



McCann Solar Project

Draft Water Body Site Investigation Report

April 11, 2011



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

DRAFT Water Body
Site Investigation Report

McCann Solar Project

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Project Report

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**Northland Power Inc.
McCann Solar Project**

DRAFT Water Body Site Investigation Report

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1. Introduction

1.1 Project Description

Northland Power Solar McCann L.P. (hereinafter referred to as “Northland”) is proposing to develop a 10-megawatt (MW) solar photovoltaic project in the Township of Rideau Lakes, titled the McCann Solar Project (hereinafter referred to as the “Project”). The Project site will be located on approximately 40 hectares (ha) of land, located just south of Big Rideau Lake in the Township of Rideau Lakes, within the United Counties of Leeds and Grenville.

1.2 Legislative Requirements

Ontario Regulation (O. Reg.) 359/09 – *Renewable Energy Approvals Under Part V.0.1 of the Act*, (herein referred to as the REA Regulation) made under the *Environmental Protection Act* identifies the Renewable Energy Approval (REA) requirements for renewable energy projects in Ontario. Per Section 4 of the REA Regulation, ground mounted solar facilities with a name plate capacity greater than 10 kilowatts (kW) are classified as Class 3 solar facilities and require a REA.

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

- a) 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
- b) whether any additional water bodies exist, other than those that were identified in the Water Body Records Review report prepared under subsection 30 (2)
- c) 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
- d) the distance from the project location to the boundaries determined under clause (c).

The REA Regulation has specific requirements if designated lake trout lakes are present within 300 m of the project area. These requirements were not deemed applicable to the Project as no such lakes were found during the Water Body Records Review (Hatch Ltd., 2010).

Waterbodies are defined in Section 1(1) of the REA Regulation to include a lake, a permanent stream, an intermittent stream or a seepage area, but does not include

- a) grassed waterways
- b) temporary channels for surface drainage, such as furrows, or shallow channels that can be tilled or driven through
- c) rock chutes and spillways
- d) roadside ditches that do not contain a permanent or intermittent stream
- e) temporarily ponded areas that are normally farmed
- f) dugout ponds, or

- g) artificial bodies of water intended for the storage, treatment or recirculation of runoff from farm animal yards, manure storage facilities and sites and outdoor confinement areas.

Further, intermittent streams are defined as “a natural or artificial channel, other than a dam, that carries water intermittently and does not have established vegetation within the bed of the channel, except vegetation dominated by plant communities that require or prefer the continuous presence of water or continuously saturated soils for their survival” (O. Reg. 359/09).

Seepage areas are defined as “a site of emergence of groundwater where the water table is present at the ground surface, including a spring” (O. Reg. 359/09).

Subsection 3 of Section 31 of the REA Regulation requires the proponent to prepare a report setting out the following:

1. A summary of any corrections to the Water Body Records Review report prepared under subsection 30 (2) and the determinations made as a result of conducting the site investigations under subsection (1).
2. Information relating to each water body identified in the records review and in the site investigations, including the type of water body, plant and animal composition and the ecosystem of the land and water investigated.
3. A map showing
 - i. the boundaries mentioned in clause (1) (c)
 - ii. the location and type of each water body identified in relation to the project location
 - iii. the distance mentioned in clause (1) (d).
4. The dates and times of the beginning and completion of the site investigation.
5. The duration of the site investigation.
6. The weather conditions during the site investigation.
7. A summary of methods used to make observations for the purposes of the site investigation.
8. The name and qualifications of any person conducting the site investigation.
9. Field notes kept by the person conducting the site investigation.

This Water Body Site Investigation Report has been prepared to meet these requirements.

2. Summary of Water Body Records Review Results

Table 2.1 summarizes the results of the Water Body Records Review (Hatch Ltd., 2010).

