



# **BENJAMINS MILL WIND PROJECT**

**Environmental Management and Protection Plan**

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# 1 Introduction

This report details the Environmental Management and Protection Plan (**EMPP**) for the construction, operation, maintenance, and decommissioning of the Benjamins Mill Wind Project (the **Project** or **BMWP**). The Project is located in the West Hants Regional Municipality area of Hants County, approximately 13 km southwest of Windsor, Nova Scotia. The proposed WTG locations and associated infrastructure are situated on a mix of privately-owned and provincial Crown lands along Highway 14. The proposed development area has largely been used for forestry activities and therefore has a network of existing forestry roads.

Natural Forces Developments Limited Partnership (the **Proponent**) aims to address potential impacts that the project may have on culturally significant and valued environmental components. These include but are not limited to water quality, wetlands, soil contamination and wildlife.

This EMPP specifically includes management plans and mitigation measures for:

- i. Air quality;
- ii. Fire management;
- iii. Domestic waste management;
- iv. Hazardous waste management;
- v. Wetland protection;
- vi. Watercourse and water quality protection;
- vii. Erosion and sedimentation control;
- viii. Wildlife interactions;
- ix. Invasive Species Management
- x. Spill contingency;
- xi. Sound management;
- xii. Visual impacts; and,
- xiii. Emergency Response.

The EMPP is produced by the Proponent for the Project. Any amendments will be issued by the Proponent and the Project Manager will be responsible for providing amendments to all relevant individuals.

## **1.1 Environmental Management and Protection Plan Objective**

This EMPP serves to guide all contractors during the construction phase of the BMWPP to avoid and/or minimize potential environmental impacts associated with the proposed works. It is the contractors' responsibility to familiarize themselves with the document and ensure that all works are undertaken in an environmentally safe and responsible manner, in compliance with all relevant Provincial, Federal, and Municipal laws, bylaws and regulations. The EMPP also serves as a guide to avoid and/or minimize environmental impacts throughout the operation, maintenance, and decommissioning phases of the Project.

## **1.2 Project Description**

The entirety of the Project being developed by the Proponent consists of 28 wind turbines capable of producing up to 154 MW of renewable energy, access roads, an underground and overhead collection system that interconnects to the Benjamins Mill Substation, which thereafter connects via a short transmission line to the existing Nova Scotia Power grid.

This Project helps Nova Scotia achieve its mandated targets for renewable energy production.

## **1.3 Scope of Work**

The scope of the EMPP includes the construction, operation, maintenance and decommissioning of the Project. The activities proposed for these four phases are further described in the sections below.

### **1.3.1 Construction work**

The construction of the Project consists of the installation of 28 WTGs, WTG foundations, 34.5 kV; overhead and underground electrical system, access roads, equipment laydown areas, crane pads, and on-site substation, and a transmission line interconnection.

There will be five main work packages for the construction of this Project:

1. The tree clearing works will include the following:
  - a. Surveying and staking roads and areas for tree clearing;
  - b. Clearing all trees from desired roadways, crane pads, laydown areas, component assembly areas, crane assembly areas, substation footprint; and
  - c. Proper management of removed vegetation.
2. The civil works, will mainly consist of the following:

- a. Construction of site roads, crane pads, and component assembly areas;
  - b. Excavation, sand placement and backfilling of cable trenching, (in cooperation with the Electrical BOP Contractor); and
  - c. Reinstatement of all excavated areas using reserved topsoil, hay and hydroseed where necessary.
3. The wind turbine foundation works will include the following:
- a. Design of Wind Turbine Foundation (design and construction done by separate contractors);
  - b. Excavation works for turbine foundation;
  - c. Construction of turbine foundation; and
  - d. Backfilling post construction of reinforced concrete turbine foundation.
4. The WTG works will include the following:
- a. Pre-assembly works;
  - b. Erection of WTG towers; and
  - c. Install and commission the wind turbines and SCADA system.
5. The electrical works will consist of the following:
- a. Design of the electrical works;
  - b. Installation of site cabling including the underground and overhead 34.5kV collection system, WTG and trench grounding, and placing and terminating all the cables; and,
  - c. Installation of site substation and interconnection to existing grid and commissioning the electrical works.

As it stands, it is not anticipated that concrete will be produced on site.

### **1.3.2 Operation & Maintenance work**

Once the Project is commissioned, minimal vehicle activity will be required. The access road will be used for periodic maintenance and safety checks. A comprehensive SCADA system will be installed for remote monitoring and control of the WTG, which will minimize the need for on-site personnel. The SCADA system ensures safe and efficient operation of the WTGs.

Scheduled maintenance work will be carried out several times each year throughout the operational phase as well as routine site visits. Unscheduled maintenance is minimal as the

SCADA system allows 24-hour monitoring of the Project by the manufacturer and the operations team at Natural Forces. Maintenance procedures may require use of small or large cranes for brief periods of time for replacement of blades or other turbine components.

### 1.3.3 Decommissioning work

The Project will be in operation for approximately 25 years. The lifetime is based on the duration of the Power Purchase Agreement (PPA) signed between Nova Scotia Power (NSP) and the Proponent.

