

Natural Heritage Assessment

Site Investigation Report

Napanee TS Taylor-Kidd

Solar Energy Project

prepared for

Axio Power Canada Inc.

DRAFT



ECOLOGICAL SERVICES

Report Author Signature

Dale Krute

Date

~~September 10th, 2010 (1st Draft)~~

May 18th, 2011 (2nd Draft)

June 24, 2011 (3rd Draft)

Table of Contents

1.0 INTRODUCTION..... 1

1.1 Renewable Energy Approval Legislative Requirements..... 1

2.0 REPORT PREPARATION AND QUALIFICATIONS..... 4

3.0 STUDY APPROACH..... 7

3.1 Summary of Natural Features from the Natural Heritage Assessment Records Review Report..... 7

3.2 Site Investigation Details and Methodology..... 9

3.2.1 *Site Investigation Detail*..... 9

3.2.2 *Site Investigation Methodology*..... 10

4.0 CONFIRMATION AND ASSESSMENT OF NATURAL FEATURES..... 12

4.1 Area of Natural and Scientific Interest..... 14

4.2 Valleylands..... 14

4.3 Woodlands..... 15

4.3.1 *Woodlands on and within 120 m of the Project Location*..... 16

4.3.1.1 *ELC Forest Stand Type found on and within 120 m of the Project Location*..... 19

4.4 Wildlife Habitat..... 21

4.4.1 *Habitats of Seasonal Concentration Areas*..... 22

4.4.1.1 *Summary of Candidate Significant Habitats of Seasonal Concentration Area*..... 28

4.4.2 *Rare Vegetation Communities*..... 28

4.4.2.1 *Summary of Candidate Significant Rare Vegetation Community Habitat*..... 29

4.4.3 *Specialized Habitats for Wildlife*..... 29

4.4.3.1 *Summary of Candidate Specialized Habitats for Wildlife*..... 31

4.4.4 *Habitat for Species of Conservation Concern*..... 34

4.4.4.1 *Summary of Habitats for Species of Conservation Concern*..... 35

4.4.5 *Animal Movement Corridors*..... 35

4.4.5.1 *Summary of Animal Movement Corridor*..... 36

5.0 SUMMARY OF SITE INVESTIGATION RESULTS..... 37

5.1 Corrections Required in the Natural Heritage Assessment Records Review Report..... 37

5.2 Candidate Significant Natural Features..... 37

6.0 NEXT STEPS..... 40

7.0 LIST OF REFERENCES..... 41

LIST OF TABLES

Table 3.1. Summary of Records Review Determinations for Napanee TS Taylor Kidd Solar Energy Project.....	7
Table 3.2 Species of Conservation Concern (S1-S3-rank) Identified in the <i>NHARR</i> and Their Preferred Habitat Type.....	8
Table 3.3. Site visit summary for the Taylor-Kidd Project Location.....	10
Table 4.1 Summary of ecological characteristics for woodlands found on and within 120 m of the Project Location.....	20
Table 4.2. Wildlife habitat assessment criteria from the Ecoregion Criteria Schedules (OMNR 2009c) for Site Region 6E.....	22
Table 4.3. Habitat requirements and occurrence for remaining species of conservation concern identified in the <i>NHARR</i> (Hatch Ltd., 2011).....	34
Table 5.1. Summary of corrections required to natural features identified in the records review..	38

LIST OF FIGURES

Figure 4.2. Pine plantation and thicket growth within central portions of Project Location	14
Figure 4.3. Open red cedar forest and thicket community.....	15
Figure 4.4. Open patch of shrub thicket within red cedar forest.....	17
Figure 4.5. Mature mixed forest associated with Cooke’s Creek riparian zone.....	18
Figure 4.6. Border of conifer plantation (access lane in foreground).....	19
Figure 4.7. Limestone ridge and boulder rubble at edge of conifer plantation – candidate snake hibernaculum.....	27

LIST OF APPENDICES

Appendix 1. Local woodland cover in association with Project Location.....	43
Appendix 2. ELC vegetation communities in relation to Project Location.....	45
Appendix 3. Field notes from site investigations.....	47
Appendix 4. Breeding bird survey results for June 21, 2010	52
Appendix 5. Map of breeding bird point count plots.....	54
Appendix 6. Checklist of wildlife species observed at the Project Location	56
Appendix 7. Checklist of vascular plant species observed within 120 m of Project Location.....	58
Appendix 8. Tree inventory of the Taylor Kidd Project Location.....	61

1.0 INTRODUCTION

Axio Power Canada Inc. (Axio Power) is proposing to develop a 10 megawatt (MW) solar photovoltaic project titled Napanee TS Taylor-Kidd Solar Energy Project. The Project Location¹ is a 36 hectare parcel situated on Part of Lots 27 and 28, Concession 1, Township of Loyalist (lower tier municipality) within the County of Lennox and Addington (upper tier municipality and within Picton Site Region 6E-15 (Figure 1.1). The longitude and latitude are 44° 13' 23.35" and 76° 42' 40.52". The property in which the Project Location is situated has been zoned Industrial by Loyalist Township.

1.1 Renewable Energy Approval 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) identifies the Renewable Energy Approval (REA) requirements for renewable energy projects in Ontario. As per the REA Regulation (Part II, Section 4), ground mounted solar facilities with a name plate capacity greater than (>) 10 kilowatts (kW) are classified as Class 3 solar facilities and require an REA.

Part IV, subsection 26 (1) of the REA Regulation requires proponents of Class 3 solar projects to conduct a site investigation (*SI*) of the air, land and water within 120 meters (m) of the Project Location for the purpose of determining:

- a) whether the results of the analysis summarized in the *Natural Heritage Assessment Records Review Report (NHARR - Hatch Ltd., 2011)* are correct and identifying any required corrections;
- b) whether any additional natural features exist, other than those that were identified in the *NHARR* (Hatch Ltd., 2011);
- c) the boundaries, located within 120 m of the Project Location, of any natural feature that was identified in the *NHARR* (Hatch Ltd., 2011) or the site investigation; and
- d) the distance from the Project Location to the boundaries determined under clause (c).

Part IV, subsection 26 (3) of the REA Regulation requires the proponent to prepare a report setting out the following:

1. A summary of any corrections to the *NHARR* (Hatch Ltd., 2011) and the determinations made as a result of conducting the site investigation under subsection 26 (1).
2. Information relating to each natural feature identified in the *NHARR* (Hatch Ltd., 2011) and in the site investigation, including the type, attributes, composition and function of the feature.

¹ "Project Location means, when used in relation to a renewable energy project, a part of land and all or part of any building or structure in, on or over which a person is engaging in or proposes to engage in the project and any air space in which a person is engaging in or proposed to engage in the project" (O. Reg. 359/09, s. 1 (1)).

3. A map showing, the boundaries of any natural feature that was identified in the *NHARR* (Hatch Ltd., 2011) and site investigation that is located within 120 m of the Project Location; the location and type of each natural feature identified in relation to the Project Location; the distance from the Project Location to the boundaries of any natural feature identified within 120 m of the Project Location.
4. The dates and times of the beginning and completion of the site investigations.
5. The duration of the site investigations.
6. The weather conditions during the site investigations.
7. A summary of methods used to make observations for the purposes of the site investigations.
8. The name and qualifications of any person conducting the site investigations.
9. Field notes kept by the person conducting the site investigations.

This *SI* report has been prepared to meet these requirements.

Natural features are defined in Part I, subsection 1 (1) of the REA Regulation to be all or part of the following:

- **Area of natural and scientific interest (ANSI) (earth science)** – An area that has earth science values related to protection, scientific study or education.
- **ANSI (life science)** – An area that has life science values related to protection, scientific study or education.
- **Coastal wetland** – A wetland that is located on Lake Ontario, Lake Erie, Lake Huron, Lake Superior, Lake St. Clair, St. Mary's River, St. Clair River, Detroit River, Niagara River or St. Lawrence River; or on a tributary to any of these waterbodies and, wither in whole or in part, downstream of a line located 2 km upstream of the 1:100 year floodline (includes wave run-up) of the water body.
- **Northern wetland** – A wetland located north of the northern limit of Ecoregions 5E, 6E and 7E as shown in Figure 1 in the Provincial Policy Statement issued under section 3 of the *Planning Act* and approved by the Lieutenant Governor in Council by Order in Council No. 140/2005.
- **Southern wetland** – A wetland located south of the northern limit of Ecoregions 5E, 6E and 7E as shown in Figure 1 in the Provincial Policy Statement issued under section 3 of the *Planning Act* and approved by the Lieutenant Governor in Council by Order in Council No. 140/2005.
- **Valleyland** – A natural area that is south and east of the Canadian Shield as shown in Figure 1 in the Provincial Policy Statement issued under section 3 of the *Planning Act* and approved by the Lieutenant Governor in Council by Order in Council No. 140/2005; and that occurs in a valley or other landform depression that has water flowing through or standing for some period of the year.
- **Wildlife habitat** – An area where plants, animals and other organisms live or have the potential to live and find adequate amounts of food, water, shelter and space to sustain their population,

including an area where a species concentrates at a vulnerable point in its annual or life cycle and an area that is important to a migratory or non-migratory species.

- **Woodland** – Land that is south and east of the Canadian Shield as shown in Figure 1 in the Provincial Policy Statement issued under section 3 of the *Planning Act* and approved by the Lieutenant Governor in Council by Order in Council No. 140/2005; and that has per hectare (ha) at least 1, 000 trees of any size or 750 trees that are > 5 centimetres (cm) in diameter, 500 trees that are > 12 cm in diameter, 250 trees that are > 20 cm in diameter that have been measured from 1.37 m from the ground.

Part I, subsection 1 (1) of the REA Regulation also provides a general definition for wetland which includes land: such as swamp, marsh, bog or fen, other than land that is being used for agricultural purposes and no longer exhibits wetland characteristics; that is seasonally or permanently covered by shallow water or has the water table close to or at the surface; and that has hydric soils and vegetation dominated by hydrophytic or water-tolerant plants.

2.0 REPORT PREPARATION AND QUALIFICATIONS

Axio Power has retained Ecological Services to assist in meeting the REA requirements by conducting the investigations in support of the preparation of the Natural Heritage Site Investigation Report as identified under O.Reg. 359/09. Contact information for this report is as follows:

Dale Kristensen: Consultant, Ecological Services

3803 Sydenham Rd. Elginburg, Ontario K0H 1M0

Tel: (613) 376-6916; Fax: (613) 544-0072 E-mail: ecoserv@kos.net

Web Site: <http://ecologicalservices.webs.com/>

Ecological Services is a locally owned firm, specializing in the provision of services relating to ecological management and research. We have been in operation in eastern Ontario since 1985. Our core personnel combine education and experience to give us a strong focus on land use planning and management as they relate to natural resources. Our experience includes environmental impact assessments, management plans, wetland evaluations, and municipal land use planning. We have research experience in aquatic ecology and chemistry, forest fragmentation, avian ecology, and fisheries ecology.

We have worked with government at the federal, provincial, local and international levels. Other clients have included Crown corporations, planning and engineering firms, developers, and local groups. Our association with Queen's University provides us immediate access to current and broad-based research, and also provides us with a pool of expert associates. A work prospectus is available at our website at <http://ecologicalservices.webs.com>.

Natural feature surveys of lands within 120 m of the Project location, and the subsequent preparation of the **SI** was done by Dale Kristensen, while Chris Grooms conducted the breeding bird surveys. CV information for each is provided below:

CURRICULUM VITAE OF DALE KRISTENSEN

Environmental Consultant
Bedford Rd.

Sydenham, Ontario
KOH 2T0

(613) 376-6561 (613) 533-6151

Phytotron Manager/Adjunct Academic 5607
Department of Biology

Queen's University

Kingston, Ontario K7L 3N6

drk1@queensu.ca

Employment

1988 - present: Environmental Consultant with Ecological Services

- Specializing in floral and faunal resource inventories, wetland evaluations, environmental impact assessments, habitat analyses, and habitat restoration.

1996 - present. Phytotron Manager (Plant Research Facility). Dept. of Biology, Queen's University.

- Manager of a controlled environment facility for plant and other research

2008 – present: Curator Queen's University Fowler Herbarium

1987- 2009: Adjunct Academic. Department of Biology at Queen's University.

Development and instruction of various courses at Queen's University, including:

- | | |
|--|---|
| - Wildlife Issues in a Changing World (ENSC 320) | - Restoration Ecology (BIOL 522) |
| - Biology of Sex (BIOL 210) | - Field Botany (BIOL 320) |
| - Field ecology module at Lake Opinicon (BIOL 344) | - International graduate-level course on biodiversity |

Education

M.Sc., 1996 (Ecology) Queen's University. Kingston, Ontario.

B.Sc., 1981 (Wildlife Biology), University of Guelph. Guelph, Ontario.

Affiliations

Ecological Restoration Society, North American Wildflower Society, Land Conservancy for Kingston, Frontenac, Lennox & Addington, Kingston Field Naturalists, COSEWIC Species Recovery Team – Deerberry (*Vaccinium stamineum*) and Cerulean Warbler (*Dendroica caerulea*) habitat modelling.
Certified Butternut Health Assessor

CURRICULUM VITAE OF CHRIS GROOMS

Environmental Consultant
4388 Florida Rd.
Harrowsmith, Ontario K0H 1V0
(613) 386-7969
cgrooms@kingston.net

Department of Biology
Queen's University
Kingston, Ontario K7L 3N6
(613) 533-6151
groomsc@queensu.ca

Employment

2006 - present: Research Assistant. Paleocological Environmental Assessment and Research Laboratory, Queen's University.

- high arctic fieldwork, maintenance and supply, data management, figure design for publication, website design, computer and analytical machine operation and maintenance.

2003- 2005: Coordinator, Eastern Region. Ontario Nature – Federation of Ontario Naturalists.

- liaison with member groups and other conservation organizations to promote conservation, land stewardship and nature education

1992- 2003. Habitat Stewardship and Ornithological Experience. Contracts with the Canadian Wildlife Service, Ontario Ministry of Natural Resources (MNR), Wildlife Preservation Trust Canada, and Bird Studies Canada.

- endangered loggerhead shrike recovery - population surveys, landowner contact; monitored nests, oversaw colour banding, mapped habitat, selected future reintroduction sites; supervised first experimental reintroduction of captive-bred shrikes to the wild.

Ontario Power Generation: inventory of the fauna of the Lennox Generation Station property.

Nature Conservancy Canada: inventory of breeding birds and amphibians at Burnley Carmel Nature Reserve near Rice Lake, Ontario.

Acres & Associated Environmental Limited: bird usage inventory of proposed wind farm sites on Wolfe Island, Ontario, and a bird inventory for a proposed wind site on Amherst Island, Ontario.

Lower Trent Region Conservation Authority: documented nesting sites of Red-Shouldered Hawks in five townships in eastern Ontario for the MNR over three years.

Education

B.Sc., 1998 (Biology), Queen's University. Kingston, Ontario.

Affiliations

Former President, Kingston Field Naturalists

3.0 STUDY APPROACH

3.1 Summary of Natural Features from the *NHARR*

Natural features were identified following the definitions provided in subsection 1 (1) of the REA Regulation and described in Section 1.2 of this report. The Ontario Ministry of Natural Resources (MNR) Ontario Base Maps and Land Information Ontario (LIO) mapping (MNR, 2010a) were used to locate natural features and other features on and within 120 m of the Project Location. A desktop exercise using satellite imagery to delineate habitat polygons was completed and ground-truthed during the *SI*.

The presence and/or absence of natural features on and within 120 m of the Project Location that were identified in the *NHARR* (Hatch Ltd., 2011) is provided in Table 3.1.

Table 3.1. Summary of Records Review Determinations for Napanee TS Taylor Kidd Solar Energy Project (Hatch Ltd., 2011a).