Table 2.1 Summary of Water Body Records Review Determinations

Determination to be Made	Yes/No	Description
Is the Project in a water body?	No	The Project will not be in a water body.
Is the Project 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?	No	There are no lakes within 120 m of the Project site.
Is the Project within 300 m of the average annual high water mark of a lake trout lake that is at or above development capacity?	Yes	Big Rideau Lake is located ~ 280 m from the Project site.
Is the Project within 120 m of the average annual high water mark of a permanent or intermittent stream?	Yes	There is one water course within 120 m of the Project site.
Is the Project within 120 m of a seepage area?	No	No seepage areas are present within the Project area.

Therefore, depending on the layout of the proposed Project, some components of the Project could potentially be located within 120 m of the average annual high water mark of one permanent stream and within 300 m of a designated lake trout lake (although the capacity of the lake with respect to shoreline development is currently unknown).

3. Site Investigation Methodology

3.1 Date, Time, and Duration of Site Investigation

- Date: May 17, 2010
- Start Time: 0835 hours
- Duration: approximately 3.5 hours

3.2 Weather Conditions During Site Investigation

- Temperature: 14°C
- Beaufort Wind: 1
- Cloud Cover: 0%

3.3 Name and Qualifications of Person Conducting Site Investigation

The site investigation was completed by Sean K. Male of Hatch.

Sean K. Male, M.Sc. is a Terrestrial Ecologist specializing in assessments of terrestrial habitat, flora and fauna. Sean received his Bachelors of Science (Honours) in Biology from Queen's University, where he completed his Honour's thesis under Dr. Raleigh J. Robertson, studying the impacts of nestbox density in Tree Swallows (*Tachycineta bicolor*) on nest-building behaviour. He then completed a Master's of Science degree in the Watershed Ecosystem Graduate Program at Trent

University under Dr. Erica Nol. Sean's thesis focused on examining the impacts of a Canadian diamond mine on a population of breeding passerines. For his thesis, Sean spent two summers in the Canadian arctic studying populations of Lapland Longspurs (*Calcarius lapponicus*) around the Ekati Diamond Mine, located 300 km northeast of Yellowknife. While at Trent, Sean participated in the Northern Saw-whet Owl (*Aegolius acadicus*) Migration Banding Project at the Oliver Centre. Following his time at Trent, Sean participated in the Landscape Monitoring Program and was involved in a study of the impacts of woodlot size on breeding birds.

Sean joined Hatch as a Terrestrial Ecologist in 2006. Since joining Hatch, Sean has participated in several environmental assessments for hydro and wind power developments. He has developed and implemented baseline monitoring and impact assessment programs for both terrestrial wildlife and plant communities, including detailed bird and bat studies for several wind power developments, including the proposed 100-MW Coldwell Wind Power Development near Marathon, Ontario, a proposed 20-MW facility near Port Dover, ON, and a proposed 110-MW wind facility in southwestern Ontario. Sean has also conducted terrestrial and wetland vegetation surveys for several proposed hydropower projects totalling over 40 MW in southern and northern Ontario and has participated in fisheries surveys for several of these projects.