Decommissioning will commence within 6 months after the PPA has been terminated unless otherwise decided by the Proponent. Should the operational phase of the Project extend past 25 years, applicable permits will be obtained at that time.

Similar traffic movements to those experienced during the delivery of the turbine components are anticipated during this phase; however, overall decommissioning will require considerably lower vehicle support than during the construction phase. The following 4 steps are anticipated:

1. The WTGs will be dismantled and removed from the site for scrap or resale. The foundation, unless the landowner wishes to keep it, will be removed to below plough depth, and the topsoil will be reinstated so that the land may be returned to its former use.
2. The substation will be dismantled and removed from the site for scrap or resale.
3. All other equipment will be dismantled and removed, and the land will be returned to its former use.
4. The access roads and site entrance may be removed if required. After removal, the land will be reinstated to its former use.
5. The underground cables will be below plough depth and contain no harmful substances. They may be recovered if economically attractive or left in the ground. Terminal connections will be cut back below plough depth.

## 1.4 Project Timeline

The timeline for the construction of the Project is outlined in the table below. This schedule is subject to change as necessary to account for unforeseeable events, weather, and delays.

Phase	Timeline
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<b>Planning, Site Preparation and Construction</b> - Clearing and Grubbing - Access Road and Laydown Area - Turbine Foundation - Electrical infrastructure - Crane Pad Construction - Turbine Installation - Commissioning - Removal of all temporary works and restoration of the site	          
<b>Phase II – Operation and Maintenance</b> - Turbine Operation - Inspection and Maintenance	  
<b>Phase III – Decommissioning (Tentative)</b> Infrastructure Removal Site Reclamation	  

## 2 Potential Environmental Impacts and Mitigation

In the following section, different valued environmental components relevant to the construction, operation, maintenance and decommissioning of the Project are analyzed to determine the potential impacts that may occur on site. From the list of potential impacts, mitigation measures were identified to avoid and/or minimize the impacts on the valued environmental components.

### 2.1 Air quality

#### 2.1.1 Potential Impacts

Air quality can have a detrimental effect on the environment by posing the potential risk of creating difficult breathing conditions, coating the vegetation with dust and being ingested by wildlife.

#### 2.1.2 Objective

The objective of this section of the EMPP is to reduce the amount of dust and pollutants created during the construction, operation, maintenance and decommissioning of the Project.

#### 2.1.3 Management and Mitigation Measures

The mitigation measures below will help address the potential risk of a decrease in air quality surrounding the site.

- Vehicles and equipment will be maintained in proper working order;

- All vehicles and machinery will comply with current emission standards and will be used efficiently, minimizing distances travelled when possible;
- Vehicle idling will be minimized where possible;
- A speed limit will be enforced to reduce unnecessary emissions and enhance safety;
- Contractor carpooling will be encouraged;
- Low sulphur fuel will be used in combustion engines, when possible;
- Fugitive dust during dry weather conditions may be controlled with the application of water; and,
- Earth work activities will be paused, where possible, during periods of significant winds.

## **2.2 Fire management**

### **2.2.1 Potential Impacts**

Fire hazards may occur on site and can have a detrimental effect on the vegetation and wildlife that surround the project site.

### **2.2.2 Objective**

The objective of this section is to reduce the risk that fires (started on site by project activities) will propagate to the surrounding vegetation and environments during the construction, operation, maintenance and decommissioning of the Project.

### **2.2.3 Mitigation Measures**

The mitigation measures below will help address the potential risk of fire propagation during the construction and decommissioning phases of the Project:

- Contractors and/or workers will not construct or use campfires on site;
- Heavy equipment operators will be outfitted with fire suppressant equipment;
- Fire suppressant equipment will be located on site at all times during the construction phase of the project; and,
- The Proponent will circulate a Work Permit to all Contractors which must be kept on-site, and all conditions adhered to.

To mitigate the risk of fire propagation during the operation and maintenance phases of the Project, fire suppressant will be located inside the turbines at all times.



## **2.3 Domestic Waste Management**

### **2.3.1 Potential Impacts**

Domestic waste can have a detrimental effect on the environment by posing the potential risk of being ingested by wildlife, polluting watercourses and wetlands, and attracting wildlife to the site.

Domestic waste will be defined as waste generated during the construction, operation, maintenance and decommissioning of the Project and may include:

- Day-to-day waste (ex. paper, cardboard, plastics, food); and
- Construction activities waste (scrap steel, scrap cable, metals, wood debris, surplus concrete and excess soils from cleared areas).

### **2.3.2 Objective**

The objective of this section of the EMPP is to reduce the amount of domestic waste found at the site during the construction, operation, maintenance and decommissioning of the Project and ensure it is properly disposed.

### **2.3.3 Management and Mitigation Measures**

The mitigation measures below will help address the potential risk of domestic waste on site throughout all phases of the Project.

- Contractors will ensure that the Project area remains clear of waste, and that adequate waste and disposal facilities are provided. The collection and disposal of waste will be carried out on an appropriate frequency to keep pace with waste generation;
- All waste bins will be kept securely closed, so as to not attract rodents, bugs or other animals;
- Limbs and timber will be chipped and or crushed and disposed of at the site. Non-combustible material, overburden and rock will be disposed of where their use as fill material is impractical; and,
- Waste disposal areas, in accordance with regulatory guidelines, will be located away from rivers, watercourses or wetlands.