Determination to be Made	Yes/No	Description
Is the Project Location in or within 120 m of a provincial park or conservation reserve?	No	<ul style="list-style-type: none"> The Project Location is not in or within 120 m of a provincial park or conservation reserve.
Is the Project Location in a natural feature?	Yes	<ul style="list-style-type: none"> There are candidate significant woodlands on the Project Location. There is potential candidate significant wildlife habitat on the Project Location.
Is the Project Location within 50 m of an ANSI (earth science)?	No	<ul style="list-style-type: none"> The nearest earth science ANSI is located several kilometres from the Project Location
Is the Project Location within 120 m of a natural feature that is not an ANSI (earth science)?	Yes	<ul style="list-style-type: none"> There are candidate significant woodlands within 120 m of the Project Location. There is potential candidate significant wildlife habitat within 120 m of the Project Location.

The *NHARR* (Hatch Ltd., 2011) identified 15 S1-S3-ranked species of conservation concern (excluding species that are designated as Endangered or Threatened on the SARO list) that based on their habitat preferences have the potential to occur on and/or within 120 m of the Project Location (Table 3.2).

Species of conservation concern include:

- globally rare species** – These species are assessed by NatureServe and assigned a global conservation status rank (G-rank) of G1 to G3.
- nationally rare species** – These species are designated by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as Endangered or Threatened and not protected in regulation under the *Ontario Endangered Species at Risk Act* (ESA).
- provincially rare species** – These species are designated by the MNR and assessed under two categories: species listed as Special Concern on the Species at Risk in Ontario (SARO) list; and species that are assigned a provincial (i.e. sub-national) conservation status rank of S1 to S3 and are not on the SARO list. There are species that can be found in both categories.
- regionally rare species** – These species are not assigned a formal designation, however, have been recognized as declining within a planning jurisdiction by government and/or nongovernment authorities.

- **conservation priority species** – These include priority species that are recognized in government and/or non-government conservation plans and assigned a conservation objective.

As discussed in the *NHARR* (Hatch Ltd., 2011), species that are designated as Endangered and Threatened under the ESA on the SARO list will be discussed in further detail in the *Approval and Permitting Requirements Document for Renewable Energy Projects* and will not be discussed herein.

It is noted that the Project Location is within the Napanee Limestone Plain Important Bird Area (Bird Studies Canada, 2010).

Table 3.2 Species of Conservation Concern (S1-S3-rank) Identified in the *NHARR* and Their Preferred Habitat Type.

<i>Species Of Conservation Concern</i>	<i>Habitat Guild</i>				
	<i>Woodland</i>	<i>Grassland</i>	<i>Shrub-early succession</i>	<i>Wetland</i>	<i>Other</i>
<i>Amphibians</i>					
Western chorus frog (<i>Pseudacris triseriata</i>) – Great Lakes / St. Lawrence Canadian Shield Population				✓	
Jefferson x blue-spotted salamander (<i>Ambystoma jeffersonianum x laterale</i> "complex")	✓			✓	
<i>Reptiles</i>					
Five-lined skink (<i>Plestiodon fasciatus</i>) – Great Lakes Population	✓				
Map turtle (<i>Graptemys geographica</i>)				✓	
Snapping turtle (<i>Chelydra serpentina</i>)				✓	
Milksnake (<i>Lampropeltis triangulum</i>)	✓	✓	✓		
Eastern ribbonsnake (<i>Thamnophis sauritus</i>) Great Lakes Population			✓	✓	
<i>Birds</i>					
Black Tern (<i>Chilidonias niger</i>)				✓	
Short-eared Owl (<i>Asio flammeus</i>)	✓		✓		
Red-headed Woodpecker (<i>Melanerpes erythrocephalus</i>)					
Common Nighthawk (<i>Chordeiles minor</i>)	✓				
Yellow-breasted Chat (<i>Icteria virens</i>)			✓		
Canada Warbler (<i>Wilsonia canadensis</i>)	✓				
Golden-winged Warbler (<i>Vermivora chrysoptera</i>)			✓		
<i>Mammals</i>					
Northern Long-eared Bat (<i>Myotis septentrionalis</i>)	✓				

3.2 Site Investigation Details and Methodology

The natural features and species of conservation concern identified in Table 3.1 and Table 3.2 respectively were considered during the site investigation as well as all other plant and wildlife species encountered. A complete list of plant and wildlife species (Ecological Services, 2011) that were observed during the *SI* is provided in Appendices 5 and 6.

The wildlife and plant species discussed in the following sections are identified by common name only. The common names of species are written according to the standard rule of lower-case letters for all species excluding birds and proper nouns, in which case it is capitalized (e.g. woodland vole, Blanding's turtle, Black Tern and Red-headed Woodpecker). The binomial nomenclature system is a standard method used to formulate the scientific name of an organism (e.g. *genus* name + *species* name). The scientific and common names used in this report follow those used by the MNR.

As per subsection 26 (1) of the REA Regulation, the report must include: dates, times (beginning and completion of the site inventory), duration and weather conditions; qualifications, name and field notes kept by the person conducting the site investigation; and methodology used to make observations during the site investigation. The following information is intended to meet these requirements.

3.2.1 Site Investigation Details (Table 3.3)

- i. Location, potential environmental constraints and identified natural features relevant to the field survey were obtained from the Project Description Report (Hatch Ltd. 2010b) and a working copy of the *NHARR* in early June 2010.
- ii. A physical survey of areas within 120 m of the Project Location was completed by Ecological Services staff on June 17, 2010 during which time vegetation and habitat surveys were conducted (Table 2). The site was resurveyed on June 18, 2010 to further assess conditions associated with the Cooke's Creek watercourse.
- iii. A breeding bird survey of the Project Location was conducted by Ecological Services staff on **June 21, 2010**.
- iv. A draft *SI* report was developed from the vegetation community maps and wildlife habitat features derived from the field surveys and satellite imagery. Information pertinent to revisions of the PDR was submitted to Hatch Ltd. in June 2010.
- v. The Project Location was visited by Ecological Services staff on March 4, 2011 to assess potential winter raptor habitat.
- vi. A physical survey of areas within 120 m of the Project Location was conducted on April 3, 2011 to determine if winter raptor habitat was present.
- vii. A physical survey of the Project Location was undertaken on April 12, 2011 to evaluate candidate wildlife habitat features (snake hibernaculum, amphibian habitat).
- viii. A tree inventory of the Project Location was prepared by a registered forester on May 12, 2011 to address requirements under Loyalist Township's tree bylaw (Appendix 8).

Table 3.3. Site visit summary for the Taylor-Kidd Project location.

Date of Survey	Time	Weather Conditions	Surveyor	Purpose of Visit
June 17, 2010	13:30 - 16:30	Sun, 26°C	Dale Kristensen	Vegetation and habitat surveys
June 21, 2010	05:45-07:20	Sunny, light wind, 17°C	Chris Grooms	Breeding bird point count assessment
March 4, 2011	09:45-10:40	Sunny, light wind, 5°C	Dale Kristensen	Winter raptor survey
April 3, 2011	06:30-7:30	Clear, -1.0°C	Dale Kristensen	Winter raptor habitat survey
April 12, 2011	11:45-12:45	Partly cloudy, 12°C	Dale Kristensen	Snake hibernaculum and amphibian habitat survey

3.2.2 Site Investigation Methodology

The *SI* was completed in part to: verify the presence and/or absence of natural features and species of conservation concern identified in Table 3.1 and Table 3.2, respectively; identify any corrections required in the *NHARR* (Hatch Ltd., 2011) and determinations made as a result of conducting the site investigation; and document existing conditions including information on the type, attributes, composition and function for each natural feature identified on and within 120 m of the Project Location.

The methodology used during the *SI* involved walking the entire site by foot and documenting the natural features (including wildlife habitat), plant and wildlife species. A search for species of conservation concern that were identified in the *NHARR* (Hatch Ltd., 2011) was also completed. Habitat communities are generally described following the methodology outlined in the ELC for Southern Ontario (Lee *et al.*, 1998) and if applicable, the *Ontario Wetland Evaluation System Southern Manual* (MNR, 2002). Photographs of the site were also taken to document the existing environment and natural features observed during the site investigation. A copy of the field notes kept by the observer is provided in Appendix 3.

Candidate significant natural features were identified following the criteria outlined in the *Natural Heritage Reference Manual (NHRM)* - MNR, 2010b), *Draft Significant Wildlife Habitat Ecoregion Criteria Schedules* (MNR, 2009b) and *Significant Wildlife Habitat Technical Guide (SWHTG)* - MNR, 2000) and are discussed further in Section 4.

A breeding bird point count survey of the Project Location was conducted using standardized survey methods as described in the Ontario Breeding Bird Atlas Guide for Participants (Cadman and Kopysh, 2001) for field and open land habitats and the Canadian Wildlife Service Forest Bird Monitoring Program for woodlands. Survey details on timing and conditions are given in Table 3.3. Surveying began after dawn under appropriate weather conditions and stations were established across the Project Location (Appendix 4) in accordance with minimum spacing requirements to reduce incidences of observational overlap. Surveys were conducted within the peak breeding season for most bird species (May-June) expected to be using the habitats found within 120 m of the Project location.

The presence of herpetofauna (reptiles and amphibians) was assessed at the Project Location by examining areas of appropriate habitat (if present) as indicated in the *SWHTG* (MNR, 2000). For reptiles, these include such features as rock piles and exposed limestone escarpment (potential hibernacula), creek basins and riparian edges, and potential basking sites (logs, exposed bedrock). For amphibians, supportive habitat includes water bodies, riparian areas, wetlands and vernal pools as well as beneath

fallen logs and other woody debris. Incidental signs of herpetofauna were also recorded and GPS referenced as encountered during vegetation community mapping and breeding bird surveys. Incidental signs included shed skins, depredated nests and eggshells. Amphibian breeding calls were recorded if heard at any time during the various survey periods.

Other wildlife species of interest (e.g., butterflies, mammals) were recorded as encountered from direct observation, or from other signs of their presence (tracks, scat, den sites, etc.).

All vascular plant species encountered were recorded and used to characterize ELC community types. A plant checklist is provided in Appendix 7 of this report. Species of conservation concern were GPS referenced and the habitat was surveyed in order to determine the extent of the population. Specimens that could not be readily identified in the field were collected and assessed later using appropriate references (e.g., Gleason and Cronquist 1991; Queen's University Fowler Herbarium records).

4.0 CONFIRMATION AND ASSESSMENT OF NATURAL FEATURES

The presence / absence of natural features identified in the *NHARR* (Hatch Ltd., 2011) were verified during the site investigation and are discussed in the following sections. The natural features identified on and within 120 m of the Project Location are shown on Figure 4.1.

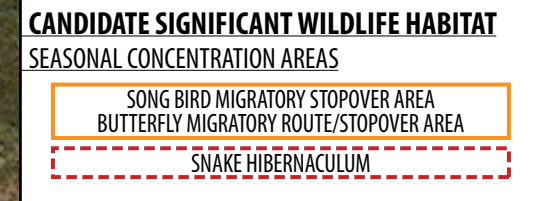
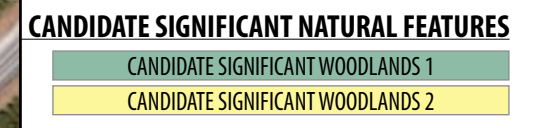
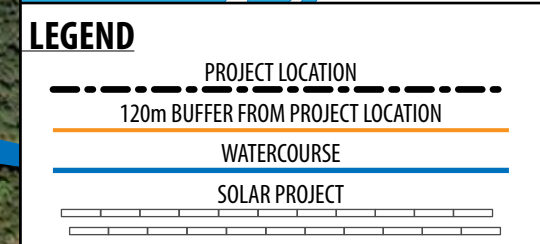
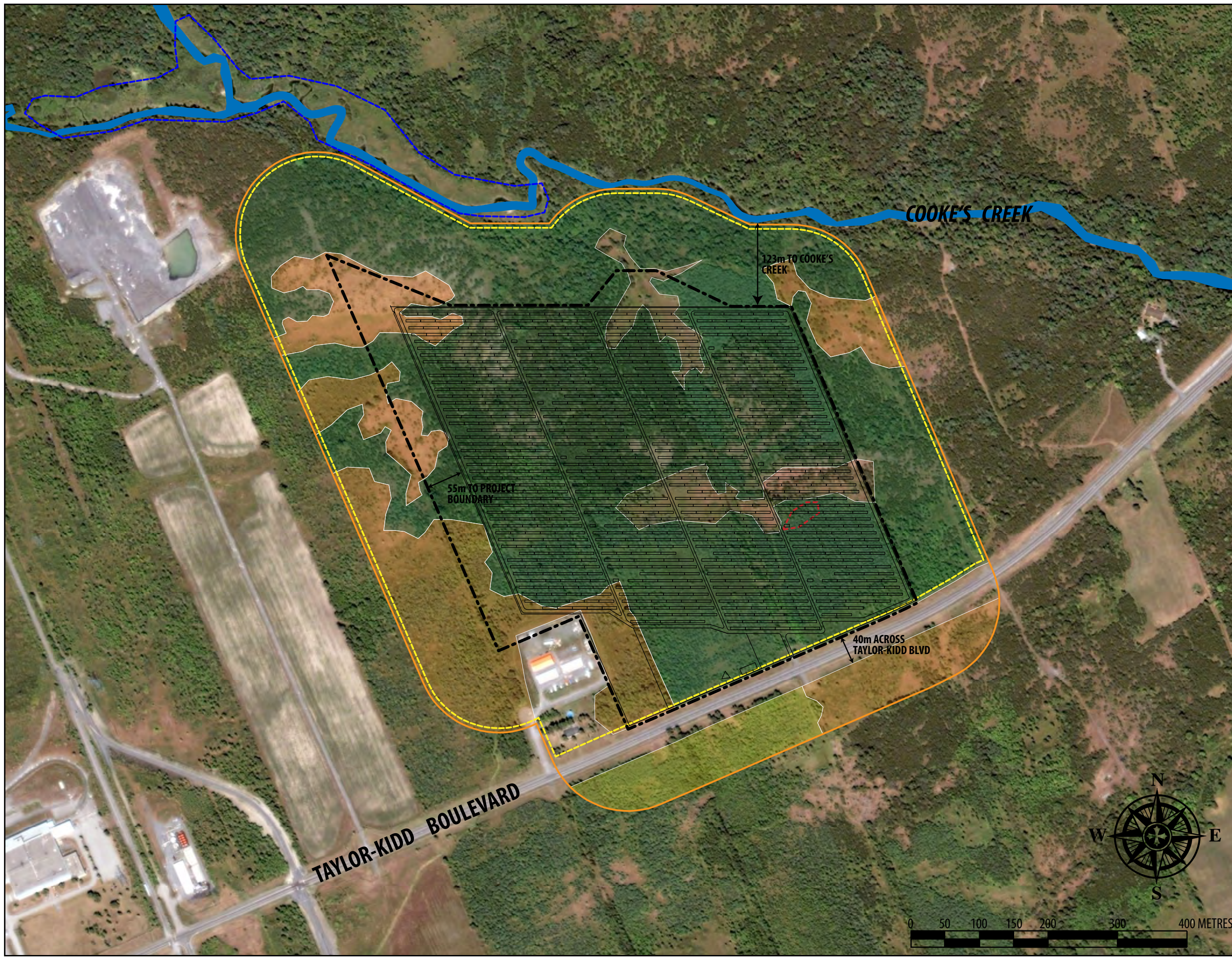


FIGURE 4.1



TITLE	NAPANEE TS TAYLOR-KIDD CANDIDATE NATURAL HERITAGE FEATURES	
DATE	JUNE 28, 2011	PROJECT No. KP-11-626
FIGURE		

4.1 Area of Natural and Scientific Interest

The information sources reviewed in the *NHARR* (Hatch Ltd., 2011) did not identify any provincially or regionally significant earth science or life science Areas of Natural and Scientific Interest (ANSI) on or within 120 m of the Project Location.

