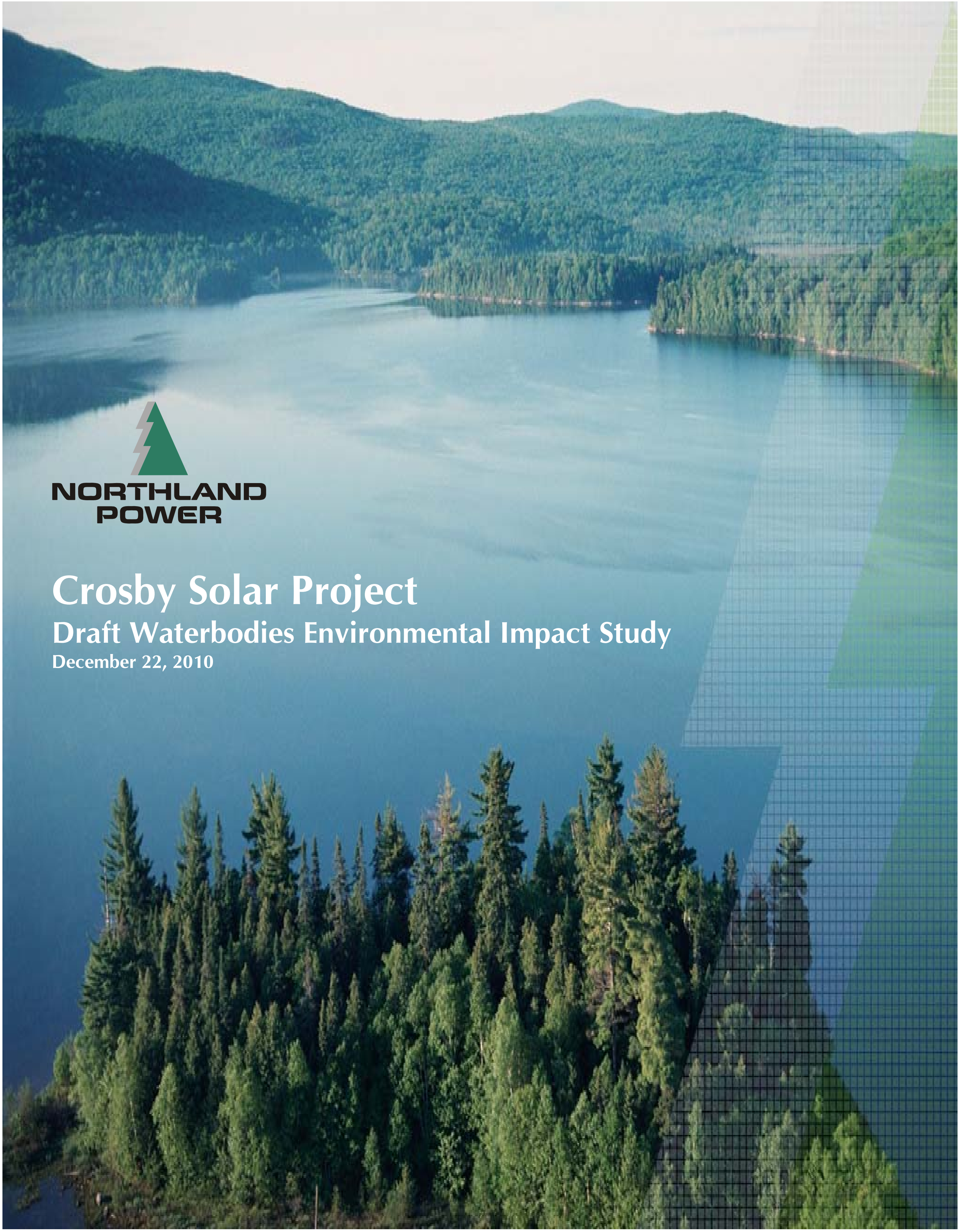

NORTHLAND POWER

Crosby Solar Project

Draft Waterbodies Environmental Impact Study

December 22, 2010

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

DRAFT Waterbodies Environmental Impact Study

Crosby Solar Project

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Northland Power Inc.
Crosby Solar Project

DRAFT Waterbodies Environmental Impact Study

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1. Introduction

Northland Power Solar Crosby L.P. (hereinafter referred to as "Northland") is proposing to develop a 10-megawatt (MW) solar photovoltaic project titled Crosby Solar Project (hereinafter referred to as the "Project"). The Project site will be located on approximately 52 hectares (ha) of land, located at 249 Little Rideau Lake Road in the Township of Rideau Lakes, within the United Counties of Leeds and Grenville (Figure 1.1).

As stated in Sections 39 and 40 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 waterbodies 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 waterbodies.

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 waterbodies on and adjacent to the Project site, including the Records Review Report, Site Investigation Report and if necessary, the EIS. The legislative requirements for these reports are summarized in the following sections.

1.1.1 Records Review Report

Section 30 of the REA Regulation requires proponents of Class 3 solar projects to undertake a water body records review to identify "whether the project is

1. in a water body
2. within 120 m of the average annual high water mark of a lake, other than a lake trout lake that is at or above development capacity
3. within 300 m of the average annual high water mark of a lake trout lake that is at or above development capacity
4. within 120 m of the average annual high water mark of a permanent or intermittent stream, or
5. within 120 m of a seepage area." (O. Reg. 359/09, s. 30, Table).

Subsection 30(2) 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 Water Body Records Review Report (Hatch Ltd., 2010a) was prepared to meet these requirements.

1.1.2 Site Investigation Report

Section 31 of the REA Regulation requires proponents of Class 3 solar projects to undertake a water body site investigation for the purpose of determining

1. whether the results of the analysis summarized in the Water Body Records Review report prepared under subsection 30 (2) are correct or require correction, and identifying any required corrections
2. whether any additional waterbodies exist, other than those that were identified in the (Water Body Records Review) report prepared under subsection 30 (2)
3. the boundaries, located within 120 m of the project location, of any water body that was identified in the records review or the site investigation; and
4. the distance from the project location to the boundaries determined under Clause 3.

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

1.1.3 Environmental Impact Study (EIS) Report

Section 39 (1) of the REA Regulation prohibits the construction, installation or expansion of any component of a solar project within the following locations:

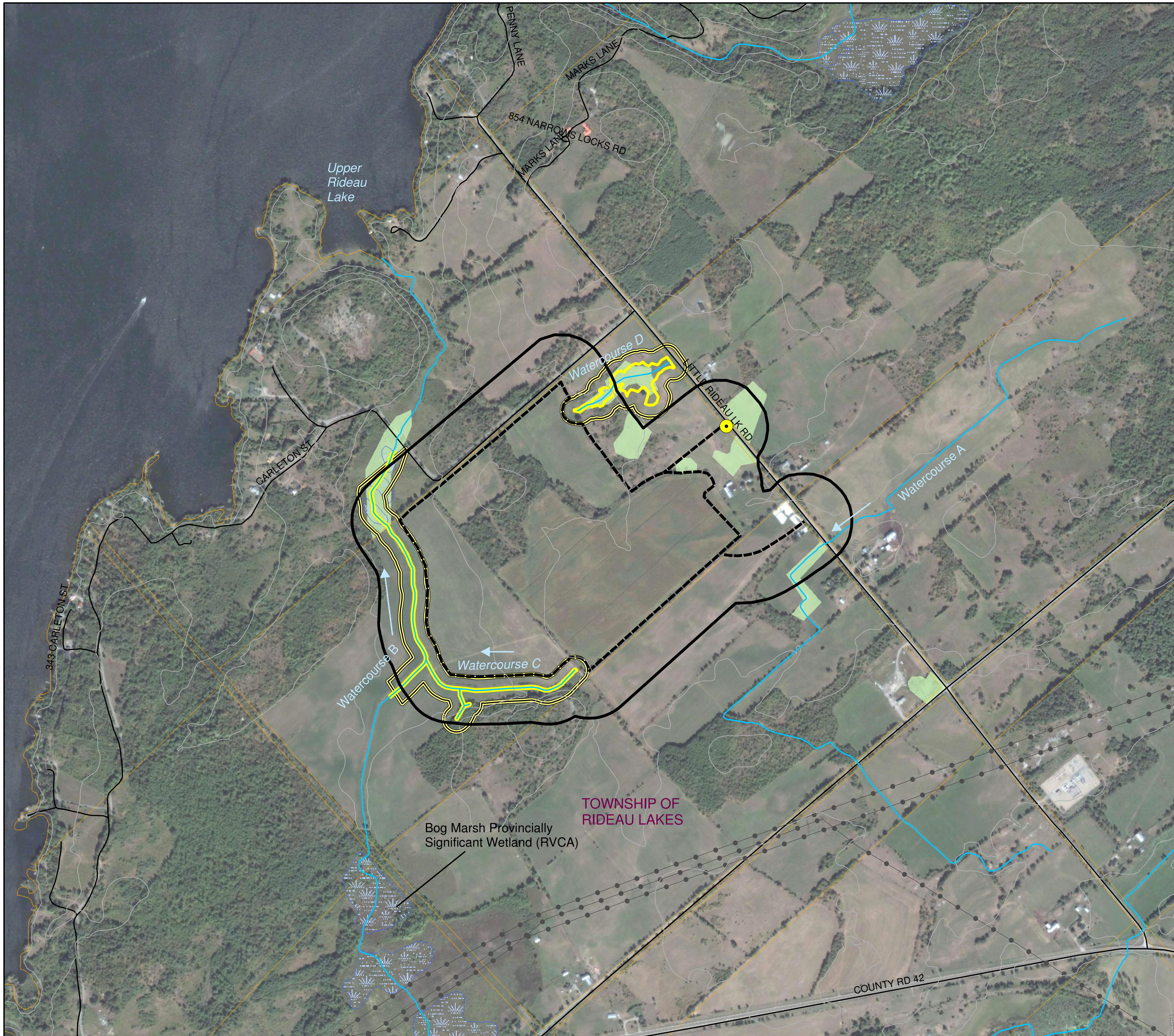
- a lake or within 30 m of the average annual high water mark of a lake
- a permanent or intermittent stream or within 30 m of the average annual high water mark of a permanent or intermittent stream
- a seepage area or within 30 m of a seepage area.

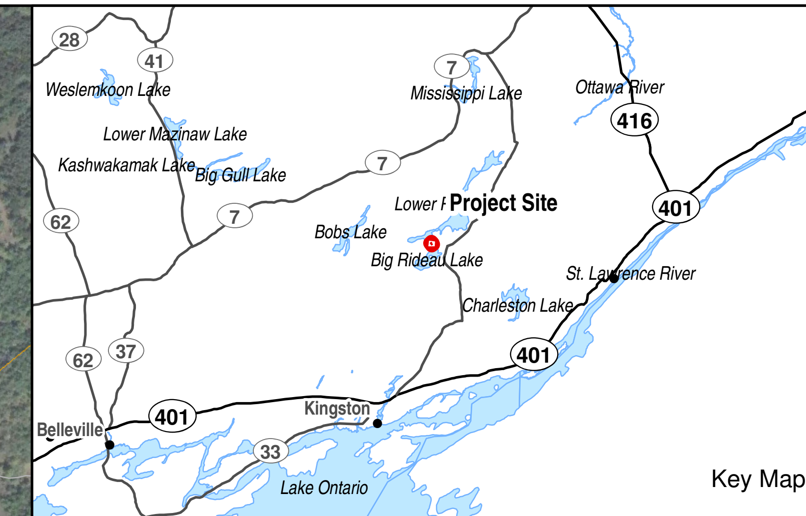
However, Section 39 (2) allows proponents to construct Project components other than solar panels or transformers (e.g., access roads or distribution lines) within the locations noted above, subject to the completion of an EIS to assess negative effects and required mitigation and monitoring measures.

Section 40 (1) of the REA Regulation prohibits construction, installation or expansion of any component of a solar project within the following locations:

- within 120 m of the average annual high water mark of a lake, other than a lake trout lake that is at or above development capacity
- within 300 m of the average annual high water mark of a lake trout lake that is at or above development capacity
- within 120 m of the high water mark of a permanent or intermittent stream
- within 120 m of a seepage area.

However, Section 40 (2) allows proponents to construct Project components within the locations noted above, subject to the completion of an EIS.





Legend

- Roads
- Transmission Line
- Topographic Contour (5m interval)
- Watercourse
- Average Annual High Water Mark
- 30m Setback From High Water Mark
- Parcels
- Wetland
- Evaluated Non-Provincially Significant Wetland

Project Components

- Connection Point With Distribution Line
- Project Location
- 120m from Project Location

Notes:
1.OBM and NRVIS data downloaded from LIO, with permission.
2. Spatial referencing UTM NAD 83.
3. Satellite imagery from Google Earth Pro

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Figure 1.1
Northland Power Inc.
Crosby Solar Energy Project
Water Body and Project Boundaries

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Sections 39 and 40 of the REA Regulation indicate that the EIS report must

- identify and assess any negative environmental effects of the projects on the waterbodies and on land within 30 m of the water body
- 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., 2010c) 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 between 30 and 120 m from the waterbodies noted in the following section.

1.2 Background Information on Waterbodies

The Water Body Records Review Report (Hatch Ltd., 2010a) and Water Body Site Investigations Report (Hatch Ltd., 2010b) confirmed that the Project will be constructed between 30 and 120 m away from unnamed Watercourses B, C and D as shown in Figure 1.1. The average annual high water mark boundaries for these watercourses, as determined during the Site Investigation, and the proposed Project development area 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 summarizes the methodology that was used to prepare the EIS. Section 3 summarizes the activities associated with project construction, operation and decommissioning, as described in the Project Description Report (Hatch Ltd., 2010e). Section 4 identifies and assesses negative environmental effects and mitigation measures to prevent/minimize the potential effects. Section 5 describes the environmental effects monitoring plan from the Design and Operations Report (Hatch Ltd., 2010c) 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, and identification of temporal and spatial boundaries.
2. Background data collection on the waterbodies within 120 m of the Project site 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 summary information is taken from the Project Description Report (Hatch Ltd., 2010e). More detailed information on the Project phases can be found in the Construction Plan Report (Hatch Ltd., 2010d), Design and Operations Report (Hatch Ltd., 2010c) and Decommissioning Plan Report (Hatch Ltd., 2010f). The Site Layout Plan from the Construction Plan Report 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., 2010d)

Activity	Description
Access Road Construction	Activities associated with construction of internal access roads will include • removal of topsoil and subsoil • placement of granular base (at least 30 cm) • installation of ditches and culverts • installation of sediment and erosion control features as necessary • replace topsoil of temporary access roads once roads are removed.
Site Preparation	Topsoil will be removed, where practical, from access road and transformer/inverter pad locations, with stockpiles placed in consultation with the land owner at locations at least 30 m from waterbodies and drainage routes. Where topsoil is not stripped, agricultural crops will be left uncut or shredded and left on the soil surface. Sediment and erosion control measures will be installed as necessary.
Installation of Support Structures	Foundations and/or support structures will be required beneath transformers, inverters and photovoltaic panels. Drilling is anticipated to be completed for the purposes of stabilizing the support structures of the photovoltaic arrays. The photovoltaic panels will be installed on fixed racking structures. Foundation construction and the installation of support structures will be subject to inspection prior to the installation of photovoltaic modules and wiring.