## 2.4 Hazardous Material and Waste Management

### 2.4.1 Potential impacts

Exposure or accidental spillage of hazardous materials or wastes might affect employee health and safety; contaminate soils, surface and groundwater; and endanger vegetation, fish and wildlife.

### 2.4.2 Objective

The objective is to avoid hazardous material disposal into the environment and manage their impact if they are released into the surrounding area. Possible hazardous materials present on site are:

- Fuel;
- Waste concrete
- Lubricants and oils;
- Paints and solvents;
- Hydraulic fluids; and
- Sewage.

### 2.4.3 Mitigation Measures

The mitigation procedures below are modelled on the *Workplace Hazardous Materials Information System (WHMIS)* program, which outlines best management strategies in proper handling, storage, disposal and control of hazardous materials.

Hazardous materials (e.g. fuels, lubricants, hydraulic oil) and Hazardous wastes (e.g. sewage, waste oil) will be managed to minimize the risk of chronic and/or accidental releases. Hazardous petroleum wastes are classified as deleterious and their disposal into the environment and water is illegal. The contractors will ensure that the following efforts are taken to minimize and mitigate potential impacts from accidental waste spillage:

- Equipment will be kept in good working order and maintained so as to reduce risk of spill/leaks and to avoid water contamination;
- Spill response kits will be provided on site for each piece of equipment to ensure immediate response to a potential waste release and will be stocked with supplies to handle a worst-case scenario in surface or groundwater;

- Routine maintenance, refueling and inspection of machinery will be performed off-site or on level ground onsite;
- Corrective measures will be implemented immediately and reported to the agencies;
- Secondary containment and limited quantities of chemicals and fuels required to be stored on site will be in an area away from the surrounding terrestrial environment, or direct pathways (i.e., ditches) to the surrounding environment;
- If contaminated soil is encountered, it will be reported to NSE and managed utilizing the Nova Scotia Contaminated Site Regulations;
- Refueling, oiling, and maintenance of equipment will be completed in specifically designated areas located at least 30 m away from any watercourse, wetland, or well to minimize potential effects that could arise in the event of a spill;
- Servicing of equipment will be completed off-site by a licensed mechanic; however if required to be completed on-site, the work will be completed over an impervious surface or trap;
- Chemical and petroleum hydrocarbons will be stored in appropriate containers and in specifically designated areas to reduce potential for leaks. Where applicable, secondary containment of chemicals or petroleum hydrocarbons will be employed;
- Oily rags will be stored in approved receptacles and disposed of at approved waste facilities;
- If fuel storage is required onsite, double walled fuel storage tanks will be required;
- Work entailing use of toxic or hazardous materials, chemicals, or otherwise creating hazard to life, safety of health, will be conducted in accordance with National Fire Code of Canada to minimize the potential for spills or fires;
- Portable toilets will be located at least 30m away from any watercourses, wetlands or environmentally sensitive areas, and the sewage will be disposed of at an approved facility;
- Waste/excess concrete must be disposed of as per environmentally accepted industry standards;
- Used oil filters, grease cartridge containers and other products associated with equipment maintenance will be collected and disposed of in accordance with regulatory guidelines;

- Fuel and hydraulic systems on all equipment will be inspected daily to ensure there are no leaks. All leaks discovered will be repaired as soon as practically possible;
- No fuel, oil or other hazardous materials will be stored near watercourses, and storage of such materials will be restricted to the located in an area identified by contractors;
- All potentially hazardous materials present on site will be handled, labeled, and stored responsibly to avoid any spillage or contamination; and,
- If a spill occurs, corrective measures will be implemented immediately and reported to the Nova Scotia Environment at 1 800 565-1633 or outside of business hours to the Canadian Coast Guard's environmental emergencies reporting system at 1-800-565-1633.

## **2.5 Wetland Protection**

### **2.5.1 Potential Impacts**

Impact to wetlands would potentially occur during clearing, grubbing and excavation activities. Such activities might induce silt run-off, alter flow into the wetlands or see them become repositories of significantly increased water flow, nutrients, or sediments.

### **2.5.2 Objective**

Wetlands have been, and will continue to be, when required, delineated by a certified wetland delineator and the Project has been carefully designed to minimize impact and avoid these areas where possible. The objective is to protect wetlands from potential impacts as previously described.

### **2.5.3 Mitigation Measures**

During construction of the roads, contractors will employ all mitigation measures shown in this EMPP to ensure ditches direct surface water from the road away from the wetlands, maintain a silt fence between the wetland and any disturbance areas, and install effective drainage structures.

Contractors must adhere to the conditions of any required Watercourse and Wetland Alteration permit.