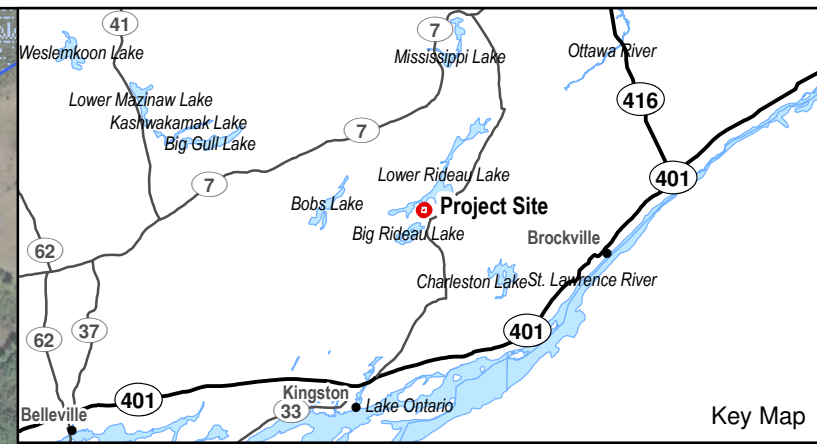
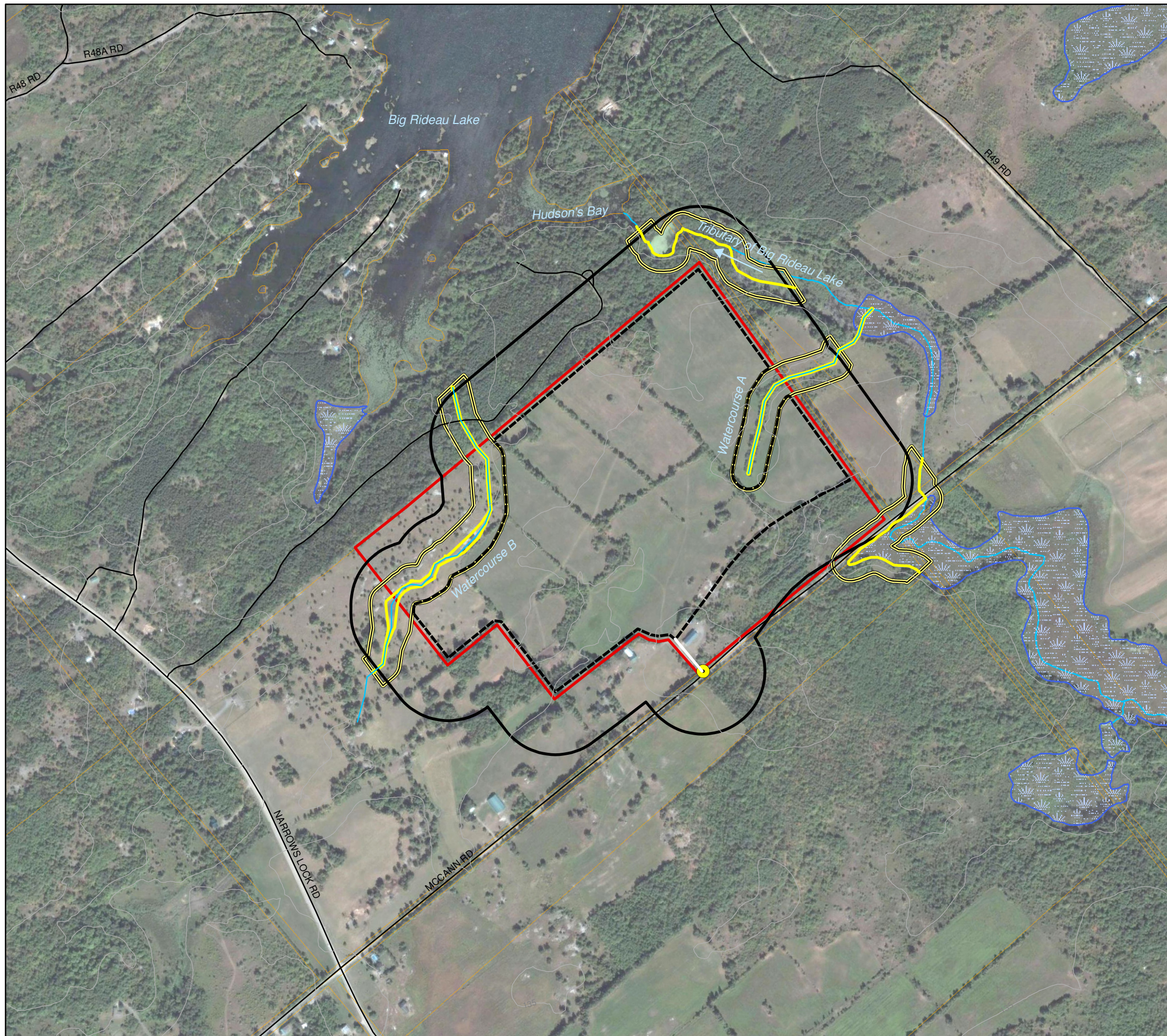
3.4 Survey Methods

The entire site was searched by the observer on foot in order to document waterbodies. Photographs of the site were taken. Any observations of waterbodies, including the type of water body, instream habitat types, surrounding riparian areas, average annual high water mark and wildlife use were noted. Geographic coordinates at representative areas of the average annual high water mark for waterbodies on and within 120 m of the Project site were recorded using a sub-meter accuracy GPS for mapping purposes.

