

Natural Heritage Assessment

Site Investigation Report

SunE Westbrook

Solar Energy Project

FIT Contract Number: FIT-FDNXGQE

prepared for

SunEdison

DRAFT



ECOLOGICAL SERVICES

Report Author Signature

Dale Kuster

Date

November 30, 2011

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1. Introduction

SunEdison, LLC (SunEdison) is proposing to develop a 10 megawatt (MW) solar photovoltaic project titled SunE Westbrook Solar Energy Project. This project has received a 20-year Feed-in Tariff contract from the Ontario Power Authority (FIT Reference Number: FIT0FDNXGQE). The Project Location¹ is a 40 hectare (ha) parcel situated on Pt Lots 4 and 5, Concession 5 WD, within the City of Kingston (single tier municipality) County of Frontenac and within Madoc Ecodistrict 6E-9. The longitude and latitude are 44.300458 and 76.632893.

Additional information regarding the project, including the draft project description report, is available on the study website at www.sunedison.ca/westbrook.

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 - Genivar, 2011a) are correct and identifying any required corrections;
- b) whether any additional natural features exist, other than those that were identified in the NHARR (Genivar, 2011a);
- c) the boundaries, located within 120 m of the Project Location, of any natural feature that was identified in the NHARR (Genivar, 2011a) 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 (Genivar, 2011a) 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 (Genivar, 2011a) and in the site investigation, including the type, attributes, composition and function of the feature.
3. A map showing, the boundaries of any natural feature that was identified in the NHARR (Genivar, 2011a) 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.

“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))

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. Report Preparation and Qualifications

SunEdison 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 (as amended). 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:

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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.
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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. 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 (Genivar, 2011a) is provided in Table 3.1.

Table 3.1. Summary of Records Review Determinations for Westbrook SunE Solar Energy Project (Genivar, 2011a).

Determination to be Made	Yes/No	Description
Located in or within 120 m of a provincial park or conservation reserve	No	<ul style="list-style-type: none"> The Project Location is not within 120 m of a provincial park or conservation reserve.
Within the Protected Countryside	No	<ul style="list-style-type: none"> The Project Location is not within the designated Greenbelt Area Protected Countryside.
Within the Oak Ridges Moraine Conservation Plan Area		<ul style="list-style-type: none"> The Project Location is not within the Oak Ridges Moraine Conservation Plan Area
In a natural feature as described by Section 25 of O'Reg 359/09	No	<ul style="list-style-type: none"> The Project Location is not located within a natural feature as described by Section 25 of O'Reg 359/09.
Within 50 m of an Area of Natural or Scientific Interest	No	<ul style="list-style-type: none"> The Project Location is not located within 50 m of an Area of Natural or Scientific Interest. The Howes Road Alvar is located approximately 700 m west of the Project Location.
Within 120 m of a natural feature other than an ANSI	Yes	<ul style="list-style-type: none"> The Project Location is located within 120 m of a natural feature other than an ANSI. Two unevaluated wetlands exist towards the north end of the Project Location and within the 120 m buffer Significant woodlands exist on the Project Location or adjacent lands.

The **NHARR** (Genivar, 2011a) identified 22 species of conservation concern (not including 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.

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.

Table 3.2 Species of conservation concern identified in the NHARR and their preferred habitat type (note: list does not include species designated as threatened or endangered under SARO).

Species Of Conservation Concern	Habitat Guild				
	Woodland	Grassland	Shrub/Early Successional	Wetland	Other
Plants					
Moss (<i>Grimmia olneyi</i>)					✓
Carolina Whitlow-grass (<i>Draba reptans</i>)		✓			
Bowman's-root (<i>Porteranthus trifoliatus</i>)				✓	
Branching Burreed (<i>Sparganium androcladum</i>)				✓	
Amphibians and Reptiles					
Five-lined skink (<i>Plestiodon fasciatus</i>) – Great Lakes Population	✓				
Map turtle (<i>Graptemys geographica</i>)				✓	
Snapping Turtle (<i>Chelydra serpentina</i>)				✓	
Eastern Ribbonsnake (<i>Thamnophis sauritus</i>) Great Lakes Population			✓	✓	
Eastern Milksnake (<i>Lampropeltis triangulum</i>)	✓	✓	✓		
Birds					
American Kestrel (<i>Falco sparverius</i>)		✓			
Barn Swallow (<i>Hirundo rustica</i>)		✓			✓
Black Tern (<i>Chlidonias niger</i>)				✓	
Canada Warbler (<i>Wilsonia canadensis</i>)	✓				
Clay-coloured Sparrow (<i>Spizella pallida</i>)		✓			
Common Nighthawk (<i>Chordeiles minor</i>)	✓		✓		
Eastern Meadowlark (<i>Sturnella magna</i>)		✓			
Northern Harrier (<i>Circus cyaneus</i>)		✓		✓	
Red-headed Woodpecker (<i>Melanerpes erythrocephalus</i>)	✓				
Short-eared Owl (<i>Asio flammeus</i>)		✓			
Upland Sandpiper (<i>Bartramia longicauda</i>)		✓			
Vesper Sparrow (<i>Pooecetes gramineus</i>)		✓	✓		
Whip-poor-will (<i>Caprimulgus vociferous</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 6 and 7.