- Through the site selection process, the project footprint has been sited predominantly in areas previously clear cut through forestry activities, creating an existing highly fragmented habitat and the Project footprint is limited, to the extent possible, outside areas of pristine habitat;
- Field surveys have and will be completed, as necessary, to ensure unmapped wetlands are delineated;

- The area to be disturbed by the Project will be minimized to the extent possible (i.e., limited to the area which is required to accomplish the Project objectives);
  - A wetland alteration permit will be obtained for work in any wetland, noting that work within wetlands will be avoided or minimized to the extent possible during the Project design phase;
  - Appropriate sediment erosion and run-off control measures (e.g. silt fencing, haybales) will be implemented when needed;
  - Natural regeneration of the site will be promoted to aid in storm water retention and reduce run-off;
  - No stockpiling of materials will occur within 30m of a wetland;
  - Equipment will be in good working order and maintained to reduce risk of spill/leaks and avoid water contamination;
  - Spill response kits will be provided on site for each piece of equipment to ensure immediate response to a potential waste release and will be stocked with supplies to handle a worst-case scenario on ground or in surface and groundwater;
  - If a spill occurs, corrective measures will be implemented immediately and reported to the Nova Scotia Environment at 1 800 565-1633 or outside of business hours to the Canadian Coast Guard's environmental emergencies reporting system at 1-800-565-1633;
- Corrective measures will be implemented immediately and reported to the appropriate authorities; and,
- Routine maintenance, refuelling and inspection of machinery will be performed off-site whenever possible.

## **2.6 Watercourse and Water Quality Protection**

### **2.6.1 Potential Impacts**

Improper water crossings can result in permanent diversion restriction or blockage of natural drainage, or have the potential to impact surface water quality, quantities, or flow.

### **2.6.2 Watercourses**

Watercourses have been delineated by a certified watercourse delineator and the Project has been designed to minimize impact and avoid these areas.

## 2.6.3 Mitigation Measures

Contractors will comply with the following best management practices on watercourse and water quality protection.

- A NSE watercourse alteration permit will be obtained prior to any work within a watercourse. A Request for Review will be submitted to DFO under the Fisheries Act where necessary
- A setback distance of 30 m between the site works and wetlands will be implemented where feasible; if not feasible, a Wetland and Watercourse Alteration (WAWA) permit will be obtained;
- Efforts will be made to design the access road such that it does not interfere with a watercourse, water body or drainage channel;
- Where water must be pumped out of excavation pits, it will not be discharged into a wetland, watercourse or defined channel. If pumped water contains total suspended solids the water will be pumped to vegetated land with gentle slope to allow sediment to filter, or the water will be filtered before release with a filter bag.

## 2.7 Erosion and Sediment Control

### 2.7.1 Potential Impacts

The mitigation measures below are to minimize the quantity and duration of exposed or transferred soil, as well as to mitigate potential impacts on nearby water quality.

### 2.7.2 Objective

The Proponent acknowledges that proper erosion and sedimentation control is necessary to maintain water quality and reduce environmental impact on the Project area. The mitigation measures will be implemented based on industry best practices. Measures are intended to minimize the impacts erosion and sedimentation have on the nearby watercourses, wetlands and on the species that live within them.

### 2.7.3 Mitigation Measures – Erosion Control

Contractors will comply with the following best management practices on erosion control.

- Proper erosion and sediment control measures will be installed and checked regularly during the construction phase and prior to, and after, storm events to ensure they are continuing to operate properly to minimize potential effects to adjacent habitat;
- A plan for handling fill and construction materials for the site will be communicated to contractors (i.e., if stockpiling is required, materials will be stored away from any

watercourse or removed from site to a predetermined location) with an intent to minimize soil stockpiled, and the duration that soil is stockpiled at the site;

- Exposed soils will be stabilized as soon as practical to minimize emissions of fine particulate matter and soil erosion;
- Fill and excavated materials will not be stockpiled for long periods of time to reduce the likelihood of sedimentation. Fill/excavation material piles will be covered with tarps if left standing for more than 24 hours;
- Weather will be monitored and additional erosion control measures such as the installation of hay bales and check dams/silt fences will be employed, as appropriate, should stockpiled fill be present in unexpected heavy rain events;
- Work will not be conducted during heavy rain events to minimize the movement of exposed soils;
- Where possible, clearing will take place in the winter months on frozen ground;
- Geotechnical studies will be carried out to assess the composition of the ground and bedrock;
- Steep slopes and erodible soils near watercourses or wet areas will be hydroseeded and dry-mulched as soon as practically possible after excavation to reduce the velocity of surface runoff and increase stabilization. Native seed mixes will be used if possible. If not possible, it will be ensured that the seed mix does not contain invasive species;
- Areas susceptible to erosion will be stabilized and erosion will be minimized through the use of control measures (i.e., haybales, coco mats etc.);
- Excavation will be managed in sections or stages such that the time between disturbance of soil and seeding of finished slopes is minimized;
- Excavations will be timed with weather forecasts to minimize open excavations during wet periods to the extent possible, which minimizes the possibility of erosion and sedimentation;
- Topsoil stockpile locations will be prepared and used as early as possible. If any topsoil stockpiles are stored on site, then they will be protected from precipitation using anchored polyethylene tarps, and erosion and sedimentation control structures should be placed to capture any potential runoff;
- A speed limit on site access roads will be enforced to help reduce soil loss;
- Existing culvert passages will be maintained; and,

- Slope grades will be minimized during construction. Unprotected cut or fill slopes will be stabilized by gravel or geo-textile fabric if they are deemed likely to erode.