A copy of the field notes kept by the observer is provided in Appendix A.

4. Results of Site Investigation

This section documents the results of the site investigation and discusses specific water features observed on and adjacent to the Project site. Features noted in the following sections, including the proposed Project footprint boundary and the average annual high water mark of watercourses on and within 120 m of the Project site, are shown in Figure 4.1. Big Rideau Lake, a designated lake trout lake, is located approximately 280 m north of the Project site. However, the lake shoreline was not reviewed since the observer did not have permission to cross private property at the lake shoreline. Therefore, the lake is not discussed further in this report. There were no other waterbodies or any seepage areas identified during the site investigation.



Legend

- Roads
- Transmission Line
- Topographic Contour (5m interval)
- Watercourse
- Average Annual High Water Mark
- 30m Setback From High Water Mark
- Project Site
- Study Area
- Parcels

Project Components

- Connection Point With Existing Distribution Line
- Proposed New Distribution Line
- Project Footprint Boundary

0 50 100 200 Metres
1:7,500

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

▲ NORTH

Figure 4.1
Northland Power Inc.
McCann Solar Energy Project
Water Body and Project Boundaries

Back of Figure 4.1

4.1 Permanent or Intermittent Streams

The Water Body Records Review (Hatch Ltd., 2010) identified one permanent watercourse (an unnamed tributary of Big Rideau Lake), located within 120 m of the Project site (Figure 4.1). During the site investigation, two additional watercourses were identified adjacent to the Project site (Watercourses A and B in Figure 4.1). These watercourses are described in the following sections.

4.1.1 Unnamed Tributary of Big Rideau Lake

The unnamed tributary of Big Rideau Lake originates southeast of the Project site. Within 1 km of the Project site, the watercourse enters a swampy woodland, which it flows through past the Project site (outside the Project area but within 120 m of the boundary) and into Hudson's Bay on Big Rideau Lake, approximately 400 m downstream from the Project site.

In the area adjacent to the southwestern corner of the Project site, the watercourse flows through wide, low-lying marshy wetland. There is a small main channel (approximately 2 to 4 m wide) bordered by inundated shrubs and emergent vegetation, consisting of tall grasses and sedges (*Carex* sp.). A photograph of the wetland area is shown in Figure 4.2.



Figure 4.2 Wetland Area on Unnamed Tributary of Big Rideau Lake Southwest of the Project Site

From this wetland, the tributary crosses through a culvert beneath McCann Road. It then enters a narrow naturally vegetated corridor that flows between two open agricultural fields adjacent to the Project site. The watercourse remains low-lying and is dominated by a small narrow wetland through a portion of this reach (Figure 4.1). Farther downstream, the watercourse enters the woodland that surrounds Big Rideau Lake. There is a small, approximately 80-m by 100-m on-line pond located within 100 m of the Project boundary. The pond consists of open water, bordered by a relatively narrow band of red-osier dogwood (*Cornus sericea*) and steep banks dominated by upland tree species including white birch (*Betula papyrifera*) and ironwood (*Ostrya virginiana*). Outflow from the pond runs for approximately 100 m before draining into Big Rideau Lake. A photograph of the pond is provided in Figure 4.3.