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.

3.3. 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 (Genivar, 2011b).
- ii. A physical survey of areas within 120 m of the Project Location was conducted by Ecological Services on April 6, 2011 to assess potential constraints including amphibian breeding habitat and raptor nesting habitat.
- iii. A physical survey of areas within 120 m of the Project Location was conducted by Ecological Services staff on June 1, 2011, the main purpose of which was to characterize and map vegetation and associated habitats (Table 2).
- iv. A breeding bird survey was conducted by Ecological Services staff on June 5 and June 12, 2011.
- v. An evening bird survey was conducted on June 14, 2011 by Ecological Services staff.
- vi. 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 *NHARR* was submitted to Genivar in July 2011.

Table 3.3 Site visit summary table for the SunE Westbrook Solar Energy Project.

Date of Survey	Time	Weather Conditions	Surveyor	Purpose of Visit
April 6, 2011	07:45-10:30	Overcast, light snow -3°C	Dale Kristensen	Preliminary site constraints, amphibian breeding habitat, nesting raptor surveys
June 1, 2011	09:10-12:15	Sunny, light wind, 25°C	Dale Kristensen	Vegetation and habitat surveys
June 5, 2011	05:59 - 08:00	Overcast, 18°C, no wind	Chris Grooms	Breeding bird point count assessment
June 12, 2011	05:58-08:00	Clear, 20°C, light wind	Chris Grooms	Breeding bird point count assessment
June 14, 2011	21:20-22:30	Clear, full moon, 22°C	Chris Grooms	Whip-poor-will survey

3.4. 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* (Genivar, 2011a) 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 identified in the *NHARR* (Genivar, 2011a) 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 1.

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.

Breeding bird point count surveys of the Project Location were 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 2) in accordance with minimum spacing requirements to reduce incidences of observational overlap. An additional evening survey was conducted to determine the presence of Whip-poor-will, an evening caller. 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.

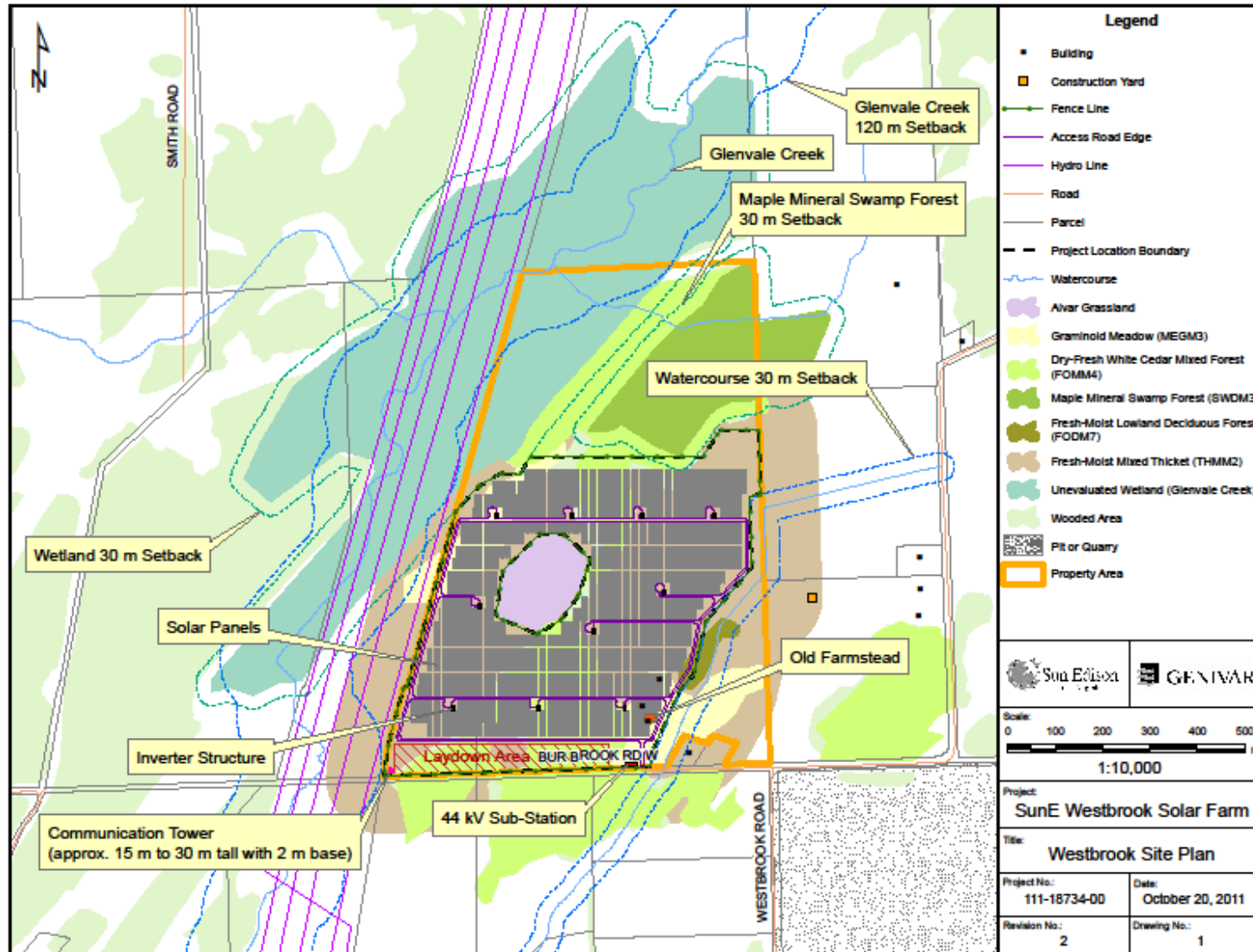
Other wildlife species of interest (e.g., butterflies, mammals) were recorded as encountered from direct observation, or from other signs of their presence (tracks, scat, den sites, etc.).