## 2.7.4 Mitigation Measures – Sediment Control

While Erosion control measures are inherent in the design of the works and will be employed in the construction as a priority, the sediment control measures outlined here will be employed at the Project site. Contractors will be responsible and ensure that these control measures are followed. These control measures include the following:

- Ditches will be designed to take off water at low velocities and redirect it to vegetated areas;
- Outflows from ditches will cross dispersion berms at ~1% grade to keep flow slow;
- Culverts and ditches will be aligned to follow existing natural drainage;
- Culvert outflows will feed into stone rip rap aprons at willow grades to minimize erosion;
- Silt fence will to be employed along edge of excavations in areas where onward drainage is possible;
- Damaged erosion and sediment control measures (ex. fallen fences) will be repaired immediately;
- Accumulated sediment will be cleaned out at regular intervals after heavy rain falls;
- Straw-bale barriers and silt curtains will be used in ditches where necessary to provide a barrier to silt movement;
- If it is deemed necessary to limit surface run-off during construction, sediment pools will be installed and maintained. Any water with large sediment concentrations will be directed to such basins and released when appropriate;
- Contractors will ensure that all erosion and sediment control measures are in place prior to site disturbance;
- The erosion and sediment control measures will be maintained during the construction phase of the Project; and
- The installation of any erosion protection materials is to be carried out by starting on the upstream side of a watercourse and progressing downstream, using clean, durable, non-ore bearing and non-toxic materials obtained from a non-watercourse source.



## 2.7.5 Monitoring Program

Contractors will inspect all sediment control barriers each week and after heavy rain events to ensure they are working as intended and fix or modify any ineffective barriers as soon as practical. During rain events, contractors will monitor culvert outflow to ensure that the rainwater does not bring excess sediment and take corrective actions, as necessary.

## 2.8 Wildlife Interactions

### 2.8.1 Potential Impacts

Terrestrial wildlife may be disturbed throughout the construction phase, but it is likely the wildlife will return to the site during operation. The wind turbines may also present a hazard to avian and bat populations in the area through collision or barotrauma (for bats).

A post-construction monitoring plan will be developed and implemented by a third-party consultant in consultation with the Department of Environmental and Climate Change, Department of Lands and Forestry, Canadian Wildlife Services (CWS), and the Mi'kmaq in Nova Scotia and will follow the most current and relevant Post-Construction Bat and Bird Mortality Survey Guidelines available at the time of the studies.

### 2.8.2 Objective

The objective of the wildlife interaction plan is to reduce the unanticipated hazards to avian and bat species as well as terrestrial wildlife on site.

### 2.8.3 Mitigation Measures

During the construction phase, wildlife interactions will be mitigated by ensuring that food waste and other garbage is stored so that it is not accessible by wildlife. The garbage will also be disposed properly to avoid attracting wildlife to the site.

Post-construction monitoring will help identify the impact of the Project on birds and bats. Should significant mortality occur during operation, consultation the groups mentioned above will occur to determine the best course of action. Mitigation that may be implemented could include the following:

- Vegetation will be retained where possible to maintain wildlife habitat;
- The Project footprint will be limited to that which is necessary to enable the Project to be carried out;
- Existing roads and trails will be utilized to limit disturbance outside the Project footprint and minimize the interactions with wildlife and wildlife habitat;

- To minimize wildlife encounters, the site and working areas will be kept clean of food scraps, garbage will be removed from the site daily and traffic will be limited to roadways;
- In the case of wildlife encounters, the following will be implemented: (1) no attempt will be made by any worker at the Project site to chase, catch, divert, follow or otherwise harass wildlife by vehicle or on foot; (2) equipment and vehicles will yield the right-of-way to wildlife; and (3) if a SAR or a nest of any bird is encountered during activities, work around the SAR or nest will cease until a biologist is dispatched to assess the situation and appropriate mitigation is applied;
- To minimize disruptions with wildlife activity at night, the Project construction activities will be limited to daylight hours when possible;
- Increasing the WTG rotor 'cut-in' speed preventing the rotor from spinning at low wind speeds when some species are more active;
- Submitting annual reports to regulators and if required, consult to determine any necessary mitigation action (e.g., increasing cut-in speed, and other operational adjustments);
- At the request of provincial departments and CWS, the Proponent can also develop an Adaptive Management Plan for bird and bat mortality monitoring to ensure a plan is in place should unanticipated avian or bat impacts occur during operation;
- In addition to these mitigation measures and measures outlined in the EIA, the Proponent will also submit post-construction data to the Wind Energy Bird and Bat Monitoring Database to support national efforts to better understand wind turbine effects on birds and bats;
- Should an active bird nest be encountered, disturbance work will temporarily stop. No tape will be used to mark nests onsite to minimize the risk of predation. However, if required for construction crews to avoid a nest, a buffer distance defined in consultation with the province and CWS may be flagged to minimize disturbance within a buffer zone; and,
- All workers will adhere to the provincial Nova Scotia Endangered Species Act and federal Species at Risk Acts.

