



**BROOKE-ALVINSTON WIND FARM
DECOMMISSIONING PLAN REPORT**

DRAFT

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1.0 Introduction

1.1 PROJECT OVERVIEW

Zephyr Farms Limited (Zephyr Farms) is proposing to develop the Brooke-Alvinston Wind Farm (the Project) in the Township of Brooke-Alvinston, Lambton County, Ontario. The Project has been awarded a Power Purchase Agreement with the Ontario Power Authority (RESOP 11836). The basic components of the Project include four Samsung Heavy Industries 2.5 MW wind turbine generators for a total installed nameplate capacity of 10 MW, transformers at each turbine, electrical collector lines, a transformer substation with associated control room, a meteorological tower (met tower), and turbine access roads. The electrical transmission system will transport the electricity generated from each turbine to Hydro One Networks Inc.'s (HONI) distribution network. The Project also includes interconnection equipment and installations specified by HONI. All Project components will be situated on private land and municipal road allowance. A copy of the Site Plan map is provided within the Draft Project Description Report.

Zephyr Farms has retained Stantec Consulting Ltd. (Stantec) to prepare a Renewable Energy Approval (REA) Application, as required under Ontario Regulation 359/09 - Renewable Energy Approvals under Part V.0.1 of the Act of the *Environmental Protection Act* (O. Reg. 359/09). According to subsection 6.(3) of O.Reg.359/09, the Project is classified as a Class 4 Wind Facility and will follow the requirements identified in O.Reg.359/09 for such a facility.

1.2 REPORT REQUIREMENTS

The purpose of the Decommissioning Plan Report is to provide the public, aboriginal communities, municipalities, and regulatory agencies with an understanding of the closure plan for the Project at the end of its useful life, and to describe how Zephyr Farms proposes to restore the Project Location to an acceptable condition for its intended use.

This Decommissioning Plan Report is one component of the REA Application for the Project, and has been prepared in accordance with Item 3, Table 1 of O. Reg. 359/09, and the Ontario Ministry of the Environment's (MOE's) draft guidance document *Technical Bulletin Four: Guidance for preparing the Decommissioning Plan Report* (MOE, 2010).

O.Reg.359/09 sets out specific content requirements for the Decommissioning Plan Report as provided in the following table (Table 1.1).

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Table 1.1: Decommissioning Plan Report Requirements: O.Reg. 359/09

Requirements	Completed	Section Reference
Set out a description of plans for the decommissioning of the renewable energy generation facility, including the following:		
1. Procedures for dismantling or demolishing the facility.	✓	3.3
2. Activities related to the restoration of any land and water negatively affected by the facility.	✓	3.4
3. Procedures for managing excess materials and waste.	✓	3.5

The MOE's Draft Technical Bulletin Four further elaborates on content guidance for the Decommissioning Plan Report, as summarized in the following table (Table 1.2).

Table 1.2: Decommissioning Plan Report Requirements: MOE Draft Technical Bulletin Four

Requirements	Completed	Section Reference
1. Decommissioning during construction (abandonment of Project).	✓	2.0
2. Decommissioning after ceasing operation.	✓	3.0
3. Restoration of lands negatively affected by the facility.	✓	3.4
4. Other decommissioning considerations:	✓	4.0
– Emergency response and communications plans	✓	4.1
– Decommissioning notification	✓	4.2
– Other approvals	✓	4.3

2.0 Decommissioning During Construction (Abandonment of Project)

In the event that Zephyr Farms cannot successfully complete the construction of the Project (e.g. due to financial considerations), the rights to the Project may be sold to allow the Project to be constructed by the purchasing developer.

In the event that a delay occurs in the purchasing of the Project by another developer, Zephyr Farms will be responsible for interim environmental protection. In the event that the site has been cleared and/or excavated in preparation for installation of Project infrastructure, appropriate environmental protection measures would be implemented to prevent topsoil erosion and/or watercourse sedimentation. The extent of environmental protection measures required would be dependent on the progress made at the time of Project abandonment, and would be determined through site inspections by qualified specialists. Possible measures would include, as appropriate, erosion and sediment control fencing, filling excavated areas, replacement of topsoil and/or reseeded and revegetation.

In the event that the Project is not purchased by another developer, Zephyr Farms would be responsible for decommissioning of the Project. In such a case the decommissioning process to be followed and the mitigation measures to be implemented would be the same as those detailed in Section 3.0 for decommissioning after ceasing operation of the Project.