All vascular plant species encountered were recorded and used to characterize ELC community types. A plant checklist is provided in Appendix 5 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. Confirmation and Assessment of Natural Features

The presence / absence of natural features identified in the *NHARR* (Genivar, 2011a) was verified during the site investigation and are discussed in the following sections. The Project Location Site Plan and 120 m setbacks is shown in Figure 4.1.

Figure 4.1 Project Location Site Plan



4.1. Area of Natural and Scientific Interest

The information sources reviewed in the NHARR (Genivar, 2011a) 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, 2011), 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 there is no requirement for these features to be carried forward to the Natural Heritage Assessment Evaluation of Significance Report.

4.2. Valleylands

The information sources reviewed in the *NHARR* (Genivar, 2011a) did not identify significant valleyland within 120 m of the Project Location. Glenvale Creek to the west of the Project Location is situated within a local low-lying depression that contains a wetland, a portion of which overlaps the northwest corner within 120 m of the Project Location.

Conclusion: Candidate significant valleyland does not occur on or within 120 m of the Project Location. This natural feature will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

4.3. Wetlands

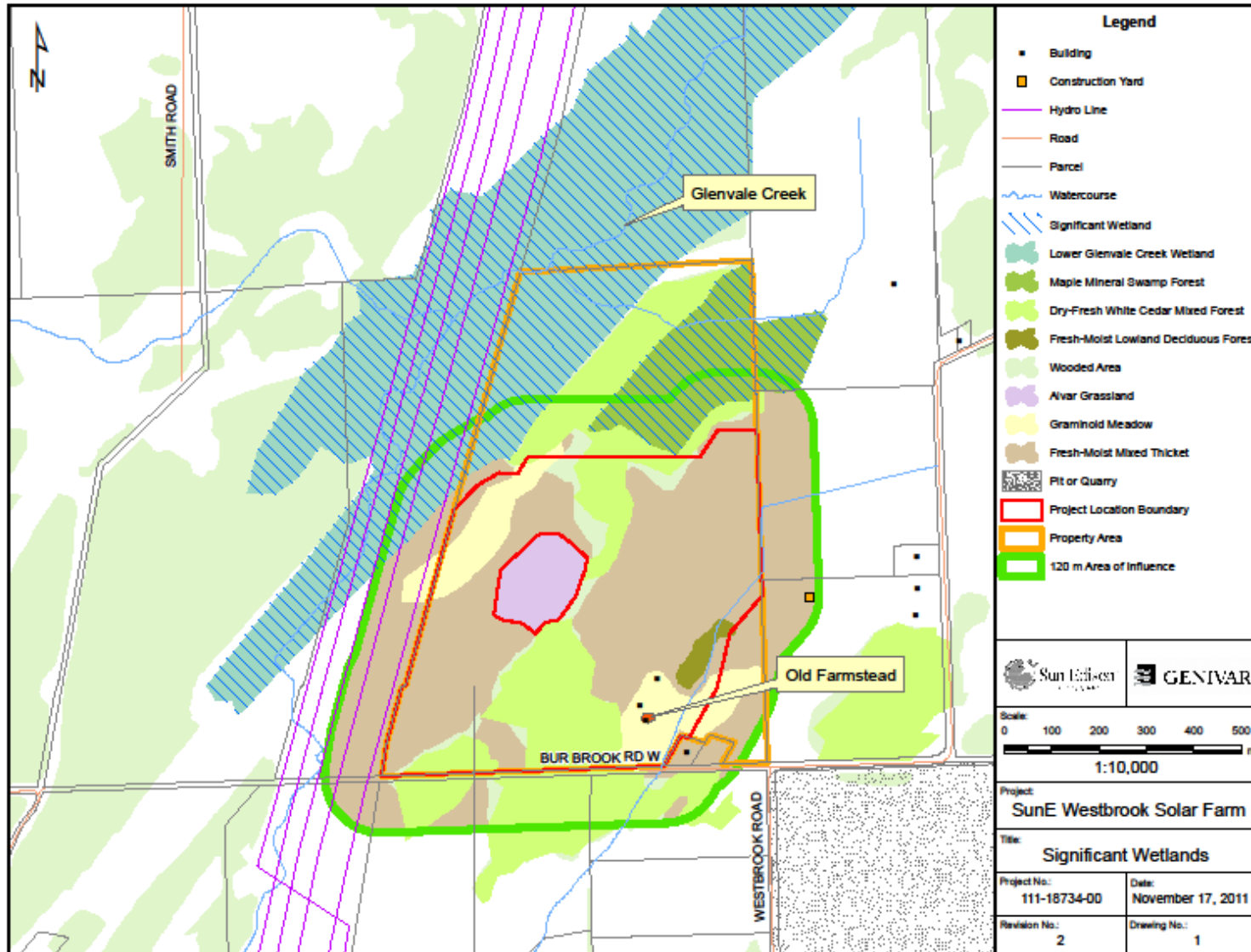
The information sources reviewed in the *NHARR* (Genivar, 2011a) identified an unevaluated wetland complex, portions of which occur within 120 m of the Project Location. During the site investigation two separate features of this wetland complex were investigated. To the north of the Project Location is a 9 ha palustrine treed swamp (SWDM3), of which 1.5 ha is within the 120 m setback (Figure 4.2). The woodland components of this feature are described in Section 4.4 below. This wetland is maintained by diffuse seasonal runoff from adjacent lands and by a small seasonal creek that flows west into Glenvale Creek. Glenvale Creek is bordered by a large riparian wetland system of approximately 160 ha and includes both marsh and swamp components. Approximately 2.5 ha of swamp thicket is within 120 m of the Project Location (Figure 4.2).

