



**NORTHLAND  
POWER**

# Glendale Solar Project

## Draft Natural Heritage Environmental Impact Study

June 15, 2011

Northland Power Inc.  
on behalf of  
Northland Power Solar  
Glendale L.P.  
Toronto, Ontario

DRAFT Natural Heritage  
Environmental Impact Study

Glendale Solar Project

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Project Report

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**Northland Power Inc.**  
**Glendale Solar Project**

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## 1. Introduction

Northland Power Inc. on behalf of Northland Power Solar Glendale L.P. (hereinafter referred to as “Northland”) is proposing to develop a 10-megawatt (MW) solar photovoltaic (PV) Project titled Glendale Solar Project (hereinafter referred to as the “Project”). The Project will be located on approximately 45 hectares (ha) of land, in the Township of South Glengarry, within the United Counties of Stormont, Dundas and Glengarry (Figure 1.1).

As stated in Sections 37 and 38 of Ontario Regulation (O. Reg.) 359/09 *Renewable Energy Approvals Under Part V.0.1 of the Act*, (herein referred to as the “REA Regulation”), an Environmental Impact Study (EIS) is required for all significant natural heritage features determined to be within a specified setback in order to obtain a Renewable Energy Approval (REA). The EIS identifies the potential negative environmental effects, documents the proposed mitigation measures, and describes the environmental effects monitoring plan for the natural heritage features.

### 1.1 Renewable Energy Approval Legislative Requirements

Per Section 4 of the REA Regulation, ground-mounted solar facilities with a nameplate capacity greater than 10 kilowatts (kW) are classified as Class 3 solar facilities and require a REA.

The REA process requires the preparation of several reports with respect to natural heritage features on and adjacent to the Project location, including the Records Review Report, Site Investigation Report, Evaluation of Significance, and if necessary, the EIS. The legislative requirements for these reports are summarized in the following sections.

#### 1.1.1 Records Review Report

Section 25 of the REA Regulation requires proponents of Class 3 solar projects to undertake a natural heritage records review to identify “whether the Project is

1. in a natural feature
2. within 50 m of an area of natural and scientific interest (earth science)
3. within 120 m of a natural feature that is not an area of natural or scientific interest (earth science).” (O. Reg. 359/09, s. 25, Table).

Natural features are defined in Section 1(1) of the REA Regulation to be all or part of

- a) an area of natural and scientific interest (ANSI) (earth science)
- b) an ANSI (life science)
- c) a coastal wetland
- d) a northern wetland
- e) a southern wetland
- f) a valleyland

- g) a wildlife habitat, or
- h) a woodland.

Subsection 25(3) of the REA Regulation requires the proponent to prepare a report “setting out a summary of the records searched and the results of the analysis” (O. Reg. 359/09). The Natural Heritage Records Review Report (Hatch Ltd., 2010a) was prepared to meet these requirements.

### **1.1.2 Site Investigation Report**

Section 26 of the REA Regulation requires proponents of Class 3 solar projects to undertake a natural heritage site investigation for the purpose of determining

- whether the results of the analysis summarized in the (Natural Heritage Records Review) report prepared under Subsection 25(3) are correct or require correction, and identifying any required corrections
- whether any additional natural features exist, other than those that were identified in the (Natural Heritage Records Review) report prepared under Subsection 25(3)
- the boundaries, located within 120 m of the Project location, of any natural feature that was identified in the records review or the site investigation
- the distance from the Project location to the boundaries determined under clause (c).

The Natural Heritage Site Investigations Report (Hatch Ltd., 2010b) was prepared to meet these requirements.

### **1.1.3 Evaluation of Significance Report**

Section 27(1) of the REA Regulation requires proponents of Class 3 solar projects to undertake an evaluation of significance for natural heritage features identified during the records review and site investigation that sets out

- a determination of whether the natural feature is
  - ◆ provincially significant
  - ◆ significant
  - ◆ not significant
  - ◆ not provincially significant
- a summary of the evaluation criteria or procedures used to make the determinations
- the name and qualifications of any person who applied the evaluation criteria or procedures.

The Evaluation of Significance Report (Hatch Ltd., 2010c) for the natural features identified on and within 120 m of the Project location was prepared to meet these requirements.

### **1.1.4 Environmental Impact Study Report**

Section 38(1) of the REA Regulation prohibits the construction, installation or expansion of any component of a solar project within the following locations:



Figure 1.1 Project Components and Natural Heritage Features

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- provincially significant northern wetland or within 120 m of a provincially significant northern wetland
- within 120 m of a provincially significant southern wetland
- within 120 m of a provincially significant coastal wetland
- a provincially significant ANSI (earth science) or within 50 m of a provincially significant ANSI (earth science)
- a provincially significant ANSI (life science) or within 120 m of a provincially significant ANSI (life science)
- a significant valleyland or within 120 m of a significant valleyland
- a significant woodland or within 120 m of a significant woodland
- a significant wildlife habitat or within 120 m of a significant wildlife habitat
- within 120 m of a provincial park
- within 120 m of a conservation reserve.

However, Section 38(2) allows proponents to construct within the locations noted above, subject to the completion of an EIS to assess negative effects and evaluate appropriate mitigation and monitoring measures.

Section 38(2) of the REA Regulation indicates that the EIS report must

- identify and assess any negative environmental effects of the projects on natural features, provincial parks or conservation reserves referred to in Section 38(1)
- identify mitigation measures in respect of any negative environmental effects
- describe how the environmental effects monitoring plan in the Design and Operations Report (Hatch Ltd., 2010e) addresses any negative environmental effects
- describe how the Construction Plan Report (Hatch Ltd., 2010d) addresses any negative environmental effects.

This EIS has been prepared to address these requirements for the construction of Project components within 120 m of significant natural heritage features noted in Section 1.1 and described in Section 1.2.

