be permitted within 50 m of any POL storage area. On-site signage will indicate the location of smoking areas.*

POL and Chemical Handling Measures

- Equipment used will be mechanically sound with no oil or gas leaks. The Contractor shall undertake frequent inspection of equipment and repair leaks immediately.
- Fuelling, storage and servicing of vehicles and construction equipment is not allowed within 30 m of a watercourse, drainage ditch, areas with a high water table, or exposed and shallow bedrock.
- Spill clean-up materials shall be accessible and maintained in the areas of fuel and chemical storage. Any spilled fuel or lubricants shall be promptly cleaned up and disposed of in accordance with Ontario MOE requirements (MOE Spills Action Centre - 1-800-268-6060).
- No equipment shall be washed within 30 m of a watercourse.
- All tanks shall be protected from collision damage by the use of snow fencing to alert operators, or by the placement of barriers to impede equipment movement near the tank.
- Handling and fuelling practices shall ensure that contamination of groundwater will not occur.
- Fuel storage areas and transfer lines shall be clearly marked or barricaded to prevent damage from vehicles.
- If drums are stored on their sides, the drums shall be stored so that the bungs are in the 9" and 3" position, on level ground and prevented from rolling.
- Drum storage areas shall be marked or fenced with temporary fence to avoid impacts.
- Day-use quantities can be stored upright or on the side as required. Drip pans lined with absorbent pads shall be used beneath taps.
- All stained soil resulting from the use of chemicals or fuels shall be cleaned-up and disposed of prior to leaving the work area.
- Waste oils and lubricants will be retained in a closed container, and disposed of in an environmentally acceptable manner.

Equipment Fuelling

Only equipment that is not easily transported will be refueled on site. All other vehicles and equipment will be refueled at a central fuelling station:

When refueling equipment, operators will:

- *Use designated fuelling locations where practical;*
- *Use drips trays;*
- *Use leak free containers and reinforced rip and puncture proof hoses and nozzles;*
- *Be in attendance for the duration of the procedure; and*
- *Seal all storage container outlets except the outlet currently in use.*

Fuelling must be done at least 30 m from a wetland or water body. The Construction Manager will make daily inspections of hydraulic and fuel systems on machinery and leaks will be repaired immediately. All spills will be reported to the MOE Spills Action Centre (1-800-268-6060). Servicing of equipment will not be allowed within 100 m of a wetland, watercourse or drainage ditch. Fuelling attendants will be trained in the requirements under the Fuel and Hazardous Material Spills Contingency Plan in this EMP.

POL Waste Disposal

- *Waste POLs will be stored in a ventilated, lockable steel container. The container will be equipped with galvanized steel drip trays for the collection of spilled substances.*
- *Waste solvents and oils will be stored separately.*
- *All used oil and petroleum products will be removed as required and disposed of in an acceptable manner in accordance with government regulations, and requirements.*
- *Waste oil will be collected separately and offered for recycling or stored for collection by an appropriate special waste collection and disposal company.*
- *Greasy or oily rags or materials subject to spontaneous combustion will be deposited, and kept, in an appropriate receptacle. This material will be removed from the work site on a regular basis and will be disposed of in an approved existing waste disposal facility.*
- *POL waste disposal will be the responsibility of the Contractor.*

Spills Response

Various lubricants, oils and fuels will be required during the operations period. Although unlikely, any leakage of oils from the turbines would be captured within the containment system. Spills response activities during the operations will be governed by this EMP. Legislation of relevance to spills management and response include:

- *Environmental Protection Act;*
- *Fisheries Act;*
- *Gasoline Handling Act;*
- *Ontario Pesticides Act;*
- *Ontario Water Resources Act; and,*
- *Transportation of Dangerous Goods Act.*

Federal and Provincial legislation place the responsibility for spill prevention and mitigation on the owner or controller of products or materials that can be spilled. Spills are defined under these Acts, as, but not limited to:

- *Spills from containers including drums and tanks;*
- *Spills resulting from breaks in hydraulic or transfer hoses or piping; and*
- *Spills resulting from traffic accidents and fire fighting.*

In accordance with these Acts, NPI has an obligation to:

- *Prevent, eliminate or remediate an adverse affect resulting from a spill; and*
- *Report the spill to NPI and the Ontario MOE (Spills Action Centre; Tel: 1-800-268-6060).*

NPI and its contractors shall reduce the likelihood of spills by implementing effective spill prevention measures such as the careful handling and proper storage of the products in use. In the event of a spill, the procedures detailed below shall be followed to facilitate a quick response.

Spills Response Measures

- The individual who discovers a leak or spill shall immediately attempt to stop and contain the release.
- Any spill or leak shall be reported immediately to NPI.
- NPI shall immediately report the release to the MOE Spills Action Centre (1-800-268-6060).
- NPI will have the authority to take appropriate action without unnecessary delay.
- NPI shall assume the overall responsibility of coordinating a cleanup and maintaining this contingency plan current and up-to-date. NPI shall, in consultation with regulatory authorities:
 - Deploy on-site personnel to contain the spilled material using a dyke, pit, absorbent material or booms, as appropriate;
 - Assess site conditions and environmental impact of various clean up procedures;
 - Choose and implement appropriate clean up procedure;
 - Deploy on-site personnel to mobilize pumps and empty drums (or other appropriate storage) to the spill site;
 - Apply absorbents as necessary;
 - Dispose of contaminate debris, cleaning materials, and absorbents by placing in an approved disposal site; and,
 - Take all necessary precautions to ensure that the incident does not reoccur.
- NPI shall submit a written report to appropriate regulatory authorities as required by applicable legislation.
- In order to respond to accidental releases, the following resources shall be made available on-site in an appropriate location to allow for immediate use:
 - Absorbent material (i.e., sorbent pads, Sorb-All, vermiculite); and
 - Protective equipment, shovels, rakes, tool kit, buckets and drums, stakes and tarpaulins.

4.2 Solid Waste Disposal

Outline of Procedure

During site preparation, construction, and maintenance, solid waste will be generated. Waste streams have been provisionally classified as domestic waste, paper, card board, wood and scrap steel and metals. This section contains measures for waste minimization, recycling and disposal.

Principal Environmental Concerns

Solid waste if not properly controlled and disposed of, can be unsightly and cause human safety and health concerns. Uncontrolled hazardous waste can contaminate soils, surface and groundwater, and can be toxic to vegetation, fish and wildlife if ingested in sufficient quantities.

Environmental Management Measures

The following protection measures will minimize the potential environmental effects of solid waste disposal:

- *Waste produced during the construction of the McLean's Mountain Wind Farm will be sorted as per the requirements of the Ontario "Waste Watch" Program.*
- *Domestic waste from temporary office quarters will be gathered on a regular basis and stored in closed containers until recycled or disposed of as per the requirements of the Ontario Waste Watch Program.*
- *Food waste will be stored in a manner that ensures wildlife will not be attracted and will be removed from the site on a daily basis.*
- *On-site temporary disposal areas for surplus material will be designated and will be located a minimum of 30 m from a wetland or watercourse. In circumstances where landowners will not permit the use of alternate locations the buffer zone will be reduced to a minimum of 10 m.*
- *The Contractor will, with the prior approval of the Site Supervisor, designate and use areas for the transfer and limited temporary storage of hazardous materials and special wastes. These sites will be properly labeled and appropriately controlled, and will be located a minimum of 30 m from a wetland or watercourse.*
- *All surplus materials, rubbish, waste materials, and construction debris will be removed from the site upon completion of construction of the project.*
- *All waste will be handled in accordance with relevant provincial and federal requirements.*
- *Waste material will not be dumped on-site. In such case as waste materials are inadvertently dumped, the Construction Manager (or designate) will immediately act to have the dumped material cleaned up and removed.*
- *No waste or debris will be permitted to enter any watercourse.*
- *Only material approved by the Environmental Monitor and the Site Supervisor will be disposed of or reused onsite (e.g., clean fill materials).*
- *Run-off from a disposal/storage area will not be allowed to enter a watercourse.*

4.3 Sewage Disposal

Outline of Procedure

Work area facilities for personnel will have sewage collection systems that will comprise temporary toilet and washing facilities or hook-ups to permanent facilities.

Principal Environmental Concerns

In most cases, it is not feasible to install permanent sewage treatment facilities at work sites. Employees will require toilet and washing facilities. The release of untreated sewage is a concern to human health, drinking water quality, and freshwater and marine ecosystems.

Environmental Management Measures

The following protection measures will minimize the potential environmental effects of sewage disposal:

- *Temporary or permanent facilities will be developed in compliance with Ontario's Environmental Protection Act to ensure that sewage effluent is not released untreated to the environment.*

Temporary Sewage Disposal

- *During the initial stages of site development and where it is not feasible to install sewage treatment facilities, portable and/or temporary toilets and wash cars will be developed with holding tanks.*
- *The holding tanks will be pumped and emptied at the treatment facilities, as required.*

Permanent Sewage Disposal

- *Where sewage facilities are required, developments will proceed, in accordance with*
- *Ontario's Environmental Protection Act, for a temporary or permanent sewage collection and treatment system (if required).*

5.0 CONTINGENCY PLANS FOR UNPLANNED EVENTS

5.1 Emergency Response Plan

Employee Training Program

The owners will develop and an operations training program to ensure personnel receive appropriate training in relation to operation and maintenance programs, environmental, health, and safety procedures, and emergency response plan. Training will cover issues such as:

- *Accident reporting;*
- *Chemical and hazardous materials handling;*
- *Fall and arrest protection;*
- *Eye, ears, head, hands, feet, and body protective equipment;*
- *First aid training and equipment;*
- *Equipment operation and hazards;*
- *Fire prevention and response;*
- *Lockout and tag out procedures;*
- *Scaffolds and ladders;*
- *Fire preparedness and response;*
- *Natural disasters (i.e., extreme weather events);*
- *Hazardous materials and spill response;*
- *Medical emergencies; and*
- *Rescue procedures.*

Training should begin as initial staff is hired during the pre-operational mobilization period. There should also be on-going training for personnel as well as specific training sessions for new hires.

5.2 Erosion Control Failure

Outline of Procedure

Control of erosion and potential sedimentation of receiving water bodies is one of the most critical environmental management concerns for this Project. Erosion control methods will be applied where there is the potential for erosion due to rain, flowing water, steep slopes and highly erodible soils. This program contains measures to prevent failure of erosion control structures.

Principal Environmental Concerns

The principal environmental concern is the associated sediment-laden runoff and the resulting effects on water quality, aquatic ecosystems and environmentally sensitive areas such as wetlands.

Environmental Management Measures

The following measures will be implemented to minimize the potential environmental effects in the event of erosion control failure.

Prevention:

- *Erosion control measures will be implemented as described earlier in this EMP, or as deemed necessary by the Construction Project Manager.*
- *Supplies for any emergency response will be on hand at all times. This may include, but not be limited to, straw bales, filter fabric and silt curtains.*

Emergency Response Action Plan:

- *If siltation of the nearby watercourses is observed, notify the Construction Project Manager and identify the source of the siltation. Siltation indicates preventative measures have been ineffective.*
- *Suspend any construction operations contributing to the problem.*
- *Isolate, contain, and control the source using measures such as straw bales or brush mats. Erosion control structures will be fixed immediately.*
- *If the release has affected, or has the potential to affect, a sensitive area (i.e., a wetland or watercourse), the Construction Project Manager or Environmental Monitor will contact and consult with the appropriate regulatory authorities (e.g., OMNR, Fisheries and Oceans Canada) as required for notification and planning.*
- *To ensure that erosion and sediment control measures are in effective working order, their condition will be monitored periodically and prior to, during, and following storm events.*
- *Accumulated sediment will be removed once it reaches a depth of one-half the effective height of the control measure or a depth of 300 mm immediately upstream of the control measure.*
- *For all erosion control measures, accumulated sediment will be removed as necessary to perform maintenance repairs.*
- *Accumulated sediment will be removed immediately prior to the removal of control measures.*
- *The sediment removed will be deposited in an area that is approved by the Construction Project Manager and will not result in erosion and runoff into a watercourse.*

5.2 Fuel and Hazardous Materials Spills

Outline of Procedure

This Fuel and Hazardous Material Spills Contingency Plan presents a detailed response system to deal with accidents such as the release of POLs or other hazardous materials. The objectives of the Plan are to minimize the following:

- *danger to persons;*
- *pollution of land and water;*

- *size of affected area; and*
- *degree of disturbance during clean-up.*

Principal Environmental Concerns

The day-to-day operations of construction equipment, machinery and vehicles, as well as the transfer of fuel from storage containers to these, offer the potential for fuel spills. Other hazardous material products include hydraulic fluids, lubricating oil, solvents, anti-freeze, and paint. Fuels and other hazardous materials can be damaging to vegetation, soil, surface water, groundwater, human health, wildlife and aquatic organisms. Please see **Appendix B** for the required arrangement for a static refueling point.

Environmental Management Measures

Prevention of Fuel and Hazardous Materials Spills

The following measures will be implemented to minimize the potential environmental effects in the event of a fuel or hazardous material spill:

- *Hazardous materials will be handled only by personnel who are trained and qualified in the handling of these materials, and only in accordance with manufacturer's instructions and government regulations. The WHMIS program will be implemented in accordance with the Ontario Occupational Health and Safety Act and Regulations.*
- *All employees involved with hazardous materials will be trained in the use of safety equipment, spill prevention equipment and emergency response procedures.*
- *Hazardous materials will be stored and handled in accordance with applicable provincial and federal regulations, codes and guidelines.*
- *Storage of hazardous materials will not occur in environmentally sensitive areas, such as wetlands or watercourses. Hazardous material containers will be properly labeled in compliance with the requirements of WHMIS.*
- *Material Safety Data Sheets (MSDS) will be available for all hazardous materials in use or stored on-site.*
- *A Fuel and Hazardous Material Spill Contingency Plan has been developed below.*
- *Designated personnel will be trained in the procedures and responsibilities outlined in the Contingency Plan.*
- *All hazardous materials will be removed and disposed of in an acceptable manner in accordance with government regulations and requirements. Hazardous materials may be removed from the site by an appropriate special waste collection and disposal company.*
- *Contaminated materials will be separated from uncontaminated materials and disposed of at approved waste disposal facilities.*
- *Reduce the need for hazardous substances by substituting for less harmful ones.*
- *Incorporate appropriate preventative and response measures and construction practices.*
- *Providing environmental awareness training to contractors and workers involved in the Project. Training will include the handling, clean-up, reporting and disposal of contaminated material.*

- *Maintaining appropriate spill response equipment in a readily accessible location.*
- *Reporting all spills to applicable authorities (e.g., 24-hour emergency reporting system at the MOE Spills Action Centre (1-800-268-6060)).*
- *The inspection of equipment (e.g., construction vehicles, exhaust systems) by the site personnel to ensure that vehicles with obvious fuel or oil leaks do not enter the project area.*

Best management practices prescribe the presence of spill kits on location and on the vehicles. Spill management procedures as outlined in the contingency plan will be followed when a spill occurs. Spill kits are mandatory on site. Any discharge will be cleaned immediately and authorities notified (e.g. OMNR, Department of Fisheries and Oceans).