According to the *Natural Heritage Assessment Guide for Renewable Energy Projects* (MNR, 2010c), identifying additional ANSIs is not required during the site investigation.

Conclusion: There are no provincially significant earth science or life science ANSIs on or within 120 m of the Project Location and therefore they will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

4.2 Valleylands

The information sources reviewed in the *NHARR* (Hatch Ltd., 2011) did not identify significant valleylands on or within 120 m of the Project Location. The Project Location and surrounding lands are mainly natural areas that include open meadows, shrublands, woodlands and conifer plantations on abandoned agricultural lands. A construction yard and gravel quarry occurs west of the Project Location. Local topography is flat with a slight decrease in elevation to the south (95-90 metres above sea level (msl)). A photograph showing the Project Location is provided in Figures 4.2 and 4.3.



Figure 4.2. Pine plantation and thicket growth within central portions of Project Location.



Figure 4.3. Open red cedar forest and thicket community.

Conclusion: The site investigation determined that there are no valleylands on or within 120 m of the Project Location and this natural feature will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

4.3 Woodlands

The presence of woodlands on and within 120 m of the Project Location was confirmed using the definition in the ELC system for Southern Ontario (Lee *et al.*, 1998) and the REA Regulation. The ELC system describes woodlands as forested areas with greater than or equal to (\geq) 35 % tree cover. The REA Regulation defines “woodland” as land that is south and east of the Canadian Shield and has per hectare at least:

- 1000 trees of any size; or
- 750 trees measuring over 5 cm in diameter; or
- 500 trees measuring over 12 cm in diameter; or
- 250 trees measuring over 20 cm in diameter.

A cultivated fruit or nut orchard or a plantation established for the purpose of producing Christmas trees is not considered woodland according to the REA Regulation.

Woodlands were confirmed as occurring on and within 120 m of the Project Location from information obtained during the site investigation based on considerations of stocking density and canopy cover as per REA requirements. A description of the form and function of this woodland is provided in the following sections.

4.3.1 Woodlands on and within 120 m of the Project Location.

The ***NHARR*** (Hatch Ltd., 2011) provided the following information with respect to woodlands on and within 120 m of the Project Location:

- The MNR Land Information Ontario (LIO) wooded area layer shows woodlands on and within 120 m of the Project Location.
- Schedule B of the Loyalist Township Official Plan (2006) identified significant woodlands within 120 m of the Project Location bordering Cooke's Creek. The areas identified as significant woodlands are not consistent with woodlands shown on the LIO mapping.
- The Cataraqui Region Conservation Authority (CRCA) prepared a natural heritage assessment of the local region (CRCA 2006) that identifies significant woodlands across the upper half of the Project Location and extending for several hundred ha across the local region. This designation includes area and interior habitat criteria, water protection and "corridor/linkage" function.

The mapped boundaries of woodland indicated by these sources do not include the conifer plantations shown on recent satellite imagery (Google Earth, NAVTEQ, 2010). For the ***SI***, woodland boundaries including plantations were verified from satellite imagery and from observations made during the ***SI*** (Figure 4.1). As per subsection 26 (3) of the REA Regulation, any corrections made to the woodland information from observations made during the ***SI*** are summarized in Table 5.1, Section 5.1 - Corrections Required in the *Natural Heritage Assessment Records Review Report*.

During the ***SI***, it was determined that 2 woodlands totalling 48 ha occur on and within 120 m of the Project Location (Figure 4.1). *Woodland 1* (46 ha) occurs north of Taylor-Kidd Blvd and is contiguous with a 218 ha woodland extending west and northeast (as determined by ArcGIS 9.3 analysis of Google Earth images and LIO mapping of contiguous woodland cover) (Appendix 1). ELC evaluations determined that *Woodland 1* is comprised of 3 stand types, including *Dry-Fresh Red Cedar Coniferous Forest* (FOC2-1), *Fresh-Moist White Cedar-Hardwood Mixed Forest* (FOM7) and *White Pine-White Spruce Conifer Plantation* (CUP3) (Appendix 2). *Woodland 2* (2.5 ha) lies south of Taylor-Kidd Blvd within 120 m of the Project Location and consists of *White Pine-White Spruce Conifer Plantation* (CUP3) and *Dry-Fresh Red Cedar Coniferous Forest* (FOC2-1), both of which are part of a 136 ha woodland that extends south and east. Information on stand characteristics is presented below, while Table 4.1 provides a summary of attributes for the woodlands found on and within 120 m of the Project Location as they relate to the requirements of the REA regulations.

As described in the ***NHARR*** (Hatch Ltd., 2011a) Loyalist Township has identified woodland bordering Cooke's Creek as significant. *A tree inventory of the Project Location was conducted by a registered forester to address the requirements of Loyalist Township's tree by-law (Appendix 8).*

4.3.1.1 ELC Forest Stand Types Found on the Project Location

Woodland 1

- i. *Dry-Fresh Red Cedar Coniferous Forest (FOC2-1)*: Approximately half (23 ha) of the lands within 120 m of the Project Location are dominated by young red cedar interspersed with white pine, elm and green ash. Stand cover is variable and ranges from 35-80%. Dense areas of tree growth lack understory development while more open patches include gray dogwood, honeysuckle, raspberry, bluegrass, timothy, Canada goldenrod, and sedges (Figure 4.4). Stand age is estimated at 25 years. Soils are generally shallow and dry with no evidence of standing water. No rare or otherwise uncommon plant species were observed.



Figure 4.4. Open patch of shrub thicket within red cedar forest.

- ii. *Fresh-Moist White Cedar-Hardwood Mixed Forest (FOM7)*: There are 10 ha of mature conifer dominated mixed forest bordering the Cooke's Creek riparian corridor within the 120 m adjacent lands of the Project Location (Figure 4.5). The canopy mix is variable depending on slope and moisture characteristics, but the narrow portion forming the riparian edge of the creek basin include White Cedar, Hemlock, White Spruce, Balsam Fir, Green Ash and Elm interspersed with White Pine, Bur Oak and Red Maple. Understory species include young white cedar and Green Ash and a mix of forbs (e.g., Columbine, Heart-Leaved Aster, Barren Strawberry, Dwarf Raspberry) and ferns (Common Polypody, Bulblet Fern). Drier upslope areas include more White Oak, Basswood and

Black Cherry. The average age of this forest community is 50-75+ years, although there are several older remnant specimens along the creek approaching 100 years with a DBH of >60 cm. Soils are shallow along upslope areas and there is an exposed limestone escarpment forming the edge of the watercourse along portions of the watercourse. There are a few signs of recent disturbance along the riparian zone and relatively few non-native species.



Figure 4.5. Mature mixed forest associated with Cooke's Creek riparian zone (note: Cooke's Creek top of bank is >120 m from the Project location).

- iii. *Conifer Plantation* (CUP3). Approximately 15 ha of the Project Location and 120 m adjacent lands consist of 20-30 year old White Pine-White Spruce plantations (Figure 4.6). Where stands are well established, tree density is high and there is little understory development, whereas on patches of shallow soil where the plantation has failed, there are small open patches of meadow or shrub thicket. There is no recent evidence of managed stand thinning.



Figure 4.6. Border of conifer plantation (access lane in foreground).

4.3.1.2 ELC Forest Stand Types Found within 120 m of the Project Location

Woodland 2

- i. *Conifer Plantation (CUP3)*. A small portion of conifer plantation approx. 1 ha in size occurs south of Taylor Kidd Blvd within 120 m of the Project Location. This stand is similar in age and structure to that described for *Woodland 1* above. There is no recent evidence of managed stand thinning. This stand is contiguous with woodlands extending 136 ha south and east of the Project Location.
- ii. *Dry-Fresh Red Cedar Coniferous Forest (FOC2-1)*: A second stand of approx. 1 ha is also found south of Taylor Kidd Blvd within 120 m of the Project Location and as in *Woodland 1* is dominated by red cedar interspersed with white pine, elm and green ash. This stand is contiguous with conifer plantation and red cedar woodland extending for 136 ha to the south and east.

Table 4.1 Summary of ecological characteristics for woodlands found on and within 120 m of the Project Location.

Ecological Characteristic	Description
<i>Woodland 1</i>	
Type(s)	<i>Dry-Fresh Red Cedar Coniferous Forest (FOC2-1); Fresh-Moist White Cedar-Hardwood Mixed Forest (FOM7); Conifer Plantation (CUP3).</i>
Attributes	<p>Location: covers 70% of Project Location and 120 m adjacent lands interspersed by shrub thicket (15 ha) and meadow (3 ha).</p> <p>Size: total area 48 ha (26 ha within Project Location). <i>Woodland 1</i> is contiguous with local woodland of 218 ha and thus exceeds the <i>NHRM</i> minimum size criterion of 50 ha for this region (MNR, 2010c). Woodland cover bordering Cooke`s Creek within the 120 m zone to the north of the Project Location has been identified as significant on Schedule B of the Loyalist Township Official Plan (2008).</p> <p>Shape: irregular and with patches of meadow and shrub thicket interspersed within.</p> <p>Topography: very flat, few undulations, generally moderate to well drained</p> <p>Adjacent Land Use: mainly natural lands, gravel quarry operation to west of Project Location</p> <p>Soils: dry-fresh mesic clay-loams of variable depth, some exposed limestone</p>
Composition	See stand descriptions (Section 4.3.1.1)
Ecological Function (as per NHRM criteria)	<p>Woodland interior: approx. 2 ha within 120m m of Project Location, while the larger local woodland contains approx. 66 ha of woodland interior (determined as 100 m setback from defined forest edge).</p> <p>Proximity to other significant woodlands: woodlands on and within 120 m of the Project Location are contiguous with regional forest cover that has been identified as significant by CRCA.</p> <p>Linkages: woodlands on and within 120 m of the Project Location are contiguous with regional forest cover that has been identified as significant by CRCA. Woodland also encompasses candidate wildlife habitat.</p> <p>Water Protection: <i>Woodland 1</i> is within 50 m of a permanent watercourse with fish habitat (Cooke`s Creek).</p> <p>Woodland diversity representation: <i>Woodland 1</i> includes native forest stand types (FOM) identified in the NHRM as experiencing major reductions in their natural distribution and is therefore considered diverse.</p> <p>Uncommon characteristics: there are trees approaching 100 years of age within woodland bordering Cooke`s Creek within 120 m of the Project Location</p> <p>Provision of significant wildlife habitat: <i>Woodland 1</i> provides candidate significant wildlife habitat as identified in Section 4.4.</p>
<i>Woodland 2</i>	
Type(s)	<i>Dry-Fresh Red Cedar Coniferous Forest (FOC2-1); Conifer Plantation (CUP3)</i>
Attributes	<p>Location: south of Taylor-Kidd Blvd within 120m adjacent lands of Project Location</p> <p>Size: <i>Woodland 2</i> is 2.5 ha in size and is contiguous with conifer plantation and red cedar woodland extending 136 ha to the south and east. As part of this larger woodland, it exceeds the <i>NHRM</i> minimum size criterion of 50 ha for this region (MNR, 2010c).</p> <p>Shape: irregular</p>

	<p>Topography: very flat, few undulations, generally moderate to well drained</p> <p>Adjacent Land Use: mainly woodland and plantation</p> <p>Soils: dry-fresh mesic clay-loams of variable depth, some exposed limestone</p>
Composition	See stand descriptions (Section 4.3.1.1)
Ecological Function (as per NHRM criteria)	<p>Woodland interior: none within 120 m of Project Location. Larger woodland of which it is part of contains approx 47 ha of interior woodland</p> <p>Proximity to other significant woodlands: <i>Woodland 2</i> is contiguous with forest cover south and east of the Project Location that exceed the minimum size criterion of 50 ha</p> <p>Linkages: <i>Woodland 2</i> is contiguous with regional forest cover, some of which has been identified as significant by CRCA (Parrotts Bay). Woodland also encompasses candidate wildlife habitat.</p> <p>Water Protection: <i>Woodland 2</i> is not within 50 m of a watercourse or wetland</p> <p>Woodland diversity representation: <i>Woodland 2</i> is not composed of tree species that have had major reductions in their natural distribution and is therefore considered not diverse.</p> <p>Uncommon characteristics: none</p> <p>Provision of significant wildlife habitat: <i>Woodland 2</i> provides candidate significant wildlife habitat as identified in Section 4.4.</p>

Conclusion: The site investigation identified 2 candidate significant woodlands (*Woodland 1 and Woodland 2*) on or within 120 m of the Project Location. These woodlands will be evaluated in the *Natural Heritage Assessment Evaluation of Significance Report*.

4.4 Wildlife Habitat

The REA Regulation defines wildlife habitat as areas “*where plants, animals and other organisms live or have the potential to live and find adequate amounts of food, water, shelter and space to sustain their population, including an area where a species concentrates at a vulnerable point in its annual or life cycle and an area that is important to a migratory or non-migratory species.*” The natural features identified on and within 120 m of the Project Location meet the definition of wildlife habitat and will be considered in further detail with respect to significance following the wildlife habitat assessment guidelines indicated in the *Draft Significant Wildlife Habitat Ecoregion Criteria Schedules* (MNR, 2009b) for Site Region 6E (Table 4.2). Additional sources of information and assessment guidance include the NHRM (MNR, 2010b), SWHTG (MNR, 2000), and the *Significant Wildlife Habitat Decision Support System* (MNR, 2009a).

Table 4.2. Wildlife habitat assessment criteria based on the Ecoregion Criteria Schedules (OMNR 2009c) for Site Region 6E.

Wildlife Habitat Category	Criteria
<i>Seasonal Concentration Areas</i>	<ul style="list-style-type: none"> i. <i>Waterfowl stopover and staging areas (terrestrial)</i> ii. <i>Waterfowl stopover and staging areas (aquatic)</i> iii. <i>Colonial-nesting bird breeding habitat</i> iv. <i>Shorebird migratory stopover area</i> v. <i>Songbird migratory stopover areas</i> vi. <i>Raptor wintering area</i> vii. <i>Bat hibernacula</i> viii. <i>Butterfly migratory route/stopover areas</i> ix. <i>Snake hibernaculum</i> x. <i>Deer wintering areas</i> xi. <i>Amphibian breeding habitat</i>
<i>Rare Vegetation Communities</i>	<ul style="list-style-type: none"> i. <i>Alvar</i> ii. <i>Cliff and talus slopes</i> iii. <i>Savannah</i> iv. <i>Tallgrass prairie</i> v. <i>Sand barren</i> vi. <i>Old growth forest</i>
<i>Specialized Habitat for Wildlife</i>	<ul style="list-style-type: none"> i. <i>Waterfowl nesting area</i> ii. <i>Osprey Nesting, Foraging and Perching Habitat</i> iii. <i>Woodland Raptor Nesting Habitat</i> iv. <i>Turtle Nesting and Over-wintering Areas</i> v. <i>Seeps and Springs</i>
<i>Habitat for Species of Conservation Concern</i>	<ul style="list-style-type: none"> i. <i>Marsh bird breeding habitat</i> ii. <i>Area-sensitive bird breeding habitat</i> iii. <i>Open country bird breeding habitat</i> iv. <i>Shrub/early successional bird breeding habitat</i> v. <i>Other Habitat Types</i> vi. <i>Special concern and S1-S3 species and communities</i>
<i>Animal Movement Corridors</i>	<ul style="list-style-type: none"> i. <i>Amphibian movement corridors;</i> ii. <i>Deer movement corridors</i> iii. <i>Bat movement corridors</i>

Each of these types of wildlife habitat was considered during the site investigation and is described in further detail below. The wildlife and plant species discussed in the following sections are identified by common name only with the scientific names and S-ranks provided in Appendices 4 and 5 (i.e. species observed during the *SI*).