Should a mortality of an individual migratory bird species at risk, or 10 or more migratory birds in one night, CWS will be contacted within 24 hours (Environmental Emergencies 1-800-565-1633).

Specifically for birds and bird habitat the following mitigations will be employed:

- Desktop and field studies conducted suggest a minimal loss of habitat due from clearing. The clearing footprint is minimized by using existing access roads and areas previously cleared from forestry activities;
- The Proponent will endeavor to conduct construction activities such as clearing and grubbing during a time period that does not coincide with the time period in which migratory and breeding birds would be in the area;
- The Project area will be visually checked on a daily basis for nesting migratory birds. Should a nesting migratory bird be identified within the work area, ECCC/Canadian Wildlife Service (CWS) will be notified and an appropriate no-work buffer zone (in consultation with ECCC/CWS) will be applied around the nest until the nest has been fledged. No flagging of the nest will occur to minimize chances of predation;
- Stockpiling of fill and excavated materials will be minimized to deter the potential for nesting by bank swallows or other ground nesting species (e.g., common nighthawk). Fill/excavation material piles will be covered with tarps if left standing for long durations;
- All workers will adhere to the Migratory Birds Convention Act, 1994 and the Migratory Birds Regulations;
- All workers will adhere to the provincial Nova Scotia Endangered Species Act and federal Species at Risk Acts;
- To minimize disruptions with wildlife activity at night, the Project construction activities will be limited to daylight hours when possible;
- Instruction will be given to wind farm maintenance staff to ensure all work lights are turned off upon leaving the site particularly during foul weather events;
- A follow up avian mortality survey will be conducted after the Project commissioning and appropriate actions will be taken in consultation with CWS should there be a significant negative impact to migration flyways; and
- A comprehensive Adaptive Management Plan will be developed and implemented in consultation with CWS;
- A follow up avian mortality survey will be conducted after the Project commissioning and appropriate actions will be taken in consultation with CWS should there be a significant negative impact to migration flyways;
- Lighting requirements will meet ECCC standards to minimize the potential impacts to migratory birds;

- Only the minimum amount of pilot warning and obstruction avoidance lighting will be used;
- Only lights with short flash durations and the ability to emit no light during the 'off phase' of the flash (i.e. as allowed by strobes and modern LED lights) will be installed on tall structures; and,
- Lights will operate at the minimum intensity and minimum number of flashes per minute (longest duration between flashes) allowable by Transport Canada.
- Instruction will be given to wind farm maintenance staff to ensure all work lights are turned off upon leaving the site particularly during foul weather events
- A follow up avian mortality survey will be conducted after the wind farm commissioning, and appropriate actions will be taken in consultation with CWS should there be a significant negative impact to night migrants
- ECCC climate database has been consulted to predict the rate of fog occurrence
- Instructions will be given to wind farm maintenance staff to ensure all work lights are turned off upon leaving the site particularly during foul weather events
- The project site has been designed to minimize the amount of land cleared. This reduces the ecological impact of the Project Footprint and minimizes the potential impact to bat habitat.
- A follow up bat mortality survey will be conducted after the Project commissioning and appropriate actions will be taken in consultation with the appropriate authorities should there be a significant negative impact to bats.

Mitigations specifically for fish and fish habitat are detailed below:

- All construction activities near watercourses will comply with the applicable regulations and guidelines such as the Fisheries Act;
- Any necessary watercourse crossings will be located in areas that exhibit a stable soil type where grades approaching the crossings will not be too steep, and will span the watercourse where possible;
- Culverts will be designed and installed to prevent the creation of barriers to fish movement and maintain bankfull channel functions and habitat functions to the extent possible; and,

- Any fish isolated in the work area will be transferred (using appropriate capture, handling and release techniques to prevent harm and minimize stress) downstream or away from the construction area prior to the commencement of work. Intakes of pumps and hoses for de-watering of in-water work areas (if required) will be screened to avoid impingement and/or entrainment of fish.

## **2.9 Vegetation Management**

### **2.9.1 Objective**

The objective of the vegetation management plan is to protect, reintroduce, and manage the vegetation on site.

### **2.9.2 Mitigation Measures**

Contractors will comply with the following best management practices for vegetation management.

- Through the site selection process, the Project footprint has been sited predominantly in areas previously disturbed via clear cutting through forestry activities, creating a highly fragmented habitat and the project footprint is limited, to the extent possible, in areas of pristine habitat;
- The area to be disturbed by the Project will be minimized to the extent possible (i.e., limited to the area that is required to accomplish the Project objectives);
- Following the construction and decommissioning phases of the Project, natural revegetation of the site will be promoted;
- There will be minimal land/habitat loss attributable to the construction phase as determined by desktop and field studies;
- The access roads have been optimized to make use of existing roads at the Project site to reduce the amount of flora to be cleared;
- Heavy equipment will be properly cleaned prior to mobilizing to site to avoid potential introduction of exotic and invasive species;
- Vegetation control measures during the operational phase will be minimized to the extent possible;
- Efforts will be made to maintain mature vegetation along the edges of the development area, particularly in riparian areas;

- During Project activities, should a SAR/SOCC be identified, a buffer will be maintained, and additional mitigation will be developed in consultation with applicable regulatory authorities;
- Vegetation will be retained where possible to maintain wildlife habitat;
- The Project footprint will be limited to that which is necessary to enable the Project to be carried out;
- Existing roads and trails will be utilized to limit disturbance outside the Project footprint and minimize the interactions with wildlife and wildlife habitat; and,
- All workers will adhere to the provincial Nova Scotia Endangered Species Act and federal Species at Risk Acts.