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3.0 Decommissioning of Facility after Ceasing Operation

The wind turbines used for the Project can be expected to be in service for the term of the 20 year RESOP contract. Following the term of the contract, a decision would be made regarding whether to extend the life of the facility or to decommission. Decommissioning would entail the removal of facility components and restoring the land to an acceptable condition for its intended use.

3.1 GENERAL ENVIRONMENTAL PROTECTION DURING DECOMMISSIONING

During all decommissioning and restoration activities, general environmental protection and mitigation measures would need to be implemented. Many activities during decommissioning would be comparable to the construction phase. As such, general mitigation measures and best management practices as appropriate, including erosion and sediment control, air quality and noise mitigation, and contingency plans for unexpected finds and spills are provided in the Construction Plan Report.

3.2 PRE-DISMANTLING ACTIVITIES

Prior to any dismantling or removal of equipment, staging areas would be delineated at each turbine site and at the substation property. All decommissioning activities would be conducted within this designated area; this includes ensuring that vehicles and personnel stay within the demarcated areas. Crane pads, to accommodate dismantling, would be installed at each turbine location.

3.3 EQUIPMENT DISMANTLING AND REMOVAL

3.3.1 Wind Turbine Generators

Turbine Foundations

The turbine foundations would be partially removed to a depth of approximately 1.2 metres below grade, in accordance with the land lease agreement. This depth enables normal agricultural practices to be conducted over the foundation areas. The concrete would be removed from the site by dump truck. No blasting would be used to remove the turbine foundations.

Turbines

The turbines would be dismantled into their original component parts. A heavy-lift crawler and mobile cranes would be used to carry out the reverse sequence of steps that occurred during turbine assembly (detailed in the Construction Plan Report), namely:

- Dismantling of the rotor: removal of blades from the hub, followed by removal of the hub;
- Removal of the nacelle; and
- Decoupling and lowering the tower sections.

The turbine components would be temporarily stored at the staging area at each turbine site until removed from the site by truck.

Staging Area

A temporary work and storage area at each turbine location would be used for temporary storage of the turbine components, staging, parking, and foundation spoil pile. This area would not be excavated or graveled, and would be restored to pre-existing conditions at the end of the decommissioning phase.

Crane Pads

All crane pads would be removed; this includes the geotextile material beneath the pads and granular material. All granular and geotextile materials would be removed from the site by dump truck.

3.3.2 Electrical Infrastructure

Electrical Collector Lines

Underground collector lines and plastic conduits they run through would remain in place, with both ends that come to the surface excavated to approximately 1.2 metres below grade, in consultation with the landowner and in accordance with the land lease agreement. The interconnection to the HONI distribution network would be removed in accordance with HONI requirements.

Substation

The substation would be dismantled as agreed to, or as necessary, in accordance with the land lease agreement. The transformers, switchgear, and grounding grid would be removed, and the concrete foundation would be removed to approximately 1.2 metres below grade. All granular and geotextile materials would be removed from the site by dump truck. All electrical system components would be taken off-site by truck.

3.3.3 Met Tower

The met tower would be disassembled and removed by truck from the site. The truck to be used for removal of the met tower would be determined based on the tower model selected, but may be an appropriately sized pick-up truck (e.g. F350) or a small rubber tired rig. The foundation would be partially removed to a depth of approximately 1.2 metres below grade. The site would be accessed using the same route as the construction phase. Power and data cabling would remain in place, with both ends that come to the surface excavated to approximately 1.2 metres below grade, in consultation with the landowner and in accordance with the land lease agreement.

3.3.4 Access Roads

All access roads would be removed; this includes the geotextile material beneath the roads and granular material. The access roads would be returned to a similar condition as prior to project commencement, as excavated areas would be brought to grade with fill and topsoil. All granular and geotextile materials would be removed from the site by dump truck. Where the landowner see it advantageous to retain access roads, these would be left in place.

3.4 SITE RESTORATION PLAN

At the time of decommissioning, this Site Restoration Plan would be updated as necessary based on the standards and best practices at the time of decommissioning, and in consultation with the landowner and appropriate regulatory and government bodies.

3.4.1 Pre-Construction State of the Project Location

The only physical natural heritage features directly impacted by the construction of Project infrastructure would be agricultural land and the municipal road allowance where the access road connects with Ebenezer Road (and where interconnection occurs with HONI's distribution network).

3.4.2 Agricultural Lands

Areas that would require excavations during decommissioning of the facility are described in Section 3.3. Subsoil or clean fill would be added as necessary.