Contingency and Response Plan

- *If it is safe to do so, the individual who discovers the leak or spill will immediately attempt to stop and contain the leak or spill.*
- *Any spill or leak must be reported immediately to the Construction Project Manager or designate.*
- *The Construction Project Manager will immediately report the spill to the MOE Spills Action Centre 24-hour Report Line (1-800-268-6060).*
- *A Spill Report Form will be filled out and will include:*
 - *a description of the source, including the name of the owner or operator;*
 - *the nature, extent, duration and environmental impact of the release;*
 - *the cause or suspected cause of the release;*
 - *any remedial action taken or to be taken to prevent a recurrence of the leak or spill;*
 - *The site Contractor will have the full authority to take appropriate action without unnecessary delay. The Spill Report Form will be filled out immediately following the discovery of the spill or leak, by the Contractor, and forwarded to the Environmental Monitor; Spill Reports will be made available to the OMNR upon request; and,*
 - *The Contractor will assume the overall responsibility for coordinating the clean-up and maintaining this contingency plan current and up-to-date.*
- *The Contractor will, in consultation with the regulatory authorities (if warranted):*
 - *deploy on-site personnel to contain the spilled material using a dyke, pit, or absorbent material;*
 - *assess site conditions and environmental impact of various cleanup procedures;*
 - *choose and implement an appropriate cleanup procedure;*
 - *deploy on-site personnel to mobilize pumps and empty drums (or other appropriate storage) to the spill site;*
 - *dispose of all contaminated debris, cleaning materials, and absorbents by placing in an approved disposal site; and take all necessary precautions to ensure that the incident does not recur; and,*
 - *The Contractor, with approval by the Environmental Monitor, will send a completed Spill Report Form to the OMNR, as soon as possible, and no later than 30 days after the spill.*

Spill Cleanup Resource List

During construction, the following resources will be available at an appropriate location in readiness to respond to accidental releases of fuels and/or hazardous materials:

- *Absorbent materials (i.e., sorbent pads, Sorb-All, peat moss);*
- *Small equipment such as shovels, rakes, tool kit, sledgehammer, buckets, stakes, tarpaulins, one empty drum, and protective equipment; and,*
- *Refer to the contact list of this EMP which contains the spill response information.*

5.3 Archaeological and Heritage Resources

Outline of Procedure

Archaeological/heritage resources are defined as known archaeological sites, designated historic sites, and heritage structures. These resources are considered important as they are recognized by the Province and form part of a collective body of information used to understand and define the Provincial heritage.

The geographical extent of any adverse effects will be the entire resource and adjacent areas associated with heritage resources that occur within the Project footprint. The magnitude of construction effects on unknown heritage resources will be high, as clearing and excavation activities will expose the resource. This effect will be immediate and irreversible. If unknown resources are encountered during either the construction or operation phase, they will be affected, and effects will be site-specific. However, the potential for significant loss of knowledge would be minimized through the initiation of a contingency plan for affected resources.

In addition to these resources, although much less likely, there is the potential for human remains to be encountered during construction. This plan will guide the Municipality and/or their contractors and subcontractors in how to respond in the event that a potential archaeological resource is encountered during construction activities.

Principal Environmental Concerns

These features represent a valuable cultural resource, and uncontrolled disturbance could result in loss of or damage to these resources and the information represented by them.

Environmental Management Measures

The following measures will be implemented to minimize the potential environmental or cultural effects in the event of the discovery of heritage resources.

Preventing Archaeological and Heritage Resource Encounters

- *All areas containing known historic or archaeological resources will be avoided where possible, and will be flagged or otherwise clearly marked to indicate that the area has elevated archaeological potential and /or significance.*
- *All mechanized vehicles/equipment will remain within the existing site roads except where required for clearing and other construction activities. Vehicles and equipment will avoid areas marked as having elevated archaeological potential.*

Contingency and Response Plan

- *All work will cease in the immediate area of the discovery until such time as the Environmental 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 Monitor with the following information:*
 - *nature of activity resulting in the discovery;*
 - *nature of the material discovered;*
 - *the precise location of the find; and*
 - *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.

5.4 Wildlife Encounters

Outline of Procedure

This program contains measures to minimize interactions that Municipal and Contractor personnel may have with wildlife during Project construction.

Principal Environmental Concerns

Encounters with wildlife may result in distress for both the animal and the employee. Serious injury could result to site workers in some instances. Threats to personnel include encounters with wildlife especially animals with young and rabid animals. Bites from any animals are potentially dangerous. Wildlife encounters have the potential to distress animals to the point of altering feeding and breeding behavior. Physical injury or death to wildlife could also occur.

Environmental Management Measures

Personnel Training

Personnel will be advised of the appropriate measures to use in the event of a wildlife encounter. Personnel will be instructed in the correct and sanitary method of garbage disposal in designated disposal locations; this will minimize wildlife encounters.

Prevention

The following waste disposal recommendations will minimize the attraction of wildlife:

- *Keep work area clean of food scraps and garbage.*
- *Transport waste to an approved landfill on a regular basis.*

Contingency and Response Plan

- *All personnel will report the presence of wildlife to the Construction Project Manager.*
- *When wildlife sightings are reported to the Construction Project Manager, the Construction Project Manager will initiate any reasonable action to reduce the chance of disruption or injury.*
- *Should disruption or injury to the wildlife occur, the Construction Manager will contact the on-call Conservation Officer.*
- *In the case of wildlife encounters in sensitive areas, and for consultation on appropriate action to be taken for any encounter, the Construction Manager will contact the on-call Conservation Officer.*
- *No attempt to harass wildlife will be made by any person at the work site.*
- *Equipment and vehicles will yield the right-of-way to wildlife.*
- *If dead animals are encountered (including birds or bats), they will be removed and disposed of, as soon as possible, in consultation with the local Provincial Wildlife Officer (or, in the case of a pet, the Ontario Humane Society). All handling of bird carcasses will be in accordance with the MBCA salvage permit. If Species at Risk ("SAR") species carcasses are found they will be sent to the Ontario Region Canadian Wildlife Service ("CWS") office with suitable permitting as advised by the Canadian Wildlife Service.*
- *In the case of encounters with injured or diseased wildlife at the work site (including birds or bats), the Construction Manager will contact the on-call Conservation Officer. No attempt will be made to harass the animal, and no person at the work site will come into direct contact with the animal.*
- *Injured birds and other wildlife will be transported to the Wild at Heart Wildlife Refuge Centre in Sudbury (11 White Rd. – Lively, ON Canada P3Y 1C3 - mail@wahrefugecentre.org – 705-692-4478) which has been operating for over 20 years as a non-profit and registered charity, has provided veterinary treatment and rehabilitation to wild animals that are orphaned, sick or injured, so that they may be reintroduced into the wild. The centre's volunteers treat up to 500 animals per year, including songbirds, raptors, shorebirds, waterfowl, small mammals, and orphaned large mammals.*

- *If an injured or dead bird or bat is encountered, the following information will be recorded: date and time it was found, injury sustained (if identifiable), cause of injury (if known), and species. This information will be kept on file for incorporation into the post-construction bird monitoring program.*

5.5 Fires

Outline of Procedure

Activities related to construction could result in a fire that could spread to the surrounding area. Alternatively, a fire started off-site could spread into the Project area. This Contingency Plan contains measures for fire prevention as well as response action plans.

Principal Environmental Concerns

Fires could result in terrestrial habitat alteration, and direct mortality of wildlife. Fire fighting chemicals and spilled materials could enter aquatic habitat and adversely affect biota and habitat. Fires also have the potential to adversely affect air quality and could pose risks to human health and safety.

Environmental Management Measures

The following measures will be implemented to minimize the potential for causing a fire and the potential environmental effects in the event of a fire.

Personnel Training

All persons working on the site will be trained in the use of on-site firefighting equipment, fire prevention and response.

Prevention

- *All flammable waste will be disposed of on a regular basis.*
- *There will be no smoking within 50 m of flammable product storage or usage. Areas for disposal of smoking material will be clearly posted.*
- *Firefighting equipment, sufficient to suit on-site fire hazards, will be maintained in proper condition and to the manufacturer's standards.*

Contingency and Response Plan

- *Notify nearby personnel.*
- *On-site personnel will take immediate steps to extinguish the fire using appropriate equipment.*
- *Notify the Environmental Monitor and Construction Manager.*
- *If the fire cannot be contained, contact the NEMI Fire Department at 9-1-1.*
- *In case of related medical emergencies, emergency medical assistance will be requested from 9-1-1.*

Decommissioning Program

The design life of the wind turbines is estimated to be approximately 30 years, but it is possible that the turbines could continue to operate at the same location after the design life either through major turbine overhauls or with the replacement of the turbines with newer models.

Should decommissioning become necessary, the owners would follow the standard industry accepted practices in effect at that time. Such practices include the removal of facilities, recycling of suitable materials (e.g., metal and parts), reuse of components and equipment in other facilities, conversion of buildings to other uses, and/or rehabilitation of the site areas. This would include the removal of the turbines bases to a depth of approximately 1 m or bedrock and backfilling with a final layer of top soil. Similarly, access road base material would be removed and the areas returned to their former state (e.g., agriculture on natural habitat).

Health and Safety Plan

The Project has been designed and will be constructed, operated and decommissioned using applicable standards and industry best practices. Equipment will be inspected regularly and maintained to prevent any potential health or safety issues.

Accidents and malfunctions with short-term impacts may occur. More serious impacts are considered to be highly unlikely.

6.0 ENVIRONMENTAL INSPECTION AND MONITORING

In compliance with the REA, associated Natural Heritage Assessment reports were submitted to the Ontario Ministry of Natural Resources and written confirmation received that appropriate procedures were followed. Through a records review, site investigation and natural features evaluation of significance, it was determined that significant and/or provincially significant natural features exist within the project location or prescribed setback areas, as outlined in **Table 1**. The EIS Report demonstrates how negative environmental effects of the project will be mitigated, and sets out a program for ongoing monitoring of the effectiveness of the mitigation measures. **Table 2** above provides a description of performance objectives in respect of each negative environmental effect; mitigation measures planned to achieve performance objectives; how the project is to be monitored; and a contingency plan to be implemented should monitoring reveal that mitigation measures have failed. The EIS Report was completed to mitigate any potential negative environmental effects to the following significant or provincially significant natural features:

- Wetland 1 to 10;
- Waterfowl Nesting 1, 4 and 5;
- Raptor Winter Feeding and Roosting 3 & 4;
- Alvar 1 to 4;
- Woodland Amphibian Breeding Habitat 1 to 8;
- Turtle Over-wintering Area 1 to 6;
- Sites Supporting Area-sensitive Species: Forest Birds 1 & 2;
- Sites Supporting Area-sensitive Species: Open Country Breeding Birds 3 & 4;
- Species of Conservation Concern – Cooper's Milkvetch, Slender Blazing Star, Clustered Broomrape, Prairie Dropseed, Short-eared Owl, Canada Warbler, Common Nighthawk & Snapping Turtle

Table 2 outlines how the activities related to the construction, operation and decommissioning of the facility affect these natural features and the appropriate mitigation and monitoring work

to be implemented. Specifics of the Environmental Effects Monitoring Plan for bird and bats as mentioned in **Table 2**, is provided in **Appendix D. Table 2** also makes reference to “see Section 6 for mitigation commitments to compensate for habitat loss and disturbance”. The mitigation commitments being referred to are for Raptor Winter Roosting and Feeding Area, Sites Supporting Area Sensitive Species: Open-Country Breeding Birds, Sites Supporting Area Sensitive Species: Forest Birds and Waterfowl Nesting Habitat. Compensation for habitat loss and disturbance for each of these habitats is itemized below.

Raptor Winter Roosting and Feeding Area and Sites Supporting Area Sensitive Species: Open-Country Breeding Birds

Develop an agreement with current participating landowners of Lot 7 and 8 of Concession 7, north of the cluster of wind turbines (T5, T6, T9, T10, T13, T15), to manage an area of 15 ha of open country habitat (i.e. Raptor Winter Roosting & Feeding Area and Open-Country Breeding Birds). This area to be managed is equal to or greater than that being removed or displaced by the above turbines, associated access roads and transmission line. The focus of this habitat management program should be to ensure:

1. Active maintenance of open country habitat, consisting of either cattle grazing or bi-annual cutting of herbaceous and woody debris, to prevent succession or change in land-use. This will ensure 15 ha of undisturbed open country habitat on Lot 7 and 8 of Concession 7 remains available for Open-Country Breeding Birds; and
2. Similar habitat maintenance will also provide the necessary habitat for a population of small mammals. These small mammals will support the Raptor Winter Roosting and Feeding Habitat; and
3. Agreement of participating landowners within the management zone (15 ha of Lot 7 and 8 of Concession 7), which prohibits cutting between May 15 to July 15.

Sites Supporting Area Sensitive Species: Forest Birds

Develop an agreement with current participating landowner of Lot 33, Concession 1, to manage a 3 ha area of treed pasture adjacent to turbine 35. This area is equal to or greater than that being removed or displaced as a result of turbine construction, associated access roads and feeder line. The focus of the habitat management program should ensure:

1. Agreement of participating landowner of Lot 33 Concession 1, which overlaps Forest Bird Interior 1 and 2 to not undertake any modification of the forest that would create gaps greater than 20m wide or decrease the canopy cover to less than 75%;
2. Expansion of interior forest habitat through infilling incised areas which currently have a treed pasture community with restoration plantings. This should be completed with native trees species which complement the adjacent vegetation communities and environmental conditions.

Waterfowl Nesting Habitat

Develop an agreement with current participating landowners to manage availability of nesting habitat within Waterfowl Nesting Areas 1, 4 and 5. This area will be equal to or greater than that being removed or displaced (1.4 ha) as a result of turbine construction and feeder line installation. The focus of the habitat management program should ensure:

1. Strategic placement of waterfowl nest boxes within Waterfowl Nesting Area 1, 4 and 5, greater than 200m from turbine edge.

Species at Risk and other Approval and Permitting Requirements

Specific mitigation and or permits required for Species at Risk as well as other requirements specific to the MNR's Approval and Permitting Requirements Document for Renewable Energy (MNR 2009), are being discussed directly with the MNR and will be implemented as directed by



the MNR.