## 1.2 Background Information on Natural Heritage Features

The Natural Heritage Records Review Report (Hatch Ltd., 2010a) and Natural Heritage Site Investigations Report (Hatch Ltd., 2010b) confirmed that the Project will be constructed within 120 m of several natural features. Of these natural features, several were identified as significant natural heritage features during the evaluation of significance (Hatch Ltd., 2010c).

The natural heritage features that are classified as significant are

- woodland located on and within 120 m of the Project location

- wetlands located within 120 m of the Project location (assumed provincially significant)
- wildlife habitat located on and within 120 m of the Project location, specifically:
  - ◆ all lands on and within 120 m of the Projects site as habitat for Milksnake
  - ◆ woodlands supporting amphibian breeding habitat.
  - ◆ forest providing a high diversity of habitats
  - ◆ highly diverse areas

The significant natural heritage features and their location in relation to the Project location are shown in Figure 1.1.

### 1.3 Environmental Impact Study Format

Section 1 of this EIS has identified the legislative requirements for an EIS under the REA Regulation and identified the reasons why an EIS is required for the Project. Section 2 provides the methodology of the EIS. Section 3 summarizes the activities associated with Project construction, operation and decommissioning, as described in the Project Description Report (Hatch Ltd., 2010h). Section 4 identifies and assesses negative environmental effects and the proposed mitigation measures to prevent/minimize the potential effects. Section 5 describes the environmental effects monitoring plan from the Design and Operations Report (Hatch Ltd., 2010e), and Section 6 describes how the Construction Plan Report (Hatch Ltd., 2010d) addresses the potential negative environmental effects. Section 7 summarizes the results of the EIS. References are included in Section 8.

## 2. Methodology

The following steps outline the methodology that was used to prepare this EIS:

1. Documentation of Project components and activities during all Project phases, including construction, operations and decommissioning, including identification of temporal and spatial boundaries.
2. Background data collection on the natural features within 120 m of the Project location through the Records Review and Site Investigation processes.
3. Identification of the effects that is likely to occur on the environmental components as result of implementing the Project.
4. Development of mitigation measures to eliminate, alleviate or avoid the identified negative effects.
5. Design of an environmental effects monitoring program to confirm the predicted effects and the effectiveness of mitigation measures.

### 3. Project Components and Activities

The following sections briefly describe the construction, operation and decommissioning phases of the Project. The information is taken from the Project Description Report (Hatch Ltd., 2010h). More detailed information can be found in the Construction Plan Report (Hatch Ltd., 2010d), Design and Operations Report (Hatch Ltd., 2010e), and Decommissioning Plan Report (Hatch Ltd., 2010f). The Site Layout from the Construction Plan Report (Hatch Ltd., 2010d) is provided in Appendix A to show the detailed components of the facility including solar panel, inverter, transformer and access road locations.

#### 3.1 Construction

Construction is anticipated to occur over an approximately 6-month period. The activities associated with construction are summarized in Table 3.1.

**Table 3.1 General Description of Construction Activities (From Hatch Ltd., 2010h)**

Activity	Description
Access Road Construction	<p>Activities associated with construction of internal access roads will include</p> <ul style="list-style-type: none"> <li>• removal of topsoil and subsoil</li> <li>• placement of granular base (at least 30 cm)</li> <li>• installation of ditches and culverts</li> <li>• installation of sediment and erosion control features as necessary</li> <li>• replacement of topsoil on the temporary access roads if the roads are to be removed.</li> </ul>
Site Preparation	<p>Activities associated with the site preparation will include</p> <ul style="list-style-type: none"> <li>• consultation with the landowner to determine the locations of topsoil and subsoil stockpiles where topsoil is stripped. Note that the piles will not be within 30 m of waterbodies and drainage routes.</li> <li>• accumulation of uncut or shredded crops on the soil surface where topsoil is not stripped</li> <li>• installation of sediment and erosion control features as necessary.</li> </ul>
Installation of Support Structures	<p>Activities associated with the installation of support structures will include</p> <ul style="list-style-type: none"> <li>• creation of drilled holes for the purposes of stabilizing the support structures of the photovoltaic arrays</li> <li>• construction of foundations and/or support structures beneath transformers, inverters and photovoltaic panels</li> <li>• installation of photovoltaic panels on fixed racking structures</li> <li>• inspection of foundation construction and of support structures prior to the installation of photovoltaic modules, and wiring.</li> </ul>
Underground Cable Installation	<p>Activities associated with underground cable installation will include</p> <ul style="list-style-type: none"> <li>• installation of direct current (DC) wiring along the structural supports of the photovoltaic arrays. A network of underground DC cabling will be required at the termination point of the photovoltaic arrays to centrally located inverters which will then convert the electricity to alternating current (AC).</li> <li>• utilization of a simple trenching device to install the cables; whereby a slot will be opened, the cable will be laid, and the soil replaced.</li> </ul>

Activity	Description
Distribution Line Erection	<p>Activities associated with distribution line erection will include</p> <ul style="list-style-type: none"> <li>• construction of an underground distribution line which transports the electricity from the inverters to the transformer</li> <li>• erection of a overhead distribution connection from the transformer to transport the generated power from the Project to the 44-kV connection point</li> <li>• utilization of new or existing wooden poles.</li> </ul>
Site Security	<p>Activities associated with site security will include</p> <ul style="list-style-type: none"> <li>• installation of gate and fence on Project location</li> <li>• installation of additional security measures (e.g., security cameras, motion sensor flood lighting) if deemed necessary.</li> </ul>

### 3.2 Operation

The expected commercial operation date (COD) is April 20, 2012. The facility will operate 365 d/yr when sufficient solar radiation exists to generate electricity. The facility will be remotely monitored with no regular on-site employees. Maintenance is anticipated to occur quarterly. Maintenance activities will involve checking the structures and interconnections and cleaning the photovoltaic panels, as necessary. All maintenance materials such as hydraulic fluids will be brought on site as required and no on-site storage will be made available. Rain and snowfall are anticipated to be sufficient for the cleaning of the panels. Should extra water be required, it will be brought on site. The system does not produce waste of any type. All debris as a result of maintenance or cleaning will be removed from the site immediately by the contracted party. The Project will also be inspected whenever the power output is lower than anticipated as this would be indicative of a mechanical problem. The Project is expected to have a lifespan of 35 to 40 years.