Activity	Description
Underground Cable Installation	Direct current (DC) wiring will run 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). A simple trenching device will be used to install the cables, whereby a slot is opened, the cable laid, and the soil replaced.
Distribution Line Erection	An underground distribution line will be constructed which transports the electricity from the inverters to the main station transformer. An overhead distribution connection from the transformer will be erected to transport the generated power from the Project to the 44-kV connection point. New wooden poles (or existing poles) will be used.
Site Security	The Project site will be gated and fenced. Additional security measures (e.g., security cameras, motion sensor lighting) will be installed if deemed necessary.

3.2 Operation

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 there will be no on-site storage for such materials. Rain and snowfall are anticipated to be sufficient for the cleaning of the panels. Should extra water be required for cleaning purposes, it will be brought on site from an off-site source. 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. As discussed in Section 3.2, 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.

The decommissioning process would involve the following:

- removal of the scrap metal and cabling. Where possible, these materials will be recycled, with non-recyclables 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 re-grading 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 Watercourses B, C and D and land within 30 m that could occur as a result of construction, operation and decommissioning phases of the Project (as described in Section 3).

Potential negative effects are discussed under each environmental component associated with waterbodies and adjacent lands, where effects on the land could negatively affect the waterbodies. Mitigation measures are proposed to minimize, eliminate or alleviate any negative effects. Relevant environmental components include

- surface water runoff (patterns and rates)
- surface water quality
- groundwater
- aquatic and riparian habitat and biota.

4.1 Surface Water Runoff

Surface water runoff occurs when snow melts and/or precipitation hits the ground and runs along the surface of the land, typically toward a watercourse or other storm water conveyance feature. Descriptors of runoff can include the pattern that runoff takes en route to its discharge to water features (i.e., the overland runoff routes) and the rate at which runoff leaves the land (e.g., the volume of runoff per unit area per unit time, such as m^3/m^2/minute).

Surface water runoff can interact with a number of other environmental components and biophysical processes occurring on land and in water. Examples include

- recharge of groundwater supplies due to infiltration into the land
- uptake of water by vegetation (either through the roots or by interception of precipitation on the plant)
- erosion of land due to changes in runoff patterns or rates
- alterations in watercourse hydrology
  - higher peak flows if surface water runoff rates increase (e.g., if more water leaves the land and enters the watercourse) or lower peak flows if runoff rates decrease (e.g., if more water infiltrates the land and is taken up by vegetation)
  - alterations in the rate of change in watercourse flows (e.g., flows increase at a higher rate if water runs off the land faster) including increase in ‘flashiness’ of watercourses

- alterations in watercourse geomorphology (e.g., channel conditions) due to changes in flows or water levels resulting in changes in sediment transport (bed and bank erosion or sediment deposition).

Surface water runoff can potentially be affected by a number of activities, including:

- changes in land topography
- changes in infiltration to the land
- changes in vegetation surface water uptake via interception or in-ground uptake.

4.1.1 Construction Phase

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
- soil compaction due to heavy equipment or stockpiling
- vegetation removal.

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

4.1.1.1 Land Grading and Ditching

No major grading works are anticipated to be required to install solar panels throughout the majority of the Project site. Minor, localized soil grading may be required in some panel installation areas (if necessary) and for temporary lay down areas, inverter/transformer pads and access roads. This minor grading may locally alter runoff patterns compared to the existing diffuse runoff from the existing field. Any minor grading will take into consideration the current land grade and will try to replicate the present storm water flow pattern. However, the size of the graded area will be very small relative to the size of the Project site, so no measurable effect on surface water runoff is anticipated to occur as a result of this grading.

Drainage features including ditching and cross culverts will be required to maintain site drainage across access roads traversing the Project site. These drainage features will serve to concentrate site runoff at discharge points, which, depending on site layout, will consist of areas adjacent to undisturbed agricultural fields, naturally vegetated features, or adjacent to the naturally vegetated area surrounding the three watercourses. Therefore, surface runoff at these discharge points may be at a higher rate than runoff from the existing Project site, since runoff from the Project site is more diffuse.

This higher rate of runoff from the Project site, or portions thereof, could potentially result in negative effects on the watercourses. In order to mitigate negative effects, Northland is proposing to undertake a number of measures including the following:

- If ditch discharge points are located next to the 30-m setback adjacent to the watercourses, flow dissipation measures (e.g., rock check dams or enhanced vegetated swales) will be installed to temporarily retain water and decrease flow velocity, and offshoot ditches will be installed from the main ditch into the 30-m setback zone, to promote diffuse overland flow through the vegetated buffer area (where grades allow) or swales, so flow is dissipated prior to entering the watercourses.

- Runoff in the ditches will be slowed through the use of rock flow check dams and/or hay bales to promote minor ponding and water retention, as well as sedimentation to reduce turbidity in ditches.
- Ditches will be grassed to the extent possible to further retain water (via uptake in vegetation) and also reduce erosion potential.

Therefore, surface water runoff from the site may be increased at ditch discharge areas compared to more diffuse runoff from the existing fields. However, the mitigation noted above to control runoff entering the waterbodies downstream from the ditch discharge locations will prevent negative effects on waterbodies.

4.1.1.2 Soil Compaction

Soil compaction may result from the use of heavy equipment (e.g., tracked bulldozers and backhoes), and stockpiling of heavy materials (e.g., soils). Soil compaction occurs when heavy equipment or material causes the soil particles to be pushed together, thereby increasing soil density and reducing the pore space within the soil structure (DeJong-Hughes et. al., 2001). Excessive soil compaction can result in inhibited water infiltration due to decreased pore space within the soil structure (DeJong-Hughes et. al., 2001). Decreased water infiltration into the soil could also potentially result in an increase in surface runoff.

Prior to site rehabilitation, disturbed areas will be visually monitored to assess if compaction has occurred, as noted by rutting or flattened areas beneath stockpile locations. Restoration efforts (e.g., disking or other soil loosening methods) will be undertaken as required to prevent long-term impacts due to excessive amounts of compaction. Soil compaction will likely occur in localized areas within the zone of disturbance during the short-term construction period. However, no significant long-term change in soil structure is anticipated following implementation of site restoration and associated mitigation to remediate significantly compacted areas, although minor amounts of compaction may persist in localized areas.

Therefore, no measurable change in surface water runoff is anticipated to occur due to minor, localized soil compaction occurring during the construction phase.

4.1.1.3 Vegetation Removal

The Project site currently consists of hay fields, with several hedgerows and a small wooded area (see Figure 1.1). During construction, woody vegetation (shrubs and trees) within the hedgerows will be cleared within the panel development area. All existing ground cover will be left in place in areas where no grading works are required. Removal of trees and shrubs will likely result in a minor increase in the rate and quantity of runoff from these areas of the Project site (due to less interception by the trees and shrubs), although given the minimal area occupied by hedgerows, this is not anticipated to have a measureable effect at the watercourse.