Table 1: Summary of the Natural Heritage Assessment for McLean's Mountain Wind Farm

Natural Feature	Applicable Project Component(s)	Distance Between Feature & Project Location (metres)	Summary of Natural Heritage Assessment			EIS Required?
			Identified During Records Review?	Identified, Verified or Refined During Site Investigation?	Evaluation of Significance Results	
Provincial Parks and Conservation Reserves						
Not applicable to project location						
ANSI, Life Science						
Not applicable to project location						
ANSI, Earth Science						
Not applicable to project location						
Valleylands						
Not applicable to project location						
Wetlands						
1	T40, Horizontal Directional Drilling (HDD) Access/Exit Pit, Access Road, Feeder Lines	30 m	✓	Refined	Prov. Significant	✓
2	HDD Access/Exit Pit, Feeder Lines	30 m	☒	Identified	Prov. Significant	✓
3	HDD Access/Exit Pit, Access Road, Feeder Lines	25 m	☒	Identified	Prov. Significant	✓
4	Access Road, Feeder Lines	0m	☒	Identified	Prov. Significant	✓
5	Access Road, Feeder Lines	0m	☒	Identified	Prov. Significant	✓
6	HDD Access/Exit Pit, Access Road, Feeder Lines, T23	30 m	☒	Identified	Prov. Significant	✓
7	Access Road, Feeder Lines, T30	52 m	✓	Refined	Prov. Significant	✓
8	Access Road	5 m	☒	Identified	Prov. Significant	✓
9	Access Road	2 m	☒	Identified	Prov. Significant	✓
10	Access Road	40 m	☒	Identified	Prov. Significant	✓
11	Access Road	75 m	☒	Identified	Not Significant	☒

Natural Feature	Applicable Project Component(s)	Distance Between Feature & Project Location (metres)	Summary of Natural Heritage Assessment			EIS Required?
			Identified During Records Review?	Identified, Verified or Refined During Site Investigation?	Evaluation of Significance Results	
12	Transmission line	Within	<input checked="" type="checkbox"/>	Identified	Not Significant	<input checked="" type="checkbox"/>
Seasonal Concentration Areas						
Waterfowl Nesting Area – WNA 1	HDD Access/Exit Pit, Feeder Line and Access Road, T40, T42	Within project location	<input checked="" type="checkbox"/>	Identified as Candidate	Significant	<input checked="" type="checkbox"/>
Waterfowl Nesting Area – WNA 4	HDD Access/Exit Pit, Feeder Line and Access Road, T29	Within project location	<input checked="" type="checkbox"/>	Identified as Candidate	Significant	<input checked="" type="checkbox"/>
Waterfowl Nesting Area – WNA 5	T6	Within 120m	<input checked="" type="checkbox"/>	Identified as Candidate	Significant	<input checked="" type="checkbox"/>
Waterfowl Nesting Area – WNA 2 & 3	HDD Access/Exit Pit, Feeder Line and Access Road,	Within project location	<input checked="" type="checkbox"/>	Identified as Candidate	Not Significant	<input checked="" type="checkbox"/>
Raptor Winter Feeding and Roosting Area RWFR 1 & 2	HDD Access/Exit Pit, Feeder Line, Access Road, T16, T29	Within project location	<input checked="" type="checkbox"/>	Identified as Candidate	Not Significant	<input checked="" type="checkbox"/>
Raptor Winter Feeding and Roosting Area RWFR 3	Turbine 34, Feeder Line and Access Road	Within project location	<input checked="" type="checkbox"/>	Identified as Candidate	Significant	<input checked="" type="checkbox"/>
Raptor Winter Feeding and Roosting Area RWFR 4	T6, T5, T13, T10, T9, T15, T19, T20 Construction Staging Area, Feeder line and Transmission line -	Within project location	<input checked="" type="checkbox"/>	Identified as Candidate	Significant	<input checked="" type="checkbox"/>
Bullfrog Concentration Area - BCA 1, 2, 3, 4, 5 & 6	HDD Access/Exit Pit, Feeder Line and Access Road, T40, T23	Within 120m	<input checked="" type="checkbox"/>	Identified as Candidate	Not Significant	<input checked="" type="checkbox"/>
Rare Vegetation Communities						

Natural Feature	Applicable Project Component(s)	Distance Between Feature & Project Location (metres)	Summary of Natural Heritage Assessment			EIS Required?
			Identified During Records Review?	Identified, Verified or Refined During Site Investigation?	Evaluation of Significance Results	
Alvar - ALV 1, 2	Feeder Line	Within 120m	<input checked="" type="checkbox"/>	Identified as Candidate	Significant	✓
Alvar - ALV 3	Feeder Line & HDD Access/Exit Pit	Within project location	<input checked="" type="checkbox"/>	Identified as Candidate	Significant	✓
Alvar - ALV 4	Transmission Line	Within 120m	<input checked="" type="checkbox"/>	Identified as Candidate	Significant	✓
Alvar - ALV 5	Transmission Line	Within project location	<input checked="" type="checkbox"/>	Identified as Candidate	Not Significant	<input checked="" type="checkbox"/>
Specialised Wildlife Habitat						
Woodland Amphibian Breeding Habitat - WABH 1 & 7	Feeder Line & HDD Access/Exit Pit	Within 120 m	<input checked="" type="checkbox"/>	Identified as Candidate	Significant	✓
Woodland Amphibian Breeding Habitat – WABH 2	T40, Feeder Line and Access Road	Within 120 m	<input checked="" type="checkbox"/>	Identified as Candidate	Significant	✓
Woodland Amphibian Breeding Habitat - WABH 3 & 4	Feeder Line & HDD Access/Exit Pit	Within 120 m	<input checked="" type="checkbox"/>	Identified as Candidate	Not Significant	<input checked="" type="checkbox"/>
Woodland Amphibian Breeding Habitat - WABH 5	HDD Access/Exit Pit, Feeder Line & Access Road	Within 120 m	<input checked="" type="checkbox"/>	Identified as Candidate	Significant	✓
Woodland Amphibian Breeding Habitat - WABH 6	Feeder Line & Access Road	Within 120 m	<input checked="" type="checkbox"/>	Identified as Candidate	Significant	✓
Woodland Amphibian Breeding	Feeder Line & T23	Within 120 m	<input checked="" type="checkbox"/>	Identified as Candidate	Significant	✓

Natural Feature	Applicable Project Component(s)	Distance Between Feature & Project Location (metres)	Summary of Natural Heritage Assessment			EIS Required?
			Identified During Records Review?	Identified, Verified or Refined During Site Investigation?	Evaluation of Significance Results	
Habitat - WABH 8						
Turtle Overwintering Areas - TOA 1	T40, HDD Access/Exit Pit, Feeder Line & Access Road	Within 120 m	<input checked="" type="checkbox"/>	Identified as Candidate	Significant	✓
Turtle Overwintering Areas - TOA 2	HDD Access/Exit Pit, Feeder Line	Within 120 m	<input checked="" type="checkbox"/>	Identified as Candidate	Significant	✓
Turtle Overwintering Areas - TOA 3	HDD Access/Exit Pit, Feeder Line & Access Road	Within 120 m	<input checked="" type="checkbox"/>	Identified as Candidate	Significant	✓
Turtle Overwintering Areas - TOA 4	Feeder Line	Within 120 m	<input checked="" type="checkbox"/>	Identified as Candidate	Significant	✓
Turtle Overwintering Areas - TOA 5	HDD Access/Exit Pit, T23, Feeder Line and Access Road	Within 120 m	<input checked="" type="checkbox"/>	Identified as Candidate	Significant	✓
Turtle Overwintering Areas - TOA 6	Access Road	Within 120 m	<input checked="" type="checkbox"/>	Identified as Candidate	Significant	✓
Sites Supporting Area-sensitive Species: Forest Birds - FB 1	T43, T39, Feeder line & Access Road	Within project location	<input checked="" type="checkbox"/>	Identified as Candidate	Significant	✓
Sites Supporting Area-sensitive	HDD Access/Exit Pit & Feeder Line	Within project location	<input checked="" type="checkbox"/>	Identified as Candidate	Significant	✓

Natural Feature	Applicable Project Component(s)	Distance Between Feature & Project Location (metres)	Summary of Natural Heritage Assessment			EIS Required?
			Identified During Records Review?	Identified, Verified or Refined During Site Investigation?	Evaluation of Significance Results	
Species: Forest Birds - FB 2						
Sites Supporting Area-sensitive Species: Forest Birds - FB 3, 4 & 5	HDD Access/Exit Pit, T17, T21, T11, T14, Feeder Line & Access Road	Within project location	<input checked="" type="checkbox"/>	Identified as Candidate	Not Significant	<input checked="" type="checkbox"/>
Sites Supporting Area-sensitive Species: Open Country Breeding Birds - OCBB 1	Feeder Line & Access Road	Within project location	<input checked="" type="checkbox"/>	Identified as Candidate	Not Significant	<input checked="" type="checkbox"/>
Sites Supporting Area-sensitive Species: Open Country Breeding Birds - OCBB 2	HDD Access/Exit Pit, T29, T16, Feeder Line & Access Road	Within project location	<input checked="" type="checkbox"/>	Identified as Candidate	Not Significant	<input checked="" type="checkbox"/>
Sites Supporting Area-sensitive Species: Open Country Breeding Birds - OCBB 3	T34	Within 120m	<input checked="" type="checkbox"/>	Identified as Candidate	Significant	✓
Sites Supporting Area-sensitive Species: Open Country Breeding Birds - OCBB 4	T6, T5, T13, T10, T9, T15, Feeder Line, Construction Staging Area, Access Road & Transmission line	Within project location	<input checked="" type="checkbox"/>	Identified as Candidate	Significant	✓
Sites Supporting Area-sensitive Species: Open Country Breeding Birds - OCBB 5	Access Road	Within project location	<input checked="" type="checkbox"/>	Identified as Candidate	Not Significant	<input checked="" type="checkbox"/>
Habitat of Species of Conservation Concern						

Natural Feature	Applicable Project Component(s)	Distance Between Feature & Project Location (metres)	Summary of Natural Heritage Assessment			EIS Required?
			Identified During Records Review?	Identified, Verified or Refined During Site Investigation?	Evaluation of Significance Results	
Northern Shrike	---	---	✓	Identified as Candidate	Not Significant	<input checked="" type="checkbox"/>
Rough-legged Hawk	---	---	✓	Identified as Candidate	Not Significant	<input checked="" type="checkbox"/>
Olive-sided Flycatcher	---	---	✓	Identified as Candidate	Not Significant	<input checked="" type="checkbox"/>
Red-headed Woodpecker	---	---	✓	Identified as Candidate	Not Significant	<input checked="" type="checkbox"/>
Short-eared Owl	See OCBB4	See OCBB4	✓	Identified as Candidate	Significant	✓
Bald Eagle	---	---	✓	Identified as Candidate	Not Significant	<input checked="" type="checkbox"/>
Common Snapping Turtle	See TOA	See TOA	✓	Identified as Candidate	Significant	✓
Cooper's Milkvetch	T30	10 m from T30	✓	Identified as Candidate	Significant	✓
Slender Blazing Star	Transmission Line	Within 120m	✓	Identified as Candidate	Significant	✓
Clustered Broomrape	No occurrence known	--	✓	Identified as Candidate	Significant	✓
Prairie Dropseed	No occurrence known	--	✓	Identified as Candidate	Significant	✓

Potential Negative/Positive Effect(s)		Significant Natural Feature Affected by Activity	Performance Objective	Mitigation Measures	Residual Effects	Monitoring Strategy & Methods	Monitoring Locations	Frequency & Duration	Reporting Requirements	Contingency Measures
Physical	Functional									
<ul style="list-style-type: none"> ▪ Potential for increased erosion and sedimentation on adjacent lands ▪ Removal of vegetation adjacent to natural features 	<ul style="list-style-type: none"> ▪ Habitat fragmentation and decreased shade cover in areas adjacent to natural feature ▪ Increased vulnerability of the cleared area to invasion by non-native species ▪ Greater exposure of wildlife to predation through the opening of interior habitat to increased predator activity ▪ Greater potential for reduced water quality required for successful breeding 	Wetland 1, 3, 6, 7, Woodland Amphibian Breeding Habitat 1, 2, 5, Turtle Over-wintering Habitat 1, 2, 3, 4, 5, 6	Prevent erosion and sedimentation of adjacent lands, minimize removal of vegetation and maintain water quality of natural feature	<ul style="list-style-type: none"> ▪ Develop and implement an erosion and sediment control plan before removing vegetation ▪ Fencing of boundary between wetland and area to be cleared to prevent encroachment ▪ Erosion and sediment control plan and/or fencing will be designed in a manner that does not prevent turtle access/exit to over-wintering habitat 	No Residual Effect	Monitor the effectiveness of the erosion and sedimentation control measures	Areas of clearing and grubbing within 30m of a wetland, Woodland Amphibian Breeding Habitat and Turtle Over-wintering Habitat	Biweekly and/or after a 10mm rain event until vegetation is re-established	<p>Notification of incident to the appropriate onsite personnel</p> <p>Identification of results, issue and resolution in annual report, which is to be submitted to the MNR</p>	Soils stabilization treatment and native replacement plantings to be provided in significantly disturbed areas with repeated erosion and sedimentation control measure failures
<ul style="list-style-type: none"> ▪ Limited potential for increased erosion and sedimentation to enter into habitat ▪ Removal/storage of spoils from HDD Access/Exit Pit on either side of Perch Creek. 	<ul style="list-style-type: none"> ▪ Localized temporary displacement of wildlife due to noise and vibration 	Wetland 1, 2, 3, 4, 5, 6, 7, Waterfowl Nesting Area 1, 4, Raptor Winter Feeding and Roosting Area 3, Woodland Amphibian Breeding Habitat 1, 3, 4, 6, 7, 8	Remove or contain spoils from HDD on site	<ul style="list-style-type: none"> ▪ Ensure all spoils from site are removed in a timely manner. If any storage of spoils is required they should be no closer than 30m from the wetland ▪ Implement erosion and sediment control plan to ensure no transportation of spoils into adjacent areas ▪ Re-grade to preconstruction condition and re-vegetate using native plant species typical of the adjacent habitat 	No Residual Effect		In areas where HDD spoils are stored between 120m and 30m from natural features	Biweekly and/or after a 10mm rain event until spoils are removed and vegetation is re-established		Any failure of sediment and erosion control measures meant to contain spoils will result in spoils being trucked offsite or at a minimum > 120m away from a natural feature
<ul style="list-style-type: none"> ▪ Loss of native substrate and potential for imported gravel material 	<ul style="list-style-type: none"> ▪ Loss of plant diversity in localized area adjacent to road 	Wetland 1, 3, 7, Waterfowl Nesting Area 1, Woodland Amphibian Breeding Habitat 5, 6	Prevent reduction in quality or loss of plant/vegetation	<ul style="list-style-type: none"> ▪ Design roads to promote infiltration (e.g. use of gravel materials); 	Minimal Residual Effect – road area small, thus marginal	Visual assessment of vegetation communities for	Areas adjacent to access roads and turbine basis	At the end of construction	Identification of results, issue and resolution in annual report,	Foreign substrate to be removed and native replacement plantings to be