### 3.3 Decommissioning

Decommissioning would occur when the decision has been made that it is no longer economically feasible to continue operation or refurbish generating equipment. It is anticipated that decommissioning would not occur for at least 35 years unless a power purchase agreement cannot be secured after the 20-yr duration of the Feed-In-Tariff (FIT) contract that has been obtained.

All decommissioning and site restoration activities would adhere to the requirements of appropriate regulatory authorities and would be conducted in accordance with all applicable federal, provincial and municipal permits and other requirements. The decommissioning and restoration process comprises the following activities:

- removal of the scrap metal and cabling. Where possible, these materials will be recycled, with non-recyclable materials taken to an approved disposal site.
- removal of support structures and foundations unless the landowner requests otherwise. These materials will be recycled where possible.
- site cleanup and regrading to original contours, and any damage to tile drainage system to be repaired/replaced
- planting of leguminous crops to provide a rapid return of nutrients and soil structure.

Once the Project, other materials, and road network are removed from the site, the fields will be returned to their condition prior to the Project at the discretion of the landowner.

## 4. Potential Negative Environmental Effects and Proposed Mitigation Measures

This section describes the anticipated negative environmental effects on the identified significant natural features that could occur as a result of construction, operation and decommissioning phases of the Project (as described in Section 3).

Mitigation measures are proposed to minimize, eliminate or alleviate any negative effects. Potential negative effects are discussed by environmental component, where effects on the land could negatively affect the significant natural features. Relevant environmental components of the significant woodland and significant wildlife habitat that may be impacted by the proposed Project include

- vegetation communities/wildlife habitat
- wildlife communities.

### 4.1 Vegetation Communities/Wildlife Habitat

Vegetation communities/wildlife habitat can be impacted by a number of activities, including the following:

- Direct encroachment on the feature – The removal of vegetation from the significant natural feature would have an impact on the vegetation community as a whole and the wildlife habitat that is provided therein.
- Fugitive dust generation – Fugitive dust generation has the potential to impact vegetation communities within the significant natural features as heavy dust loads on the photosynthetic surfaces of plants can retard growth and ultimately result in loss of the individual.
- Changes in surface water runoff altering the moisture regime of the feature – Alterations in surface water runoff may impact the moisture regime of the receiving significant natural feature. If the moisture regime of the receiving natural feature was altered significantly, the composition of this community may change as a result.

The potential negative effects and proposed mitigation measures associated with these activities are discussed by Project phase in the following sections.

#### 4.1.1 Construction Phase

##### 4.1.1.1 Direct Encroachment on the Natural Heritage Features

Direct encroachment will be required on the following significant natural heritage features:

- Woodland
- Forest Providing a High Diversity of Habitats

- Highly Diverse Areas
- Milksnake Habitat
- Woodlands supporting amphibian breeding habitat

Potential impacts to these features and mitigation measures to minimize impacts are discussed further below by feature.

There will be no direct encroachment on the wetlands assumed to be provincially significant. A 30 m setback from the wetland community will be put in place to ensure there is no impact on the feature. The setback will be wooded and there will be no vegetation management within the setback. As a result, there will be no impact to the form or function of the wetland communities.

#### 4.1.1.1.1 Woodland/Forest Providing a High Diversity of Habitats

Vegetation removal will be required within portions of the significant woodland and associated forest providing a high diversity of habitats located on the Project location. In order to minimize the amount of vegetation removal required, work areas will be clearly flagged and workers will be made aware not to work beyond the extent of the cleared areas. All trees will be felled into the already cleared areas. Further, workers will be advised not to trespass beyond the bounds of the areas that had been previously flagged for vegetation removal.

At 16 ha, the amount of vegetation removed will represent a minor component (~2%) of the more than 800 ha woodland, of which much is located along the edge of the woodland community. As a result, the woodland will still maintain sufficient size to be considered a significant woodland. In addition, there will be no areas of woodland isolated as a result of Project construction.

Further, there will be no clearing within 30 m of the high water mark of the wetland communities present within the woodland, such that the woodland will maintain water protection functions. In addition, woodland clearing will be completed from a relatively homogeneous portion of the community. As a result, the remaining woodland will maintain the functions of the forest providing a high diversity of habitats.

Clearing within the woodland will not be conducted within the identified areas of forest interior habitat, however, the clearing will create a new edge to the woodland that will reduce the amount of interior forest present within the woodland by 0.85 ha.

Vegetation removed from the woodland and hedgerows will be placed within the woodland around the perimeter of the Project location in order to provide increased habitat for wildlife species, such as snakes.

The fenceline will be installed at the edge of the cleared area at 1 m from the dripline of the woodland. Periodic maintenance may be required along the fenceline to prevent woodland encroachment. This will consist of occasional (no more than once per year) tree removal to be conducted in the late fall to minimize impacts on wildlife populations.

As a result, there will be no impact on the significance of the woodland.

In order to compensate for the loss of woodland communities, Northland will enter into an agreement to provide funding to undertake a woodland restoration program. The woodland



restoration program will consist of targeted tree planting on a number of properties in eastern Ontario to facilitate the restoration of an equal area of woodland as was removed from the Project location (currently anticipated to a maximum of approximately 16 ha, pending final design) with the following target criteria:

- a mix of native woodland tree species appropriately selected for the properties on which they will be planted
- an approximate planting density of approximately 2000 to 2400 trees per ha
- up to 0.85 ha of interior habitat provided by the plantings (defined as woodland area > 100 m from the woodland edge)
- plantings to enhance connectivity in the landscape and core habitat areas to enhance the function of existing woodlands to provide benefits to wildlife.