Conclusion: The site investigation confirmed the presence of a wetland complex, parts of which overlap the 120 m setback. Accordingly, this feature will be treated as a provincially significant wetland as per Section 6.2.1 of the NHA renewable Energy Guide (MNR 2011) and will be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

4.4. 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:

Figure 4.2 Candidate significant wetlands and watercourses within 120 m of the Project Location



- 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.

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

The NHARR (Genivar, 2011a) 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.
- The Cataraqui Region Conservation Authority (CRCA) prepared a natural heritage assessment of the local region (CRCA 2006) that identifies significant woodland on and within 120 m of the Project Location. This designation was based on linkage functions.

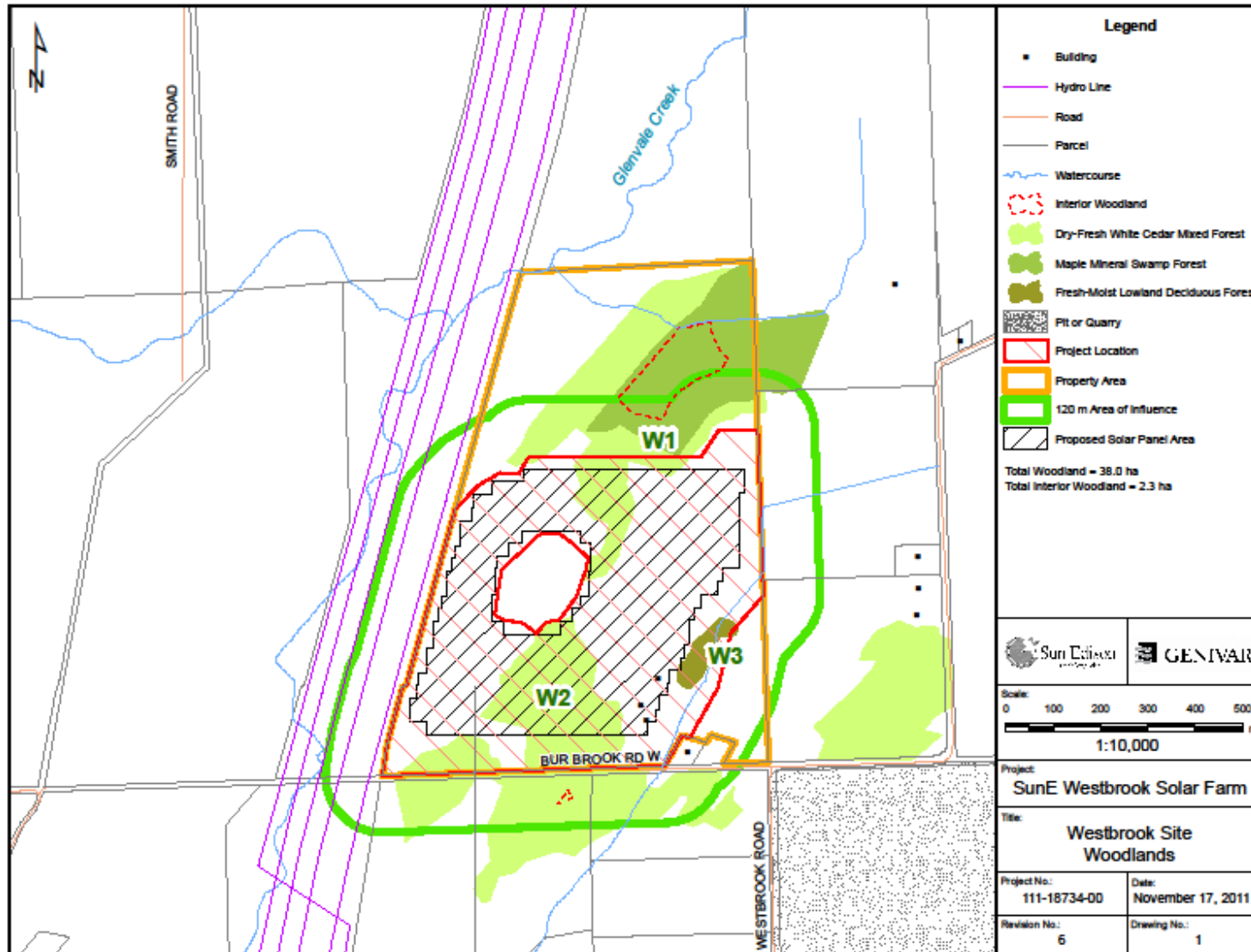
For the *SI*, woodland boundaries were verified from satellite imagery and from observations made during the field surveys (Figure 4.3). As per subsection 26 (3) of the REA Regulation, any corrections made to the woodland information from observations made during the *SI* are summarized in Table 5.1, Section 5.1 - Corrections Required in the *Natural Heritage Assessment Records Review Report*. Woodland areas were determined through ArcGIS 9.3 analysis of Google Earth images and LIO mapping of contiguous woodland cover. Accordingly, three woodlands were identified on and within 120 m of the Project Location (Figure 4.3). Woodland north of the Project Location (**W1**) consists of a 9 ha stand of swamp forest (*Maple Mineral Swamp Forest – SWDM3*) bordered on the south by an 8 ha stand of upland mixed forest (*Dry-Fresh White Cedar Mixed Forest – FOMM4*). A total of 4 ha of this woodland occurs within the 120 m setback with a 2 ha arm of upland forest extending onto the Project Location.