Potential Negative/Positive Effect(s)		Significant Natural Feature Affected by Activity	Performance Objective	Mitigation Measures	Residual Effects	Monitoring Strategy & Methods	Monitoring Locations	Frequency & Duration	Reporting Requirements	Contingency Measures
Physical	Functional									
<ul style="list-style-type: none"> to enter into immediately adjacent habitat during storm events Increased runoff during storm events as a result of reduced infiltration in local area 	<ul style="list-style-type: none"> Where road substrate is removed post-construction, imported soil has the potential to support the growth of non-native species Loss of upland forage structure in localized area adjacent to road 	Woodland Amphibian Breeding Habitat 5	communities adjacent to access roads and turbine basis	<ul style="list-style-type: none"> Maintain or provide vegetative buffers; Stock piled materials necessary for construction will be placed greater than 30m away from a wetland and potential sedimentation arising from these will be contained by the erosion and sediment control measures. 	decrease in localized infiltration expected; negligible change to surface water runoff volumes expected from pre-development conditions	disturbance			which is to be submitted to the MNR	provided in significantly disturbed areas
<ul style="list-style-type: none"> Disturbance of vegetation that has regenerated adjacent to access road during the operational period 	<ul style="list-style-type: none"> Increased vulnerability of the site to invasion by non-native species 	Wetland 1, 3, 6, 7, 8, 9, 10, Waterfowl Nesting Area 1, 4 & 5, Raptor Winter Feeding and Roosting Area 4, Woodland Amphibian Breeding Habitat 2, 5, 6, Turtle Over-wintering Habitat 1, 3, Area Sensitive Species: Forest Birds FB 1, Area Sensitive Species: Open Country Breeding Birds OCBB 3, 4	Reduce disturbance of vegetation that has regenerated around project components that are to be removed	<ul style="list-style-type: none"> Confine disturbance to the smallest area possible No additional footprint disturbance than was created during construction Re-vegetate disturbed area with fast growing competitive nurse crop; Develop and implement an erosion and sediment control plan prior to decommissioning Cease decommissioning in Waterfowl Nesting Area during April 15 to June 15, May 1 to July 15 for other natural features 	No Residual Effect	Monitor establishment of nurse crop as well as the effectiveness of the erosion and sediment control plan	A representative subset of project components where habitat is disturbed, including those within 30m of a wetland, Woodland Amphibian Breeding Habitat and Turtle Over-wintering Habitat	Biweekly and/or after a 10mm rain event for one growing season until vegetation is re-established	Notification of incident to the appropriate onsite personnel. Identification of results, issue and resolution in annual report, which is to be submitted to the MNR	Where nurse crop does not sufficiently establish itself and erosion is observed to be occurring, reseed and monitor
<ul style="list-style-type: none"> Existing access road to follow an esker and material to be used as construction material, which may result in reduced stability of landform composed of 	<ul style="list-style-type: none"> Clearing of forest vegetation along slope of road as material is extracted for other construction purposes. Potential to reduce the quality of natural features 	Wetland 6, 8, 9, 10, Waterfowl Nesting Area 4	Prevent the sedimentation of wetland at the base of esker road slope	<ul style="list-style-type: none"> Use existing access road (esker) and minimize widening Minimize vegetation removal on slopes and add additional thick native shrub plantings at the base of slope closest to 75m Wetland 6 finger in 	Minimal Residual Effect – provided: appropriate construction monitoring occurs’ erosion and sediment	Monitor the effectiveness of the erosion and sedimentation control measure protecting & visually inspect slope stability	Areas of wetland 6, 8, 9 and 10 that are closest to the access road	Bi-weekly during construction and monthly after construction for 2 years (except during	Identification of results, issue and resolution in annual report, which is to be submitted to the MNR	Stabilize slopes ; remove esker material which has reduced quality of wetland and provide native replacement plantings of an appropriate extent

Potential Negative/Positive Effect(s)		Significant Natural Feature Affected by Activity	Performance Objective	Mitigation Measures	Residual Effects	Monitoring Strategy & Methods	Monitoring Locations	Frequency & Duration	Reporting Requirements	Contingency Measures
Physical	Functional									
<ul style="list-style-type: none"> unconsolidated material ▪ Increased erosion of esker material into down slope natural features 	<ul style="list-style-type: none"> vegetation immediately down slope of access road 			<ul style="list-style-type: none"> proximity to access road ▪ Maintain appropriate side slopes and add native plantings to stabilize material during and after removal ▪ Develop and implement an erosion and sediment control plan before removing vegetation on slopes and before any extraction ▪ Stock piled materials necessary for construction will be placed greater than 30m away from a wetland and potential sedimentation arising from these will be contained by the erosion and sediment control measures. 	<ul style="list-style-type: none"> control structure is maintained, additional native plantings added and side slopes are stabilized effects will be decreased 	and wetland		winter when snow cover is present)		and species diversity to ensure no net lose of wetland vegetation and function
<ul style="list-style-type: none"> ▪ Loss of forest vegetation 	<ul style="list-style-type: none"> Disturbance/displacement of wintering raptors, especially Short-eared Owl from local area 	Raptor Winter Feeding and Roosting Area 3	<ul style="list-style-type: none"> Monitor effectiveness of project location design to prevent the displacement of wintering raptors 	<ul style="list-style-type: none"> ▪ Project location designed to be on the periphery of this habitat and minimize the loss of vegetation ▪ Additional pre-construction surveys will be conducted to further assess the significance of this feature. If the feature continues to be considered significant, mitigation, as detailed here, is required. Pre-construction surveys to be conducted will be confirmed in consultation with the MNR. 	No Residual Effect	Behavioural and mortality post construction monitoring developed in consultation with MNR	Raptor Winter Feeding and Roosting Area 3 & 4, Forest Birds FB 2, Area Sensitive Species: Open Country Breeding Birds OCBB 3, 4	Winter season for 3 years post-construction	<ul style="list-style-type: none"> Identification of results, issue and resolution in bird and bat post-construction annual report, which is to be submitted to the MNR 	<ul style="list-style-type: none"> Possible change in project operations as determined necessary through consultation with MNR and Northland Power Inc. Possible habitat compensation in other areas of Manitoulin Island, as determined appropriate with MNR and NLP Inc.

Potential Negative/Positive Effect(s)		Significant Natural Feature Affected by Activity	Performance Objective	Mitigation Measures	Residual Effects	Monitoring Strategy & Methods	Monitoring Locations	Frequency & Duration	Reporting Requirements	Contingency Measures
Physical	Functional									
				<ul style="list-style-type: none"> See Section 9.1 for mitigation commitments to compensate for habitat loss and disturbance. 						
Loss of open pasture habitat	Reduced foraging area for winter raptors	Raptor Winter Feeding and Roosting Area 4	Monitor the level of displacement or mortality of birds associated with significant wildlife habitats	<ul style="list-style-type: none"> To the degree possible, the project location has been designed to minimize habitat displacement and reduce potential disturbance of winter raptors using this area. <ul style="list-style-type: none"> Construction to be done outside of the winter months to avoid disturbance to wintering raptors Additional pre-construction surveys will be conducted to further assess the significance of this feature. If the feature continues to be considered significant, mitigation, as detailed here, is required. Pre-construction surveys to be conducted will be confirmed in consultation with the MNR. See Section 9.1 for mitigation commitments to compensate for habitat loss and disturbance. 	Minimal Residual Effect					
<ul style="list-style-type: none"> Displacement/mortality of birds 	<ul style="list-style-type: none"> Reduced foraging/breeding area, abundance and diversity 	Waterfowl Nesting Area 1, 4 & 5, Raptor Winter Feeding and Roosting Area 4, Area Sensitive Species: Forest Birds FB 1, Area Sensitive		<ul style="list-style-type: none"> 3 year post-construction behavioural and mortality monitoring, consistent with MNR protocols, to assess 	Minimal Residual Effect					

Potential Negative/Positive Effect(s)		Significant Natural Feature Affected by Activity	Performance Objective	Mitigation Measures	Residual Effects	Monitoring Strategy & Methods	Monitoring Locations	Frequency & Duration	Reporting Requirements	Contingency Measures
Physical	Functional									
		Species: Open Country Breeding Birds OCBB 3, 4		<ul style="list-style-type: none"> impacts of turbines on birds for the purpose of advising on mitigation strategies to be used as part of an adaptive management plan Potential occurrence of raptor mortality during winter months will be completed during behavioural monitoring. 						
<ul style="list-style-type: none"> Potential for increased erosion and sedimentation within and adjacent to Alvars Disturbance of adjacent habitat and potential for sedimentation of area where Slender Blazing Star plants occur during extreme storm event 	<ul style="list-style-type: none"> Disruption of indicator species in Alvar 3 Increased vulnerability of the cleared area to invasion by non-native species within Alvar 3 and adjacent to Alvar 1, 2 & 4 Reduction in quality of plants and germination of seeds in areas associated with Alvar 4 Slender Blazing Star occurrence 	Alvar 1, 2, 3 & 4 including Slender Blazing Star Associated with Alvar 4	Prevent sediment and erosion within or immediately adjacent to Alvars and protect indicator species	<ul style="list-style-type: none"> Develop and implement an erosion and sediment control plan before removing vegetation Fencing of boundary between Alvar community and area to be cleared/disturbed to prevent encroachment 	No Residual Effect	Monitor the effectiveness of the erosion and sedimentation control measures	Areas of clearing and grubbing within 30m of a Alvar	Biweekly and/or after a 10mm rain event until vegetation is re-established	<ul style="list-style-type: none"> Notification of incident to the appropriate onsite personnel Identification of results, issue and resolution in annual report, which is to be submitted to the MNR 	Soils stabilization treatment and native replacement plantings to be provided in significantly disturbed areas with repeated erosion and sedimentation control measure failures
<ul style="list-style-type: none"> Displacement and disturbance of area sensitive forest birds 	<ul style="list-style-type: none"> Reduced recruitment 	Area Sensitive Species: Forest Birds FB 2	Monitor the level of displacement or mortality of birds associated with significant wildlife habitats	<ul style="list-style-type: none"> Avoid site preparation and construction during the core breeding bird season (May 1 to July 15) 	No Residual Effect	Behavioural and mortality post construction monitoring developed in consultation with MNR	Waterfowl Nesting Areas 1, 4 & 5, Forest Birds FB 1, 2, Area Sensitive Species: Open Country Breeding Birds OCBB 3, 4	Breeding season for 3 years post-construction	<ul style="list-style-type: none"> Identification of results, issue and resolution in bird and bat post-construction annual report, which is to be submitted to the MNR 	<ul style="list-style-type: none"> Possible change in project operations as determined necessary through consultation with MNR and Northland Power Inc. Possible habitat compensation in other areas of Manitoulin Island, as determined appropriate with
<ul style="list-style-type: none"> Removal of a small portion of habitat Localized disturbance/displacement /mortality of waterfowl/areas sensitive birds 	<ul style="list-style-type: none"> Greater exposure of wildlife (birds) to predation and parasitism Reduced recruitment 	Waterfowl Nesting Area 1, 4 & 5, Area Sensitive Species: Forest Birds FB 1, Area Sensitive Species: Open Country Breeding Birds OCBB 3, Area Sensitive Species: Open Country Breeding Birds OCBB 4		<ul style="list-style-type: none"> Avoid site preparation and construction during the core breeding bird season (May 1 to July 15), for waterfowl nesting areas dates will be April 15 to June 15 See Section 9.1 for mitigation commitments to compensate 	Minimal Residual Effect					

Potential Negative/Positive Effect(s)		Significant Natural Feature Affected by Activity	Performance Objective	Mitigation Measures	Residual Effects	Monitoring Strategy & Methods	Monitoring Locations	Frequency & Duration	Reporting Requirements	Contingency Measures
Physical	Functional									
				for habitat loss and disturbance.						
<ul style="list-style-type: none"> Loss of Cooper's Milkvetch 	<ul style="list-style-type: none"> The individual was the only one observed in the study area 	Species of Conservation Concern – Cooper's Milkvetch	Prevent the disturbance or possible extirpation of Cooper's Milkvetch from the local area	<ul style="list-style-type: none"> Transplant Cooper's Milkvetch from area around Turbine 30 and plant other individuals within appropriate habitat Monitor transplants/plantings to document plant survivorship 	No Residual Effect	Monitor the survivorship of transplanted and other planted Cooper's Milkvetch	Alvar habitat with low potential for disturbance	Twice yearly for two years after transplant during the growing season.	Identification of results, issue and resolution in annual report, which is to be submitted to the MNR.	Provide additional plantings and locations if survivorship is found to be low
<ul style="list-style-type: none"> Potential loss of plants of conservation concern 	<ul style="list-style-type: none"> A single individual removed could influence survivorship of species in the larger area 	Plant Species of Conservation Concern – Clustered Broomrape, Prairie Dropseed, Slender Blazing Star and Cooper's Milkvetch	Prevent the disturbance or possible extirpation of listed plants from the local area	<ul style="list-style-type: none"> As a precaution, assess areas of project location with appropriate habitat for presence of species prior to clearing. This is recommended due to recent changes in project location Transplant any occurrence observed and plant other individuals within appropriate habitat Monitor transplants/plantings to document plant survivorship 	No Residual Effect	Were appropriate habitat occurs and prior to clearing, a search for plant species of conservation concern will be completed within the footprint to be cleared	Clustered Broomrape – Alvar; Prairie Dropseed - Alvars and prairie/grassland ; Slender Blazing Star - limestone and dolostone pavement, prairies and open woods; Cooper's Milkvetch - Alvars, riparian, woodlands and woodland edges	Twice yearly for two years after transplant during the growing season.	Identification of results, issue and resolution in annual report, which is to be submitted to the MNR.	Provide additional plantings and locations if survivorship is found to be low



7.0 KEY CONTACT LIST

The following section lists key organizations and/or individuals that may be contacted during emergency situations and regarding regulatory issues, followed by the Project Contact List. This list will be posted in the base of each turbine, and it will be carried by maintenance personnel during the operation phase of the project.