4.4.1 Habitats of Seasonal Concentration Areas:

Habitats of seasonal concentrations of animals are areas where animals occur in relatively high densities for specific periods in their life cycles and/or in particular seasons (MNR, 2010b). These areas are generally localized and relatively small in relation to the area of habitat used at other times of the year (MNR, 2010b). Areas that support species at risk, or provide important habitat for a large proportion of a

population are also examples of seasonal concentration areas that are considered *significant wildlife habitat*.

The criteria used to determine habitat of seasonal concentrations areas are outlined in the *Ecoregion Criteria Schedules* (MNR, 2009). The site investigation considered these 11 types of habitats of seasonal concentrations of animals and their potential occurrence on the Project Location are discussed below.

- i. ***Waterfowl stopover and staging areas (terrestrial):*** Waterfowl traditionally congregate in larger wetlands and relatively undisturbed shorelines with vegetation during spring and fall migration. Habitat requirements for staging areas differ in the spring and fall depending on the nesting habits and wintering areas for some waterfowl species. In the fall, some waterfowl species may use staging areas as night-time roosts and disperse to other areas to feed during the day. During the spring migration, waterfowl may congregate on flooded agricultural fields.

The *Draft Significant Wildlife Habitat Ecoregion Criteria Schedules* (MNR, 2009) provide habitat characteristics that are important for migrating waterfowl (i.e., terrestrial habitat) and for local and migrant waterfowl populations during the spring and fall migrations (i.e., aquatic habitat). Suitable stopover and staging habitat for migrating waterfowl include cultural meadow and thicket communities that are seasonally flooded (i.e., annual spring flooding from meltwater or surface water runoff), especially during spring migration (i.e., mid-March to May). Suitable aquatic habitat includes wetland communities such as ponds, marshes, swamps, lakes, bays, coastal inlets and watercourses. These habitat types have an abundant food supply (i.e., aquatic invertebrates and vegetation in shallow water) (MNR, 2009).

No waterfowl species were observed during the site investigations. There are no wetlands, or extensive areas of cultural meadow or thicket communities on or within 120 m of the Project Location that are conducive to waterfowl staging. The majority of the Project Location is comprised of conifer dominated plantation and red cedar woodlands that do not provide suitable waterfowl stopover and staging habitat. Waterfowl stopover and staging areas are generally known within the planning area. A review of existing planning documents and available information from the MNR determined that there are no confirmed significant *waterfowl stopover and staging areas* on or within 120 m of the Project Location (Hatch Ltd., 2011).

Conclusion: *Waterfowl stopover and staging areas* will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

- ii. ***Waterfowl stopover and staging areas (aquatic):*** See information provided above.

Conclusion: *Waterfowl stopover and staging area habitat (aquatic)* will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

- iii. ***Colonial-nesting bird breeding habitat:*** Colonial birds are a diverse group of species including herons, gulls, terns and swallows. Nesting sites for these species includes eroding banks/cliffs, sandy hills, pits, steep slopes, rock faces or piles (e.g. swallows), trees/shrubs (e.g. herons) and ground (e.g. gulls and terns). The *Ecoregion Criteria Schedules* (MNR, 2009) identify habitat characteristics for the Bank Swallow and Cliff Swallow as any exposed soil banks that are undisturbed or naturally eroding for more than 10 years. However, areas that are not considered important habitat include

man-made structures or recently (i.e. two years) disturbed soils, such as berms, embankments or aggregate stock piles.

The one colonial-nesting bird species (Ring-billed Gull) observed during the *SI* within 120 m of the Project Location was a fly-by. Suitable nesting habitat for colonial nesting species was not observed on or within 120 m of the Project Location. A review of existing planning documents and available information from the MNR determined that there is no confirmed significant colonial bird *nesting sites* on or within 120 m of the Project Location (Hatch Ltd., 2011).

Conclusion: *Colonial-nesting bird breeding habitat* will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

- iv. **Shorebird migratory stopover area:** This habitat type includes shorelines of lakes, rivers, and wetlands, including beach areas, bars, and seasonally flooded shoreline, usually muddy and un-vegetated. Shorebird species considered during the site investigation include: Common Snipe, Killdeer, Spotted Sandpiper and Wilson's Phalarope. None of these species were observed during the *SI*. Suitable habitat for shorebird migratory stopover areas does not occur on or within 120 m of the Project Location.

A review of existing planning documents and available information from the MNR determined that there are no confirmed significant *shorebird migratory stopover areas* on or within 120 m of the Project Location (Hatch Ltd., 2011).

Conclusion: *Shorebird migratory stopover area habitat* will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

- v. **Songbird migratory stopover areas:** *Songbird migratory stopover areas* are found within 5 km of the Lake Ontario shoreline and include traditionally-used sites to feed, rest and wait in poor weather conditions. To accommodate the habitat requirements of the diversity of migratory species, stopover areas must include a variety of habitat types ranging from open fields to large woodlands of >10 ha that provide adequate food and shelter for a minimum of 35 migratory species. Although no spring or fall migration surveys were conducted as part of this *SI*, breeding bird point count surveys identified 16 migratory songbird species within the Project Location and 120m adjacent lands (Appendix 4). Local birding records (e.g., Weir, 2008) and OBBA survey data for the survey square that encompasses the Project Location report more than 35 migrant bird species for the spring and fall migration period (although most of this data is from Amherst Island). The Project Location is within 5 km of the Lake Ontario shoreline; it includes a range of habitat types potentially supportive of migratory birds (FOM, FOC); and, it is within the Napanee Plains Important Bird Area (*NHARR*). Accordingly, candidate *songbird migratory stopover area habitat* is considered present on and within 120 m of the Project Location.

Conclusion: *Songbird migratory stopover area habitat* will be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

- vi. **Raptor wintering area:** This habitat type includes a combination of fields (CUM, CUT) and woodlands (FOD, FOM, FOC) that provide roosting, foraging and resting habitat for wintering

raptors. These areas should have productive small mammal populations such as open fields, agricultural lands (i.e., hayfields, pasture) and meadows. Roosting sites for most raptor species include mature mixed or coniferous woodlands, although some species prefer grassy fields (i.e. Northern Harrier, Short-eared Owl). To be considered significant, raptor wintering sites need to be >20 ha, include both woodlands and upland vegetation community types, and have confirmed use by one or more Short-eared Owls or two or more of the following species: American Kestrel, Northern Harrier, Red-tailed Hawk, Roughlegged Hawk, Snowy Owl (MNR, 2009).

Potentially supportive woodland habitat of >20 ha intermixed with upland meadow and thicket communities occurs on and within 120 m of the Project Location. The raptor species considered during the site investigation include: American Kestrel, Barred Owl, Cooper's Hawk, Eastern Screech-Owl, Great Horned Owl, Long-eared Owl, Northern Goshawk, Northern Harrier, Northern Hawk Owl, Northern Saw-whet Owl, Red-tailed Hawk, Sharp-shinned Hawk and Short-eared Owl.

No raptor species or signs of their presence (e.g., pellets, droppings) were observed during survey transects of the Project Location on March 4, 2011 or April 3, 2011, and no raptors were encountered during the June 21, 2010 breeding bird survey.

A review of existing planning documents and available information from the MNR determined that there are no confirmed significant *raptor winter feeding and roosting areas* on or within 120 m of the Project Location (Hatch Ltd., 2011). Christmas bird count records for the local area as reported by Weir (2008) identify Amherst Island as an important wintering area for several species of hawks and owls, but do not identify the Taylor-Kidd area or its habitats as notable wintering areas.

Conclusion: Candidate *significant raptor wintering area habitat* will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

- vii. **Bat hibernacula:** *Bat hibernacula* are found in caves, abandoned mines and underground foundations. Winter roosts and maternal colonies are often found in trees with loose bark, tree cavities/hollow trees and buildings (buildings are not considered significant wildlife habitat). *Bat hibernacula, winter roosts and maternal colonies* are generally known within the planning area.

A review of existing planning documents and available information from the MNR determined that there are no confirmed *bat hibernacula, winter roosts and maternal colonies* on or within 120 m of the Project Location (Hatch Ltd., 2011; MNR, 2010d). The bat species whose ranges overlap the Project Location and that were considered during the site investigation include: big brown bat, little brown bat and northern long-eared bat (Hatch Ltd., 2011). All of these bat species are known to overwinter in Ontario.

Bat surveys were not completed and therefore, the presence / absence of these species on and within 120 m of the Project Location are unknown. However, an assessment of potential habitat for these species was considered during the site investigation. Most of the woodlands within 120 m of the Project Location are dominated by young red cedar, pine and spruce, trees that have not developed cavities or hollows that would provide suitable habitat for winter roosts or maternal colonies. More mature woodlands near Cooke's Creek consist of conifer and mixed woods that may provide larger

specimens, but no hollow trees or tree cavities were encountered during the site investigations of these areas. Furthermore, there are no caves or karst topography on or within 120 m of the Project Location that would provide suitable bat hibernacula. Therefore, the site investigation has determined that there are no bat hibernacula, *winter roosts or maternal colonies* on or within 120 m of the Project Location.

Conclusion: *Bat hibernacula, winter roosts and maternal colonies* will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

- viii. **Butterfly migratory route/stopover areas:** *Migratory butterfly stopover areas* are found within uplands (CUT, CUM) and woodlands (e.g., FOC, FOM, CUP) located within 5 km of Lake Ontario. The butterfly species that are considered important in determining the significance of this habitat type include: monarch butterfly, painted lady and white admiral. *Migratory butterfly stopover areas* are generally known within the planning area. A review of existing planning documents and available information from the MNR determined that there are no confirmed significant *migratory butterfly stopover areas* on or within 120 m of the Project Location (Hatch Ltd., 2011). The Project Location is within 5 km of the Lake Ontario shoreline and monarch butterflies were noted during the *SI* foraging within a 3 ha patch of open meadow. There are 15 ha of cultural thicket present within 120 m of the Project Location and extensive area of supportive woodland habitat which exceeds the minimum size criterion of 10 ha for this wildlife habitat category.

Conclusion: *Candidate butterfly migratory route/stopover area habitat may be present and will be carried forward to the Natural Heritage Assessment Evaluation of Significance Report*.

- ix. **Snake hibernaculum:** Some species of snakes migrate to wooded areas in the fall where they find areas to hibernate such as animal burrows, log piles, and rock crevices. Woodlands ≥ 30 ha are favourable as they provide interior forest habitat with more moderate environmental conditions. Snake hibernacula are also found on man-made sites such as old stone fences, crumbling foundations and old wells. For identification of significance, 5 or more snakes or 2 or more species must be found in association with candidate hibernacula. Areas of the Project Location with characteristics potentially supportive of snake hibernacula, e.g., fenceline boulder piles and log piles, were examined on April 3, 2011, but no snakes or evidence of their presence were observed at these locations. A potential hibernaculum was noted within a north-facing limestone ridge and boulder pile running east-west across the south of the Project Location within conifer plantation (Figure 4.7). A single Eastern Gartersnake was encountered in a thicket community within the Project location, but this was more than two hundred metres from this feature.

A review of existing planning documents and available information from the MNR determined that there are no confirmed significant *snake hibernacula* on or within 120 m of the Project Location (Hatch Ltd., 2011).

Conclusion: *A snake hibernaculum may be present and will be carried forward to the Natural Heritage Assessment Evaluation of Significance Report*.



Figure 4.7. Limestone ridge and boulder rubble at edge of conifer plantation – candidate snake hibernaculum.

- x. **Deer wintering areas:** To function as a *deer wintering area*, the **SWHTG** identifies the following requirements: history of use by deer; absence of barriers to migration to and from the yard itself; suitable areas of cover, food and adjacent natural lands. *Deer wintering area* have three basic habitat components: core areas; core feeding areas; and staging areas. Deer spend the majority of the winter in core areas and core feeding areas. These areas are associated with coniferous and mixed forests which provide shelter (i.e. > 60 % canopy cover) and an adequate supply of food (i.e. woody browse, fruits and nuts). Staging areas are located adjacent to winter deer yards and provide temporary habitat as deer move in and out of winter yards. Suitable staging areas include agricultural land and mast-producing woodlands where food is abundant.

A review of existing planning documents and available information on deer wintering areas from the MNR determined that there are no confirmed significant *winter deer yards* on or within 120 m of the Project Location (Hatch Ltd., 2011). *Deer wintering area habitat* does not occur on or within 120 m of the Project Location.

Conclusion: *Deer wintering areas* will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

- xi. **Amphibian breeding habitat:** Undisturbed woodlands with permanent ponds or those containing water in most years until at least mid July are most significant as are sites that contain shrubs, logs and woody debris. For designation as candidate significant *amphibian breeding habitat*, 2 or more species with at least 20 individuals must be reported (or any number of American bullfrogs). During

surveys of the Project Location in June 2010 and April 2011 no amphibians were encountered within 120 m of the Project location. Soils across the Project Location and 120 m adjacent lands are generally shallow and well-drained and there are no ponds or wetlands present. Suitable breeding habitat for green frog and leopard frog was observed within the riparian wetland and shallow pools along Cooke's Creek. This wetland and riparian habitat is well defined and confined to the Cooke's Creek floodplain area.

Conclusion: Candidate significant amphibian breeding habitat will not be carried forward to the Natural Heritage Assessment Evaluation of Significance Report.

4.4.1.1. Summary of Candidate Significant Habitats of Seasonal Concentration Areas

Three candidate significant habitats of seasonal concentration areas (*songbird migratory stopover area; butterfly migratory route/stopover area; and snake hibernaculum*) were identified on and within 120 m of the Project Location and will be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

Amphibian breeding habitat was also noted for within the wetlands associated with the Cooke's Creek riparian corridor. This habitat is located outside of the 120 m area of investigation under REA requirements and will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

4.4.2 Rare Vegetation Communities

All vascular plant species encountered during the site investigation were recorded and used in characterizing individual vegetation community types. A plant checklist is provided in Appendix 7 of this report. Any plant identified as a species of conservation concern was GPS referenced and the habitat was surveyed in order to determine the extent of the population. Specimens that could not be readily identified in the field were collected and assessed later using appropriate references (e.g., Gleason and Cronquist 1991; Queen's University Fowler Herbarium records).

Rare vegetation communities are those that are considered rare in Site Region 6E under the *Ecoregion Criteria Schedules* (see also NHIC S-Ranks designations). Rare community types are typically those with SRANKS of S1 to S3 (i.e., extremely rare to rare – uncommon in Ontario). In addition to being rare themselves, it is also assumed that these communities support wildlife species that are also considered significant. There are 6 identified communities for Site Region 6E, including:

- i. Alvar,
- ii. Cliff and talus slopes,
- iii. Savannah,
- iv. Tallgrass prairie,
- v. Sand barren, and
- vi. Old growth forest.

Soils within the Loyalist Township region consist primarily of shallow loams over limestone bedrock, with pockets of clay soils along the Lake Ontario shoreline. Topography is generally flat to gently sloping and drainage is southward toward the lake. Early to mid-seral vegetation community types similar to

those found on the Project Location are prevalent across the region. Due to the large scale abandonment of lands that were unsuitable for sustained agricultural use, vegetation communities across the region tend to be patchy with indistinct borders (i.e., broad ecotones), although remnant mature tree cover occurs along old fencerows and drainage corridors. Properties with deeper, well-drained soils generally remain as working farms.

The Loyalist Township region is also known for the presence of alvar communities, which tend to develop on very shallow soils with seasonal extremes in temperature and moisture. Larger alvar communities have been provincially recognized and include the Odessa and Asselstine Alvars several kilometres to the west of the Project Location.

Provincially Rare Vegetation Communities – The *Great Lakes Conservation Blueprint for Terrestrial Biodiversity, Volume 2: Ecodistrict Summaries* (Henson and Brodribb, 2005) identifies the following provincially rare vegetation community within the Picton Ecodistrict 6E-15.