In association with the planting program, survival monitoring will be undertaken in years 1, 2 and 5 following the planting. The target survival rate at the end of year 5 is 60%. If this target is not met, Northland will fund re-fill plantings to ensure that the target survival is met.

The proposed woodland compensation will, in the long-term, result in the restoration of a similar amount of woodland with equal or better ecological functions (i.e., provision of interior habitat, connectivity and linkage and general wildlife habitat) than that which will be lost due to the Project.

#### 4.1.1.1.2 Highly Diverse Areas

As was noted within the Site Investigation Report, the Project location and surrounding area were identified as highly diverse areas as a result of the presence of agricultural lands, hedgerows, wetlands, and woodland communities.

There will be no removal of wetland communities as a result of the Project, while the loss of hayfields do not represent a significant loss from the planning area given the presence of more than 150,000 ha of pastureland and abandoned agricultural fields. There will be some minor removal of hedgerow communities,

As is noted within Section 4.1.1.1.1, clearing within the woodland communities, was already determined to not be impactful on the forest providing a high diversity of habitats. Further, as has been noted within Section 4.1.1.1.1, compensation for loss of woodland communities is proposed, which will result in restoration of habitat diversity in the region.

As a result, there will be no significant impact to the highly diverse areas present within this region.

#### 4.1.1.1.3 Woodlands Supporting Amphibian Breeding Habitat

There will be no construction within the wetland communities providing amphibian breeding habitat. As is discussed above, some clearing will occur within the woodland communities supporting the amphibian breeding habitat, however no removal will occur within 30 m of the amphibian breeding habitat, and the amphibian breeding habitat will remain connected to the woodland communities and larger wetland areas located off the Project location. Overall, tree removal planned from the woodland supporting amphibian breeding habitat is not anticipated to significantly impact the form or function of the amphibian breeding areas.

Three 0.2-ha amphibian breeding pools outside of the wetland communities will be removed from the woodland as a result of Project construction. In order to ensure there is no impact on amphibian breeding, clearing activities within 30 m of the features will be undertaken outside of the period of use (i.e. before April 15 to end of July) to ensure that there are no frog eggs/young within the water features at the time of the construction. In conjunction, 0.6 ha worth of breeding ponds will be created within the terrestrial upland habitats between portions of the assumed provincially significant wetland in the northern portion of the Project location. These ponds will be created to the following specifications:

- Ponds to be created without removing existing shrubs/trees to maintain woodland cover
- Ponds will be created by removing surficial materials until a depression is formed.
- Minimum pond surface area will be 0.1 ha to ensure sufficient water for amphibian breeding
- Banks of the pond will be graded to ensure amphibian retreat from the feature

This compensation plan will ensure that there is no net loss of amphibian breeding habitat as a result of construction. Ponds will be surveyed annually in the spring for the first 5 years after installation to ensure amphibian breeding functions are maintained. If no amphibians are recorded after Year 2, additional enhancement activities, such as vegetation planting, will be considered in discussion with MNR.

#### 4.1.1.1.4 Milksnake Habitat

Construction of the Project will result in direct encroachment onto the significant wildlife habitat for Milksnake that is present on the Project location. This will result in a temporary loss during construction of general use habitat for Milksnake. No specific habitat features for Milksnake, such as hibernation sites, were identified during the site investigations. Given that Milksnake are a habitat generalist and all lands in this area would represent suitable general use habitat, sufficient alternate habitat locations are available.

In order to minimize the potential for incidental take of Milksnake, speeds on access roads of the Project site will be restricted. Further, daily visual monitoring of the project area will be completed to search for Milksnake to ensure that potential impacts are minimized. In addition, the construction workforce will be made aware of the potential for Milksnake occurring on the Project site and that measures should be taken to avoid snakes wherever possible. If wildlife are observed on the Project site, they will be either directed off of the Project site by the worker (without the use of vehicles) or collected by a designated employee, who has been provided with protocols for the safe handling and transport of wildlife, and transported to the nearest available location off site and released.

#### 4.1.1.2 *Fugitive Dust Generation*

Dust may be mobilized due to vehicular traffic and heavy machinery use, drilling (if necessary for solar panel installation) and soil moving activities (e.g., excavation, trenching).

However, it is not anticipated that dust generation will result in adverse effects on vegetation communities and associated wildlife habitat, since the potential impacts can be substantially mitigated through the use of standard construction site best management practices and mitigation measures. In this regard, the document entitled “Best Practices for the Reduction of Air Emissions

from Construction and Demolition Activities” (Cheminfo Services Inc., 2005) will be used as a guideline for contractors. Mitigation measures to be used, as required, to control dust generation on the Project location include

- use of approved dust suppression (i.e., water or non-chloride based materials) on exposed areas including access roads, stockpiles and works/laydown areas as necessary
- hard surfacing (addition of coarse granular A material, free of fine soil particles) of access roads or other high-traffic working areas
- phased construction, where possible, to limit the amount of time soils are exposed
- avoid earth moving works during excessively windy weather. Stockpiles to be worked (e.g., loaded/unloaded) from the downwind side to minimize wind erosion.
- stockpiles and other disturbed areas to be stabilized as necessary (e.g., tarped, mulched, graded, revegetated or watered to create a hard surface crust) to reduce/prevent erosion and escape of fugitive dust.

Visual monitoring of dust generation will occur during the construction period, and if dust is observed to be of concern, additional mitigation will be implemented. Given the mitigation and monitoring proposed, it is anticipated that dust generation will be relatively low in magnitude and limited in duration and geographical area, such that no negative effects on vegetation communities will occur as a result of dust.