Agency	Area	Phone Number
Emergency Contacts		
Ambulance/Police/Fire/Rescue		9-1-1
RCMP/OPP		9-1-1
Regulatory and Municipal Contacts		
Ontario Ministry of Environment	Paula Allen Environmental Planner/ EA Coordinator Ministry of the Environment 199 Larch Street, Suite 1201 Sudbury ON P3E 5P9	705-564-3273
Ministry of Transportation Ontario (MTO)	Sudbury 159 Cedar Street 5th Floor, Suite 503 Sudbury, ON P3E 6A5	705-564-7722
Association of Worker's Compensation Board of Canada	Customer Liaison Officer	905-542-3633
Department of Fisheries and Oceans	Fisheries and Oceans Canada Ontario Area 867 Lakeshore Road Burlington Ontario L7R 4A6	905-336-4595
Environment Canada (EC) / Canadian Wildlife Service (CWS)	Bird / Bat Conservation Officer	1-800-668-6767
Ministry of Natural Resources (OMNR)	Ms. Caleigh Sinclair Espanola District Office Ministry of Natural Resources 148 Fleming Street, 2nd Floor Espanola, ON, P5E 1R8	705-869-1330
Environmental Emergencies and Spills		
Local Hospitals with Emergency Services	Sudbury Regional Hospital 700 Paris Street, Sudbury, ON, P3E 3B5	1-866-469-0822



MOE Spills Action Centre	24-hour Report Line	1-800-268-6060
Project Contacts		
Development Manager	TBD	
Environmental Monitor	TBD	
Site Supervisor	TBD	
Construction Manager	TBD	

8.0 REFERENCES

- Cadman, M.D., D. A. Sutherland, G. G. Beck, D. Lepage, and A. R. Couturier. 2007. Atlas of the Breeding Birds of Ontario, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature. 728 pages.
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APPENDIX A: ENVIRONMENTAL CHECKLIST

Project Number:	Project Name:			
Environmental Checklist				
Originated by:			Date	
Name	Organisation			
1	Existing Conditions	Y	N	N/A
1.1	Are areas of contaminated land being protected/remediated properly?			
1.2	Are all underground services identified and excavation permits used?			
1.3	Have existing storage tanks been checked and safely emptied?			
1.4	Is the site reasonably protected from vandalism and dumping?			
1.5	Are procedures in place to prevent fires on site?			
1.6	Are all survey monuments protected?			
1.7	Are existing communication lines protected?			
1.8	Are land improvements further than 500 yards from water tanks?			
1.9	Is Archaeological Monitoring being carried out in accordance with the requirements of the "Cultural Resources Construction Monitoring and Construction Plan"			
2	Site Drainage			
2.1	Is surface and foul water drainage independent and identified?			
2.2	Is there sufficient surface water drainage?			
2.3	Are pad sites rehabilitated for drainage?			
3	Deliveries			
3.1	Are material deliveries being correctly supervised?			
4	Storage			
4.1	Are all static fuel and oil storage units located in suitable bunds?			

4.2	Are all fuel bowsers banded or double-skinned?			
4.3	Are all fuel bowsers secured in sensible locations?			
4.4	Is all subcontractors work, plant and materials secure?			
4.5	Are all chemicals stored in accordance with the material data sheets?			
4.6	Is fuel delivery manual and are all valves locked when not in use?			
4.7	Do all tanks display their contents and other warning notices?			
4.8	Is a competent contractor removing all storage tanks off site?			
5	Waste Management			
5.1	Is waste being stored in designated areas away from watercourses?			
5.2	Are all skips on site covered and being replaced when full?			
5.3	Is all waste being disposed of quickly and correctly?			
5.4	Is "special waste" being identified and disposed of correctly?			
5.5	Are copies of consignment notes being kept in the job book?			
5.6	Are all fuel/oil leaks properly removed?			
5.7	Has sewage been properly disposed in portable toilets?			
6	Earthworks			
6.1	Does excavation drainage prevent silty water reaching watercourses?			
6.2	Are temporary stockpiles protected from silt/dust loss?			
6.3	Are roads being kept free of excess mud or dust?			
6.4	If silty water exists is it being treated prior to meeting a watercourse?			
6.5	Are excavated and demolition materials being re-used?			
6.6	Are all blasting activities being adequately controlled?			
6.7	Are the requirements of the SWPPP being followed?			
6.8	Are the requirements of the Pollutants Discharge Elimination Systems permits being followed?			
6.9	Are the requirements of the Temporary Air Quality permits being met?			

7	Plant			
7.1	Is refueling of plant taking place in a clean and controlled way?			
7.2	Does all site plant appear to be in good condition and free from leaks?			
7.3	Is plant servicing taking place over a well-maintained drip-tray?			
7.4	Are plant operators aware of the sites environmental responsibilities?			
8	Concrete			
8.1	Are concrete trucks washing out in the agreed locations?			
8.2	Is cement or mortar being allowed to enter watercourses?			
8.3	Is site batching in accordance with the agreed method statement and permits?			
8.4	Are the requirements of the sand and gravel permit being met?			
9	Emergencies			
9.1	Is site personnel trained and able to perform emergency procedures?			
9.2	Are the relevant environmental emergency numbers widely posted?			
9.3	Are there adequate fire precautions in operation?			
9.4	Has Owner been notified of any Emergencies within 24hrs?			
10	Wildlife			
10.1	Is wildlife protected from becoming trapped/injured in the works?			
11	<i>Site Restoration and Reclamation</i>			
11.1	Are areas disturbed by construction being kept to a minimum?			
11.2	Has a site reclamation plan been agreed for all construction facilities?			
11.3	<i>Are there measures to stop introduction and spread of noxious plants?</i>			
11.4	<i>Has the use of pesticides complied with Applicable laws?</i>			
12	Installation			
12.1	<i>Are all leaks being promptly repaired?</i>			



12.2	<i>Has all work met proper requirements?</i>			
13	<i>Final Job Book</i>			
13.1	Is the Job Book being developed during the construction period?			
14	<i>Personnel Reprimands</i>			
14.1	Has personnel been reprimanded for failure to comply with above?			

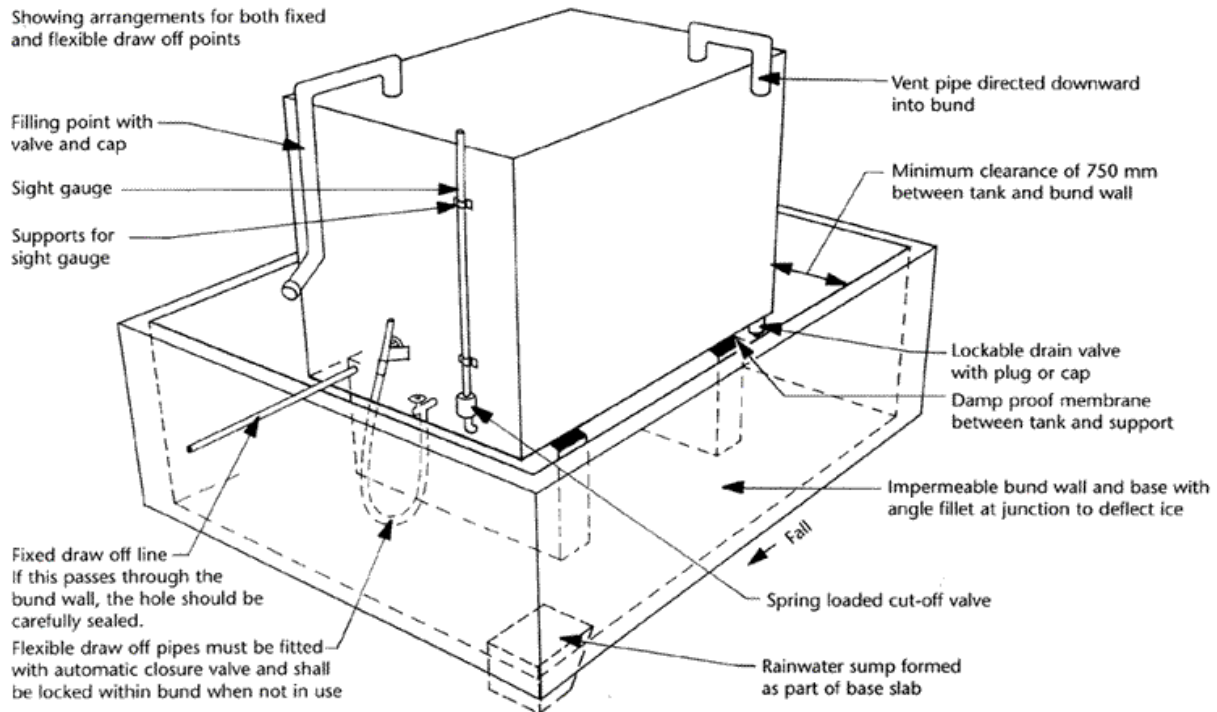
N.B. If the answer to any of the questions on the previous page are “No,” then please confirm what further preventative measures will be taken to prevent any environmental problems from occurring. Should any environmental concerns specific to the site not be covered in the above document please detail the steps necessary to mitigate possible problems, below.

APPENDIX B: FUEL AND OIL STORAGE (STATIC REFUELING POINT)

The required arrangement for a static refueling point is shown below:

BUNDED OIL TANK

Showing arrangements for both fixed and flexible draw off points



Bund design for storage tanks of up to 25m³ capacity can be found in a report produced by the Construction Industry Research and Information Association (CIRIA):

CIRIA Report 163 "Construction of bunds for oil storage tanks" ISBN 0 86017 468 9



APPENDIX C: SUMMARY OF EMERGENCY SERVICES

(to be developed prior to Construction)



APPENDIX D: AVIAN AND BAT DRAFT POST-CONSTRUCTION MONITORING PLAN

APPENDIX D
UTM Coordinates for Project Components

**McLean's Mountain Wind Farm
UTM Coordinates for Project Components**

ID	HEIGHT	X	Y	Z	Status
T10	98	426243	5088273	382	24 Wind Turbine Locations
T11	98	423155	5087692	418	24 Wind Turbine Locations
T12	98	424685	5087875	413	24 Wind Turbine Locations
T13	98	425578	5087836	385	24 Wind Turbine Locations
T14	98	424005	5087874	417	24 Wind Turbine Locations
T15	98	426514	5087605	374	24 Wind Turbine Locations
T16	98	423976	5085277	395	24 Wind Turbine Locations
T17	98	421160	5086508	414	24 Wind Turbine Locations
T18	98	423020	5086314	409	24 Wind Turbine Locations
T19	98	426002	5086354	368	24 Wind Turbine Locations
T20	98	425263	5086379	392	24 Wind Turbine Locations
T21	98	420869	5086170	411	24 Wind Turbine Locations
T23	98	423091	5085958	401	24 Wind Turbine Locations
T25	98	415729	5084615	377	24 Wind Turbine Locations
T28	98	424742	5084943	381	24 Wind Turbine Locations
T29	98	423719	5084978	391	24 Wind Turbine Locations
T30	98	424258	5084654	385	24 Wind Turbine Locations
T31	98	416174	5082550	371	Five Extra Permitted Sites
T34	98	423970	5084235	376	Five Extra Permitted Sites
T35	98	415668	5083842	371	24 Wind Turbine Locations
T36	98	416181	5083552	376	24 Wind Turbine Locations
T38	98	415679	5083197	370	24 Wind Turbine Locations
T39	98	417095	5082519	379	Five Extra Permitted Sites
T40	98	416441	5082915	371	Five Extra Permitted Sites

T42	98	415354	5082675	362	24 Wind Turbine Locations
T43	98	416653	5082179	390	Five Extra Permitted Sites
T5	98	425967	5088867	388	24 Wind Turbine Locations
T6	98	425374	5088648	390	24 Wind Turbine Locations
T9	98	426960	5088349	378	24 Wind Turbine Locations

APPENDIX E
MOE Letters Regarding Hunt Camps

Ministry of the Environment

Environmental Assessment and
Approvals Branch

2 St. Clair Avenue West
Floor 12A
Toronto ON M4V 1L5
Tel.: 416 314-8001
Fax: 416 314-8452

Ministère de l'Environnement

Direction des évaluations et des
autorisations environnementales

2, avenue St. Clair Ouest
Étage 12A
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Télééc. : 416 314-8452



March 19, 2010

Mr. Rick Martin
Project Manager
Northland Power Inc.
30 St. Clair Avenue West, 17th Floor
Toronto, ON M4V 3A1

Dear Mr. Martin:

RE: Noise Receptors and Vacant Lots

The Ministry of the Environment (MOE) has reviewed the matters raised regarding noise receptors in relation to hunt camps and the centre of vacant lots. The MOE offers the following position on both matters below.

Hunt Camps as Noise Receptors

In respect of Northland Power's McLean's Mountain Wind Project, we understand that shortly after the turbine layout was made available to the public in July 2009, a number of applications were made for building permits to allow the construction of small buildings without servicing. We understand that individuals are claiming these to be hunt camps. It does not seem likely that these buildings will be used for overnight accommodation and thus will not be considered noise receptors as defined under section 1(4) of the Renewable Energy Approval Regulation (O.Reg 359/09). When preparing the documentation that forms part of your application, we would expect you to identify and explain whether or not a particular hunt camp meets the definition of a "noise receptor" and as part of the renewable energy approval process, we expect you to consult with the public about this determination.

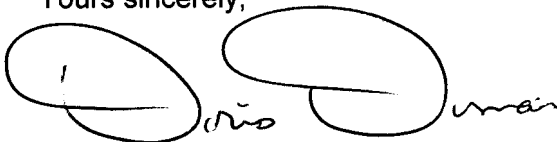
Centre of Vacant Lot

For the purposes of the setback prohibitions in sections 54 and 55 of O.Reg 359/09, the noise receptor is considered to be the centre of the vacant lot if no site plan approval or building permit has been issued to permit a building or structure used for overnight accommodation, educational facility, a day nursery or a place of worship. However, the definition of a noise receptor as it pertains to vacant lots as described in the ministry's *Noise Guidelines for Wind Farms*, dated October 2008 (Guideline) governs the preparation of a noise report prepared in accordance with the Guideline.

Proponents will need to demonstrate that receptor locations on vacant lots as defined in 6.3.3 of the *Noise Guidelines for Wind Farms* can comply with O.Reg 359/09 noise setbacks including the minimum 550 metre setback.

If you have any questions or concerns, please contact myself at (416) 314-8171 or Mansoor Mahmood at (416) 314-8573.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Doris Dumais', with a large, stylized flourish at the end.