- Dry Bur Oak - Shagbark Hickory Tallgrass Woodland Type – Globally and provincially rare based on conservation ranks of G? S1
- Dry Tallgrass Prairie Type - Globally and provincially rare based on conservation ranks of G3 S1
- Graminoid Coastal Meadow Marsh Type - Globally and provincially rare based on conservation ranks of G2? S2
- Little Bluestem - Switchgrass - Beachgrass Dune Grassland Type - Globally and provincially rare based on conservation ranks of G? S2
- Red Cedar - Early Buttercup Treed Alvar Grassland Type- Globally and provincially rare based on conservation ranks of G2? S2
- Tufted Hairgrass - Canada Bluegrass - Philadelphia Panic Grass Alvar Grassland Type - Globally and provincially rare based on conservation ranks of G2G3? S2S3

No rare vegetation communities were found within 120 m of the Project Location during the site investigations. As described in Section 7.3.1, the Project Location is represented by dense red cedar forest and conifer plantations interspersed by small patches of meadow and thicket (Figure 4.1), while stands to the north along Cooke's Creek are represented by mature mixed forest. All of these community types have an S-rank of S5. A checklist of vascular plants identified within 120 m of the Project Location is shown in Appendix 7. All of the plant species encountered are common native species with an S-rank of S5, or are non-native (SU).

4.4.2.1 Summary of Candidate Significant Rare Vegetation Community Habitat

Candidate significant rare vegetation communities are not present and will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

4.4.3 Specialized Habitats for Wildlife

The *NHRM* (MNR, 2010b) describes specialized habitats for wildlife as:

- areas that support wildlife species that have highly specific habitat requirements
- areas with high species and community diversity

- areas that provide habitat that greatly enhances species' survival.

The *Ecoregion Criteria Schedules* (MNR 2009b) identifies 5 categories of specialized habitat for wildlife for Site Region 6E, the area in which the Project Location occurs. Each of these is discussed below in context with what was observed during the site investigations of the areas within 120 m of the Project Location:

- Waterfowl nesting area:*** Waterfowl nesting areas can extend 120 m from a wetland (> 0.5 ha) and can include clusters of 3 or more small (<0.5 ha) wetlands within 150 m of each other where waterfowl nesting is known to occur. No wetlands or waterbodies occur within 120 m of the Project Location and no habitat is available to support nesting waterfowl. No waterfowl were observed during the surveys and no references to the occurrence of this feature were indicated in the *NHARR* (Hatch Ltd., 2011a). Cooke's Creek may provide limited habitat for waterfowl as there are narrow patches of riparian marsh present, but these features are confined to the creek floodplain >130 m from the Project Location.

Conclusion: *Waterfowl nesting area habitat* will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

- Osprey Nesting, Foraging and Perching Habitat:*** Osprey nests are associated with lakes, ponds, rivers, or wetlands. Osprey nests are along forested shorelines, on islands or on structures over water within dead trees; nests are usually at the top of the tree. No wetlands or waterbodies occur within 120 m of the Project Location. No ospreys or their nests were observed within 120 m of the Project Location during the site investigation and no references to their occurrence are indicated in the *NHARR* (Hatch Ltd., 2011). Cooke's Creek, 130 m north of the Project Location does not support large prey fish species required by osprey.

Conclusion: *Osprey nesting, foraging and perching habitat* will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

- Woodland Raptor Nesting Habitat:*** Several species of raptors, and those nesting and hunting in forests and grasslands require somewhat specialised nesting habitat for their long-term survival. The raptor species considered during the site investigation include: American Kestrel, Barred Owl, Broad-winged Hawk, Common Nighthawk, Cooper's Hawk, Eastern Screech-Owl, Great Horned Owl, Long-eared Owl, Northern Goshawk, Northern Harrier, Northern Hawk Owl, Northern Harrier, Northern Saw-whet Owl, Red-shouldered Hawk, Red-tailed Hawk, Sharp-shinned Hawk and Short-eared Owl. No raptor species were encountered during site investigations in the spring of 2010 or 2011. Characteristics of the woodlands within 120 m of the Project Location were considered in relation to their potential to provide raptor nesting habitat. Younger red cedar dominated woodland and conifer plantations in the central portions of the Project Location (FOC) may provide suitable foraging habitat, while the larger trees found within the mixed forest bordering Cooke's Creek may provide suitable nest sites.

Conclusion: *Candidate significant woodland raptor nesting habitat* will be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

- iv. Turtle Nesting and Over-wintering Areas:** Turtle nesting areas include exposed sites typically with a southern exposure and with sand or gravel substrates that allow turtles to dig. Turtle over-wintering areas consist of permanent waterbodies, large wetlands, and bog or fens with adequate dissolved oxygen. A single Snapping Turtle nest (destroyed by predators) was found along the railway line approx. 400 metres northwest of the Project location, where a tributary of Cooke's Creek crosses the rail line. Therefore this species, and presumably Painted Turtle as well, use the Cooke's Creek riparian valley as a corridor to access suitable nesting sites in the local area, which potentially includes uplands within 120 m of the Project location. It is noted that sands and gravels are absent from the Project Location as soils consist of shallow clay-loams over limestone bedrock.

Conclusion: Candidate turtle nesting and over-wintering habitat will be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

- v. Seeps and Springs:** No seeps or springs were identified within 120 m of the Project Location and these features were not identified in the *NHARR* (Hatch Ltd., 2011).

Conclusion: Seeps and springs will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

4.4.3.1 Summary of Candidate Specialized Habitats for Wildlife

Two candidate specialized habitats for wildlife (woodland raptor nesting habitat; turtle nesting and over-wintering habitat) were found on or within 120 m of the Project Location and will be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

Potential waterfowl nesting area habitat was also noted for within the wetlands associated with the Cooke's Creek riparian corridor. This habitat is located outside of the 120 m area of investigation under REA requirements and will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

4.4.4 Habitat for Species of Conservation Concern

The NHRM (MNR, 2010b) identifies species of conservation concern as:

- species that are designated at the national level as endangered or threatened by COSEWIC, which are not protected in regulation under Ontario's ESA
- species listed as special concern under the ESA on the SARO List (formerly referred to as "Vulnerable" in the SWHTG)
- species that are rare or substantially declining, or have a high percentage of their global population in Ontario.

The *SWHTG* (MNR, 2000) defines rare or significant species at six levels: globally significant; nationally significant; provincially significant; regionally significant; locally significant (within a Site District); within a planning authority's jurisdiction.

Five categories of habitat that support species of conservation concern are listed in the *Ecoregion Criteria Schedules* (MNR, 2009b) for Site Region 6E. Each of these is discussed below in context with species observed during the site investigations. A list of species of conservation concern identified in the *NHARR* (Hatch Ltd., 2011), including their preferred habitat type is provided in Table 3.2. Habitats supportive of identified species of conservation concern will be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

- i. **Marsh bird breeding habitat:** Marsh bird breeding habitat occurs in wetlands. All wetland habitats are to be considered as long as there is shallow water with emergent aquatic vegetation present. The presence of 5 or more nesting pairs of Sedge Wren or Marsh Wren or 4 nesting pairs for any other listed species (i.e., American Bittern, Virginia Rail, Sora, Common Moorhen, American Coot, Pied-billed Grebe, Common Loon, Green Heron ; or 1 pair of Sandhill Cranes; or breeding by any combination of 5 or more of the listed species. Any wetland with breeding Black Terns or Yellow Rail is to be considered as significant. Other wetland associated species considered during the *SI* include: American Woodcock, Killdeer, Spotted Sandpiper, Upland Sandpiper, Wilson's Snipe, Bald Eagle, Belted Kingfisher, Black-crowned Night Heron, Black Tern, Forster's Tern, and Wilson's Phalarope.

No marsh habitat associated bird species were encountered during the *SI* surveys and there are no shallow water wetlands with emergent aquatic vegetation within 120 m of the Project Location. Cooke's Creek was identified as having sections of narrow riparian marsh within the creek corridor floodplain >130 m from the Project location that could potentially support marsh bird breeding habitat.

Conclusion: Marsh breeding bird habitat will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

- ii. **Area-sensitive bird breeding habitat:** All mature (>60 years old) natural forest (non-plantation) stands 30 ha or greater in size and with at least 10 ha interior habitat assuming 100 m buffer at edge of forest are to be considered for this criterion. Studies will confirm the presence of 3 or more breeding or nesting area-sensitive species including Yellow-bellied Sapsucker, Red-breasted Nuthatch, Veery, Blue-headed Vireo, Northern Parula, Black-throated Green Warbler, Blackburnian Warbler, Black-throated Blue Warbler, Ovenbird, Scarlet Tanager, Winter Wren and Canada Warbler.

Most of the Project Location is dominated by a mix of young-mid seral red cedar woodlands and conifer plantations. One area-sensitive woodland indicator species (Ovenbird) was heard calling from within the mature mixed conifer-hardwoods bordering Cooke's Creek (Station 82 - Appendix 5). As the Project Location and 120 m adjacent lands includes 2 ha of woodland interior and there is an additional 66 ha available within connected woodland, *area-sensitive bird breeding habitat* is considered to occur.

Conclusion: Candidate *area-sensitive bird breeding habitat* will be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

- iii. **Open country bird breeding habitat:** Grassland habitat 30 ha or larger in size, that is not Class 1 or 2 agricultural lands, and not being actively used for farming (i.e., no row-cropping in the last 5 years). Studies will confirm the presence of nesting or breeding of 2 or more indicator (Bobolink,

Grasshopper Sparrow, Vesper Sparrow, Upland Sandpiper) or special concern species (Short-eared Owl) and at least 1 of the common species (Eastern Kingbird, Eastern Meadowlark, Northern Harrier and American Kestrel). A field with breeding Short-eared Owl is to be considered a Significant Wildlife Habitat. Other open country bird species of regional conservation concern considered in the *SI* include Killdeer and Savannah Sparrow.

No open country indicator bird species were encountered during the breeding bird survey and the non-contiguous patches of open meadow habitat associated with the Project Location (total area = 3 ha) falls well below the minimum habitat area requirement of 30 ha.

Conclusion: Candidate open country bird breeding habitat will not be carried forward to the Natural Heritage Assessment Evaluation of Significance Report.

- iv. ***Shrub/early successional bird breeding habitat:*** Shrubland or successional fields 30 ha or larger in size, not class 1 or 2 agricultural lands, and not being actively used for farming (i.e., no row-cropping in the last 5 years). Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or pasturelands. Studies must confirm the presence of nesting or breeding of 2 or more indicator (Brown Thrasher, Clay-coloured Sparrow) or special concern species (Yellow-breasted Chat, Golden-winged Warbler) and at least 1 of the common species (Field Sparrow, Black-billed Cuckoo, Eastern Towhee, Willow Flycatcher, or Blue-winged Warbler). A field with breeding Yellow-breasted Chat or Golden-winged Warbler is to be considered as Significant Wildlife Habitat. Other shrub/early successional species of regional conservation concern considered for this local area include: American Woodcock, Black-billed Cuckoo, and Prairie Warbler.

During the site investigations, 3 shrub/early successional habitat breeding bird species (Field Sparrow (N =3), Clay-coloured Sparrow (N=1), Eastern Towhee (N=5)) were encountered within the Project Location. All 3 species were encountered within small (< 1 ha) patches of thicket and meadow located within the red cedar forest and pine plantation areas (Figure 4.2) and not from within larger cultural thicket communities to the northwest and northeast (total area-15 ha). As there is shrub/early successional habitat available and indicator species were observed, shrub/early successional bird breeding habitat is considered to be present.

Conclusion: Candidate shrub/early successional bird breeding habitat will be carried forward to the Natural Heritage Assessment Evaluation of Significance Report.

- v. ***Other Habitat Types:*** No other species of conservation concern requiring other forms of habitat (e.g., lakes, lakeshore) were noted in Table 3.2 and no other forms of habitat not already noted above occur within 120 m of the Project Location.

Conclusion: Candidate significant other habitat types will not be carried forward to the Natural Heritage Assessment Evaluation of Significance Report.

- vi. ***Special concern and S1-S3 species and communities:*** Candidate habitat assessments for remaining species of conservation concern indicated in Table 3.2 that were not included in the habitat criteria evaluations are discussed in Table 4.3.

Table 4.3. Habitat requirements and occurrence for remaining species of conservation concern identified in the NHARR (Hatch Ltd., 2011)

<i>Species Of Conservation Concern</i>	Preferred Habitat Description (from Appendix G SWHTG)	Habitat Assessment from SI	Observed during SI	Occurrence Potential
<i>Amphibians</i>				
Jefferson x blue-spotted salamander (<i>Ambystoma jeffersonianum x laterale</i> "complex")	damp shady deciduous forest, swamps, moist pasture, lakeshores; temporary woodland pools for breeding; hides under leaf litter, stones or in decomposing logs	No wetlands or woodland pools. Woodlands are dense and conifer dominated. No records of occurrence in this area. No records for 6E-15	<i>no</i>	<i>nil</i>
<i>Reptiles</i>				
Five-lined skink (<i>Plestiodon fasciatus</i>) – Great Lakes Population	moderately dense or open deciduous or mixed woodlands with logs and slash piles; damp spots under logs, leaf litter, or sawdust; open talus slopes, barren rock; breeds in forest floor litter; lays, protects eggs under rocks, logs; forages in open woodlands, in sandy areas; hibernates under rock piles, in rock crevices, under logs and in stumps	No record of species occurring below Hwy 401 in Site Region 6E-9 (Seburn and Seburn, 1998)	<i>no</i>	<i>nil</i>
Map turtle (<i>Graptemys geographica</i>)	large water bodies with soft bottoms, and aquatic vegetation; basks on logs or rocks or on beaches and grassy edges, soft soil or clean dry sand for nest sites; may nest at some distance from water; home range size is larger for females (about 70 ha) than males (about 30 ha) and includes hibernation, basking, nesting and feeding areas; aquatic corridors (e.g. stream) required for movement	No foraging, basking or suitable nesting substrates (sands) occur within 120 m of Project Location. Cooke's Creek is very shallow and semi-permanent. Species is reported from deep water embayment of Parrott's Bay >500 m away	<i>no</i>	<i>nil</i>
Milksnake (<i>Lampropeltis triangulum</i>)	Farm meadows, hardwood or aspen stands; pine forest with brushy or woody cover; river bottoms; hides under logs, stones, or boards or in outbuildings; often uses communal nest sites	Regionally common foraging habitat present on and within 120 m of Project Location; potential snake hibernaculum on Project Location	<i>no</i>	<i>Moderate to high</i>
<i>D. Mammals</i>				
Northern Long-eared Bat (<i>Myotis septentrionalis</i>)	hibernates in mines or caves; roosts in houses, manmade structures but prefers hollow trees or under loose bark; hunts within forests, below canopy	No caves present; young conifer plantations and woodland stands too young to support large hollow trees; subcanopy dense	<i>no</i>	<i>Low (mammal atlas record for local region)</i>

Conclusion: Foraging habitat for milksnake, a species of conservation concern, is found on and within 120 m of the Project Location and will be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

4.4.4.1 Summary of Habitats for Species of Conservation Concern

Candidate habitats for species of conservation concern found on and within 120 m of the Project Location include:

- *area-sensitive bird breeding habitat (forest)*
- *shrub/early successional bird breeding habitat*
- *Special concern and S1-S3 species and communities (milksnake)*

*These candidate significant specialized habitats for species of conservation concern will be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.*

Potential marsh bird breeding habitat was also noted for the wetlands associated with the Cooke's Creek riparian corridor. This habitat is located outside of the 120 m area of investigation under REA requirements and will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

4.4.5 Animal Movement Corridors

Animal movement corridors are defined in the *SWHTG* (MNR, 2000) as elongated, naturally vegetated parts of the landscape used by animals to move from one habitat to another. Under the *Ecoregion Criteria Schedules* (MNR, 2009b) for Site Region 6E, movement corridors that should be identified as candidate SWH include *amphibian movement corridors, deer movement corridors, and bat movement corridors*.