No vegetation removal will be required within the 30-m buffer adjacent to any of the watercourses. Therefore, this buffer vegetation will remain undisturbed and will continue to provide storm water management control functions including slowing the velocity of surface water runoff and interception of precipitation and uptake in plants and roots. This will also assist in mitigating overall changes in surface water runoff from the Project site.

4.1.2 Operations Phase

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 following sections.

4.1.2.1 Long-Term Changes in Land Grading and Ditches

As discussed in Section 4.1.1.1, the ditches and drainage conveyance features installed during the construction period will remain in place throughout the operations period. Mitigation measures also discussed in Section 4.1.1.1 (e.g., vegetated buffer, diffuse runoff patterns, flow retention features in ditches) will also remain in place for the duration of the operations phase. These measures are anticipated to be effective in preventing localized changes in surface water runoff from impacting the receiving waterbodies. Maintenance on these features will be undertaken as required.

4.1.2.2 Impervious or Less Pervious Surfaces

Inverter/Transformer Pads

Each of the inverter concrete pads and the main station transformer pad will be an impervious surface that will not allow infiltration of surface water into the soil. Surface precipitation landing on the pads will immediately run off to the adjacent ground surface. Therefore, the runoff from the area of the pad will be higher than would normally occur for the existing fields, since there will be no infiltration. However, the size of these impervious areas will be negligible compared to the overall size of the Project site. Once the runoff from the pad area enters the adjacent field areas, it will be subject to similar uptake, infiltration and retention properties as currently exist. Therefore, no overall effect on surface water runoff from the Project site is anticipated to occur as a result of these small concrete pads.

Solar Panels

Each of the solar panels will also be an impervious surface. Due to the tilt of the solar panels, all precipitation landing on the panel surface will run off the lower edge of the panel onto the ground. Therefore, discharge from each individual panel to the ground surface will be concentrated at the base of each panel. However, given that rows of panels will be separated from each other, panels effectively function as temporary interceptors of precipitation with only minor concentration of precipitation at the point where water runs off their surface. Once the water reaches the ground surface, there will be no impacts on surface drainage due to the presence of the panel and water will either infiltrate the soil, be temporarily ponded in depressions, be taken up by vegetation or travel over land in surface drainage routes as per the existing drainage patterns. Therefore, the impervious panels will not have any effects on overall surface drainage (rate and quantity) from the Project site. Erosion potential is discussed in Section 4.2.2.1.

Access Roads

Access road surfaces, which will be comprised of granular material, may be less pervious than the existing fields. Therefore, more surface runoff per unit area may occur on the access roads compared to the existing conditions. This runoff will likely enter the ditches lining the access roads and drain toward the waterbody and road side ditches. However, the mitigation noted in Section 4.1.1.1 will be sufficient to prevent any significant long term effects due to this minor change in local runoff.

Parking Area

The long-term parking area will consist of granular materials, but permeability and associated infiltration capacity may be less than the existing fields in this location. Therefore, it is anticipated that a slightly higher rate of runoff will occur from the parking area compared to existing conditions. Runoff from the parking area will diffuse into the surrounding fields or into the adjacent ditch, therefore, it is anticipated that any additional runoff due to the parking area will infiltrate or be otherwise retained through vegetation uptake. Therefore, no adverse effects on the hydrology of the watercourses are anticipated to occur due to the less pervious parking area.

4.1.2.3 Changes in Vegetation

As noted in Section 4.1.1.3, existing vegetation on the Project site consists of hay fields. Areas in and around the solar panel arrays and within all area disturbed during construction will be planted with a low growing, native ground cover of various grasses and forbs, which will comprise the long term vegetation community on the site. Some change in the stormwater retention function of the Project site may occur due to removal of shrubs and trees in the hedgerows, which may intercept slightly more precipitation and decrease overland flow, but this is anticipated to be negligible. However, the long-term ground cover will be dense vegetation mix with similar stormwater management functions as the existing groundcover throughout the area. Therefore, stormwater runoff rates throughout the operational period are anticipated to remain similar to existing conditions since vegetation will remain similar. Therefore, no adverse effects on surface water runoff from the Project site is anticipated to occur due to long term changes in vegetation community on the Project site.

Vegetation within the 30 m setback adjacent to the watercourses, where the 30 m setback is situated on the Project site, will be allowed to grow naturally with no long-term management intervention. This will change the composition and structure and function of the buffer compared to current conditions where hay is periodically harvested within a portion of the setback zone. This will likely result in a long-term improvement in the stormwater management functions of the buffer as vegetation may grow denser and shrub growth is anticipated to occur.

4.1.3 Decommissioning Phase

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 following sections.

4.1.3.1 Long-Term Changes in Land Grading

The decommissioning process will revert the Project site as close as possible back to the existing conditions or the condition desired by the landowner. For the purposes of this EIS, it has been assumed that fields will be restored to hay production. Access roads and ditches will be removed and grading will be conducted to restore the natural grades of the fields where they have been affected by Project features.

This is anticipated to restore existing surface water runoff patterns over the long term, with no negative effects on surface water runoff compared to existing conditions.

4.1.3.2 Changes in Vegetation

Decommissioning will result in the rehabilitation of the land to existing conditions with restoration of the fields to hay production. Rehabilitation of the existing vegetation on the site is not anticipated to have any adverse effects on surface water runoff.

4.2 Surface Water Quality

Surface water quality includes both the physical characteristics of the watercourse and any overland flow (e.g., clarity, turbidity, pH, temperature) and chemical characteristics (e.g., dissolved oxygen, metals, nutrients and other potentially hazardous contaminants). Surface water quality affects a number of other natural environmental components and biophysical processes in watercourses, including receiving waterbodies that can be located substantial distances from the water body where the initial change was affected. This includes

- adverse effects on aquatic biota (e.g., fish and benthic invertebrates)
- adverse effects on aquatic habitat (e.g., due to deposition of sediment from turbid water).

4.2.1 Construction Phase

Activities that could occur during the construction phase that would have the potential to affect surface water quality in ditches and nearby watercourses include

- increased erosion and sedimentation
- dust generation
- accidental spills of fuels
- accidental spills of concrete.

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

4.2.1.1 *Increased Erosion and Sedimentation*

Disturbance of the Project site due to vegetation clearing, topsoil and subsoil stripping (if necessary), grading, use of heavy machinery, stockpiling and concentration of flow in drainage features (e.g., ditches) has the potential to increase soil erosion due to exposure of bare soil (not protected by vegetation) to the effects of surface water (e.g., rain, overland flow due to rain/snow melt). Erosion is defined as the process where individual soil particles are detached from the ground, whereas sedimentation is defined as the subsequent transport (by wind or water) and deposition of the detached soil particles. Erosion and sedimentation have the potential to affect surface water quality by resulting in higher levels of turbidity and possibly contaminants associated with the soil surface (e.g., pesticides due to previous agricultural activities) in receiving waterbodies.

In order to mitigate this potential, a conceptual erosion and sediment control (ESC) plan is proposed below which should be supplemented by an ESC drawing prepared by the proponent's engineer or contractor. Additional information on the sediment and erosion control plan is also provided in the Construction Plan Report (Hatch Ltd., 2010d).