Doris Dumais
Director – Environmental Approvals
Environmental Assessment and Approvals Branch

- c: David A. Williamson, Chief Administrative Officer, Town of Northeastern Manitoulin and the Islands
Don McKinnon, Dillon Consulting

Ministry of the Environment

Environmental Assessment and
Approvals Branch

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March 22, 2010

Mr. Rick Martin
Project Manager
Northland Power Inc.
30 St. Clair Avenue West, 17th Floor
Toronto, ON M4V 3A1

Dear Mr. Martin:

Further to our March 19th letter and in response to your request for further clarification on what constitutes overnight accommodation for the purposes of the definition of noise receptors in section 1(4) of the Renewable Energy Approval Regulation (O.Reg 359/09), we offer the following information:

It was not intended that the definition of noise receptor would apply in respect of things like hunt camps (e.g. a building or structure that was used for limited duration in any given month to facilitate hunting or fishing activities). Factors that would indicate that a building or structure would not be used for overnight accommodation are limited use and a lack of physical infrastructure to support services such as electricity, potable water supply, and sanitary sewage disposal.

The main purpose of establishing the setback prohibitions in sections 54 and 55 of O.Reg 359/09 was in consideration of long term exposure to noise. Given the temporary use of hunt camps, there is limited potential for long term exposure to noise from wind turbines or transformers.

Where there are existing hunt camps, we would expect you to make efforts to obtain in consultation with the owner the nature of the hunt camp in question (e.g. whether it has servicing and is suitable for accommodation other than during the summer months), and how the hunt camps have historically been used (e.g. duration and frequency of stay, wildlife habitat on the property). The MOE would expect Northland Power Inc. to provide these details as part

of its renewable energy approval application.

We understand that shortly after the turbine layout was made available to the public in July 2009, a number of applications were made for building permits to allow the construction of hunt camps. For these hunt camps that have not yet been constructed, the MOE expects you to make efforts to obtain information regarding when the building permits were sought, when construction is to occur, whether the building will have servicing, how the building will be used (e.g. duration of stay, wildlife habitat on the property), details about the owners hunting practices on the property, and the rationale for where it is proposed to be constructed. The MOE would expect Northland Power Inc. to provide these details as part of its renewable energy approval application.

The MOE is in the process of preparing policy to provide further direction and clarification regarding this matter which will be posted on the Environmental Registry for review and comment.

If you have any questions or concerns, please contact myself at (416) 314-8171 or Mansoor Mahmood at (416) 314-8573.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Doris Dumais', with a stylized flourish at the end.

Doris Dumais
Director – Environmental Approvals
Environmental Assessment and Approvals Branch

c: David A. Williamson, Chief Administrative Officer, Town of Northeastern Manitoulin and the Islands
Don McKinnon, Dillon Consulting

APPENDIX F
Post-Construction Monitoring Plan

**Bird and Bat Environmental
Effects Monitoring Plan:**

**McLean's Mountain Wind
Farm**

September 16, 2011

09-1983

Submitted by:

**Dillon Consulting
Limited**

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1.0 INTRODUCTION

Northland Power Inc. (Northland Power) and Mnídoo Mnising Power (MMP), propose to develop a wind facility with a maximum name plate capacity of 60 megawatts (MW) located south of Little Current in the Town of Northeastern Manitoulin and the Islands, Ontario (**Figure 1**). The renewable energy facility will be known as the McLean's Mountain Wind Farm and will be rated as a Class 4 wind facility. Northland Power has received a contract from the Ontario Power Authority (OPA) for the purchase of electricity generated by wind turbines from this renewable facility through the Province's Feed-in-Tariff (FIT) program (enabled by the *Green Energy and Green Economy Act*). Natural Heritage Assessment reporting was submitted to the Ontario Ministry of Natural Resources (MNR) and confirmation in writing was received that reporting fulfilled the requirements of relevant sections of the *Ontario Energy Approvals (Ontario Regulation 359/09)*.

A requirement of *Ontario Regulation 359/09* is the preparation of an Environmental Effects Monitoring Plan for birds and bats. In developing this Plan, protocols outlined in *Bird and Bird Habitats: Guidelines for Wind Power Projects (MNR 2010)* and *Bat and Bat Habitat – Draft Guidelines for Wind Power Projects (MNR 2011)* were used. In addition, mitigation/monitoring requirements, as outlined in the Environmental Impact Study (EIS), which form the final component of the Natural Heritage Assessment reports, was used. The MNR are being consulted to confirm this monitoring strategy. Once their input is received, this plan will be finalized.



Figure 1: General Location of the McLean's Mountain Wind Farm Project in Ontario

2.0 EXISTING ENVIRONMENTAL CONDITIONS OF RELEVANT NATURAL FEATURES

Existing environmental conditions for the project location and surrounding areas was determined through the records review and site investigation, which comply with Section 25 and 26 of the *REA* process. An evaluation of significance, consistent with Section 27 of the *REA* identified four bird wildlife habitats that required an EIS. Based on the EIS, specific monitoring requirements for these four bird wildlife habitats were identified. Below, we provide the EIS commitments made regarding pre and post-construction monitoring, which is to help confirm the predicted environmental effect and inform an adaptive management strategy.

Waterfowl Nesting Area 1, 4 and 5 & Raptor Winter Roosting and Feeding Area 3 and 4

- Additional pre-construction surveys will be conducted to further assess the significance of these features. If these features continue to be considered significant a 3 year post-construction behavioural and mortality monitoring, consistent with MNR protocols, to assess impacts of turbines on birds for the purpose of advising on mitigation strategies to be used as part of an adaptive management plan. Methods to be followed for behavioural monitoring are outlined in Section 4.2.1 below. Mortality monitoring methods are outlined in Section 4.2.2.

Area Sensitive Species: Forest Birds 1 - Including Canada Warbler, Common Night Hawk & Area Sensitive Species: Open Country Breeding Birds 3 and 4 - Including Short-eared Owl, Common Night Hawk

- A 3 year post-construction mortality monitoring, consistent with MNR protocols will be undertaken to assess impacts of turbines on birds for the purpose of advising on mitigation strategies to be used as part of an adaptive management plan. Mortality monitoring methods are outlined in Section 4.2.2.

Bats

- According to Section 23.1 of the *REA* a 3 year post-construction mortality monitoring, consistent with MNR protocols will be undertaken to assess impacts of turbines on birds for the purpose of advising on mitigation strategies to be used as part of an adaptive management plan. Mortality monitoring methods are outlined in Section 4.2.2.

3.0 PROJECT TEAM

Table 1: Post Construction Environmental Monitoring Team

Staff	Role
Michael Enright	Dillon Consulting Limited – Project Manager
Dave Restivo	Dillon Consulting Limited – Field Ornithologist
Richard Baxter	Dillon Consulting Limited – Field Ornithologist

Michael Enright, B.Sc. (Hons) - is a Terrestrial Biologist with eleven years of education and professional employment in the biological sciences. During this time, Michael has acquired an in-depth knowledge of natural systems and their protection under the various levels of the legislative framework. He has been involved in numerous Renewable Energy Projects and developed environmental solutions for multi-disciplinary projects. Michael is currently the Project Manager for two post-construction monitoring studies for birds and bats in Ontario.

David Restivo, B.Sc. (Hons), CEPIT - is a Biologist with over seven years of professional experience conducting biological assessments including avian surveys. Prior to working with Dillon, David worked with Bird Studies Canada conducting migration monitoring studies on the shores of Lake Erie. David has been involved in avian surveys for six wind power projects.

Richard Baxter, B.Sc. - is a Biologist with over four years of professional experience conducting biological assessments including avian surveys. Prior to working with Dillon, Richard worked with Ducks Unlimited Canada as a Biological Technician, the University of Alberta as a Research Assistant on a cavity nester study and with Bird Studies Canada conducting migration monitoring studies on the shores of Lake Erie. Richard has been involved in avian surveys for four wind power projects.

4.0 BIRD AND BAT ENVIRONMENTAL MONITORING PLAN

4.1 The Need for Monitoring - Bird and Bat Mortality at Wind Farms in North America

Birds

Data available from studies of wind farms in North America indicate that the number of passerine birds killed due to blade strikes is not numerically significant in terms of population effects. Estimates of total passerine fatalities from a review of 14 studies of North American wind farms vary considerably, however on a per turbine and per MW basis, fatality rates are similar (Arnett 2007). Annual fatality rates ranged from 0 at a Searsburg, Vermont wind farm (Kerlinger 1997 *in* Arnett 2007) to 11.7 birds/MW/year at Buffalo Mountain, Tennessee (Nicholson 2003 *in* Arnett 2007). Most studies indicate that passerine fatalities occur throughout the wind farm facility, with no relationship to specific features within the facility. In general, fatalities occur throughout the year but are most common from April to October (Arnett 2007). It appears that certain seasons pose a higher risk to birds at specific facilities; for example spring migration at Buffalo Ridge, Minnesota (Johnson et al 2002 *in* Arnett 2007) and fall migration at Stateline, Washington (Erickson et al 2004 *in* Arnett 2007).

The highest recorded raptor fatality rates relating to wind power facilities have occurred in California at a few specific sites that were designed and constructed with little thought given to impacts on avian resources. Outside of California, studies of 14 newer generation wind farm facilities in North America indicate that the mean fatality rate for raptors was 0.03 raptors per turbine and 0.04 raptors per MW. These studies occurred over at least a one-year period and included correction for scavenging and searcher efficiency (Arnett 2007).

Several studies on wind farms in Ontario have been performed which can provide more area specific context for the McLean's Mountain Wind Farm. James (2003) reported finding 3 bird carcasses in association with the single turbine present near the Lake Ontario shore at Pickering, with monitoring conducted throughout 2002. James and Coady (2004) reported finding 2 bird carcasses in association with the single turbine present at Exhibition Place in Toronto, over 11 weeks of monitoring during the spring and fall of 2003. James (2008) estimated a range of 0.41-2.6 native birds/turbine/year at the 66 turbine Erie Shores Wind Farm near Port Burwell. For the Erie Shores project, all but 4 individual turbines had estimates of below 1 bird/turbine/year. For raptors a mortality estimate of 0.04 raptors/turbine/year was observed at Erie Shores. Natural Resource Solutions Inc. (2008) estimated an annual mortality rate for birds at 0.39 birds/turbine (0.26 birds/MW) at the 126 turbine Prince Wind Power Project (Stantec 2008a). Stantec Consulting Ltd (2008b) estimated an annual mortality rate for birds at 1.4 birds/turbine (0.9 birds/MW) at the Melancthon 1 Wind Plant, based on 12 weeks of post construction monitoring during the spring and fall of 2007 (Stantec 2008a).

Bats

Large numbers of bat fatalities have been reported at some wind energy facilities in North America. In general, bat fatalities at wind farms are higher than at other man made structures. Estimates of bat fatalities from 21 studies located at 19 wind farms in North America range from 0.9-53.3

bats/MW/year. The highest bat fatality rates have been found to occur near forested ridges. Bat fatalities appear to be higher in late summer and early fall, with migratory species like hoary bat, eastern red bat and silver haired bat being most susceptible. Bat activity and associated wind farm mortality appear to be higher on nights with low wind speeds (Arnett 2007).

4.2 Methods

4.2.1 Pre-Construction Monitoring

Waterfowl Nesting Area 1, 4 and 5

For pre-construction waterfowl breeding surveys, a standardized fixed width linear transect area search methodology will be used in Waterfowl Nesting Area 1, 4 and 5 (**Figure 2**). Surveys will include a single survey event between April 15 and May 15. This method requires that the area being searched and the search effort be strictly standardized. The number of individuals of each species detected during the sampling period is recorded to provide an index of abundance. The number of transects and fixed width of observations will be confirmed with the MNR prior to implementation. Information recorded for each survey event will include:

- The level of effort for each visit (date, start time, finish time, hours of searching, width and length of transect);
- A complete list of species detected and an estimate of the number of individuals actually detected (by sound or by sight);
- Data on any breeding evidence detected, using standard breeding bird atlas codes; and
- A basic description of the habitat(s) covered.

This survey will be repeated in a similar manner 3 years post-construction, where pre-construction surveys support the designation of these habitats as significant.

Raptor Winter Roosting and Feeding Area 3 and 4

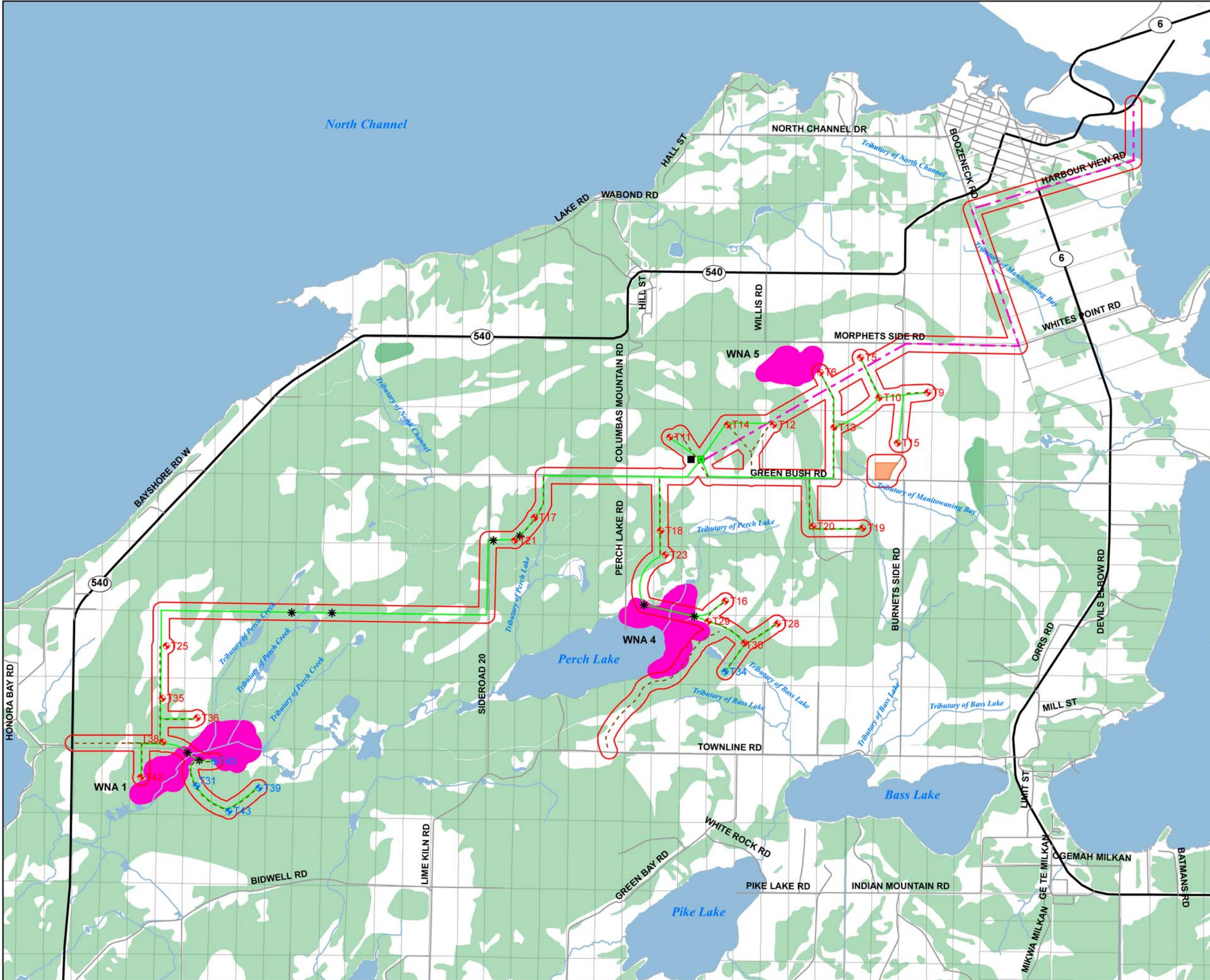
For pre-construction raptor winter and feeding area surveys, an area search methodology will be used in Raptor Winter Roosting and Feeding Area 3 and 4 (**Figure 3**). Surveys will include three survey events between November 15 and February 15. This method requires that a similar transect path and survey duration be completed during each. Each transect will sample both portions of both open areas as well as adjacent wooded areas within 120 metres of open areas. The general route of transects will be confirmed with the MNR prior to implementation. Information recorded for each survey event will be the same as above with exception to the width of transect, which not required.