Amphibian movement corridors: Amphibian movement corridors provide a linkage between aquatic breeding habitat (includes both wetland and woodlands) (i.e., spring) and terrestrial habitat (i.e. summer and fall). There are no records of amphibian movement corridors reported in the *NHARR* (Hatch Ltd., 2011a) and no habitat or landscape features supportive of significant movements (e.g., valleylands, treed corridors) are found within 120 m of the Taylor Kidd Project Location. The vegetation community types present are regionally common and extend broadly across the local landscape. Cooke's Creek may provide a natural corridor but is located >120 m from the Project location.

Conclusion: *Amphibian movement corridors* are not considered to be present within 120 m of the Project Location and will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

Deer movement corridors: Deer movement corridors are typically found in (but are not limited to) riparian areas, ravines, steep river valleys and woodlands (MNR, 2000; MNR, 2009), and provide a linkage between summer and winter range and deer yards. There are no confirmed winter deer yards or deer movement corridors reported in the *NHARR* (Hatch Ltd., 2011) based upon a review of MNR records. The woodland community types present within the Project Location extend broadly across the local landscape (i.e., there is no natural corridor occurring within an otherwise restrictive landscape matrix).

Conclusion: *Deer movement corridors* will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

Bat movement corridors: Suitable bat migration corridors include areas along shorelines of large lakes or areas of high elevation (i.e. escarpment). Although the Project Location is located 1 km from the Lake Ontario shoreline, there are no available records of bat movement corridors reported in the **NHARR** (Hatch Ltd., 2011a) for this site and no habitat features supportive of significant movements (e.g., escarpments, treed corridors). The vegetation community types present are regionally common and extend broadly across the local landscape (i.e., there is no natural corridor occurring within an otherwise restrictive landscape matrix).

Conclusion: *Bat movement corridors* are not considered to be present and will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

4.4.5.1 Summary of Animal Movement Corridors

The results of the site investigation determined that there are no candidate significant animal movement corridors within 120 m of the Project Location. This candidate significant wildlife habitat will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

5.0 SUMMARY OF SITE INVESTIGATION RESULTS

5.1 Corrections Required in the Natural Heritage Assessment Records Review Report

Subsection 26 (3) of the REA Regulation requires that the *Natural Heritage Assessment Site Investigation Report* include a summary of any corrections to the *NHARR* (Hatch Ltd., 2011) and the determinations made as a result of conducting the site investigation. Table 5.1 identifies the corrections required (if any) and determinations made for the natural features identified in the *NHARR* and documented during the site investigation.

5.2 Candidate Significant Natural Features

The findings from this report identified the following confirmed and candidate significant natural features. A map showing the locations of these natural features is provided on Figure 4.1.

Candidate Significant Woodlands – There are woodlands on and within 120 m of the Project Location.

Candidate Significant Wildlife Habitat – The following candidate significant wildlife habitat types have been identified within 120 m of the Project Location.

- **Seasonal Concentration Areas** - *songbird migratory stopover area; butterfly migratory route/stopover area; and snake hibernaculum*
- **Specialized Habitats for Wildlife** – *raptor nesting habitat, turtle nesting and overwinter areas*
- **Habitats of Species of Conservation Concern** – These include: *area-sensitive bird breeding habitat (forest), shrub/early successional bird breeding habitat, and special concern and S1-S3 species and communities (milksnake).*

The candidate significant natural features identified above will be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

Other candidate significant wildlife habitats (amphibian breeding habitat, waterfowl nesting habitat, marsh bird breeding habitat) were noted for the riparian wetlands associated with the Cooke's Creek floodplain zone (Figure 4.1). As these habitats are located outside of the 120 m area of investigation under REA requirements, they will not be carried forward to the Natural Heritage Assessment Evaluation of Significance Report.

Table 5.1. Summary of corrections required to natural features identified by the records review (Hatch Ltd., 2011a).

RECORDS REVIEW			SITE INVESTIGATION				
Natural Feature identified through Records Review	In Project Location?	In 120 metre buffer?	Type	Functions and Attributes	Composition	Distance from Project Location (PL)	Corrections to Records Review?
Woodlands	Yes	Yes	Candidate Significant Woodland	Woodland 1 - Size: 46 ha of 218 ha local woodland - Proximity to significant woodlands - Linkage - Interior woodland - Water Protection - Diversity representation - Wildlife habitat	- Dry-Fresh Red Cedar Coniferous Forest, Fresh-Moist White Cedar-Hardwood Mixed Forest, White Pine-White Spruce Conifer Plantation	- 28 ha of woodland within PL	No
			Candidate Significant Woodland	Woodland 2 - Size: 2.6 ha of 136 ha woodland - Proximity to other significant woodlands - Linkage - Wildlife habitat	- Dry-Fresh Red Cedar Coniferous Forest, White Pine-White Spruce Conifer Plantation	- within 120 m adjacent lands only	No
Wildlife Habitat	Yes	Yes	Seasonal Concentration Areas	<i>Songbird migratory stopover area</i>	- woodland and shrub thicket communities within Napanee Plains IBA - within 5 km of Lake Ontario	On and within 120 m of PL	No
				<i>Butterfly migratory route/stopover area</i>	- 3 ha open meadow - 15 ha shrub thicket - within 5 km of Lake Ontario	On and within 120 m of PL	No
				<i>Snake hibernaculum</i>	- small limestone ridge and rubble present	Within PL	No
			Specialized Habitats for Wildlife	<i>Raptor nesting habitat</i>	- extensive woodlands, meadows and shrub thickets across local region	On and within 120 m of PL	No
<i>Turtle nesting and overwintering areas</i>	- Cooke’s Creek riparian corridor - Snapping turtle nest located within corridor (400 m away)	120 - 150 m from PL		No			

RECORDS REVIEW			SITE INVESTIGATION				
Natural Feature identified through Records Review	In Project Location?	In 120 metre buffer?	Type	Functions and Attributes	Composition	Distance from Project Location (PL)	Corrections to Records Review?
Candidate Wildlife Habitat	Yes	Yes	Habitats of Species of Conservation Concern	<i>Area sensitive bird breeding habitat</i>	- Interior woodland habitat (2 ha) within 120 m of Project Location - Indicator species present	On and within 120 m of PL	No
				<i>Shrub/early successional bird breeding habitat</i>	- 15 ha of shrub thicket areas across Project Location and 120 m adjacent lands - Indicator species noted	- on and within 120 m of PL	No
				<i>Special concern and S1-S3 species and communities (milksnake)</i>	- extensive woodlands, meadows and shrub thickets across local region	- on and within 120 m of PL	No

6.0 NEXT STEPS

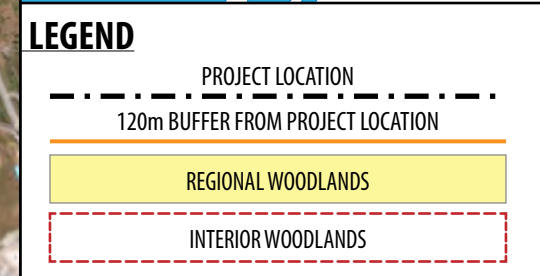
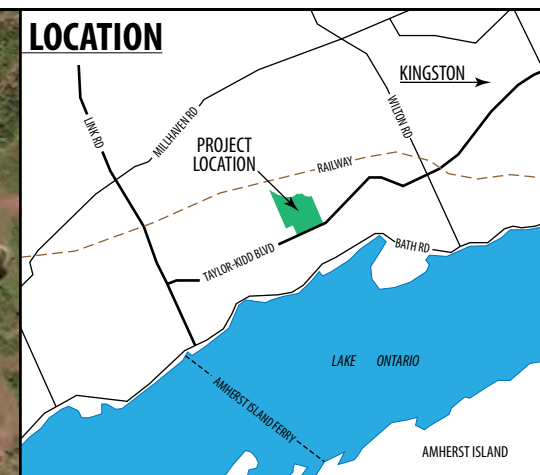
- A *Natural Heritage Assessment Evaluation of Significance Report* will be prepared for the confirmed and candidate significant natural features identified in this report.

7.0 LIST OF REFERENCES

- Cataraqui Region Conservation Authority. 2006. Central Cataraqui Region Natural Heritage Study. Kingston, Ontario.
- Cadman M. and N. Kopysh. 2001. Ontario Breeding Bird Atlas Guide for Participants. Bird Studies Canada, Environment Canada: Canadian Wildlife Service, Federation of Ontario Naturalists, OFO, Ontario Ministry of Natural Resources. Available on-line at http://www.birdsontario.org/download/atlas_feb03.pdf. Last updated 2003
- Dobbyn, J. 1994. Atlas of the Mammals of Ontario. Federation of Ontario Naturalists.
- Gleason, Henry A. and Arthur Cronquist. 1991. Manual of the Vascular Plants of Northeastern United States and Adjacent Canada, Second Edition. D. Van Nostrand, N.Y
- Government of Canada. 2010a. Species Profile – Golden-winged Warbler. Government of Canada, Species at Risk Public Registry. Available on-line at http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=942. Accessed September 1, 2010; Last Updated January 11, 2010.
- Government of Canada. 2010b. Species Profile – Red-headed Woodpecker. Government of Canada, Species at Risk Public Registry. Available on-line at http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=57. Accessed September 1, 2010; Last Updated January 11, 2010.
- Government of Canada. 2010d. Species Profile – Short-eared Owl. Government of Canada, Species at Risk Public Registry. Available on-line at http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=60. Accessed September 1, 2010; Last Updated January 11, 2010.
- Government of Canada. 2010e. Species Profile – Yellow-breasted Chat. Government of Canada, Species at Risk Public Registry. Available on-line at http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=61. Accessed September 1, 2010; Last Updated January 11, 2010.
- Government of Canada. 2010f. Species Profile – Canada Warbler. Government of Canada, Species at Risk Public Registry. Available on-line at http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=1008. Accessed September 1, 2010; Last Updated January 11, 2010.
- Government of Canada. 2010g. Species Profile – Western Chorus Frog. Government of Canada, Species at Risk Public Registry. Available on-line at http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=1019. Accessed September 1, 2010; Last Updated January 11, 2010.
- Government of Canada. 2010h. Species Profile – Five-lined Skink. Government of Canada, Species at Risk Public Registry. Available on-line at http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=538. Accessed September 1, 2010; Last Updated January 11, 2010.

- Hatch Limited. 2011a. Napanee TS Taylor-Kidd Solar Energy Project Natural Heritage Assessment Records Review. Axio Power Canada Inc. and Canadian Solar Solutions Inc.
- Hatch Limited. 2011b. Napanee TS Taylor-Kidd Solar Energy Project Natural Heritage Project Description Report. Axio Power Canada Inc. and Canadian Solar Solutions Inc.
- Henson, B.L. and K.E. Brodribb 2005. *Great Lakes Conservation Blueprint for Terrestrial Biodiversity, Volume 2: Ecodistrict Summaries*. Nature Conservancy of Canada.
- Hoover, J. P., M.C. Brittingham, and L.J. Goodrich. 1995. Effects of forest patch size on nesting success of Wood Thrushes. *The Auk* 112(1): 146-155.
- Lee, H., W. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig, and S. McMurray. 1998. Ecological Land Classification for Southern Ontario. Natural Heritage Information Centre, MNR Peterborough.
- NAVTEQ 2010. Bing Maps Satellite imagery – Available at www.bing.com/maps
- Ontario Ministry of Natural Resources. 2000. Significant Wildlife Habitat Technical Guide. 151 pp. Fish and Wildlife Branch, Technical Section.
- Ontario Ministry of Natural Resources. 2009a. Significant Wildlife Habitat: Decision Support System
- Ontario Ministry of Natural Resources 2009b. Significant Wildlife Habitat Ecoregion Criteria Schedules. Addendum to Significant Wildlife Habitat Technical Guide. Working Draft January 2009
- Ontario Ministry of Natural Resources. 2010a. Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement, Second Edition.
- Ontario Ministry of Natural Resources. 2010b. Natural Heritage Assessment Guide for Renewable Energy Projects. December 2010.
- Rowei, J. W., and S.F. Dalgarn. 2010. Home range sizes and daily movements of Midland painted turtles (*Chrysemys picta marginata*) in relation to body size, sex, and weather patterns. *Herpetological Conservation and Biology* 5(3):461–473.
- Seburn, C. and D. Seburn. 1998. Status report on the Five-lined Skink (*Eumeces fasciatus*) in Canada. COSEWIC. 12pp.
- Weir, Ron. 2008. Birds of the Kingston Region, 2nd edition, 2008, 611pp. Kingston Field Naturalists.

Appendix 1. Local woodland cover in association with Project Location



WOODLAND NORTH OF TAYLOR KIDD BOULEVARD
REGIONAL WOODLAND = 218.3ha
INTERIOR WOODLAND = 65.5ha
WOODLAND SOUTH OF TAYLOR KIDD BOULEVARD
REGIONAL WOODLAND = 136.0ha
INTERIOR WOODLAND = 47.1 ha

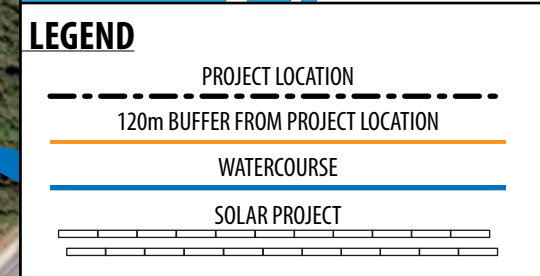
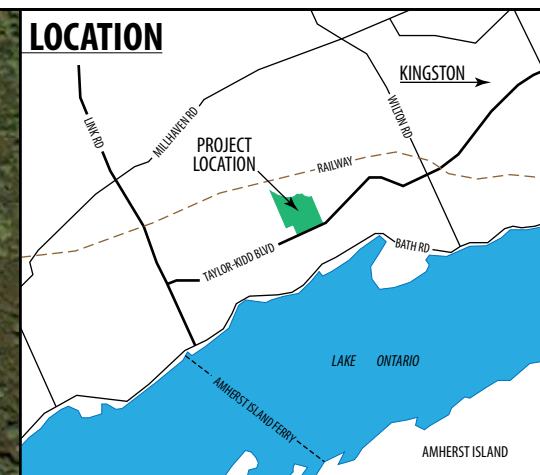
axiopower



TITLE	NAPANEE TS TAYLOR-KIDD PROJECT LOCATION & REGIONAL WOODLAND	
DATE	JUNE 27, 2011	PROJECT No. KP-11-626
FIGURE		



Appendix 2. ELC vegetation communities in relation to Project Location

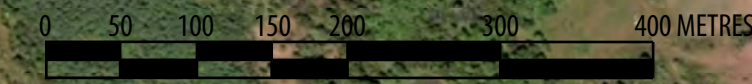


- ### ELC VEGETATION COMMUNITIES
- CUM**
CULTURAL MEADOW
 - CUT**
CULTURAL THICKET
 - CUP3**
CULTURAL PLANTATION
 - FOC2-1**
RED CEDAR FOREST
 - FOM7**
FRESH-MOIST WHITE CEDAR HARDWOOD FOREST

axiopower



TITLE NAPANEE TS TAYLOR-KIDD ELC VEGETATION COMMUNITIES: PROJECT OVERLAY		
DATE JUNE 28, 2011	PROJECT No. KP-11-626	FIGURE



Appendix 3. Field notes from site investigations

June 17/10 22C
 Taylor Kidd Site 13:30-16:30
 Photo 1 scrub cepts near path - kids R.
 Air F - Red Cedar → damp meadow
 scrub - Cor. Vay, Sedum, Grass - similar
 to other sites but more Red Cedar.
 d'Ar, Card. Sicks, Orange Blankets
 → some exposed limestone escarpment.
 Photo 2 - possible milkweed habitat!
 63929/7762

R. Nbr. Catnip, Tamarix, Parsnip
 → following escarpment W. into plantation
 Owl, Lin. Bitterberry Frag. Sumac.
 (35cm post) Nordendier sanguineus
 AW, Barron stamb. Gal. Herb Robert
 PW, Sm. Ch. Cherry, Do. Arumum.
 20 yr. old.
 Plantation → ~~scrub~~ P. S. RSTO.
 surrounding area dense Red Cedar cept
 with path open meadow. Photo 3
 Terial, Milk. Red Dove, white Dove
 Spring Azalea, Yarrow, Tulip, Sl. Nettle
 B.F. Dogwood, Cb. Vicia, sceptor
 Patchy mixedwood forest to 6316/51007
 large remnant trees. O. (55 DS18)
 (30) Broom, Bullfinch understory
 V. Nbr & mixed scrub. white Cedar
 Photo 4
 Bullfinch Fern, Vicia, sceptor, R. Nbr
 Smilax, Yillium, Poly podys
 Wood fern, Tar. Spangulifer
 limestone escarpment borders creek
 Aquilegia, AL Act, R.