#### 4.1.1.3 *Surface Water Runoff*

Activities that could occur during the construction phase that would have the potential to affect surface water runoff patterns and rates include

- land grading and ditching associated with access roads
- soil compaction due to heavy equipment or stockpiling
- vegetation removal.

The potential negative effects and proposed mitigation measures associated with these activities are discussed in the Waterbodies Environmental Impact Study (Hatch Ltd., 2010g). The study concluded that through the use of effective mitigation measures there will be no significant change in surface water runoff as a result of Project construction. Measures will be employed to ensure that surface water runoff patterns and rates remain similar to existing conditions. Therefore, no alterations in the moisture regime in the significant woodland are anticipated to occur.

#### 4.1.2 *Operations Phase*

With the Project operating unmanned and regular maintenance only expected to occur periodically throughout the year, potential impacts on the significant natural feature are expected to be limited to changes in surface water runoff and presence of the Project within the significant wildlife habitat for Milksnake.

#### 4.1.2.1 *Surface Water Runoff*

Long-term site alterations associated with the operational phase of the Project that could potentially affect surface water runoff include

- long-term changes in land grading and ditches
- presence of impervious or less pervious surfaces
- changes in vegetation structure and density.

The potential negative effects and mitigation measures associated with these activities are discussed in the Waterbodies Environmental Impact Study (Hatch Ltd., 2010g). The study concluded that through the use of effective mitigation measures there will be no significant change in surface water runoff as a result of Project operations. Measures will be employed to ensure that surface water runoff patterns and rates remain similar to existing conditions. Therefore, no alterations in the moisture regime in the significant woodland are anticipated to occur.

#### 4.1.2.2 *Presence of Project Within Significant Wildlife Habitat for Milksnake*

The presence of Project components on significant wildlife habitat for Milksnake is not expected to impact the amount of available habitat. Milksnake are a habitat generalist and are commonly found around manmade structures, and as such it can be anticipated that the presence of the structures will not result in an impact on the amount of habitat available in the local area.

### 4.1.3 *Decommissioning Phase*

Certain decommissioning activities will be similar to those activities that occurred during the construction phase of the Project, and as such mitigation measures from the construction phase will be similar to those employed in the decommissioning phase.

#### 4.1.3.1 *Fugitive Dust Generation*

The potential for dust generation during decommissioning will be the same as that previously discussed for construction (see Section 4.1.1.2). The mitigation measures previously identified with respect to construction will also be effective at mitigating potential impacts during decommissioning.

#### 4.1.3.2 *Surface Water Runoff*

Short-term activities and long-term site alterations associated with the decommissioning of the Project that could potentially affect surface water runoff include

- long-term changes in land grading
- changes in vegetation structure and density.

The potential negative effects and mitigation measures associated with these activities are discussed in the Waterbodies Environmental Impact Study (Hatch Ltd., 2010g). The study concluded that decommissioning will restore the Project location to pre-existing conditions and there will therefore be no long-term effect on surface water runoff and, therefore, no effect on the significant natural feature.

#### 4.1.3.3 *Restoration of Significant Wildlife Habitat for Milksnake*

During decommissioning, the Project location will be restored to pre-existing conditions, returning the Project area to use by Milksnake similar to that which is already present on site.

## 4.2 **Wildlife Communities**

Some Project activities (e.g., tree clearing and solar panel installation) will occur within the significant wildlife habitat and significant woodland, causing direct impacts to the wildlife present within those features.

### 4.2.1 **Construction Phase**

Major activities, such as tree clearing, land grading, excavation, construction of access roads and trenching will be scheduled to occur outside of the breeding amphibian and bird period (generally April through July) to the greatest extent possible so that impacts to wildlife species breeding on the Project site, such as nesting birds, will be minimized.

If major activities are required during the breeding wildlife period outside of the previously specified areas, potentially impacted work areas will be searched by a trained biologist within 48 hours of the proposed activity in order to determine if birds are currently nesting in these areas. If nests are found, work will be suspended within 100 m of the nest location until such time as the nest is successful or abandoned. Use of these mitigation measures is anticipated to prevent potential effects to nesting wildlife.

In order to minimize the potential for incidental take of wildlife, speeds on access roads of the Project site will be restricted. Further, daily visual monitoring of the project area will be completed to search for amphibians and reptiles to ensure that potential impacts to these species are minimized. In addition, the construction workforce will be made aware of the potential for wildlife occurring on the Project site and that measures should be taken to avoid wildlife wherever possible. If wildlife are observed on the Project site, they will be either directed off of the Project site by the worker (without the use of vehicles) or collected by a designated employee, who has been provided with protocols for the safe handling and transport of wildlife, and transported to the nearest available location off site and released.

Some incidental take may still occur during construction; however, levels should be negligible. Known occurrences of incidental take will be documented in the monthly environmental report. If a species of conservation concern is noted, work within the area will be ceased immediately, and the Ministry of Natural Resources (MNR)/Environment Canada (EC) will be contacted to make them aware of the occurrence. Work in the area will remain ceased until a survey is conducted by a trained biologist to ensure that there are no species of conservation concern present in the area.

The presence of the construction workforce and construction activities associated with the Project will also result in auditory and visual disturbance of local wildlife populations. Wildlife populations within the significant natural features adjacent to the Project location may retreat from these areas as a result of the disturbance. However, sufficient retreat habitat exists within the woodland such that no significant impact on local populations is anticipated. It is expected that wildlife populations that typically occurred on the Project location will abandon these sites throughout the duration of construction. In respect of Milksnake, Milksnake may temporarily retreat from these areas during

construction as a result of the disturbance; however, as they are habitat generalists, this is not expected to impact the local population.

#### **4.2.2 Operations Phase**

As regular maintenance is anticipated to occur infrequently throughout a year, this would be consistent with existing disturbances on the Project location from agricultural operations.