This survey will be repeated in a similar manner 3 years post-construction, where pre-construction surveys support the designation of these habitats as significant.



**NORTHLAND
POWER**

McLean's Mountain Wind Farm Figure 2: Waterfowl Nesting Areas of Significance



Legend

- Local Roads
- Highway
- Watercourse
- 120 m Project Location Setback
- Lots/Concessions
- Water Body
- Unclassified Woodland Community
- Waterfowl Nesting Areas (Including: MAMM1, MAMM3, MASM1, MASM1-1, MASM1-14, ME, SWDM2, SWDM2-1, SWDM2-2, SWDM3, SWDM4-5, SWTM2-5, SWTM3)

Project Components

- 24 Wind Turbine Locations
- Five Extra Permitted Sites
- Substation
- Operations Building
- Horizontal Directional Drilling Access/Exit Pit
- Transmission Line
- Access Road
- Feeder Lines
- Construction Staging Area

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**DILLON
CONSULTING**



**NORTHLAND
POWER**

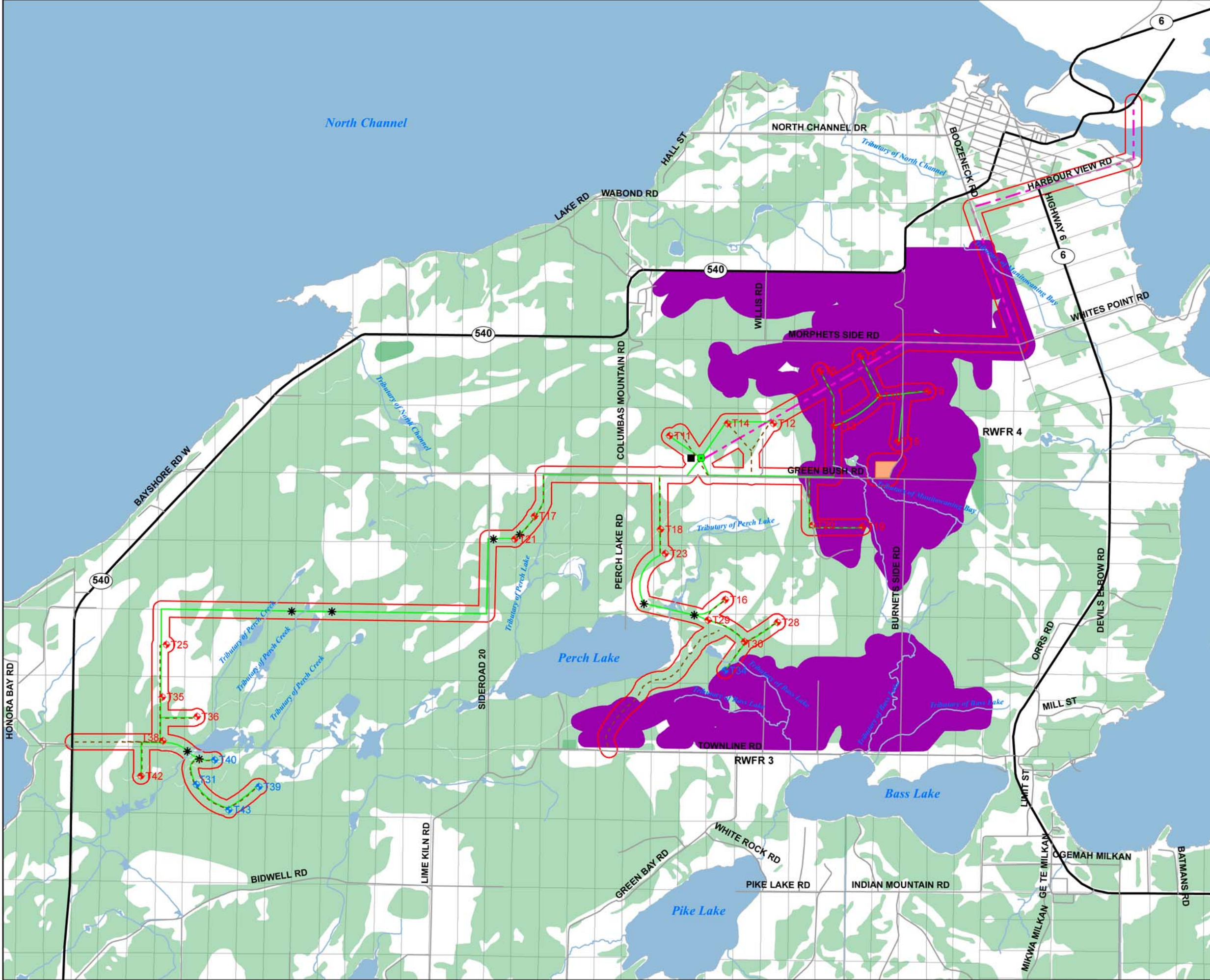
McLean's Mountain Wind Farm Figure 3: Raptor Winter Feeding and Roosting Areas of Significance

Legend

- Local Roads
- Highway
- Watercourse
- 120 m Project Location Setback
- Lots/Concessions
- Water Body
- Unclassified Woodland Community
- Raptor Winter Feeding and Roosting Area (120m Buffer) (Including: OAGM4)

Project Components

- 24 Wind Turbine Locations
- Five Extra Permitted Sites
- Substation
- Operations Building
- Horizontal Directional Drilling Access/Exit Pit
- Transmission Line
- Access Road
- Feeder Lines
- Construction Staging Area



1:55,000



4.2.2 Post-Construction Mortality Monitoring

Post-construction mortality monitoring for birds and bats will be done concurrently to improve efficiency of fieldwork. As this project has been assigned as a REA Class 4 wind facility it will be subject to the environmental effects monitoring surveys for the first three years (for each phase) of wind turbine operation. Monitoring will include carcass removal trials, searcher efficiency trials and post-construction mortality monitoring around a minimum of 30% of the turbines. Monitoring for all birds and bats will take place twice per week from May 1 to October 31 in each monitoring year. As this wind farm plans to construct 24 turbines, a stratified sample of 8 turbines, which reflect the various habitat types and distribution of the wind farm, will be selected for monitoring.

In addition to this, specific raptor mortality surveys will be continued once per week through the month of November at the stratified sample turbine locations. All turbines are to be searched at least once during the month of November. These additional surveys are not to be added to the sample survey mortality estimate calculations. Rather, the purpose of the raptor mortality surveys is to identify any individual or groups of turbines that may exceed the significant mortality threshold. Searcher efficiency and scavenger removal trials are only necessary for raptors considered as part of bird/bat mortality survey monitoring, but are not necessary when conducting raptor mortality surveys.

Mortality Surveys will use the Baerwald Spiral Method which includes circular transects within 50 m of the turbine base, spaced 5.0 – 6.0 metres apart allowing for a visual search of 2.5 – 3.0 metres on each side. Carcass searches will be performed by trained technicians, under the guidance of an experienced biologist. All carcasses found will be photographed and recorded/labelled with species, sex, date, time, location, carcass condition, searcher, injuries, distance and direction to nearest turbine, ground cover/substrate, estimated number of days since time of death and distance to plot centre. The condition of each carcass collected should be recorded in one of the following categories:

- Intact – a carcass that is not badly decomposed and shows no sign of having been fed upon by a predator or scavenger, although it may show signs of traumatic injury such as amputation from a turbine collision;
- Scavenged – an entire carcass that shows signs of having been fed upon by a predator or scavenger or a partial carcass that has been fed upon, with portions of it found in more than one location

Each carcass should be collected (using vinyl, latex or rubber gloves), bagged and stored in a freezer for future reference, identification, and/or necropsy. In the case of bats, White Nose Syndrome Protocol is to be used throughout all monitoring, which includes the use of 1 pair of latex gloves per bat carcass handled. A copy of the data sheet should be kept with the carcass at all times. All searchers will have updated rabies pre-exposure vaccination. Carcasses found during bird mortality searches may be used in carcass removal or searcher efficiency trials.

The following equation will be used to calculate Corrected Mortality Estimates:

The minimum estimated bird (or bat) mortality (C) is as follows:

$$C = c / [(S_e)(S_c)(P_s)]$$

Where:

- C - is the corrected number of bird/bat fatalities
- c - is the number of carcasses found
- S_e - is the searcher efficiency
- S_c - is the proportion of carcasses not removed by scavengers over the search period
- P_s - is the percent of the area searched

Percent Area Searched

Most birds/bats appear to fall within 50m of a wind turbine base. Therefore, a circular search area consisting of a 50m radius will be used for all mortality searches, unless specific site attributes require a reduced search area (e.g. steep slopes, active cultivation, etc.). In cases where a reduced search area is necessary, the actual available area to be searched during the mortality survey will be mapped and calculated at each turbine and a correction factor applied.

A description of habitat, as well as other physical attributes, (e.g. % vegetation cover, vegetation height, steep slopes, active cultivation, etc.) within the 50m radius search area will be mapped and described to determine the respective visibility class as outlined in MNR 2010 and 2011. Changes in visibility class will be updated on a continuous basis to inform the need for additional searcher efficiency trials.

The following equation will be used to calculate Percent Area Searched:

$$P_s = \text{actual area searched} / \Pi r^2$$

R = 50 m

Carcass Removal Trials

Levels of carcass scavenging will be determined through carcass removal trials. In these trials, carcasses are planted around the wind turbines and monitored until they disappear or have sufficiently decomposed (2 weeks). Carcass Removal Trials will be conducted once a month during each monitoring year and will be performed to estimate the proportion of carcasses that are scavenged.

Carcass Removal Trials will use native bird/bat species that are freshly dead or frozen while freshly dead. Where possible, an equal amount of bird and bat carcasses should be used throughout carcass removal trials. Trials using other small mammals may also be used, where birds and bats are not available. Technicians will wear gloves to avoid getting human scent on the test specimens, which could bias results.

Carcasses will be laid out in a search area before daylight with their location marked by GPS in advance of a search being conducted. Weather conditions will be recorded. Carcasses should be laid out for trials at each turbine that will be searched, with a small number used (1 to 2 specimens) at each site. To avoid confusion with turbine-related fatalities, carcasses should be discreetly marked (e.g., clipping the ear, wing leg, fur; hole-punching ear; etc.). Carcasses should be distributed on substrates in proportion to the availability of these substrates. Scavenger trials will be repeated during each monitoring year, as efficiency of scavengers may change among years. Presence or absence of scavenging, and degree of scavenging if present, will be recorded for trial specimens.

Proportions of carcasses remaining after each search interval are pooled to calculate the overall scavenger correction (S_c) factor using the following equation:

$$S_c = (n_{\text{visit1}} + n_{\text{visit2}} + n_{\text{visit3}}) / (n_{\text{visit0}} + n_{\text{visit1}} + n_{\text{visit2}})$$

Where:

- S_c - is the proportion of carcasses not removed by scavengers over the search period
- n_{visit0} - is the total number of carcasses placed
- n_{visit1} - n_{visit3} - are the numbers of carcasses remaining on visit 1 through 3

Searcher Efficiency Trials

Searcher efficiency will vary between each searcher as well as between different sites. To correct for this, searcher efficiency trials will be conducted at least once a season for each surveyor during mortality monitoring surveys. A minimum of 10 carcasses per searcher per visibility class will be used. These trial carcasses will be spread out over the trial period and conducted with the bird/bat mortality surveys. Searcher efficiency trials will be conducted for each individual searcher. The searcher will not be notified when they are participating in an efficiency trial to avoid potential search biases. Trial carcasses will be discreetly marked (e.g., clipping of ear, wing leg, fur or hole punching ear) with a unique identification so that they can be identified as a trial carcass. Trial carcasses will be randomly placed within the search area and location recorded so that they can be retrieved if they are not found during the trial. Bird/bat carcasses (including at least one raptor) will be used for searcher efficiency trials. Bat species known to be prone to white nose syndrome will not be used in searcher efficiency trials. Where frozen carcasses are used, they will be thawed prior to beginning searcher efficiency trials. Trials will be repeated for all post-construction monitoring years.

The date, time and location that test specimens were planted will be recorded, as will the date it was searched for and whether or not it was retrieved. The condition of the carcass when it was retrieved will also be recorded.

The following equation will be used to calculate Searcher Efficiency:

$$S_e = \text{number of test carcasses found} / \text{\# of test carcasses placed} - \text{\# of carcasses scavenged}$$

The number of turbines that each individual searches will vary so it will be necessary to calculate a weighted average that reflects the proportion of turbines each searcher searched. The weighted average or overall searcher efficiency will be calculated as follows:

$$S_{eo} = S_{e1}(n_1/T) + S_{e2}(n_2/T) + S_{e3}(n_3/T)...$$

Where:

S_{eo} - is the overall searcher efficiency

S_{e1} and 2 and $3...$ - are individual searcher efficiency ratings

n_1 and 2 and $3...$ - are number of turbines searched by each searcher

T - is the total number of turbines searched by all searchers

4.2.3 Post-Construction Disturbance Effect Monitoring

If pre-construction surveys support the designation of Waterfowl Nesting Area and Raptor Winter Roosting and Feeding Area habitats as significant, pre-construction surveys are to be repeated post-construction for three years. These surveys will be used to assess potential disturbance effects for these habitat types.