- similar to South Creek.
 - most mature forest areas assoc'd
 riparian zone AFD-LVD Backwash
 - width of creek to slope character
 prohibitive to crossing. 100m N.
 NOTE: MIN. TURBULENCE IN JUNE
 DUE TO SHALLOW DEPTH HOWEVER
 probable corridor for breeding
 turtles assoc'd to Parakee Bay.
 STINKBOMBS / BLANDINGS RECORDS
 Revised top end from rail line
 access via Tim Snow Blvd. N. to road

Taylor Kidd N. END JUNE 18/10
 29°C CLEAR 10:00-12:00
 - enter from rail line GPS ref: NW
 (Photo) CREEK CREEPING TO SWR RAILLINE
 W. of site SWAMPY NO GROUND WATER
 GRA, NOCA PUFF, SOXP, P. C. G. C. S. S. S.
 - scrub regrowth P. C. G. C. S. S. S.
 Pichin ash (Photo?) 100m S. of soil
 0.5m. E. of mixed forest
 cut all way to riparian edge
 - some patches of dense mixed
 wood with AFD or
 -> debris on top mature or
 contiguous forest could ->
 NOT SURVIVE FOREST IN YEARS OF
 CRESTING FLOODS.

-> very shallow over exposed barack,
 - re exposed flow width ~ 10-20m
 -> submerged, mossy substrate,
 -> eye head, Iris v. Phul, Cr Frog
 -> Lee Frog, Puffin, BATH.
 -> Aramide, Marsh Warbler, Noddy,
 -> Equi pd. substrate rock, silt, sand
 -> depth variable at some downstream
 (2cm -> 30cm) Peccaria, Hycopus
 C. Vesicaria, Arrowhead, Scirp. validus,
 Can. Bluejoint, Pot. rotundif., Pot. agrost.
 Burdock, Blackberry, Milkweed,
 W. Pasture Borer.
 N. side of creek -> mature forest
 mixedwood, SW, Cedars, ~~Arrowhead~~
 -> drier upland, DBH up to 50-60
 Zig Zag, Goldenrod, Ar. Qu. Cd.
 N. riparian edge consists of 20m
 slope up to of mature forest
 top of slope younger, mostly decid.
 SNIPE.
 -> uplope areas grade back into
 deep cedar dem. forest to open field.

Location Taylor-Kidd
Date Apr 3/11

Project / Client Axio Power

Weather: clear -1°C, no wind

→ assessment of water cedar riparian
- TRANSECT 1 → South → North end
at Cook's Creek
- TRANSECT 2 → North → South
Child 200 m east

Notes: No raptors observed.
(crows, robins, jays)
→ deer scat & sign throughout
→ forest cover very dense
cedar forest
→ ~~SW~~ SW low mature forest
with 20 m of creek
→ Hydrogaster site: north -
sloping & steep with pine
plantations - (likely not good
habitat)
→ No standing water or
shaded areas throughout
* change CUM-1 to
FACE-2
red cedar density &
elder growth

Location Taylor-Kidd
Date Mar 4/11
Project / Client Axio

Time: 0:45 - 10:40

WEATHER: Sunny, light wind SC

Purpose: establish geotek
survey plots with Geinivon.
→ check for presence of
greenhouse gas captrns.
→ entered from Taylor-Kidd Blvd.
and travelled N to Cook's Creek
→ return along East side
through red cedar & pine
dominated forest area.
- NO raptors noted.
→ AMCE, GLSA, SCAM,

Note: maturity & density of cedar
woodland greater than wooden
dominated forest - 10% cover
vs 20% cover

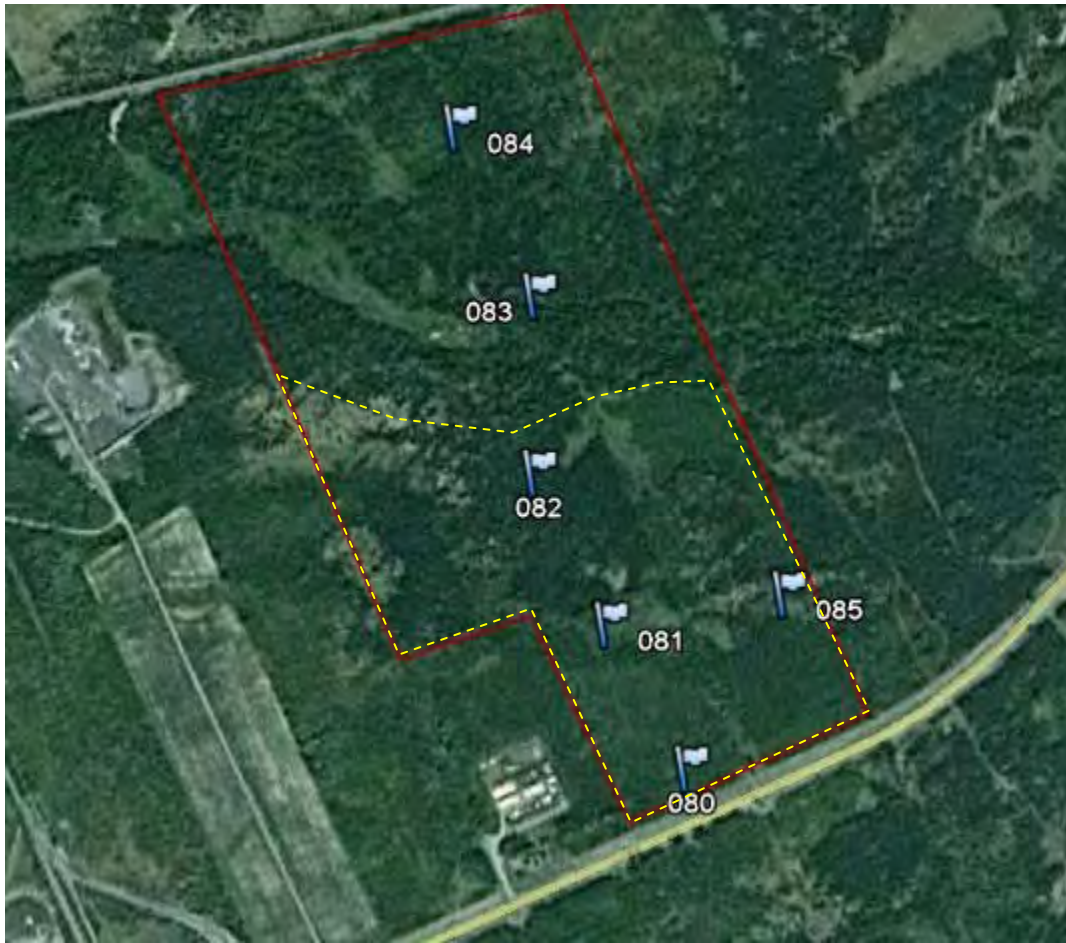
20 Location Taylor Kidd Date Apr 12/11
Project / Client Asso
12C 11:45 - 12:45 cloud/sun
→ investigate potential hibernacula
& look for rattler nesting.
SURVEYORS: Dale Kristensen
Rob Smetrager
→ escarpment areas surveyed
across Proj. location
→ no snakes
→ most areas North facing
→ no frogs.

Appendix 4. Breeding bird survey results for **June 21st, 2010.**

Date: June 21, 2010**Survey Start time: 05:45- 7:20****Weather: Sunny, 17C**

distance in metres Start 0545h Name	Station 80		Station 81		Station 82		Station 85	
	<100	>100m	<100	>100	<100	>100	<100	>100
Ring-billed Gull	1							
Mourning Dove		1			1	2		
Northern Flicker				1				
American Robin	1	4	3	3	1	3	2	1
Black-capped Chickadee	1		3					
Blue Jay	1	2	1				1	2
American Crow				1		2		2
Chestnut-sided Warbler								1
Ovenbird					1	1		
Common Yellowthroat	3		2		1			1
Red-winged Blackbird	1							
Brown-headed Cowbird			1					
Eastern Towhee	1				1	2		1
Chipping Sparrow	1		2				3	
Clay-colored Sparrow	1							
Field Sparrow	2						1	
Song Sparrow	3		2					
White-throated Sparrow		1	2		2			
Rose-breasted Grosbeak		1	1			1		1
American Goldfinch			1		2			

Appendix 5. Map of breeding bird point count plots. Image from Google Earth maps. Note: Yellow hatched line = approx. Project location.



Appendix 6. Checklist of wildlife species observed within 120 m of Project Location (Note: mammal list from regional surveys).

Scientific Name	Common Name	SRANK	COSEWIC	MNR	FAMILY
<i>Agelaius phoeniceus</i>	Red-winged Blackbird	S5B			ICTERIDAE
<i>Bombycilla cedrorum</i>	Cedar Waxwing	S5B			BOMBYCILLIDAE
<i>Cardinalis cardinalis</i>	Northern Cardinal	S5			CARDINALIDAE
<i>Carduelis tristis</i>	American Goldfinch	S5B			FRINGILLIDAE
<i>Carpodacus purpureus</i>	Purple Finch	S5B			FRINGILLIDAE
<i>Colaptes auratus</i>	Northern Flicker	S5B			PICIDAE
<i>Corvus brachyrhynchos</i>	American Crow	S5B			CORVIDAE
<i>Cyanocitta cristata</i>	Blue Jay	S5			CORVIDAE
<i>Dendroica pensylvanica</i>	Chestnut-sided Warbler	S5B			PARULIDAE
<i>Dumetella carolinensis</i>	Gray Catbird	S5B			MIMIDAE
<i>Gallinago delicata</i>	Wilson's Snipe	S5B			SCOLOPACIDAE
<i>Geothlypis trichas</i>	Common Yellowthroat	S5B			PARULIDAE
<i>Hylocichla mustelina</i>	Wood Thrush	S5B			TURDIDAE
<i>Mniotilta varia</i>	Black-and-white Warbler	S5B			PARULIDAE
<i>Molothrus ater</i>	Brown-headed Cowbird	S5B			ICTERIDAE
<i>Myiarchus crinitus</i>	Great Crested Flycatcher	S5B			TYRANNIDAE
<i>Pheucticus ludovicianus</i>	Rose-breasted Grosbeak	S5B			CARDINALIDAE
<i>Pipilo erythrophthalmus</i>	Eastern Towhee	S4B			EMBERIZIDAE
<i>Poecile atricapillus</i>	Black-capped Chickadee	S5			PARIDAE
<i>Quiscalus quiscula</i>	Common Grackle	S5B			ICTERIDAE
<i>Seiurus aurocapilla</i>	Ovenbird	S5B			PARULIDAE
<i>Spizella pallida</i>	Clay-colored Sparrow	S4B			EMBERIZIDAE
<i>Spizella passerina</i>	Chipping Sparrow	S5B			EMBERIZIDAE
<i>Spizella pusilla</i>	Field Sparrow	S5B			EMBERIZIDAE
<i>Toxostoma rufum</i>	Brown Thrasher	S5B			MIMIDAE
<i>Turdus migratorius</i>	American Robin	S5B			TURDIDAE
<i>Zenaidura macroura</i>	Mourning Dove	S5B			COLUMBIDAE
<i>Zonotrichia albicollis</i>	White-throated Sparrow	S5B			EMBERIZIDAE
<i>Rana clamitans</i>	Green Frog	S5			RANIDAE
<i>Rana pipiens</i>	Northern Leopard Frog	S5	NAR	NAR	RANIDAE
<i>Chelydra serpentina</i>	Snapping Turtle	S3	SC		CHELYDRIDAE
<i>Thamnophis sirtalis sirtalis</i>	Eastern Gartersnake	S5			COLUBRIDAE
<i>Canis latrans</i>	Coyote	S5			CANIDAE
<i>Castor canadensis</i>	Beaver	S5			CASTORIDAE
<i>Erethizon dorsatum</i>	Porcupine	S5			ERETHIZONTIDAE
<i>Mephitis mephitis</i>	Striped Skunk	S5			MEPHITIDAE
<i>Microtus pennsylvanicus</i>	Meadow Vole	S5			MURIDAE
<i>Odocoileus virginianus</i>	White-tailed Deer	S5			CERVIDAE
<i>Peromyscus maniculatus</i>	Deer Mouse	S5			MURIDAE
<i>Sciurus carolinensis</i>	Eastern Gray Squirrel	S5			SCIURIDAE
<i>Tamias striatus</i>	Eastern Chipmunk	S5			SCIURIDAE
<i>Tamiasciurus hudsonicus</i>	Red Squirrel	S5			SCIURIDAE
<i>Vulpes vulpes</i>	Red Fox	S5			CANIDAE

**Appendix 7. Checklist of vascular plant species observed within 120 m of
Project Location.**

Scientific Name	Common Name	SRANK	FAMILY
<i>Abies balsamea</i>	Balsam Fir	S5	PINACEAE
<i>Achillea millefolium var. millefolium</i>	Common Yarrow	SNA	ASTERACEAE
<i>Alisma triviale</i>	Northern Water-plantain	S5	ALISMATACEAE
<i>Amelanchier sanguinea var. sanguinea</i>		S5?	ROSACEAE
<i>Anemone canadensis</i>	Canada Anemone	S5	RANUNCULACEAE
<i>Aquilegia canadensis</i>	Wild Columbine	S5	RANUNCULACEAE
<i>Caltha palustris</i>	Marsh Marigold	S5	RANUNCULACEAE
<i>Carex atherodes</i>	Awned Sedge	S4S5	CYPERACEAE
<i>Carex bebbii</i>	Bebb's Sedge	S5	CYPERACEAE
<i>Carex brunnescens</i>	Brownish Sedge	S5	CYPERACEAE
<i>Carex gracillima</i>	Graceful Sedge	S5	CYPERACEAE
<i>Carex normalis</i>	A Sedge	S4	CYPERACEAE
<i>Carex scoparia</i>	Pointed Broom Sedge	S5	CYPERACEAE
<i>Carya cordiformis</i>	Bitter-nut Hickory	S5	JUGLANDACEAE
<i>Cornus foemina</i>	Stiff Dogwood	S5	CORNACEAE
<i>Danthonia spicata</i>	Poverty Oatgrass	S5	POACEAE
<i>Dipsacus laciniatus</i>	Cut-leaf Teasel	SNA	DIPSACACEAE
<i>Dryopteris carthusiana</i>	Spinulose Shield Fern	S5	DRYOPTERIDACEAE
<i>Dryopteris marginalis</i>	Marginal Wood-fern	S5	DRYOPTERIDACEAE
<i>Equisetum palustre</i>	Marsh Horsetail	S5	EQUISETACEAE
<i>Eupatorium maculatum ssp. maculatum</i>	Spotted Joe-pye Weed	S5	ASTERACEAE
<i>Eupatorium perfoliatum</i>	Common Boneset	S5	ASTERACEAE
<i>Fraxinus americana</i>	White Ash	S5	OLEACEAE
<i>Fraxinus pennsylvanica</i>	Green Ash	S5	OLEACEAE
<i>Galium aparine</i>	Catchweed Bedstraw	S5	RUBIACEAE
<i>Galium asprellum</i>	Rough Bedstraw	S5	RUBIACEAE
<i>Galium mollugo</i>	Great Hedge Bedstraw	SNA	RUBIACEAE
<i>Galium trifidum</i>	Small Bedstraw	S5	RUBIACEAE
<i>Geranium robertianum</i>	Herb-robert	SNA	GERANIACEAE
<i>Inula helenium</i>	Elecampane Flower	SNA	ASTERACEAE
<i>Iris versicolor</i>	Blueflag	S5	IRIDACEAE
<i>Juniperus communis</i>	Ground Juniper	S5	CUPRESSACEAE
<i>Laportea canadensis</i>	Wood Nettle	S5	URTICACEAE
<i>Leersia oryzoides</i>	Rice Cutgrass	S5	POACEAE
<i>Lonicera tatarica</i>	Tartarian Honeysuckle	SNA	CAPRIFOLIACEAE
<i>Lycopus americanus</i>	American Bugleweed	S5	LAMIACEAE
<i>Melilotus officinalis</i>	Yellow Sweetclover	SNA	FABACEAE
<i>Mentha x piperita</i>	Hybrid	SNA	LAMIACEAE
<i>Ostrya virginiana</i>	Eastern Hop-hornbeam	S5	BETULACEAE
<i>Parthenocissus vitacea</i>	Virginia Creeper	S5	VITACEAE
<i>Pastinaca sativa</i>	Wild Parsnip	SNA	APIACEAE
<i>Picea glauca</i>	White Spruce	S5	PINACEAE
<i>Pinus strobus</i>	Eastern White Pine	S5	PINACEAE
<i>Poa compressa</i>	Canada Bluegrass	SNA	POACEAE
<i>Poa palustris</i>	Fowl Bluegrass	S5	POACEAE
<i>Poa pratensis ssp. pratensis</i>		S5	POACEAE
<i>Polypodium virginianum</i>	Rock Polypody	S5	POLYPODIACEAE
<i>Potamogeton gramineus</i>	Grassy Pondweed	S5	POTAMOGETONACEAE
<i>Potamogeton natans</i>	Floating Pondweed	S5	POTAMOGETONACEAE