Woodland to the south of the Project Location (**W2**) consists of a 15 ha stand of upland mixed forest of the same type as indicated above (*Dry-Fresh White Cedar Mixed Forest – FOMM4*), of which 7 ha extends onto the Project Location. Woodland to the east of the Project Location (**W3**) consists of a 0.5 ha patch of lowland deciduous forest (*Fresh-Moist Lowland Deciduous Forest – FODM7*), all of which is within the Project Location.

Remaining vegetation communities occurring within the Project Location include 23.5 ha of *Fresh-Moist Mixed Thicket (THMM2)*, 4.5 ha of *Graminoid Meadow* and a 3 ha *Open Alvar (RBOA1-4)* community.

Information on individual stand characteristics is presented below, while Table 4.1 provides a summary of attributes for the two woodlands as they relate to the requirements of the REA regulations.

Figure 4.3 Woodlands within 120 m of the Project Location



4.4.2. ELC Forest Stand Types Associated with Identified Woodlands.

- *Dry-fresh White Cedar Mixed Forest (FOMM4)*: Tree cover within these two stands is variable, but generally >60% (Figure 4.4). The stands are dominated by white cedar, white spruce, white pine, green ash, and white elm, interspersed by open patches of gray dogwood, honeysuckle, raspberry and dense herbaceous growth (Canada bluegrass, Canada goldenrod, and sedges). Stand age is less than 50 years, but there are remnant trees along old fence lines (mainly bur oak) approaching 100 years. Soils are shallow and dry across upland portions, with seasonal inundation occurring within poorly drained, low-lying areas across central and southwest portions of the Project Location.



Figure 4.4. Typical condition of conifer dominated mixed forest stand within Project Location.

- *Maple Mineral Deciduous Swamp (SWDM3)*: A 9 ha stand of mature deciduous swamp forest occurs to the north of a minor bedrock relief feature (1 m drop) separating upland mixed forest communities from lowland. Tree cover is dominated by silver and red maple, with black ash and white elm subdominants (Figure 4.5). During the site survey in June, shallow vernal pools and facultative wetland plants (sedges and sensitive fern) were observed. Stand age is estimated at 75-100 years.



Figure 4.5. Maple swamp forest north of Project Location.

- *Lowland Deciduous Forest (FODM7):* A 0.5 ha swath of mid-seral deciduous forest occurs along a seasonally intermittent watercourse to the east of the Project Location. Tree cover is dominated by green ash, red maple and white elm. Stand age is estimated at 50 years.