Preventing erosion from occurring in the first place is the primary goal of the ESC plan and measures such as proper construction phasing, minimizing the size and duration of soil disturbance and exposure and revegetating or stabilization as soon as possible after disturbance are all identified as effective erosion control measures. Sediment control measures are the last line of defence and are implemented to ensure that eroded soil particles are not transported off the Project site or to watercourses. Sediment control measures include measures such as silt fence barriers to trap and retain sediments.

The main mitigation measures that will form the basis for the ESC plan will include the following:

- Minimize the size of the cleared and disturbed areas at the construction site. Install limit of work devices to prevent the contractor from operating outside the defined construction area (e.g., silt fences at the edge of the 30-m buffer around the watercourses).
- Existing ground cover vegetation will be left on-site, to the extent possible to minimize exposure of bare soils.
- Phase construction to minimize the time that soils are exposed.
- Limit vegetation removal to areas within the development footprint and solar panel buffer requirements. Limit of work devices should be installed outside the drip line of residual trees, where possible to prevent damage.
- An adequate supply of erosion control devices (e.g., geotextiles, revegetation materials) and sediment control devices (e.g., silt fence barriers) to be provided on site to control erosion and sedimentation and respond to unexpected events.
- Sediment control fencing may be installed along the periphery of the Project site where there is the potential for sedimentation off site and at the edge of the 30-m buffer area adjacent to the watercourses on the Project site as one of the first construction activities. These silt fence barriers should remain in place until construction is complete and site vegetation, and other long-term protection measures, are stabilized and adequate to prevent further erosion.

- Divert runoff from the temporary and permanent access roads or laydown areas through vegetated areas or into a properly designed and constructed drainage collection system to ensure that exposed soils are not eroded. Runoff velocities in ditches or other drainage routes, or along slopes, to be kept low via proper installation of flow velocity control measures such as enhanced vegetated swales or check dams, to minimize erosion potential. Runoff discharge locations to be protected with erosion resistant material, if required.
- Grade stockpiles to a stable angle as soon as possible after disturbance to eliminate potential slumping. Revegetation (if during the growing season) or some other means of stabilization (e.g., tarping) should occur for any disturbed surface that is to be left exposed for longer than 30 days.
- Revegetate or stabilize exposed sites as soon as possible after they have been disturbed, using quick growing grasses or other native vegetation species approved by the Rideau Valley Conservation Authority (RVCA). Where revegetation is not possible other erosion protection methods, such as erosion matting may be used.
- Excavated erodible material stockpiles to be placed in suitable designated areas away from waterbodies (i.e., outside the 30-m buffer adjacent to waterbodies, away from drainage channels) and properly constructed silt fence barriers should be installed around the stockpiles to limit the transport of sediment.
- Monitoring the tracking of mud onto adjacent roads during construction. If mud is transferred to the road, the contractor will be required to implement a system to prevent transfer of this material to local ditches and waterbodies. This could potentially include wheel washing areas at the exit from the construction site or end-of-day street sweeping/scraping to remove accumulated materials from local streets.

Implementation of these mitigation measures is anticipated to be effective in minimizing soil erosion and off-site transport from the construction area, such that waterbodies are not negatively affected. Monitoring will be conducted throughout the construction period to ensure ESC measures are functioning as designed (see Section 5).

4.2.1.2 Dust Generation

Dust may be mobilized due to vehicular traffic and heavy machinery use, drilling, blasting (if required) and soil moving activities. If unmitigated, excessive dust levels could adversely impact surface water quality and aquatic habitat if it were to be deposited in waterbodies.

However, it is not anticipated that dust generation will be a significant problem 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 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. Stock piles 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 waterbodies occur as a result of dust.

4.2.1.3 Accidental Spills

Fuels, lubricants and other hazardous materials will be used on the construction site. Activities during the construction phase that could potentially result in transport of these materials to the watercourse, with subsequent negative impacts on water quality, include

- refuelling and maintenance
- use of equipment containing fuels, lubricants or other materials within, or in the vicinity of watercourse
- storage of hazardous materials.

There are a number of general mitigation practices to be followed by the contractor during construction to minimize the potential for negative environmental impacts associated with the scenarios above which could be caused by the storage, use and disposal of fuels, lubricants and other hazardous materials. These include the following:

- Establish designated refuelling and maintenance areas at least 30 m from waterbodies, drainage ditches, channels or other wet areas.
- Locate designated hazardous material storage areas at least 30 m away from waterbodies, for all hazardous materials to be stored outside. Storage areas should be above ground and enclosed by an impervious secondary containment structure (e.g., berm or container) capable of holding the entire volume of the stored material, as well as some additional volume of rainwater. The area should be equipped with a drain so that it can be cleared of any spilled material or accumulated rainwater, which would be disposed of in a suitable manner. Secondary containment areas should be monitored throughout the construction period to ensure their integrity.
- A barrier will be erected around the storage area to prevent accidental damage to containers.
- Machinery is to arrive on site in a clean condition and is to be maintained free of fluid leaks.

- An emergency spill kit will be kept on site in case of fluid leaks or spills from machinery.
- Provide adequate spill clean-up materials/equipment (e.g., absorbents) on site. The contractor must have a spill clean-up procedure/emergency contingency plan in place prior to commencement of work at the site. All site staff should be trained in implementation of the procedure.

Given this mitigation, no adverse effects on surface water quality due to use of fuels, lubricants and other hazardous materials during Project construction is anticipated to occur.

4.2.1.4 *Accidental Spills of Concrete*

Concrete will be used to construct the inverter and transformer pads, and depending on soil strength conditions, may also be used as ballast for the solar panel racking. Concrete will be brought on site by a ready-mix concrete supplier in concrete trucks and poured directly into the form for each transformer/inverter pad. If concrete ballast is required for the panel racking structures, it would likely consist of pre-fabricated structures brought to the site. No cement is anticipated to be stored or mixed on site.

Concrete, grout and associated materials (e.g., cement, mortars) typically have high pH values (i.e., highly basic or alkaline), which, if they enter a watercourse, could create adverse surface water quality conditions that are toxic to aquatic biota (Province of British Columbia, 2007).

Although the use of concrete during Project construction is relatively limited and will not occur within 30 m of any water body, mitigation measures are proposed to prevent negative effects. The Province of British Columbia (2007) has identified a number of construction best management practices to prevent adverse impacts on surface water quality and biota due to the use of concrete. Therefore, in order to mitigate potential adverse effects due to concrete and cement use, the following mitigation measures are to be implemented:

- No alkaline cement products will be deposited directly or indirectly into or adjacent to any watercourse.
- Concrete truck rinsing will occur at a designated area at least 120 m from any waterbodies or drainage routes in a manner to contain the rinse water and concrete residue to prevent off site transport.
- No cement is anticipated to be stored on site. However, if some cement bag storage is required, bags are to be stored indoors, where possible. If outdoor storage is required, cement bags should be covered with waterproof sheeting and raised off the ground (e.g., on wooden palates) to ensure no contact with surface water runoff. Impervious material will be placed under the elevating mechanism to collect any spills (e.g., due to ripped bags). Empty cement bags are to be collected as soon as possible after use and spills of cement or concrete cleaned up as appropriate.

Given this mitigation, no negative effects on surface water quality due to use of concrete during construction is anticipated to occur.

4.2.2 Operations Phase

Long-term site alterations associated with the operations phase that would have the potential to affect surface quality in nearby watercourses include

- erosion and sedimentation from the Project area
- maintenance activities such as panel cleaning
- accidental spills.