Mowing of vegetation beneath and around the solar panels, if required, may also result in incidental take. Mowing will be scheduled to occur outside of the breeding bird period. If these activities are required during the breeding period, the site will be searched for breeding birds prior to undertaking mowing activities. If nesting locations are identified, mowing will not be conducted within 25 m of the proposed location, until such time as the nest is successful or abandoned. Known occurrences of incidental take will be reported and the species impacted will be determined. If the species is determined to be a species of conservation concern, work within the area will be ceased immediately, and the MNR/EC will be contacted to make them aware of the occurrence. Work in the area will remain ceased until a survey is conducted by a trained biologist to ensure that there are no further species of conservation concern present in the area. Milksnake are habitat generalists and may be impacted by incidental take.

Selective tree removal may be required along the fenceline to ensure that new growth of trees does not impact Project infrastructure. Tree removal in these areas will be completed by hand and will be conducted in the late fall (late October/November) to ensure that there is no impact to amphibian populations. As deadfall enhances wildlife habitat, any felled trees will be left along the edge of the Project location to provide increased wildlife habitat structure.

Beyond the selective tree removal described above, there will be no vegetation management beyond the defined boundaries of the Project location as shown in Figure 1.1.

As a result of the low level of disturbance associated with the Project (infrequent nature of site investigation, minimal noise produced by the Project equipment), operations are not expected to impact wildlife communities within the significant wildlife habitat features within 120 m of the Project location.

#### **4.2.3 Decommissioning Phase**

During the decommissioning phase, disturbances present in the area will be similar to those that may occur during the construction phase as described in Section 4.2.1. In order to minimize potential impacts to wildlife communities of the significant natural features, decommissioning will be scheduled to occur outside of breeding wildlife period. Though there may be some avoidance of the significant natural features near the Project location during decommissioning, these effects are temporary, and following decommissioning, the site will be restored to existing conditions.

## 5. Environmental Effects Monitoring Plan – Design and Operations Report

As discussed in the Design and Operations Report (Hatch Ltd., 2010c), environmental effects monitoring is proposed in respect of any negative environmental effects that may result from engaging in the Project. As per the REA Regulation, the monitoring plan identifies

- performance objectives in respect of the negative environmental effects
- mitigation measures to assist in achieving the performance objectives
- a program for monitoring negative environmental effects for the duration of the time the Project is engaged in, including a contingency plan to be implemented if any mitigation measures fail.

For the purposes of this EIS report, the effects monitoring measures with respect to negative effects on the significant natural feature have been reproduced here, in Table 5.1.

The monitoring proposed in Table 5.1 will confirm that mitigation measures are functioning as designed to meet performance objectives. If monitoring shows that performance objectives are not being met, the contingency measures documented in Table 5.1 will be used to ensure that remedial action is undertaken as necessary to meet the performance objectives.

## 6. Construction Plan Report

The REA Regulation requires proponents of Class 3 solar projects to prepare a Construction Plan Report (CPR). Hatch Ltd. completed the CPR for this Project (Hatch Ltd., 2010d). The CPR details the construction and installation activities, location and timing of construction and installation activities, any negative environmental effects that result from construction activities within 300 m of the Project, and proposed mitigation measures for the identified negative environmental effects. The CPR addresses all potential effects of construction on natural features within 300 m of the Project location in a general manner. The mitigation proposed in the CPR with respect to preventing/minimizing negative effects on natural features is the same as that discussed in this EIS. Additional mitigation is proposed to address negative effects during construction not related to natural features. Therefore, the CPR and this EIS should be read in conjunction with each other, although all negative effects and mitigation requirements with respect to significant natural features are contained within this EIS and duplicated in the CPR.

## 7. Summary and Conclusions

As discussed in the Natural Heritage Records Review Report (Hatch Ltd., 2010a), the Natural Heritage Site Investigations Report (Hatch Ltd., 2010b) and the Evaluation of Significance (Hatch Ltd., 2010c), there is significant wildlife habitat on, and a significant woodland located on and adjacent to the Project location.

The EIS has been prepared to identify potential negative environmental effects that all phases of the Project may have on the significant natural feature. Mitigation measures have been proposed to prevent these effects from occurring or minimize the magnitude, extent, duration and frequency in



the event that they do occur to an acceptable level. Monitoring measures have been proposed to confirm that mitigation measures are having the intended effect and that performance objectives are being met.

## 8. References

- Cheminfo Services Inc. 2005. Best Practices for the Reduction of Air Emissions From Construction and Demolition Activities. Prepared for Environment Canada. March 2005. 49 pp.
- DeJong-Hughes, J., J. F. Moncreif, W. B. Vorhees, and J. B. Swan. 2001. Soil Compaction Causes, Effects and Control. Regents of the University of Minnesota. Available on-line at <http://www.extension.umn.edu/distribution/cropsystems/DC3115.html>. Accessed November 28, 2007.
- Hatch Ltd. 2010a. Glendale Solar Project – Natural Heritage Records Review Report. Prepared for Northland Power Inc. August 2010.
- Hatch Ltd. 2010b. Glendale Solar Project – Natural Heritage Site Investigations Report. Prepared for Northland Power Inc. August 2010.
- Hatch Ltd. 2010c. Glendale Solar Project – Evaluation of Significance Report. Prepared for Northland Power Inc. August 2010.
- Hatch Ltd. 2010d. Glendale Solar Project – Construction Plan Report. Prepared for Northland Power Inc. August 2010.
- Hatch Ltd. 2010e. Glendale Solar Project – Design and Operations Report. Prepared for Northland Power Inc. August 2010.
- Hatch Ltd. 2010f. Glendale Solar Project – Decommissioning Plan Report. Prepared for Northland Power Inc. August 2010.
- Hatch Ltd. 2010g. Glendale Solar Project – Waterbodies Environmental Impact Study. Prepared for Northland Power Inc. August 2010.
- Hatch Ltd. 2010h. Glendale Solar Project – Project Description Report. Prepared for Northland Power Inc. May 2010.