Areas that may have become compacted due to facility operation or decommissioning activities, including crane pads and access roads, would be decompacted using chisel ploughing and/or subsoiling, as determined by a Soil Inspector.

Any agricultural tile drains capped during construction, and or damaged during decommissioning, would be repaired by a Drainage Contractor. After repair, the landowner would be invited to inspect and approve the repair.

Topsoil would be added to similar depth as surrounding areas, where necessary. Imported topsoil added to agricultural areas would be of the same or similar soil type and texture as pre-construction conditions and/or adjacent lands and would be selected with input from the landowner. Topsoil replacement would be avoided during heavy precipitation or extremely windy conditions, as determined by the Decommissioning Contractor. Large stones would be removed after topsoil replacement.

All areas would be graded to pre-construction conditions and restored appropriately, in consultation with the landowner.

3.4.3 Municipal Road Allowances

Where Project infrastructure has been removed, all roadside ditches would be seeded with quick growing native species to prevent topsoil erosion; the seed mixture would be determined at that time in consultation with the municipality and/or the St. Clair Region Conservation Authority. Erosion and sediment control measures would be left in place until seed is fully established, as determined by an Environmental Inspector.

3.4.4 Potential Contamination

During construction and operation of the Project, environmental management practices would be in effect, such as secure containment of potential hazardous materials, to minimize the potential for spills. As there is limited handling or storage of bulk fuels or chemicals during the construction or operations phases of the Project, the potential for site contamination is very low. The Project should not, therefore, result in any long term decommissioning issues that would be detrimental to future site uses. In addition, the turbine sites would have no materials storage. Liquids such as oils would be primarily fully contained within equipment. The potential for spills at each turbine site during the life of the Project is minimal.

The substation would contain materials storage for the overall facility. As part of the decommissioning of this site, an Environmental Site Assessment would be completed to evaluate any potential impacts identified from a review of site operational and historical records. The Environmental Site Assessment would follow the protocols of O.Reg 153/04 – Records of Site Condition, Part XV.1 of the *Environmental Protection Act* (O.Reg 153/04) as amended or other applicable regulation that is in place at the time of the decommissioning of the Project including the completion of a Phase I Environmental Site Assessment to identify potential impacts to soil and groundwater and a Phase II subsurface investigation to investigate the potential issues.

If soil contaminants are noted, the impacted soils would be delineated and remediated as appropriate to the applicable standards of the day. The excavated contaminated material would be disposed at the nearest approved disposal facility in operation at the time of decommissioning. The removed soils would be replaced with appropriately compatible material.

3.4.5 Monitoring

Follow-up monitoring for one year after site restoration would be conducted, to allow for the Project area to experience seasonal changes and help determine if additional restoration is required, as determined by an Environmental Inspector. A monitoring plan would be prepared prior to decommissioning.

For agricultural land, potential soil problem areas including trench subsidence, soil erosion and/or stoniness would be noted. For the municipal road allowance, a review should occur of the establishment and health of revegetation. Additional monitoring activities may also be conducted, depending upon the site conditions at the time of decommissioning. If negative impacts are noted during monitoring activities, appropriate remediation measures would be implemented as necessary, and additional follow-up monitoring would be conducted, as determined by an Environmental Inspector.

3.5 MANAGING EXCESS MATERIALS & WASTE

Prior to embarking on the dismantling and demolition of the Project, Zephyr Farms would complete a waste audit of the materials to be handled and prepare a waste reduction work plan in accordance with *A Guide to Waste Audits and Waste Reduction Work Plans For Construction & Demolition Projects, as required under Ontario Regulation 102/94 (O.Reg.102/94)*, as amended or other applicable regulation that is in place at the time. All wastes would managed in accordance with *Ontario Regulation 347, General – Waste Management (O.Reg.347)* and with reference to *Ontario Provincial Standard Specification 180 - General Specification For The Management of Excess Materials (OPSS 180)*, or relevant regulations and specifications in effect at that time.

Typical waste materials and modes of disposal, recycling or reuse are presented in Table 3.1.

Component	Mode of Disposal
Turbine blades	Cut and dispose in landfill
Towers	Recycle for scrap
Generators and gearboxes	Salvage for reuse or recycle for scrap
Concrete foundations	Crush and recycle as granular material
Cabling	Recycle for scrap
Transformers and switchgear	Salvage for reuse or recycle for scrap
Granular materials (roads, tower sites, etc.)	Reuse or dispose in landfill
Oils/lubricants	Recycle
Hazardous materials	Dispose through licensed hauler
Geotextile material	Dispose in landfill
Miscellaneous non-recyclable materials	Dispose in landfill

Major pieces of equipment may be recyclable or reusable. The steel towers may be sold for scrap or recycled. Electrical equipment could either be salvaged for reuse or recycled. Components such as the generators and cabling would have a high resale value due to copper and aluminum content. Concrete from footings could be crushed and recycled as granular fill material. Spent oils could be recovered for recycling through existing oil reprocessing companies.