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

Ecological Characteristic	Description
Type(s)	<i>W1: Dry-Fresh White Cedar Mixed Forest (FOMM4); Maple Mineral Swamp Forest (SWDM3)</i>
Attributes	<p>Location: mainly north of the Project Location and partly within 120 m adjacent lands.</p> <p>Size: 17 ha woodland of which 2 ha extends south onto the Project Location</p> <p>Shape: oblong with a south extending arm</p> <p>Topography: flat with a 1 m bedrock relief separating upland forest from the swamp forest</p> <p>Adjacent Land Use: mainly natural lands with successional thicket on abandoned farmland</p> <p>Soils: fresh-moist mesic loams of variable depth, minor exposed limestone relief</p>
Composition	See stand descriptions (Section 4.4.2)
Ecological Function	<p>Woodland interior: 2 ha woodland interior present to north of Project Location</p> <p>Proximity to other significant natural features: woodland is within 30 m of a significant natural feature (wetland).</p> <p>Linkages: woodland is not within 120 m of significant forest</p> <p>Water Protection: SWDM3 swamp is within 50 m of a seasonal watercourse</p> <p>Woodland Diversity Representation: W1 includes native stand types identified in the NHRM as experiencing major reductions in their natural distribution.</p> <p>Uncommon characteristics: there are no old growth features present meeting the minimum size criterion in the form of large trees >100 years of age</p>
Type(s)	<i>W2: Dry-Fresh White Cedar Mixed Forest (FOMM4)</i>
Attributes	<p>Location: south of and partly overlapping Project Location</p> <p>Size: 15 ha woodland of which 9 ha overlaps the Project Location</p> <p>Shape: irregular</p> <p>Topography: very flat, few undulations, poorly to moderately well drained</p> <p>Adjacent Land Use: residential and abandoned agricultural</p> <p>Soils: dry-fresh mesic loams of variable depth</p>
Composition	See stand descriptions (Section 4.3.1.1)
Ecological Function	<p>Woodland interior: 0.3 ha woodland interior</p> <p>Proximity to other significant natural features: woodland is not within 30 m of significant forest or other natural feature.</p> <p>Linkages: woodland is not within 120 m of significant regional forest cover.</p> <p>Water Protection: Woodland is within 50 m of a seasonal watercourse</p> <p>Woodland diversity representation: W2 includes native stand types identified in the NHRM as experiencing major reductions in their natural distribution.</p> <p>Uncommon characteristics: No uncommon features present.</p>

Ecological Characteristic	Description
Type(s)	W3: Fresh-Moist Lowland Deciduous Forest (FODM7)
Attributes	<p>Location: east side of the Project Location bordering an intermittent stream</p> <p>Size: 0.5 ha</p> <p>Shape: linear</p> <p>Topography: flat with some low-lying pockets that are poorly drained</p> <p>Adjacent Land Use: mainly natural lands with successional thicket on abandoned farmland</p> <p>Soils: fresh-moist mesic loams of variable depth</p>
Composition	See stand descriptions (Section 4.4.2)
Ecological Function	<p>Woodland interior: none</p> <p>Proximity to other significant natural features: n/a</p> <p>Linkages: n/a</p> <p><i>Water Protection: woodland borders a small seasonal creek.</i></p> <p>Woodland Diversity Representation: woodland includes native stand types identified in the NHRM as experiencing major reductions in their natural distribution.</p> <p>Uncommon characteristics: there are no old growth features present</p>

Conclusion: Woodlands with an identified ecological function (water protection) occur within 120 m of the Project Location. These candidate significant woodlands will be carried forward to the Natural Heritage Assessment Evaluation of Significance Report.

4.5. 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*).

4.5.1. 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 graminoid 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). For a designation of significance within Site Region 6E, candidate habitat should support 100 or more waterfowl from a list of waterfowl species including American Black Duck, Northern Pintail, Gadwall, Blue-winged Teal, American Green-winged Teal, American Widgeon, Northern Shoveler and Tundra Swan.

A 53 ha riparian wetland community (mineral deciduous thicket swamp) associated with Glenvale Creek occurs west of the Project Location, but habitat suitable for waterfowl stopover and staging as described above is located >120 m from the Project Location. None of the waterfowl species indicated in the evaluation criteria were observed during the site investigations. Site conditions within the Project Location are not considered suitable as there are no open flooded areas of thicket or meadow present (seasonal inundation does occur but thicket growth is dense).

Conclusion: Candidate significant *waterfowl stopover and staging areas (terrestrial)* found on or within 120 m of the Project Location will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*

- ii. ***Waterfowl stopover and staging areas (aquatic)***: The wetland associated with Glenvale Creek that occurs adjacent to the Project Location possesses open water components (as determined from recent satellite image analysis from Google Earth) which may provide aquatic habitat for some waterfowl species. However, these open water features are >120 m from the Project Location. Candidate significant habitat supportive of waterfowl stopover and staging areas (aquatic) is therefore not considered to be present.

Conclusion: Candidate significant *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.

Wetland habitat occurs within 120 m of the Project Location (swamp forest, thicket swamp), and a colonial breeder (Great Blue Heron) was observed during the site surveys. However, no heronries occur within 120 m of the Project Location and no other colonial nesting species or their habitats were encountered.

Conclusion: Candidate significant *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: Wilson`s Snipe, Killdeer, Spotted Sandpiper and Wilson`s Phalarope.