**Table 5.1 Summary of Environmental Effects Monitoring Requirements with Respect to Significant Natural Features**

Negative Effect	Mitigation Strategy	Performance Objective	Monitoring Plan				Contingency Measures
			Methodology	Monitoring Locations	Frequency	Rationale	
<b>Construction Phase</b>							
Clearing within wooded areas	Demarcation of work areas.  Restrictions on entry into natural areas beyond work areas.	Minimize disturbance to remaining vegetation community.	Visual inspection of work areas.	Throughout construction sites.	Daily during clearing activities within wooded areas.	Visual inspection will confirm that bounds of work areas are respected.	Reported in monthly environmental monitoring report during construction.  Contractor to be advised if they have worked beyond bounds of work areas. These sites to be replanted with trees to encourage reforestation.
Impacts to wildlife breeding	Major construction activities to be timed outside of breeding wildlife period wherever possible.  No construction at amphibian breeding ponds during amphibian breeding period (generally April 15 to end of July)	Minimize impacts to breeding wildlife.	Timing restrictions to be clearly identified to construction contractor.	Throughout construction sites.	Confirmation of clearing progress to occur weekly during clearing in order to ensure completed prior to breeding bird period. If clearing required during breeding bird period, searches will be conducted within 48 hours of clearing activities.	The use of this monitoring will confirm that clearing is either conducted outside of the breeding wildlife period, or that breeding wildlife will be identified prior to clearing being undertaken.	If major activities are required within this time period, potential work areas will be searched by a trained biologist for breeding wildlife. If nesting birds are identified, work will be suspended within 100 m of the nest until the nesting attempt is successful or abandoned.  Regardless of the above, no construction will be permitted within 30 m of identified amphibian breeding areas during the timing restriction.
Incidental take of wildlife	Daily visual monitoring of work areas and construction equipment prior to start of work. Wildlife observed will be removed from areas of impact through established protocols.  Speeds to be limited on Project location and construction workforce to be made aware of potential for wildlife on the Project location.	Avoid occurrences of incidental take.	Daily visual monitoring will be conducted by workers on foot of the areas to be worked on the given day.  Any wildlife observed will be either directed off of the Project site or collected by a designated employee and transported to the nearest available location off-site and released.	Throughout construction site..	Ongoing during construction on a continued basis..	Incidental take will be reported by construction workforce to the on-site personnel responsible for environmental protection if incidents occur..	Reported in monthly environmental monitoring report during construction, unless the species is a species of conservation concern in which case reporting will be immediate to the MNR/EC..  If incidental take of species of conservation concern are recorded, work will be ceased until such time as a trained biologist can state that the species is no longer present in the area.
Dust generation and off-site transport	Standard construction site best management practices to prevent fugitive dust.	Minimize fugitive dust from the construction site.	Visual monitoring of visible dust plumes during construction.	Throughout construction site.	Periodically during all construction activities.	Visual dust monitoring would identify if dust plumes are an issue and where their source may be.	Reported in monthly environmental monitoring report during construction.  Dust control measures implemented as necessary to prevent/minimize dust generation.

Negative Effect	Mitigation Strategy	Performance Objective	Monitoring Plan				Contingency Measures	
			Methodology	Monitoring Locations	Frequency	Rationale		Reporting Requirements
<b>Operations Phase</b>								
Loss of amphibian breeding ponds	1:1 compensation for lost ponds through creation of pond habitats in the upland wooded areas	Create amphibian breeding habitats	Pond survey for tadpoles/egg masses/frogs	At ponds	Annual, 1 <sup>st</sup> 5 years following installation	Monitoring at this frequency will allow assurances that ponds are functioning as desired.	Reported annually to the Ministry of Natural Resources	If no amphibians are recorded after Year 2, additional enhancement activities, such as vegetation planting, to be considered in discussion with MNR.
Incidental take of wildlife	Speeds to be limited on Project location and maintenance workforce to be made aware of potential for wildlife on the Project location.	Avoid occurrences of incidental take.	Occasions of incidental take to be reported as they are identified..	Throughout Project location.	Ongoing during maintenance activities.	Incidental take will be reported by maintenance staff to the on-site personnel responsible for environmental protection if incidents occur.	No requirement; unless the incident involves a species of conservation concern in which case reporting will be immediate to the MNR/EC.	If incidental take of species of conservation concern are recorded, work will be ceased until such time as a trained biologist can state that the species is no longer present in the area.
<b>Decommissioning Phase</b>								
Incidental take of wildlife	Daily visual monitoring of work areas and decommissioning equipment prior to start of work.  Speeds to be limited on Project site and construction workforce to be made aware of potential for wildlife on the Project location.	Avoid occurrences of incidental take.	Daily visual monitoring will be conducted by workers on foot of the areas to be worked on the given day.  Any wildlife observed will be either directed off of the Project site or collected by a designated employee and transported to the nearest available location off-site and released.	Throughout decommissioning site.	Ongoing during decommissioning on a continued basis.	Incidental take will be reported by decommissioning workforce to the on-site personnel responsible for environmental protection if incidents occur.	Reported in monthly environmental monitoring report during decommissioning, unless the species is a species of conservation concern in which case reporting will be immediate to the MNR/EC.	If incidental take of species of conservation concern are recorded, work will be ceased until such time as a trained biologist can state that the species is no longer present in the area.
Dust generation and off-site transport	Standard site best management practices to prevent fugitive dust.	Minimize fugitive dust from the Project location.	Visual monitoring of visible dust plumes during decommissioning.	Throughout Project location.	Periodically during all decommissioning activities.	Visual dust monitoring would identify if dust plumes are an issue and where their source may be.	Reported in monthly environmental monitoring report during decommissioning.	Dust control measures implemented as necessary to prevent/minimize dust generation.