Figure 4.3 Photograph of On-line Pond on Tributary of Big Rideau Lake

The pond and reaches of this tributary likely provide aquatic habitat for a variety of fish species. The lower reaches in particular may provide spawning and foraging habitat for species residing in Big Rideau Lake. This tributary may also provide forage (e.g., benthic invertebrate drift and allochthonous materials) to the Big Rideau Lake fish community and it likely affects water quality in the discharge zone in the lake itself.

As shown in Figure 4.1, the proposed Project may be constructed between in the area less than 120 m away from the average annual high water mark of the tributary of Big Rideau Lake adjacent to

the Project site. Therefore, an Environmental Impact Study (EIS) is required to assess the potential for adverse effects of the Project and mitigation measures necessary to prevent or minimize these effects.

4.1.2 Watercourse A

Watercourse A consists of a drainage tributary originating on the Project site and flowing for approximately 500 m before draining into the tributary of Big Rideau Lake (Figure 4.1). The tributary runs on the Project site for approximately 200 m. It flows through a narrow naturally vegetated corridor, surrounding by grassed fields used as cow pastures. The channel bottom is comprised of a mix of organic and mineral soils and the channel is approximately 1.5 to 2 m wide. Water depth during the site investigation was <0.30 m and no flow was evident. It appears as though this watercourse primarily flows during precipitation and snow melt events and it is likely intermittent during the drier parts of the year. Algae was abundant throughout the channel on the Project site.

There were some bulrushes (*Scirpus sp.*) and cattails (*Typha sp.*) and some inundated willow shrubs (*Salix sp.*) within the main channel. The riparian areas of the channel are dominated by a variety of shrubs and trees including trembling aspen (*Populus tremuloides*) and raspberries (*Rubus sp.*) in the upland areas near the border of the Project site.

A photograph of typical habitat conditions within Watercourse A is provided in Figure 4.4.



Figure 4.4 Photograph of Watercourse A on the Project Site

Watercourse A may provide seasonal aquatic habitat for fish residing within the tributary of Big Rideau Lake, although it appears to be intermittent and would not provide direct habitat on a year-round basis. It also likely provides habitat for benthic invertebrates, which may provide a source of forage for the downstream fish community, and seasonal habitat for frogs, which were observed during the site investigation. The watercourse also provides some hydrology and water quality regulation for the downstream watercourse.

The site investigation has confirmed that Watercourse A is an intermittent watercourse, which runs through a portion of the Project site. The average annual high water mark was determined to be the top of bank feature, given that riparian vegetation was not indicative of communities tolerant of any annual inundation. The high water mark and associated 30-m setback are shown in Figure 4.1. Development of the proposed solar facility will occur between 30 and 120 m away from the average annual high water mark. Therefore, an EIS will be required to assess potential adverse effects and required mitigation and monitoring measures to protect this water body.

4.1.3 Watercourse B

Watercourse B arises in the scrublands located approximately 300 m west of the Project boundary. It flows in a northeasterly direction for approximately 1.1 km before draining into Big Rideau Lake approximately 200 m north of the Project site. The watercourse runs through the Project site for approximately 400 m.

There is a small, on-line, open water, low lying pond surrounded by an open meadow adjacent to the Project site boundary. The pond is approximately 50 m long and 20 m wide and consists of relatively stagnant water with abundant algae. A photograph of the pond is provided in Figure 4.5.



Figure 4.5 On-line Pond on Watercourse B Immediately Adjacent to the Project Boundary

Outflow from the pond enters the Project site in a poorly defined channel that flows through a low lying meadow area. There was some standing water in and around the sedges and grasses that make up the meadow. A photograph of this area is provided in Figure 4.6.



Figure 4.6 Photograph of Poorly Defined Watercourse B Channel on Western End of Project Site

Approximately 150 m upstream from the Project boundary, the watercourse channel becomes well defined, consisting of an approximately 1-m wide channel with a mix of mineral soil, gravel and small cobbles on the channel bed. Water was flowing in this area during the site investigation and flow velocity was evident, indicating an increase in gradient in this lower reach of the channel. Riparian areas are dominated by grass and sedge meadows with some shrubs. A photograph of the watercourse in this area is provided in Figure 4.7.