## 2.10 Invasive Species Management

### 2.10.1 Objective

The objective of the invasive species management plan is to reduce the risk of introducing invasive species on site.

### 2.10.2 Mitigation Measures

Contractors will comply with the following best management practices on invasive species.

- During the construction phase, invasive species importation will be mitigated by ensuring that construction equipment is cleaned prior to transportation and use to ensure that machinery is clean.

## 2.11 Spill Contingency Planning

### 2.11.1 Potential Impacts

The potential impacts to soil, surface water and ground water could occur during the construction, operation, maintenance and decommissioning of the Project due to spills.

### 2.11.2 Objective

This contingency plan reflects on potential accidents and malfunctions during project work. The Canadian Standards Association publication, *Emergency Preparedness and Response*, was used in developing this plan that will aim to contain spills should they occur despite using the approaches discussed in this EMPP.

### 2.11.3 Spill Response Procedures

Contractors will ensure spill kits accompany each piece of heavy equipment / machinery and that there are adequate supplies in each kit to address the worst-case scenario in which a spill could occur on the ground, in surface water or in groundwater. All spills or leaks such as those from machinery or storage tanks must be promptly contained, cleaned up and reported. Within a week of the accidental spill or leakage, a report will be submitted to Nova Scotia Environment by the Proponent. As demonstrated in the spill response report form included as Appendix A, the report will outline:

- The cause of the release;
- Adequacy of the response to the release by the persons responsible;
- Plans to remediate land that was directly impacted;
- Manners of collection and dispose of the contaminant; and;
- Plans to prevent a reoccurrence of the unauthorized release.

### 2.11.4 Emergency contacts

All accidental spills and leaks will be reported to Nova Scotia Environment at 902 424-7773 during business hours and the Canadian Coast Guard at 1 800 565-1633 at any time.

## 2.12 Sound Level Management

During the construction, maintenance, and decommissioning phases of the Project the ambient sound level will be elevated as a result of the use of equipment and machinery such as excavators, dump trucks and bulldozers. Elevated sound levels can disturb fauna and local residents.

To mitigate the risk of annoyance due to the elevated construction and equipment sound, the following mitigative measures will be applied, as discussed in the Complaint Resolution Plan (Appendix B):

- A sound level impact assessment has been conducted that shows the worst case scenario sound levels that can be expected at nearby dwellings are below 40 dB(A);
- A complaint resolution plan will be developed for handling sound level concerns;
- Turbine locations have been sited in order to comply with provincial wind turbine sound level guidelines;

- The wind turbine model selected for the Project will incorporate sound reduction technologies to mitigate sound levels generated by the moving blades, if feasible;
- Clearing of flora on the Project site will be minimized to aid in attenuation of sound levels;
- Site preparation, construction, and decommissioning activities will be limited to daytime hours, when feasible; and,
- Infrasound from wind turbines is not a concern given the distance the wind turbines are located relative to dwellings.

To address elevated sound level impacts during the operational phase, the turbines have been sited to minimize the impact the heightened sound levels will have on residences and local businesses surrounding the project. Should a community member have any concerns regarding the sound level emissions from the turbines during the operation of the Project, their complaint will be addressed following the Complaint Resolution Plan (Appendix B).

## 2.13 Visual Impacts

A Visual Impact Assessment has been completed to help understand the impacts on the community members and existing landscape. In addition to this assessment, the following mitigations will be implemented to reduce the visual impacts of the Project:

- LED lighting will be used to minimize light throw;
- Only the minimum amount of pilot warning and obstruction avoidance lighting will be used;
- Only lights with short flash durations and the ability to emit no light during the ‘off phase’ of the flash (i.e. as allowed by strobes and modern LED lights) will be installed on turbine structures;
- Lights will operate at the minimum intensity and minimum number of flashes per minute (longest duration between flashes) allowable by Transport Canada;
- Exterior turbine maintenance lights will be turned off prior to maintenance staff leaving the site.
- The potential negative effect of shadow flicker has been largely mitigated at the design stage through responsible turbine siting;
- A shadow flicker assessment has been completed for dwellings and public areas within 2.0 km of the proposed turbines;



- Compliance with industry standard guidelines on shadow flicker has been achieved. All dwellings will experience less than 30 hours of shadow flicker per year and 30 minutes of shadow flicker on the worst day;
- If shadow flicker occurrences during operation are found to be exceeding guidelines and annoying to surrounding houses and buildings, screening receptors may be considered;
- A Compliant Resolution Plan will be developed for residents to refer to if they have concerns about any shadow flicker observed during operation;
- Construction activities will be limited to the day time when possible. It is noted that the turbine may be erected during the evening as the activity must be completed when the wind is less than 4 m/s as a safety measure. These conditions are commonly seen in the early evening;
- The paint on the turbines will be selected such that it does not contrast sharply with the environment and minimizes blade glint; and,
- Policies regarding responsible siting of wind turbines were followed to minimize the potential impact on the landscape aesthetics during siting.