<i>Potamogeton pusillus ssp. pusillus</i>	Slender Pondweed	SU	POTAMOGETONACEAE
<i>Prunus serotina</i>	Wild Black Cherry	S5	ROSACEAE
<i>Prunus virginiana</i>	Choke Cherry	S5	ROSACEAE
<i>Quercus alba</i>	White Oak	S5	FAGACEAE
<i>Rhamnus alnifolia</i>	Alderleaf Buckthorn	S5	RHAMNACEAE
<i>Rhamnus cathartica</i>	Buckthorn	SNA	RHAMNACEAE
<i>Rhus aromatica</i>	Fragrant Sumac	S5	ANACARDIACEAE
<i>Rhus typhina</i>	Staghorn Sumac	S5	ANACARDIACEAE
<i>Sagittaria latifolia</i>	Broadleaf Arrowhead	S5	ALISMATACEAE
<i>Schoenoplectus tabernaemontani</i>	Soft-stem Club-rush	S5	CYPERACEAE
<i>Scirpus atrovirens</i>	Dark-green Bulrush	S5	CYPERACEAE
<i>Smilax herbacea</i>	Smooth Herbaceous Greenbrier	S4	SMILACACEAE
<i>Solidago canadensis var. canadensis</i>		S5	ASTERACEAE
<i>Solidago flexicaulis</i>	Broad-leaved Goldenrod	S5	ASTERACEAE
<i>Sparganium eurycarpum</i>	Large Bur-reed	S5	SPARGANIACEAE
<i>Symphyotrichum cordifolium</i>	Heart-leaf Aster	S5	ASTERACEAE
<i>Symphyotrichum lanceolatum ssp. lanceolatum</i>	Panicled Aster	S5	ASTERACEAE
<i>Symphyotrichum novae-angliae</i>	New England Aster	S5	ASTERACEAE
<i>Thuja occidentalis</i>	Eastern White Cedar	S5	CUPRESSACEAE
<i>Tilia americana</i>	American Basswood	S5	TILIACEAE
<i>Trifolium pratense</i>	Red Clover	SNA	FABACEAE
<i>Trifolium repens</i>	White Clover	SNA	FABACEAE
<i>Trillium grandiflorum</i>	White Trillium	S5	LILIACEAE
<i>Tsuga canadensis</i>	Eastern Hemlock	S5	PINACEAE
<i>Ulmus americana</i>	American Elm	S5	ULMACEAE
<i>Ulmus rubra</i>	Slippery Elm	S5	ULMACEAE
<i>Urtica dioica ssp. gracilis</i>		S5	URTICACEAE
<i>Utricularia vulgaris</i>	Greater Bladderwort	S5	LENTIBULARIACEAE
<i>Verbascum thapsus</i>	Great Mullein	SNA	SCROPHULARIACEAE
<i>Viburnum rafinesquianum</i>	Downy Arrowwood	S5	CAPRIFOLIACEAE
<i>Vicia cracca</i>	Tufted Vetch	SNA	FABACEAE
<i>Vicia tetrasperma</i>	Lentil Vetch	SNA	FABACEAE
<i>Waldsteinia fragarioides</i>	Barren Strawberry	S5	ROSACEAE
<i>Zanthoxylum americanum</i>	Northern Prickley Ash	S5	RUTACEAE

Appendix 8. Tree inventory of the Taylor-Kidd Project Location.

Axio Power, Taylor Kidd
Tree Assessment Report

Tree Bylaw for Loyalist Township, 2010-130

Prepared for: Axio Power Canada Inc.

Prepared by: David Smallwood

May 12, 2011

Report prepared for

Robert Barkley
Manager Project Development, Axio Power Canada Inc.
945 Princess Street, Suite 252
Kingston, ON, K7L 3N6
Tel 613-545-0215

Report prepared by

David Smallwood
321 Deshane Rd. RR2
Marlbank ON K0K 2L0
Tel 613-478-2888
Ontario Professional Foresters Association # 1988
Provincial Tree Marker Certification # TM-00333-L1

This report has been prepared to satisfy the requirements of the Tree Bylaw for the Loyalist Township, 2010-130.

Location of intended tree removal

Taylor Kidd Blvd. Part Lot 27 & 28, Concession 1, Loyalist Township (Ernestown), Lennox and Addington County
(maps attached)

Background and methodology

It is the intent of Axio Power to remove all of the trees on a 34.59-hectare portion of their 68.83-hectare property (see attached maps) in order to establish a 10-MW solar photovoltaic project. All tree cover north of Cooke's Creek and a buffer of 120 metres south of the creek will be retained.

Strip cruise lines were established on that portion of the property described as the project location with a 3% sampling intensity as the goal.

Information on tree species, diameter at breast height (Dbh), tree health/quality and stand history was collected.

Extrapolations of data collected were based on area determinations from information provided by Axio Power and measurements taken on the ground during the cruise.

It was determined that three distinct stands are present for a total of 34.59 hectares. None of these stands contains merchantable material from a forestry point of view.

No "distinctive trees" as outlined in the bylaw were encountered.

Stand 1 12.25 hectares
194.6 stems per hectare (>15cm Dbh)

Stand history

Spruce plantation established on abandoned agricultural land.

Species	% Composition	Average Dbh cm (range cm)	Comments
Sw	100	19.02 (16-30)	20+-year old plantation with a 1.8mX2.4 spacing No trees less than 15cm were measured

Stand 2 19.34 hectares
382 stems per hectare (>15cm Dbh)

Stand history

Abandoned agricultural land reverting to forest cover.

Species	% Composition	Average Dbh (cm) (range cm)	Comments
Cer	77	21.76 (15-50)	
Ew	8.9	19.5 (15-30)	>70% *UGS Dutch elm disease
Ce	8.9	24.9 (15-44)	
Aw	1.3	16 (15-17)	50% UGS dieback
Ag	1.3	30 (24-36)	60% UGS dieback
Ob	1.3	25 (24-26)	100% **AGS
His	1.3	23 (18-28)	80% AGS

*UGS-unacceptable growing stock, trees that have a high risk of dying or are expected to decline over the next 20 years

**AGS-acceptable growing stock, trees that may be suitable for retention and not expected to decline in the next 20 years

Stand 3 3 hectares
 301 stems per hectare (>15cm Dbh)

Stand history

White pine plantation established on abandoned agricultural land.

Species	% Composition	Average Dbh (cm) (range cm)	Comments
Pw	100	17.67 (16-36)	White pine blister rust and weevil present (30% UGS)

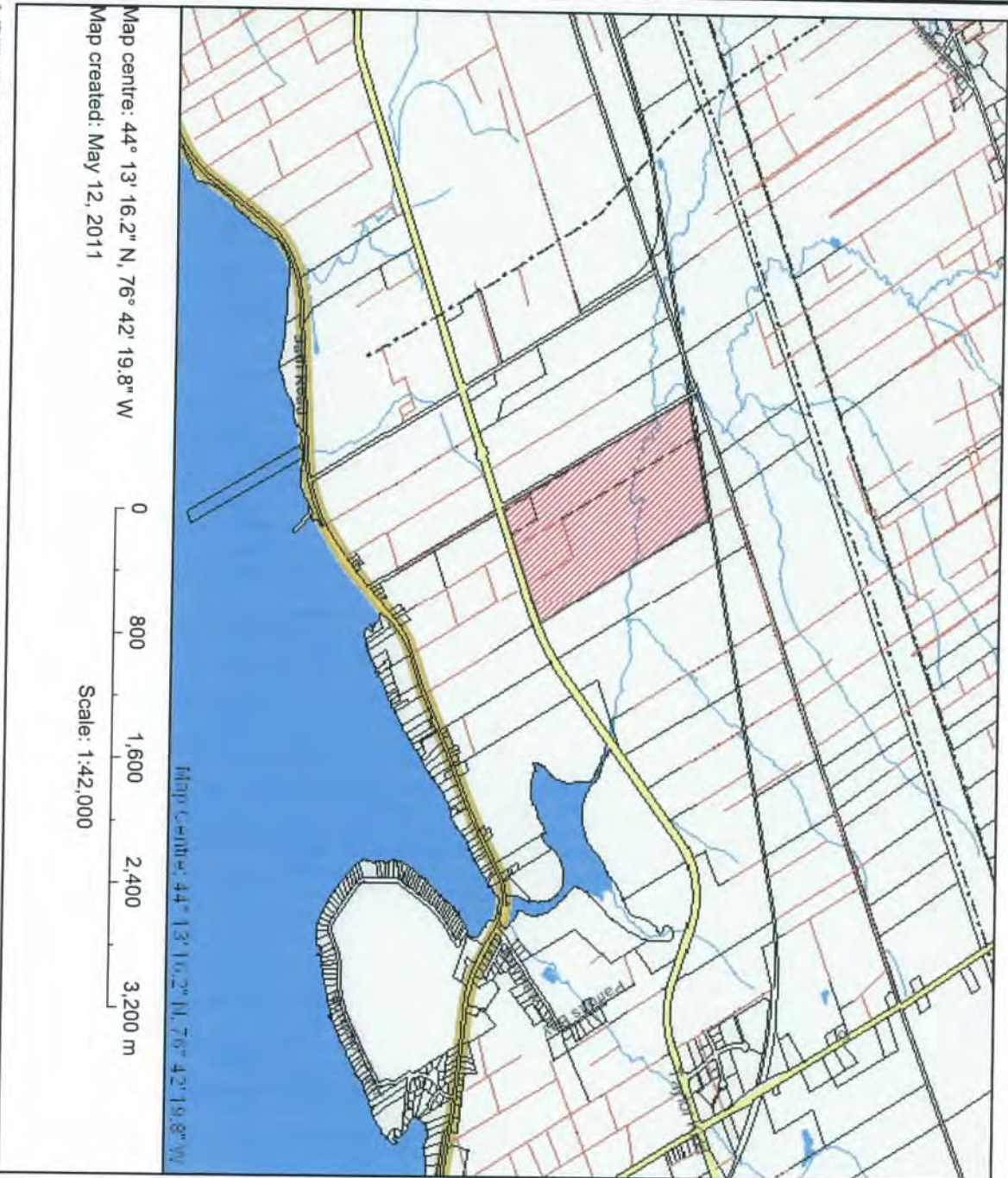
Species Code	Common name	Genus	Species
Ag	Green (Red) Ash	Fraxinus	pennsylvanica
Ce	White Cedar	Thuja	occidentalis
Cer	Eastern Red Cedar	Juniperus	virginiana
Ew	White Elm	Ulmus	americana
Pw	White Pine	Pinus	strobus
Aw	White Ash	Fraxinus	americana
His	Shagbark Hickory	Carya	ovata
Ob	Bur Oak	Quercus	macrocarpa
Sw	White Spruce	Picea	glauca

Recommendations

In order to achieve the stated long term goal of the Tree Bylaw for Loyalist Township to at least maintain, if not increase, the amount of tree coverage in the City", the following suggestions are made;

1. Assess those portions of the property (Part Lot 27 & 28, Concession 1, Loyalist Township (Ernestown), Lennox and Addington County) that will not be affected by the project to determine suitability for tree planting. If a portion of the property can be planted with a reasonable expectation of seedling survival, it is suggested that planting commence in the spring of 2012. The tree planting prescription will be prepared in 2011 and submitted to Loyalist Township for approval. Lack of access to the

Pt L 27 & 28 Ernestown Key Map



Map centre: 44° 13' 16.2" N, 76° 42' 19.8" W
 Map created: May 12, 2011

Scale: 1:42,000

Map Centre: 44° 13' 16.2" N, 76° 42' 19.8" W

For QTA 1995 and 1999 Imagery: Source Data provided by Ontario Ministry of Natural Resources & Copyright Thomson Ltd 1999. All rights Reserved.
 For QTA 2005 Imagery: Source Data provided by Ontario Ministry of Natural Resources & Copyright Thomson Ltd 1999. All rights Reserved.
 For SMOOP 2008 Imagery: Source Data provided by Ontario Ministry of Natural Resources & Copyright Thomson Ltd 1999. All rights Reserved.
 For 2008 Forest Resource Inventory (FRI) Digital Aerial Photographic data: Source Data provided by Ontario Ministry of Natural Resources & Copyright Thomson Ltd 1999. All rights Reserved.
 For Land Use Inventory: Source Data provided by Ontario Ministry of Natural Resources & Copyright Thomson Ltd 1999. All rights Reserved.
 © Copyright for Ontario Parcel Data is held by Queen's Printer for Ontario and is licensed (2009) and may not be reproduced without permission. This is NOT A PLAN OF SURVEY.



Ontario
 © Queen's Printer for Ontario, 2010

Legend

- Fence
- Pipeline 50K (NTS)
- Transmission Line 50K (NTS)
- Assessment Parcels
- Freeways
- Highways
- Arterial Roads
- Collector Roads
- Local Roads
- Rivers and Streams 20K
- Lakes and Ponds 20K
- Province

This map should not be relied on as a precise indicator of routes or locations, nor as a guide to navigation. The Ontario Ministry of Natural Resources (OMNR) shall not be liable in any way for the use of, or reliance upon, this map or any information on this map.

This map was produced automatically by the LIO Make a Map Website, a Ministry of Natural Resources website.

northern portions of the property may preclude tree planting opportunities.

2. If a suitable site cannot be located on the property then the local Planting Delivery Agencies for Trees Ontario (Catarauqui Region Conservation or Lennox and Addington Stewardship Council) shall be contacted and funding offered for tree planting projects within the municipality for an agreed upon number of seedlings.
3. A third option could be providing local schools with an agreed upon number of seedlings for students to plant at their own homes or for schoolyard naturalization projects.
4. In addition, a visual buffer of wildlife shrubs (species to be determined) could be established along the Taylor Kidd boundary of the project.