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

4.2.2.1 Erosion and Sedimentation from the Project Area

Given the mitigation associated with long-term stormwater management on the site as discussed in Section 4.1.2, no erosion is anticipated to occur throughout the operations period. Precipitation running off each solar panel face will be concentrated at the point where it intercepts the ground surface and therefore, could potentially have more erosive force than normal diffuse precipitation patterns. However, the dense ground cover vegetation beneath the solar panels will be sufficient to prevent erosion of the underlying soils due to this concentrated impact. Precipitation will then drain from the site in a similar manner as presently occurs. Therefore, no erosion is anticipated due to runoff from the solar panels.

General site monitoring will be conducted during the general site inspections throughout the life of the Project to determine if erosion is occurring on or adjacent to the site, including in the runoff area from the panels. Remediation would be undertaken as necessary to prevent any further erosion.

Given this mitigation and monitoring, no erosion and sedimentation and therefore no adverse effects on surface water quality are anticipated to occur during the operations period.

4.2.2.2 Maintenance Activities

As noted in Section 3.2, normal maintenance activities will include inspection of components and panel washing, if rainfall and snow are not sufficient to prevent dust build up on the panel faces. Normal maintenance and inspection are not anticipated to have any negative effects on waterbodies. If extra water is required to be brought on site for panel cleaning purpose, it is anticipated that volumes will be relatively low and less than that which would occur during a normal precipitation event. No cleaning agents (e.g., detergents) will be used to clean panels. Therefore, no adverse effects on surface water quality are anticipated to occur due to maintenance activities.

4.2.2.3 Accidental Spills

Use of fuels, lubricants and other potentially hazardous materials during the operations phase will be limited to those materials brought on site during periodic maintenance activities. This would include fuel and other lubricants in maintenance vehicles that are used to maintain the solar facilities. All maintenance vehicles will be equipped with a spill kit and a spill contingency and response plan will be in place for the duration of the operational period. Given this mitigation, and the limited quantity of material on site and the limited frequency and duration that it will be on site, no adverse effects due to accidental spills are anticipated to occur.

The main transformer will contain a small volume of transformer oil that could potentially be transferred to waterbodies in the event of a leak. In order to mitigate this potential, a containment structure will be installed around the transformer. Therefore, in the event of a leak, spilled fluid will be contained within the concrete pad surrounding the transformer. It would then be removed and disposed of in accordance with regulatory requirements. More details on the proposed containment system are provided in the Design and Operations Report (Hatch Ltd., 2010c). No adverse effects on surface water are anticipated to occur due to presence of transformer oils on site.

4.2.3 Decommissioning Phase

Short-term activities and long-term site alterations associated with the decommissioning phase that would have the potential to affect surface quality in nearby watercourses include

- increased erosion and sedimentation from the facility
- accidental spills during decommissioning.

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

4.2.3.1 Erosion and Sedimentation

Standard construction site erosion and sedimentation control measures will be installed during the decommissioning process, since heavy equipment may be needed, which will result in some vegetation and ground disturbance and therefore, exposure of bare soil. However, decommissioning is anticipated to be a relatively quick process with minimal amounts of ground disturbance required to remove panels and other features. Once the field is returned to its existing agricultural condition, erosion rates will be similar to existing conditions. Therefore, given the mitigation that will be implemented during decommissioning and the fact that the site will be restored to existing agricultural conditions, no negative effects on water quality are anticipated to occur as a result of sediment and erosion during decommissioning.

4.2.3.2 Accidental Spills

Equipment associated with the decommissioning process could potentially result in accidental spills and/or leaks. The mitigation noted in Section 4.2.1.3 for use during the construction process, would also be implemented during the decommissioning process. It is anticipated that this mitigation will be effective in preventing spills and minimizing the magnitude and extent of any small spills that do occur. Therefore, no adverse effects on surface water quality are anticipated to occur due to small leaks or spills during decommissioning.

4.3 Groundwater

Groundwater will likely be present in the sub soils underneath the site at various depths throughout the year. Groundwater is important to a number of natural environment components since it may provide base flow to water courses, which in turn supports aquatic biota and habitat. An artesian well is known to provide a small amount of flow to Watercourse C.

Impacts on groundwater could potentially occur due to excavations below the groundwater table (e.g., for transformer pad footings) or accidental spills during construction, operations or decommissioning. Those potential effects and associated mitigation are discussed by Project phase in the following sections.

Given the mitigation proposed in Section 4.1 to prevent any changes in soil structure that may affect infiltration (e.g., compaction), the Project is not anticipated to have any effect on groundwater recharge that may occur during precipitation or snow melt events.

4.3.1 Construction Phase

During construction, groundwater could potentially be affected by any Project excavation if it is deep enough to intersect the groundwater table. Groundwater quality could also be affected by any spills that infiltrate the soil and enter the groundwater table. Potential negative effects and proposed mitigation measures are discussed in the following sections.

4.3.1.1 Effects on Groundwater Due to Project Excavations

The only Project excavation anticipated to be potentially deep enough to intersect the groundwater table and where dewatering could potentially be required would be the excavations for transformer/ inverter pads. Should these excavations intersect the groundwater table, some pumping of groundwater may be required to keep the excavation area dry to facilitate construction and such pumping could potentially result in localized decrease in groundwater levels.

Any groundwater entering project excavations, as well as any accumulated precipitation, is to be pumped out of the excavated area, treated, if required to meet the Ministry of the Environment (MOE) water quality discharge criteria, and discharged to a vegetated buffer area.

Given the very small size of the excavations required for transformer/inverter pads and the limited duration that they will be exposed (2 weeks or less), it is not anticipated that pumping of groundwater at these sites will have any significant effect on the local groundwater table.

4.3.1.2 Accidental Spills

Mitigation proposed in Section 4.2.1.3 is anticipated to be effective in minimizing the potential for accidental spills and in the event of a spill, minimizing the magnitude of that spill. Accordingly, it is not anticipated that spills would be large enough to have any noticeable effect on groundwater supplies. However, if spills do occur, the spill response and contingency plan protocol will be implemented and this will involve notifying the MOE Spills Action Centre. If the spill is determined to have the potential to impact groundwater, remedial measures will be taken, such as excavating the soil that was contaminated by the spill, in order to prevent infiltration of contaminants into the groundwater table.

4.3.2 Operations Phase

During the operations phase, the only potential effect on groundwater would be due to accidental spills associated with maintenance activities and the presence of transformer oil.

4.3.2.1 Accidental Spills

Mitigation proposed in Section 4.2.2.3 is anticipated to be effective in minimizing the potential for accidental spills and in the event of a spill, minimizing the magnitude of that spill. Accordingly, it is not anticipated that spills would be large enough to have any noticeable effect on groundwater supplies. However, if spills do occur, the spill response and contingency plan protocol will be implemented and this will involve notifying the MOE Spills Action Centre. If the spill is determined to have the potential to impact groundwater, remedial measures will be taken, such as excavating the soil that was contaminated by the spill, in order to prevent infiltration of contaminants into the groundwater table.

A secondary containment structure will be installed around the main station transformer to contain transformer oils in the event of a leak. This will prevent transfer of these materials to nearby watercourses or the soil/groundwater.