As much of the facility would consist of reusable or recyclable materials, there would be minimal residual waste for disposal as a result of decommissioning the facility. Small amounts of registerable waste materials would be managed in accordance with O.Reg.347 or subsequent applicable legislation. Residual non-hazardous wastes would be disposed at a licensed landfill in operation at the time of decommissioning.

4.0 Other Considerations

4.1 EMERGENCY RESPONSE AND COMMUNICATIONS PLAN

The Project’s Emergency Response and Communications Plan is provided in the Design and Operations Report. The plan would be in effect for all phases of the Project including decommissioning.

4.2 DECOMMISSIONING NOTIFICATION

Prior to decommissioning, Zephyr Farms would consult with interested parties regarding the details of decommissioning and would amend this Decommissioning Plan to meet regulatory requirements in effect at that time. The Design and Operations Report contains an Emergency Response and Communications Plan, including information on notification, which would be in effect for all phases of the Project including decommissioning.

4.3 OTHER APPROVALS

Following updating of the Decommissioning Plan as noted in Section 4.2, Zephyr Farms would obtain all necessary permits and approvals in effect at the time from appropriate government and regulatory bodies. Currently existing permits and approvals, which may be required at the time of decommissioning, are provided in the following table (Table 4.1).

Table 4.1: Potential Decommissioning Permits and Approvals		
Permit / Approval	Administering Agency	Rationale
Municipal		
Building Permit	Municipality	Compliance with building codes (demolition)
Oversize/Overweight Permit	Municipality	For moving oversized or heavy loads
Provincial		
Record of Site Condition	MOE	For change of property use and/or ownership
Notice of Project	Ministry of Labour	Notify the Ministry of Labour before decommissioning begins
Special vehicle configuration permit	Ministry of Transportation (MTO)	Use of non-standard vehicles to transport large components
Transportation Plan	MTO	Adherence to road safety and suitability
Highway Entrance Permit	MTO	Interference or obstruction of the highway
Change of Access and Heavy/Oversize Load Transportation Permit	MTO	Compliance with provincial highway traffic and road safety regulations

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Other Considerations

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Table 4.1: Potential Decommissioning Permits and Approvals

Permit / Approval	Administering Agency	Rationale
Wide or excess load permit	MTO	Transportation of large or heavy items on provincial highways
Development, Interference with Wetlands, and Alterations to Shorelines and Watercourses Permit	St. Clair Region Conservation Authority	Work within floodplains, water crossings, river or stream valleys, hazardous lands and within or adjacent to wetlands. Projects requiring review, <i>Fisheries Act</i> authorization and/or assessment under the <i>Canadian Environmental Assessment Act</i> are forwarded to the Department of Fisheries and Oceans

5.0 Closure

The Brooke-Alvinston Wind Farm Decommissioning Plan Report has been prepared by Stantec Consulting Ltd. for Zephyr Farms Limited in accordance with Item 3, Table 1 of O.Reg 359/09, and the MOE's draft guidance document *Technical Bulletin Four: Guidance for preparing the Decommissioning Plan Report* (MOE, 2010).

This report has been prepared by Stantec for the sole benefit of Zephyr Farms Limited, and may not be used by any third party without the express written consent of Zephyr Farms Limited. The data presented in this report are in accordance with Stantec's understanding of the Project as it was presented at the time of reporting.

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6.0 References

MOE 2010 - Technical Bulletin Four – Guidance for Preparing the Decommissioning Plan Report, as part of an application under O.Reg. 359/09.

OPSS 180 - Ontario Provincial Standard Specification 180 - General Specification for The Management of Excess Materials, November 2005.

O.Reg.102/94 - A Guide to Waste Audits and Waste Reduction Work Plans For Construction & Demolition Projects, as required under Ontario Regulation 102/94.

O.Reg.153/04 – Records of Site Condition, Part XV.1 of the Environmental Protection Act

O.Reg.347 - Ontario Regulation 347, General – Waste Management.

O.Reg.359/09 - Ontario Regulation 359/09 - Renewable Energy Approvals Under Part V.0.1 of the Act under the Environmental Protection Act.