Additional disturbance effect monitoring is required for Sites Supporting Area Sensitive Species: Open Country 3 and 4 (**Figure 4**) and Sites Supporting Area Sensitive Species: Forest Birds 1 (**Figure 5**). Monitoring will occur twice between June and July. Methodology will include the use of paired ten minute fixed radius point counts (with point counts located 100m and 300m from the edge of a turbine or other infrastructure component). This pairing of point counts will allow analysis of possible change of bird diversity or abundance as it relates to the distance from a turbine (e.g. 0-50, 50-100, 100-150... up to 400 m away). Only turbines with similar habitat type extending out for at least 400m, will be sampled for disturbance effects. Specific turbines which confirm to the above will be determined prior to monitoring in consultation with the MNR.



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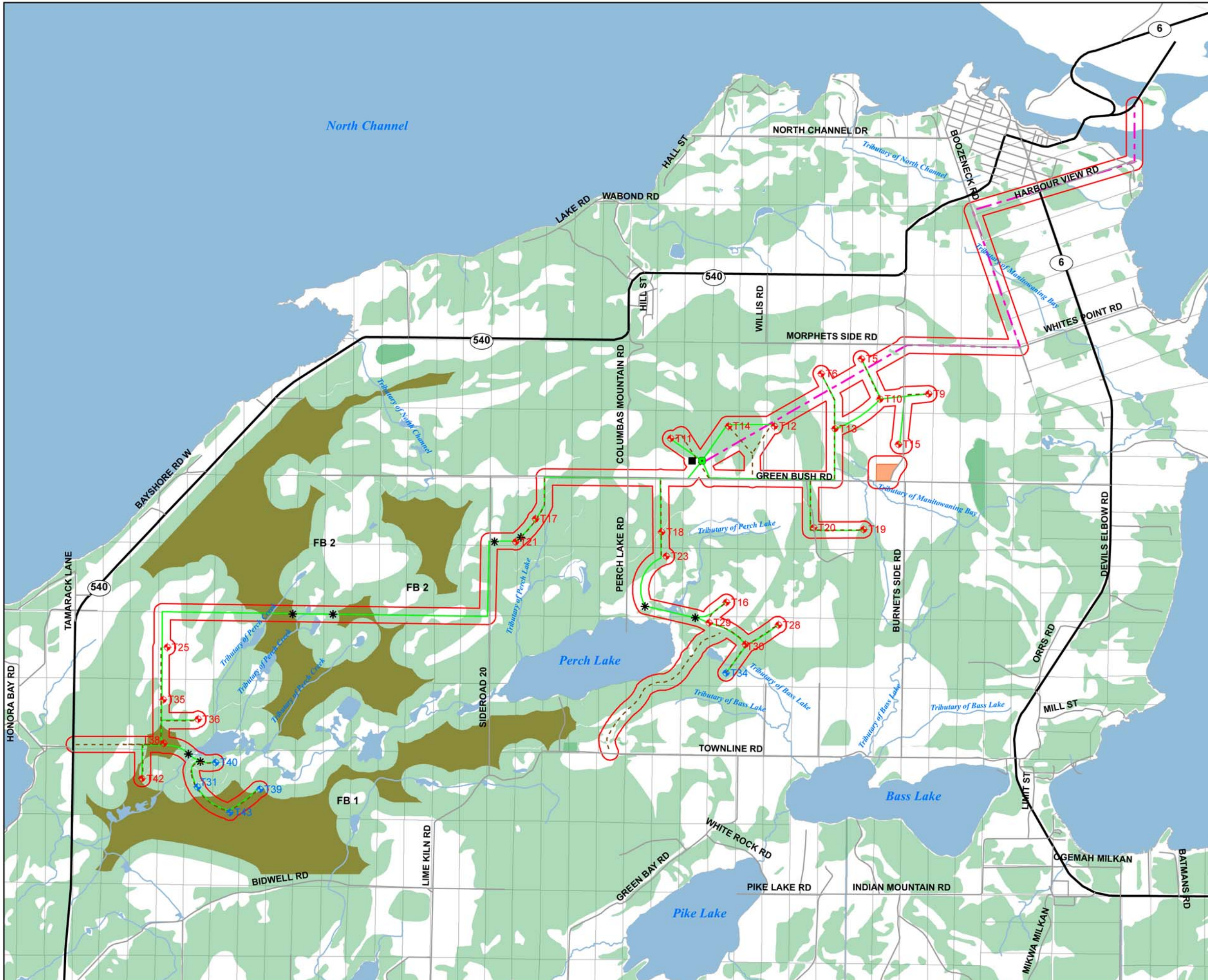
McLean's Mountain Wind Farm Figure 4 : Sites Supporting Area- Sensitive Species: Forest Birds

Legend

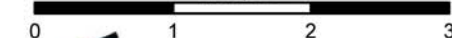
- Local Roads
- Highway
- Watercourse
- ▭ 120 m Project Location Setback
- ▭ Lots/Concessions
- ▭ Water Body
- ▭ Unclassified Woodland Community (< 200m from edge)
- ▭ Unclassified Woodland Community (Interior > 200 m from edge)
(Including: FOD, FODM1, FODM5-1, FODM8-1, FOMM10, FOMM4, FODM5-1, SWCM1-2, SWDM2-1, SWDM2-1, SWDM2-2, SWDM2, SWDM3, SWDM4-5, SWMM1-1, SWMM3-2, SWMM4)

Project Components

- ♦ 24 Wind Turbine Locations
- ♦ Five Extra Permitted Sites
- Substation
- Operations Building
- * Horizontal Directional Drilling Access/Exit Pit
- Transmission Line
- - - Access Road
- Feeder Lines
- ▭ Construction Staging Area



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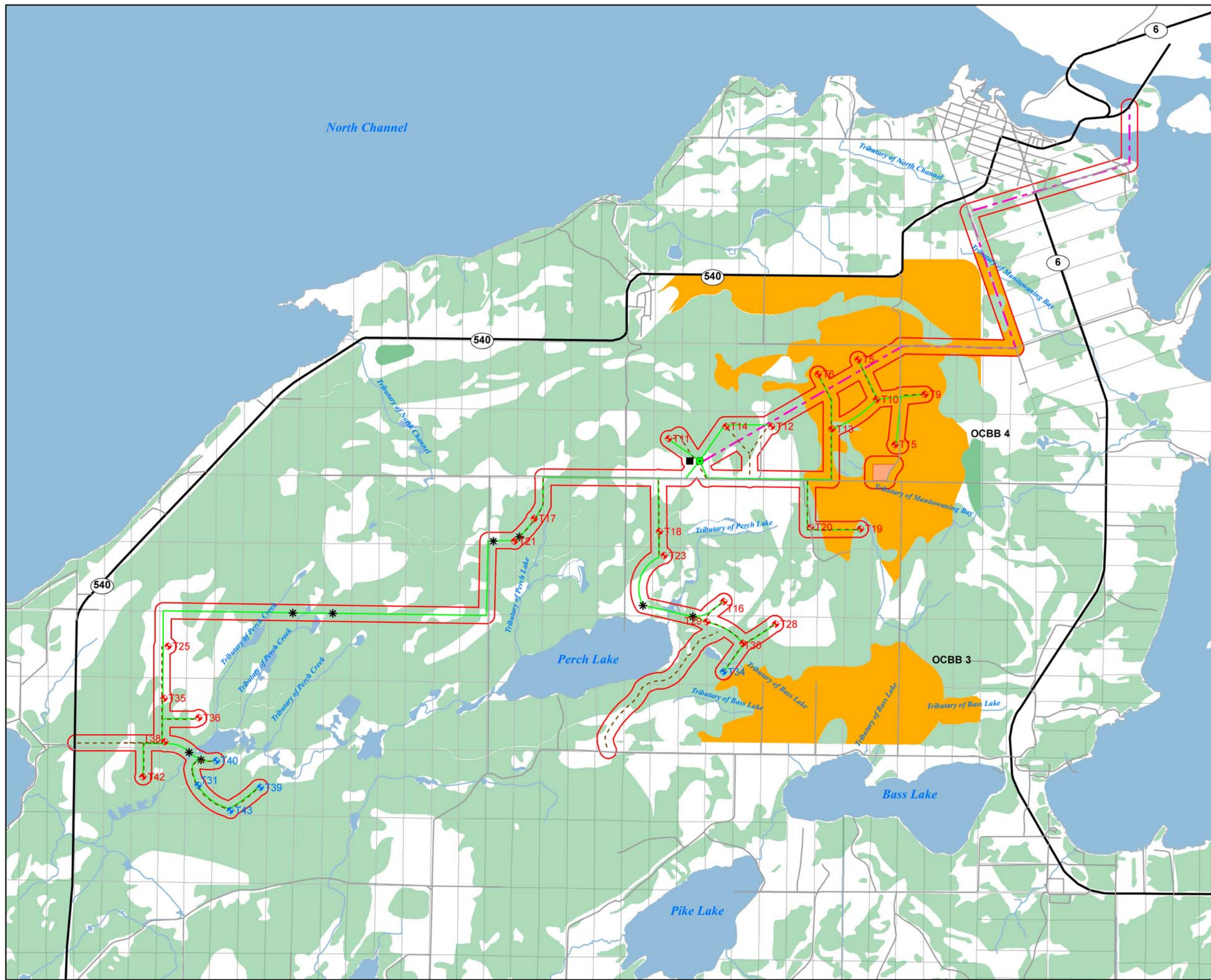
McLean's Mountain Wind Farm Figure 5 : Sites Supporting Area- Sensitive Species: Open Country Breeding Bird Habitat

Legend

- Local Roads
- Highway
- Watercourse
- 120 m Project Location Setback
- Lots/Concessions
- Water Body
- Unclassified Woodland Community
- Open Country Breeding Bird Habitat > 30 ha (Including: OAGM4, ME)

Project Components

- 24 Wind Turbine Locations
- Five Extra Permitted Sites
- Substation
- Operations Building
- * Horizontal Directional Drilling Access/Exit Pit
- Transmission Line
- - - Access Road
- Feeder Lines
- Construction Staging Area



1:55,000



5.0 REPORTING

Reporting of fieldwork results will be submitted annually, and results will be expressed both in terms of fatalities/turbine/year and fatalities/MW/year, to enable comparison between studies. Reports will include comparisons between projected annual avian and bat mortality rates for the McLean's Mountain Wind Farm and rates reported at other projects in North America (e.g., as summarized in Arnett 2007). If these projected annual mortality rates fall within the low or middle ranges of reported rates, no immediate mitigation is needed. However, if mortality rates begin to approach, meet or exceed the significant mortality threshold numbers outlined below, Northland Power will consult with the relevant agencies as needed to determine the reasons for the high mortality rates. Subsequently, Northland Power will develop possible mitigation measures and adjust monitoring as needed. If needed, Northland Power may take action prior to contacting the relevant agencies.

Bird, raptor and bat mortality will be considered significant when a threshold of annual mortality exceeds the following:

- 18 birds/ turbine/year at individual turbines or turbine groups;
- 0.2 raptors/turbine/year (all raptors) across a wind power project;
- 0.1 raptors/turbine/year (raptors of provincial conservation concern) across a wind power project;
- 2 raptors/wind power project (<10 turbines); or
- 10 bats/turbine/year (averaged over the entire wind farm)

Studies indicate that turbine-related mortality maintained below these thresholds is unlikely to affect bird populations. Thresholds have been established based on the highest reported bird mortality at wind power projects in North America, outside California.

A single mortality event will be considered significant when a bird mortality event exceeds:

- 10 or more birds at any one turbine; or
- 33 or more birds (including raptors) at multiple turbines.

These thresholds are not intended to replace any species-specific approaches that may be needed to comply with the Endangered Species Act.

6.0 ADAPTIVE MONITORING AND MANAGEMENT

In general, if observed mortality impacts for any group of birds, bats and/or Species at Risk are found to exceed thresholds noted in **Table 2** above, EC and the MNR will be consulted to establish the appropriate mitigative response, which could include: conducting research with the goal of identifying the factors leading to the observed mortality rate; conducting more frequent surveys; increasing reporting frequency; and operational modifications.

If bats are experiencing disproportionate mortality, and rates are near the higher reported levels, Northland Power may consider installation of ultrasonic deterrent devices. However, as yet this technology has limited ability to effectively deter bats from areas as large as a turbine's blade-sweep radius (Szewczak and Arnett 2008). Furthermore, the wind speed required to start turbines (i.e., increasing the turbine cut-in speed to 5.5 m/s or controlled idling) could be implemented on select turbines of the wind power project should the mortality threshold rates be met. This method could help to mitigate bat mortality if implemented during peak bat activity (July 15 to September 30 or overnight), as bats tend to be active at lower wind speeds (Arnett 2007).

If a review of environmental conditions unrelated to the wind farm's operation is unable to shed light on increased mortality rates, then further action will be required. This could include blade feathering, and if necessary, shutting down specific problem turbines.

Blade feathering involves adjusting the pitch of the turbine blade such that reduced aerodynamics precludes efficient turbine operation. Blade rotation would be slowed and energy output reduced. This approach would be used to manage the turbine operation during specific time periods or weather conditions considered a high risk for bats or birds.

Turbine shut down would include the temporary removal of a turbine from service, stopping production of power. This action would be taken during a set period, such as a core seasonal migration window, and turbine operation would resume after the period of high risk has passed (EC 2007a).

These actions will be considered on a turbine by turbine basis or could be applied across the wind farm, based on areas of concern identified through the monitoring program and as deemed economically feasible. Actions taken in response to mortality events will depend on species involved, behaviour implicated (migration, foraging etc.) and geographical extent of the observed mortality, as agreed upon by the relevant agencies.

Where operational mitigation measures are required to reduce bird or bat mortality, the post-construction mortality monitoring period may be extended beyond the minimum requirement of three years to assess the effectiveness of mitigation.

7.0 SUMMARY

The Project Location for Northland Power's McLean's Mountain Wind Farm has been designated as REA Class 4 Wind Facility. This REA designation triggers the need for this post-construction monitoring plan as stipulated in MNR guideline documents. Some pre-construction monitoring is planned to confirm the significance of certain bird wildlife habitats. Post-construction monitoring is planned for three years after the wind farm is in operation. The MNR will be kept up to date on monitoring results through annual reporting and will be notified of unexpected negative environmental effects. Mitigation measures have also been outlined for unexpected negative environmental effects that may occur but cannot be explained by factors unrelated to the wind farms operation.

8.0 REFERENCES

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APPENDIX G
GE Maintenance Checklist

Secured Document from General Electric
– Available for download at:

<http://mcleansmountain.northlandpower.ca>

Under the 'Reports' Link