4.3.3 Decommissioning Phase

Similarly, the only potential effect on groundwater during decommissioning would be due to accidental spills associated with decommissioning equipment (e.g., spills or leaks during equipment dismantling or from heavy equipment, vehicles or generators). However, given the mitigation proposed and the small volume of fluids that will actually be used on site, no negative effects on groundwater quality are anticipated to occur as a result of small accidental spills that may occur.

4.4 Aquatic Biota and Habitat

Aquatic biota (e.g., fish and benthic invertebrates) and their habitat in the watercourses on and adjacent to the Project site will not be directly affected by any Project component, since no activities will occur within 30 m of the average annual high water mark of the watercourses and in some cases, this buffer width may be substantially greater.

Aquatic biota and habitat could potentially be indirectly affected if changes in surface water runoff, surface water quality and groundwater quality or quantity were to occur as a result of any phase of the Project. However, the mitigation proposed in Sections 4.1, 4.2 and 4.3 is anticipated to be effective in preventing/minimizing negative effects associated with these other biophysical components of the environment, such that there are no adverse effects on aquatic biota and habitat within the tributaries. Given this, no specific mitigation measures, other than those noted in the above-mentioned sections are required to prevent adverse effects to aquatic biota and habitat.

5. Environmental Effects Monitoring Requirements

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 environmental effects monitoring measures with respect to negative effects on waterbodies and lands within 30 m of waterbodies have been reproduced here, in Table 5.1.

The monitoring proposed in Table 5.1 will serve to verify if 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). The CPR is a stand-alone report (Hatch Ltd., 2010d) that will be included as part of the REA application.

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 mitigation measures for the identified negative environmental effects. The CPR addresses all potential effects of construction on waterbodies within 300 m of the Project site in a general manner. The mitigation proposed in the CPR with respect to preventing/ minimizing negative effects on waterbodies is the same as that was discussed in this EIS. Additional mitigation is proposed to address negative effects during construction not related to waterbodies and associated 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 waterbodies are contained within this EIS and duplicated in the CPR.

7. Summary and Conclusions

As discussed in the Water Body Records Review Report (Hatch Ltd., 2010a) and Water Body Site Investigation Report (Hatch Ltd., 2010b), some components of the Project will be located within 30 to 120 m of Watercourses B, C and D.

This EIS has been prepared to identify potential negative effects that all phases of the Project may have on these waterbodies and lands within 30 m of the average annual high water mark. Potential negative effects are associated with

- alterations in surface water runoff due to
  - changes in topography associated with land grading and ditching
  - soil compaction during construction
  - changes in vegetation structure and density
  - increase in impervious and less pervious surfaces
- alterations in surface water quality due to

Table 5.1 Summary of Environmental Effects Monitoring Requirements with Respect to Waterbodies

Negative Effect	Mitigation Strategy	Performance Objective	Monitoring Plan					Contingency Measures
			Methodology	Monitoring Locations	Frequency	Rationale	Reporting Requirements	
Construction Phase								
Increases in surface water runoff from the construction site	Stormwater management measures including grassed swales, enhanced vegetated swales, ditch flow controls and filter strips, and temporary construction measures as necessary (e.g., hay bales).	Minimize changes to surface water runoff conditions to watercourses.	Visual assessment of structural stability of mitigation measures and identification of unintended impacts.	Throughout construction site.	Once per week and during/ after storm events.	Visual monitoring will confirm that stormwater management measures remain as designed (e.g., rock flow check dams, straw bale flow checks, ditches, etc) and identify deficiencies.	Reported in monthly environmental monitoring report during construction.	Stormwater management measures will be remediated as necessary to ensure that they are functioning as designed. Alternate measures may be required and will be determined based on on-site issues and conditions.
Soil compaction due to heavy equipment use and stockpiling	Remediation of compaction following construction.	No significant compaction that would inhibit vegetative growth.	Visual monitoring for signs of compaction.	Throughout construction site.	Once after remediation.	Visual monitoring will identify areas requiring remediation.	At close-out of Project.	Areas of compaction will be remediated as necessary to alleviate compaction (e.g., discing).
Erosion and sedimentation resulting in increased turbidity in site runoff	Erosion and sediment control measures.	No significant changes to surface water quality in watercourse.	Visual monitoring of sediment and erosion controls (e.g., silt fence barriers).	All ESC controls throughout work site.	Once per week and in advance and following major precipitation.	ESC measures to be monitored to ensure they are functioning as designed and in good working order to meet performance objectives.	Reported in monthly environmental monitoring report during construction.	Alternate ESC measures will be used as necessary to ensure required control.
			Visual monitoring of surface water quality conditions in drains during construction.	Throughout length of the drains on Project site.	Once per week and once during all in-water works.	Visual monitoring would identify areas of turbidity and would show that remedial measures would be necessary to prevent further erosion issues.	Reported in monthly environmental monitoring report during construction.	Alternate ESC measures will be used as necessary to ensure required control.
Dust generation and off-site transport	Standard construction site best management practices to prevent fugitive dust (see Section 4.2.1.2).	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.	Alternative dust control measures will be implemented as necessary to prevent/minimize dust generation.
Potential for adverse surface water and groundwater quality due to accidental spills	Standard mitigation to prevent spills and minimize magnitude of spills that do occur (see Section 4.2.1.3).	No long-term environment effects due to spills.	Visual monitoring of spill prevention/mitigation measures.	Throughout construction site.	Once per week.	Spill prevent and control measures to be monitored to ensure they are functioning as designed and protocols are being implemented as specified in plans to meet performance objectives.	Reported in monthly environmental monitoring report during construction.	Spill contingency measures will be implemented as necessary in the event of a spill. Following spill event, response will be reviewed to determine if additional or altered response protocols are necessary to meet performance objectives.
Operations Phase								
Increases in surface water runoff from Project site	Stormwater management measures including grassed swales, enhanced vegetated swales and filter strips.	Minimize changes to surface water runoff conditions to drains.	Visual assessment of structural stability of mitigation measures and identification of unintended impacts.	Throughout Project site.	Twice per year during site inspections.	Visual monitoring will confirm that stormwater management measures are effective and identify deficiencies.	Reported in annual operational environmental monitoring report.	Stormwater management measures will be remediated as necessary to ensure that they are functioning as designed.
Erosion and sedimentation resulting in increased turbidity in site runoff	Vegetation to prevent erosion due to stormwater.	No long-term erosion from site over and above existing conditions.	Visual monitoring of Project area to identify areas of erosion (e.g., rills, gullies).	Throughout Project site.	Twice per year during site inspections.	Visual monitoring of erosion would identify potential areas of concern.	Reported in annual operational environmental monitoring report.	Erosion remediated as necessary to ensure no long erosion issues.
Potential for adverse surface water and groundwater quality due to accidental spills	Standard mitigation to prevent spills and minimize magnitude of spills that do occur.	No long-term environment effects due to spills.	Visual monitoring of spill prevention/mitigation measures during maintenance activities.	Throughout Project site where maintenance occurs and at transformer locations.	Twice per year during site inspections.	Spill prevent and control measures to be monitored to ensure they are functioning as designed and protocols are being implemented as specified in plans to meet performance objectives.	Reported in annual operational environmental monitoring report.	Spill contingency measures will be implemented as necessary in the event of a spill. Following spill event, response will be reviewed to determine if additional or altered response protocols are necessary to meet performance objectives.