Figure 4.7 Photograph of Watercourse B at Downstream End Near Project Boundary

After leaving the Project site, the watercourse enters the adjacent woodlot and flows for approximately 200 m through the wooded area before draining into Big Rideau Lake.

Therefore, the site investigation has confirmed that Watercourse B appears to be an intermittent watercourse. It is relatively small and shallow and does not appear capable of providing any direct habitat for fish, although it may provide habitat for tolerant invertebrate species. It would also assist in regulating hydrology and surface water quality in Big Rideau Lake in the discharge zone.

The average annual high watermark of Watercourse B was primarily assessed as being the border of inundation tolerant and non-tolerant vegetation species, since the channel is poorly defined along much of its length and appears to inundate a lower lying area. The average annual high water mark, 30-m setback line and proposed development footprint are shown in Figure 4.1. The proposed development will occur between 30 and 120 m away from the average annual high water mark. Therefore, an EIS will be required for this water body.

5. Conclusions

Based on the results of the site investigation discussed above, the Water Body Records Review would be changed to indicate that the presence of two additional watercourses on the Project site (Watercourses A and B) were not identified during the Water Body Records Review (Hatch Ltd., 2010). The project footprint has also been refined in this Water Body Site Investigation Report.

Based on the results of the site investigation and the proposed Project components and boundaries shown in Figure 4.1, an EIS will be required.

6. References

Hatch Ltd. 2010. McCann Solar Project – Water Body Records Review Report. Prepared for Northland Power Inc. August 2010.

Appendix A
Site Investigation
Field Notes

No Northland McCann

Date May 11, 10

Page ①

Time 8:35 - 12:07

Temp - 14°

B1

CC - 0

Birds

WTK	RVL	NOB	AMGO	WTSP
	COYE	NOBO	RCCH	MAKO
	CHSP	YELA	ROWA	PLSP
	COGB	CAGO	SAAC	BLAK
	AMCK	SOSP	BLWA	UNHE
	PLJA	GRCA	GCPL	

Notes:

→ Gulls all on pasture

→ wooded area SE

Red line → very green

→ mixed sp.

→ in wood

→ Trampling Aspen

→ Sugar Maple

No Northland McCann

Date May 12, 10

Page ②

Hydrolysis: → substrate demand

→ substrate common

→ wash etc.

→ picky at entering but

he ^{is} ~~is~~ ^{is} ~~is~~

→ ~~is~~ ^{is} ~~is~~ ^{is}

→ ~~is~~ ^{is} ~~is~~ ^{is}

→ ~~is~~ ^{is} ~~is~~ ^{is}

Hydrolysis

→ broke bottom

→ lots of algae growth

→ 1.5 m wide → inside edge of

→ the rest of the cut bank (mainly

→ ~~is~~ ^{is} ~~is~~ ^{is}

→ restricted to hydrolysis, low

→ ~~is~~ ^{is} ~~is~~ ^{is}

→ this clay near edge + higher

Shallowly

→ shallow in water → edge of part

→ lake / flow

→ ~~is~~ ^{is} ~~is~~ ^{is}

→ ~~is~~ ^{is} ~~is~~ ^{is}

→ Trampling Aspen @ long edge of pond

→ ~~is~~ ^{is} ~~is~~ ^{is}

Open Pond →
 Rich / Poor soil / dry / rocky
 P.O. → 100%
 → steep banks → restricted to 100%
 rain or night.

Woodland a base
 → simple / complex
 → simple / complex

(W1) selected bank
 → rocky
 → open / habitat
 → grass / paper
 → with about 100 grass (in.)

(W2) Open area
 → simple / complex
 → simple / complex

W1
 → 100%
 → 100%
 → 100%

W2
 → 100%
 → 100%

W3
 → 100%
 → 100%

(W4) 100%
 → 100%
 → 100%

W5
 → 100%
 → 100%