### 3 Emergency Response

The following provides contact numbers in the case of emergencies involving worker safety, public safety and environmental emergencies.

#### 3.1.1 Emergency Contact List

Organization	Contact Name	Contact Number
Fire Department	-	911
Ambulance	-	911
RCMP Police	-	911
Windsor RCMP	-	902.798.2207
Natural Forces Project Manager	Chris Veinot	902.981.8900
Windsor Medical Centre	-	902.798.2207
Nova Scotia Environment	Bedford Office	902.424.7773
Canadian Coastguard	Environmental Emergencies	1.800.565.1633
Canadian Wildlife Services	-	1.800.668.6767
Archaeology Services Branch	-	506.453.2738

## **Appendix A: Spill Response Report Form**



# Spill Response Reporting Form

General information	
Date (dd/mm/yyyy)	
Contact person	
Consultant or Contractor	
Address	
City	
Postal Code	
Tel	
Email	
Details of incident	
Date of spill (dd/mm/yyyy)	
Time of spill (hh:mm)	
Weather conditions at the time of the spill	
Name of person who reported the spill	
Name of person who responded to the spill	
Type of contaminant spilled	
Description of spill (size, location, environment, source of spill, extent of contamination, etc.)	
Cause of spill	
Response to the spill (in detail)	

Names of organization, departments or local authority contacted	
Adequacy of the response (by person responsible)	
Are further steps required to remediate the land (y/n)	
If yes, describe the future plans to remediate the land that was impacted	
How was the containment collected and disposed	
Describe the steps or approach that will be implemented to prevent a reoccurrence of this incident	
Additional detail	

## **Appendix B: Complaint Resolution Plan**



# COMPLAINT RESOLUTION PLAN

Benjamins Mill Wind Project

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## Natural Forces

1801 Hollis St Suite 1205

Halifax, NS B3J 3N4

[naturalforces.ca](http://naturalforces.ca)



## Overview

Natural Forces Developments Limited Partnership (the Proponent) is committed to addressing any public concerns regarding the Benjamins Mill Wind Project (the Project) in the West Hants Regional Municipality area of Hants County, approximately 13 km southwest of Windsor, Nova Scotia. The intention is that this plan can inform the public on the ways that they can communicate their concerns to the Proponent and how concerns will be addressed.

## Purpose

The purpose of this plan is to ensure all public concerns are addressed consistently and effectively. The Proponent aims to:

- Manage concerns and complaints openly, promptly and properly;
- Resolve concerns and complaints as soon as possible; and
- Learn from the issues and minimize any impacts the Project has on the community.

## Scope

This plan details how concerns can be reported to the Proponent regarding the Project, and how the Proponent will address those concerns.

## Procedure

All concerns or complaints related to the Project will be directed to Kathleen Funke:

Kathleen Funke, Communications & Government Relations Manager  
Natural Forces  
Address: 1801 Hollis Street, Suite 1205, Halifax, NS, B3J 3N4  
Phone: 902 292-2476

The complainant will be notified upon receipt of the complaint. The Proponent will investigate complaints within 20 days of being receiving; upon which complainants will be notified of how the concern was or will be addressed.

## Sound Levels and Shadow Flicker

Complaints regarding sound levels and shadow flicker will be assessed on a case by case basis. The Proponent will follow the steps listed below in resolving the issue:

- 1) Conduct an investigation to understand the conditions under which elevated sound levels or shadow flicker issues are experienced. The specific date, time, location of observed shadow flicker, and local weather conditions (including wind direction and wind speed) will be noted for each incident of elevated sound levels or shadow flicker, as well as the duration of the event.



- 2) If it is determined from the investigation that the shadow flicker was caused by the Project, the Operations Team for the Project will work to identify the best mitigation based on the circumstances, such as screening, discussed below.
- 3) The Operations Team will track any such events along with the supporting data, and will track the success of any mitigation measures employed in consultation with the complainant, which will inform future resolutions.

The complainant will also be asked to record any additional incidents or occurrences.

If several occurrences of issues regarding sound levels and/or shadow flicker that arise from the Project, an assessment of the causes of the impacts will be conducted and a monitoring program will be developed and implemented in consultation with the complainant.

Mitigation measures to reduce sound levels and shadow flicker have been described in the Environmental Impact Assessment and will be discussed with the Project Operations Team.

## **Construction and Operation**

Complaints regarding construction and operation activities will be discussed with workers or contractors involved.

Solutions to the complaints will be established with worker(s) and contractor(s), and complainants will be informed of how issues are addressed.

If complaints persist, then worker(s) and contractor(s) may be dismissed.

## **Closure**

This plan acts as a guidance document to result in the resolution of any complaints communicated to the Proponent about the Project. Ultimately, the situation of the individual complaints will more specifically inform the procedure followed to address them.

If the complainant is not satisfied with the response from the Proponent in addressing their complaint, the complaint will be referred to a higher authority within the company to further resolve the issue.