Negative Effect	Mitigation Strategy	Performance Objective	Monitoring Plan					Contingency Measures
			Methodology	Monitoring Locations	Frequency	Rationale	Reporting Requirements	
Decommissioning Phase								
Erosion and sedimentation resulting in increased turbidity in site runoff	Erosion and sediment control measures.	No significant changes to surface water quality in watercourses.	Visual monitoring of sediment and erosion controls (e.g., silt fence barriers).	All ESC controls throughout work site.	Once per week and in advance and following major precipitation and snow melt events.	ESC measures to be monitored to ensure they are functioning as designed and in good working order to meet performance objectives.	Reported in monthly environmental monitoring report during construction.	Alternate ESC measures will be used as necessary to ensure required control.
			Visual monitoring of surface water quality conditions in drains during construction.	Throughout length of tributary on Project site.	Once per week and once during all in-water works.	Visual monitoring would identify areas of turbidity and would show that remedial measures would be necessary to prevent further erosion issues.	Reported in monthly environmental monitoring report during construction.	Alternate ESC measures will be used as necessary to ensure required control.
Potential for adverse surface water and groundwater quality due to accidental spills	Standard mitigation to prevent spills and minimize magnitude of spills that do occur.	No long-term environment effects due to spills.	Visual monitoring of spill prevention/mitigation measures.	Throughout construction site.	Once per week.	Spill prevent and control measures to be monitored to ensure they are functioning as designed and protocols are being implemented as specified in plans to meet performance objectives.	Reported in environmental monitoring report during decommissioning.	Spill contingency measures will be implemented as necessary in the event of a spill. Following spill event, response will be reviewed to determine if additional or altered response protocols are necessary to meet performance objectives.

  - erosion and sediment from Project site
  - dust generation during construction
  - accidental spills during construction, operations and decommissioning
  - use of concrete during construction
- alterations in groundwater levels and quality due to
  - project excavations below the groundwater table during construction
  - accidental spills during construction, operations and decommissioning
- adverse effects on aquatic biota and habitat due to
  - indirect effects due to alterations in other environmental components and biophysical processes.

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. The primary mitigation measure that will prevent adverse effects on the waterbodies is adherence to the 30-m setback requirement. Monitoring measures have been proposed to confirm that mitigation measures are having the intended effect and that performance objectives are being met.

Overall, while the Project will result in some changes to the natural environment, no negative effects on waterbodies are anticipated to occur following implementation of the mitigation and monitoring measures proposed in this EIS.

8. References

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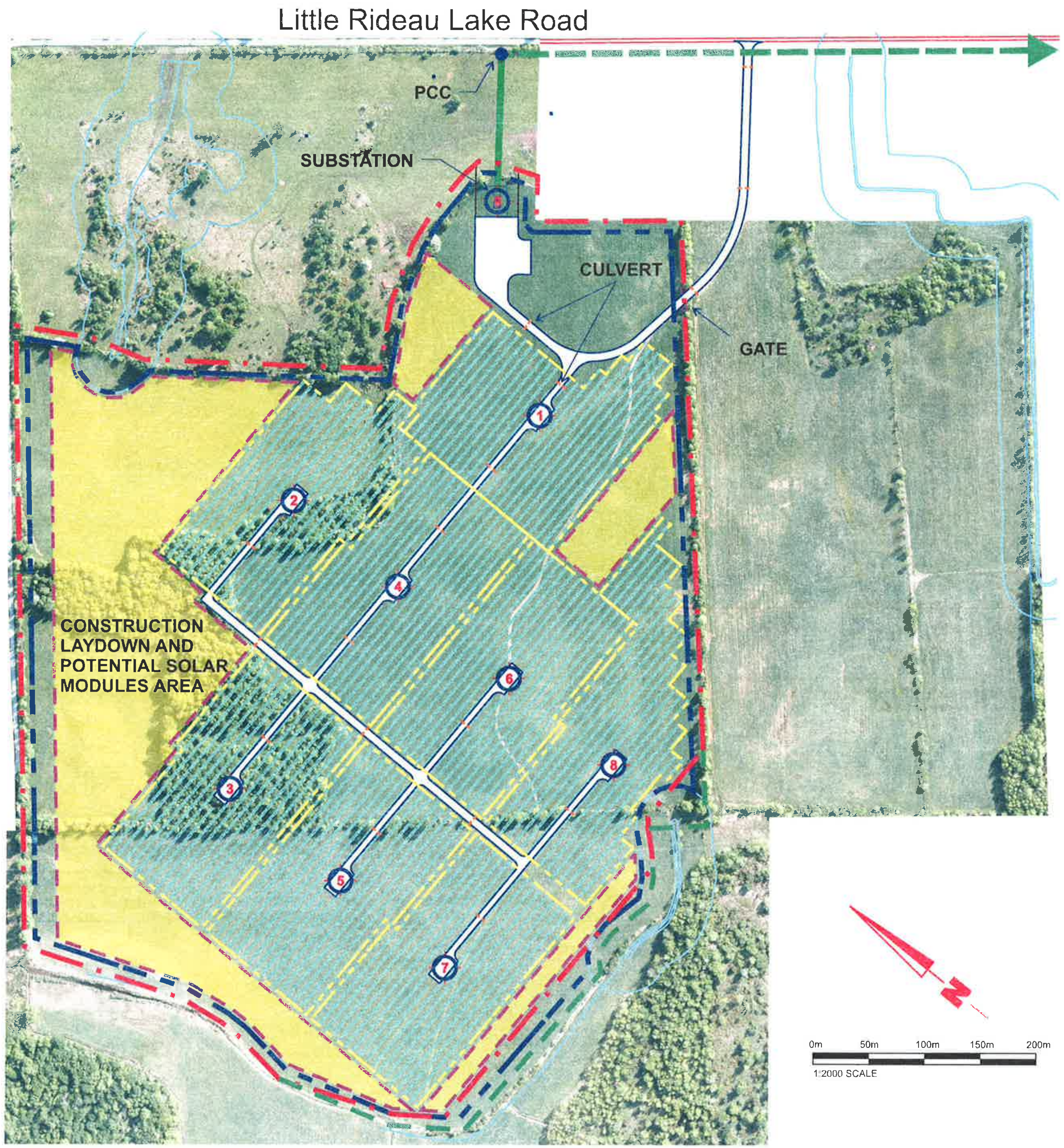
Appendix A

Site Layout



TO POINT OF CONNECTION
APROX. 910 m
(44.666046, -76.296564)

LEGEND:

- GRAVEL ACCESS ROAD
- GATE
- 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 MODULE AREA
- PCC (POINT OF COMMON COUPLING)
- 163 RACKS IN ONE GROUP, 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_{DC} OR 10 MW_{AC}
- 7 — 2 x 625 kVA INVERTER, 1 x 1250 kVA TRANSFORMER

REVISIONS

NO	DATE	SYMBOL	REMARKS
P0	NOV 2010		ISSUED FOR CONSTRUCTION PLAN REPORT
P1	FEB 2011		RELOCATION OF INVERTERS GROUP 1

STAMP

COGENERATION Associates Limited

PREPARED FOR
NORTHLAND POWER

PROJECT
NORTHLAND POWER SOLAR CROSBY

DRAWN BY	TIEN PHAM	VERIFIED BY	
SCALE	N.T.S.	VERIFIED BY	
DATE	NOV 2010	APPROVED BY	

ISSUED FOR TENDER

PROJECT No.

TITLE: SOLAR FARM PROJECT SITE PLAN

DRAWING No. **SP-02 (CROSBY)** Rev.P1