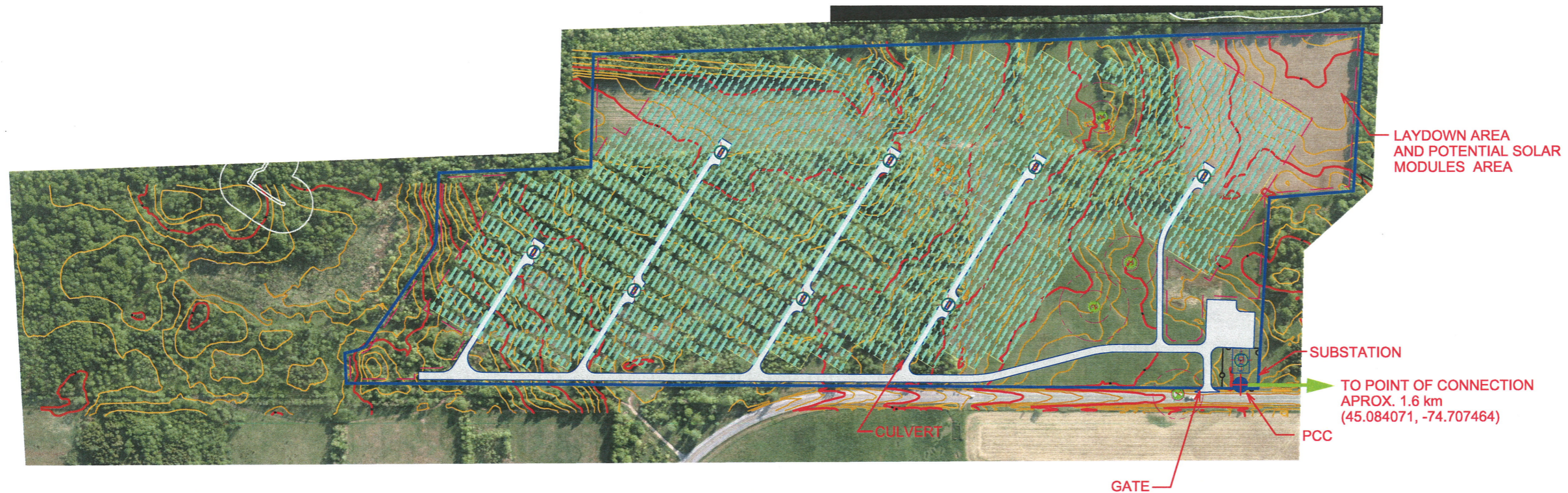


# Appendix A

## Site Layout



NO	DATE	SYMBOL	REMARKS
P0	AUG/20 2010		ISSUED FOR SITE PLAN APPLICATION
P1	OCT/05 2010		LAYOUT CHANGED
P2	APR/25 2011		LAYOUT CHANGED
P3	JUNE 2011		GENERAL CHANGED
P4	JUNE/20 2011		RELOCATION OF GROUP 1 AND 2



**LEGEND:**

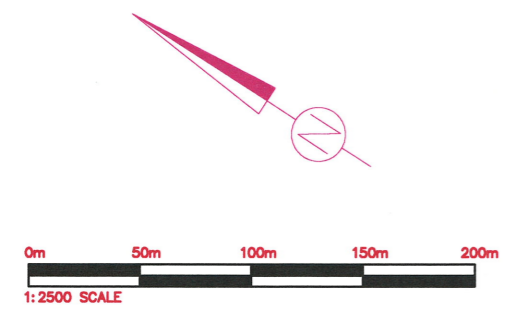
- GRAVEL ACCESS ROAD
- OVERHEAD 44 kV LINE
- OVERHEAD 44 kV LINE BY HYDRO ONE
- PROPERTY BOUNDARY
- CULVERT
- AVAILABLE AREA BOUNDARY / FENCE LINE & PROPERTY SETBACK @ 10 m (CONSTRUCTION SILT FENCE)
- CONSTRUCTION LAYDOWN AND POTENTIAL SOLAR MODULES AREA
- PCC (POINT OF COMMON COUPLING)
- 3 STRINGS OF 11 PANELS PER RACK (SET @ 30° TILT WITH 7.6 METERS SPACING) 42,900 PANELS REQUIRED, AND 43,032 PANELS USED FOR LAYOUT  
NOMINAL CAPACITY: 12 MW<sub>DC</sub> OR 10 MW<sub>AC</sub>

2 x 625 kVA INVERTER, 1 x 1250 kVA TRANSFORMER

INVERTER'S TRANSFORMER (UTM Co-ordinate)		
18 T	X (m E)	Y (m N)
P1	522474.63	4993849.60
P2	522030.33	4994427.44
P3	522050.53	4994313.07
P4	522227.70	4994309.98
P5	522136.74	4994151.94
P6	522314.12	4994148.85
P7	522212.05	4994013.81
P8	522389.23	4994010.71

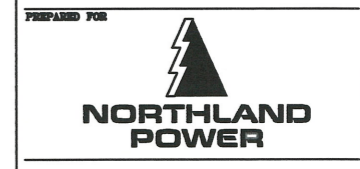
SUBSTATIONS TRANSFORMER (UTM Co-ordinate)		
18 T	X (m E)	Y (m N)
P9	522295.09	4993693.61

FIND SPOT UTM CO-ORDINATE		
	X	Y
P1	522257.37	4993751.552
P2	522291.86	4993878.205
P3	522353.11	4993869.088
P4	522472.95	4993977.601



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PROJECT  
**NORTHLAND POWER SOLAR GLENDALE**

DRAWN BY TIEN PHAM	VERIFIED BY
SCALE N.T.S.	VERIFIED BY
DATE MAY 18/2011	APPROVED BY
ISSUED FOR TENDER	

PROJECT No.  
TITLE SOLAR FARM PROJECT SITE PLAN  
DRAWING No. SP-01 Rev.P4

**PRELIMINARY LAYOUT  
NOT FOR CONSTRUCTION**