Four Wilson`s Snipe were observed within wet thicket areas on the Project Location during the *SI*. However, candidate significant migratory stopover habitat as described in the *Ecoregion Criteria Schedules* (MNR, 2009) does not occur within 120 m of the Project Location.

Conclusion: Candidate significant *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.

The Project Location includes forest habitat types potentially supportive of migratory birds, but these features are >5 km north of Lake Ontario. Accordingly, candidate *songbird migratory stopover area habitat* is not considered to be present on and within 120 m of the Project Location.

Conclusion: Candidate significant *songbird migratory stopover area habitat* will not 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 and 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, and Snowy Owl (MNR, 2009). Other raptor species considered during the site investigation include: Barred Owl, Cooper's Hawk, Eastern Screech-Owl, Great Horned Owl, Long-eared Owl, Northern Goshawk, Northern Hawk Owl, Northern Saw-whet Owl, and Sharp-shinned Hawk.

Neither of the potentially supportive woodland habitats associated with the Project Location are >20 ha in size and no raptors were observed during the early April field survey or at any other time.

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 (Genivar, 2011a) determined that there are no confirmed *bat hibernacula, winter roosts and maternal colonies* on or within 120 m of the Project Location (*note: OMNR wind resource mapping show a bat hibernaculum approximately 20 km north of the Project Location*). 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 (Genivar, 2011a). 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 is unknown. There are no caves or karst topography on or within 120 m of the Project Location that would provide suitable bat hibernacula. A search of the abandoned farmhouse located to the southeast of the Project Location within 120 m adjacent lands did not encounter bats or evidence of their presence (droppings).

Conclusion: Candidate significant *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. The Project Location is >5 km from the Lake Ontario shoreline and no monarch butterflies were encountered during the field investigations.

Conclusion: Candidate significant *butterfly migratory route/stopover area habitat* will not 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.

Potential snake hibernacula, e.g., a collapsed barn structure were examined on April 6, and June 1, 2011, but no snakes or evidence of their presence were observed. It was noted that there is no subterranean foundation structure associated with the barn. No other features present within 120 m of the Project Location that possess qualities suitable for snake hibernacula (e.g., south-facing limestone ridges, crevices, etc.) were observed.

Conclusion: *Snake hibernaculum* will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

- 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 areas* 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 (Genivar, 2011a). *Deer wintering area habitat* does not occur on or within 120 m of the Project Location.

Conclusion: Candidate significant *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 observed (or any number of American bullfrogs).

Large numbers of gray treefrogs were heard calling from within the swamp forest north of the Project Location during an evening breeding bird survey (June 14, 2011) and other species are presumed to be present (e.g., wood frog, spring peeper) given the characteristics of the site (pools, down woody debris, lack of disturbance) (Figure 4.6).

Amphibian breeding habitat also occurs within the shrub thicket and marsh wetland communities associated with Glenvale Creek.

Conclusion: Candidate significant *amphibian breeding habitat* found on or within 120 m of the Project Location will be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.



Figure 4.6. Vernal pools within swamp forest north of Project Location.

4.5.1.1. Summary of Candidate Significant Habitats or Seasonal Concentration Areas

One candidate significant habitat of seasonal concentration areas was identified on and within 120 m of the Project Location and will be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report* (Figure 4.7). This habitat was identified as:

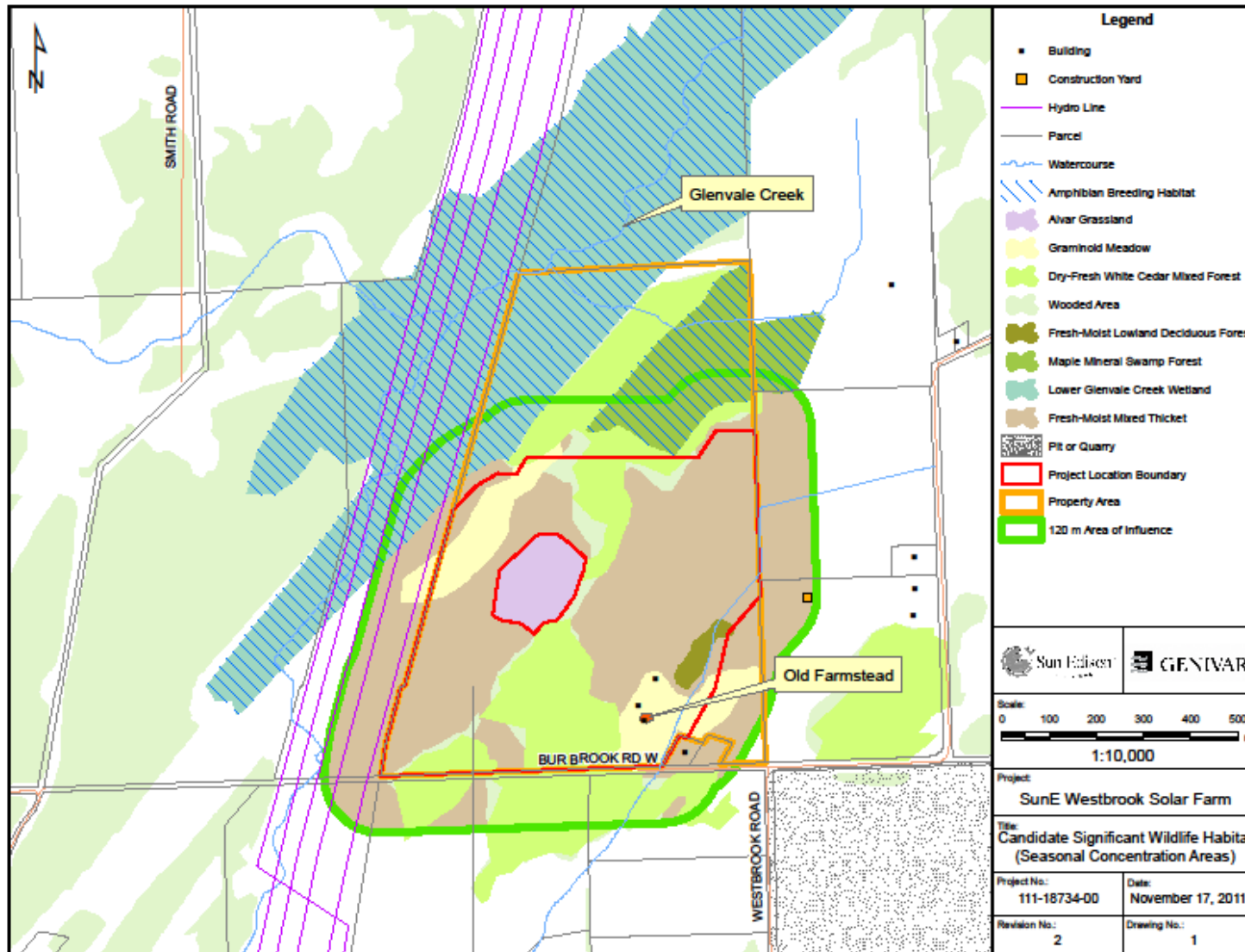
- ***Amphibian breeding habitat***

4.5.2. 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 5 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

Figure 4.7 Candidate Significant Habitats or Seasonal Concentration Areas



S-ranks 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.

Much of the natural vegetation communities within this local area are of secondary or tertiary growth on shallow soils over limestone bedrock. Local topography is generally flat with moderate to poor drainage. Early and mid-successional vegetation community types tend to be patchy with indistinct borders (i.e., broad ecotones); although remnant, mature trees occur along fencerows. Small (i.e., <0.2 ha), seasonally inundated areas occur within low-lying areas of the Project Location. Owing to the timing of the survey seasons, not all plant species that potentially occur on the site were found; however, representative species were noted for each community.

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 Madoc Ecodistrict 6E-9.

- Common Juniper – Fragrant Sumac – Hairy Beardtongue Alvar Shrubland – Globally and provincially rare based on conservation ranks of G2?, S2
- Dry – fresh White Pine Coniferous Forest Type – Globally rare based on a conservation rank of G3G4
- Dry Bur Oak – Shagbark Hickory Tallgrass Woodland Type – Globally and provincially rare based on conservation ranks of G?, S1
- Moist – Fresh Sugar Maple – Black Maple Deciduous Forest Type – Globally and provincially rare based on conservation ranks of G?, S3?
- Philadelphia Panic Grass – False Pennyroyal Alvar Pavement Type – Globally and provincially rare based on conservation ranks of G1Q, S1
- 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
- White Cedar – Jack Pine – Shrubby Cinquefoil Treed Alvar Pavement – Globally and provincially rare based on conservation ranks of G1G2, S1
- White Cedar – White Spruce – Philadelphia Panic Grass Treed Alvar Grassland Type – Globally and provincially rare based on conservation ranks of G3?, S3
- Winterberry Organic Thicket Swamp Type – Globally and provincially rare based on conservation ranks of G3G4Q, S3S4

One rare vegetation community (Alvar Grassland - *RBOA1-4*) was found on the Project Location during the site investigations. This community is approximately 3 ha in size, locally distinctive and surrounded by white cedar-white spruce. The dominant species were Canada Bluegrass, Philadelphia Panic Grass and Balsam Ragwort, with alvar indicators including Prairie Smoke, False Pennyroyal and Upland White Aster. In terms of a defined alvar community, it is considered to match most closely to a Tufted Hairgrass – Canada Bluegrass – Philadelphia Panic Grass Alvar Grassland Type. All other community types encountered within 120 m of the Project Location have an S-rank of S5. A checklist of vascular plants identified on the Project Location is shown in Appendix 56. All plant species encountered are common native species with an S-rank of S5, S4, or non-native (SNA).

Conclusion: A candidate significant rare vegetation community (Alvar Grassland) found on the Project Location will be carried forward to the Natural Heritage Assessment Evaluation of Significance Report.

4.5.2.1. Summary of Candidate Significant Rare Vegetation Community Habitat

One candidate significant rare vegetation community type was encountered and will be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report* (Figure 4.8).

- *Alvar*

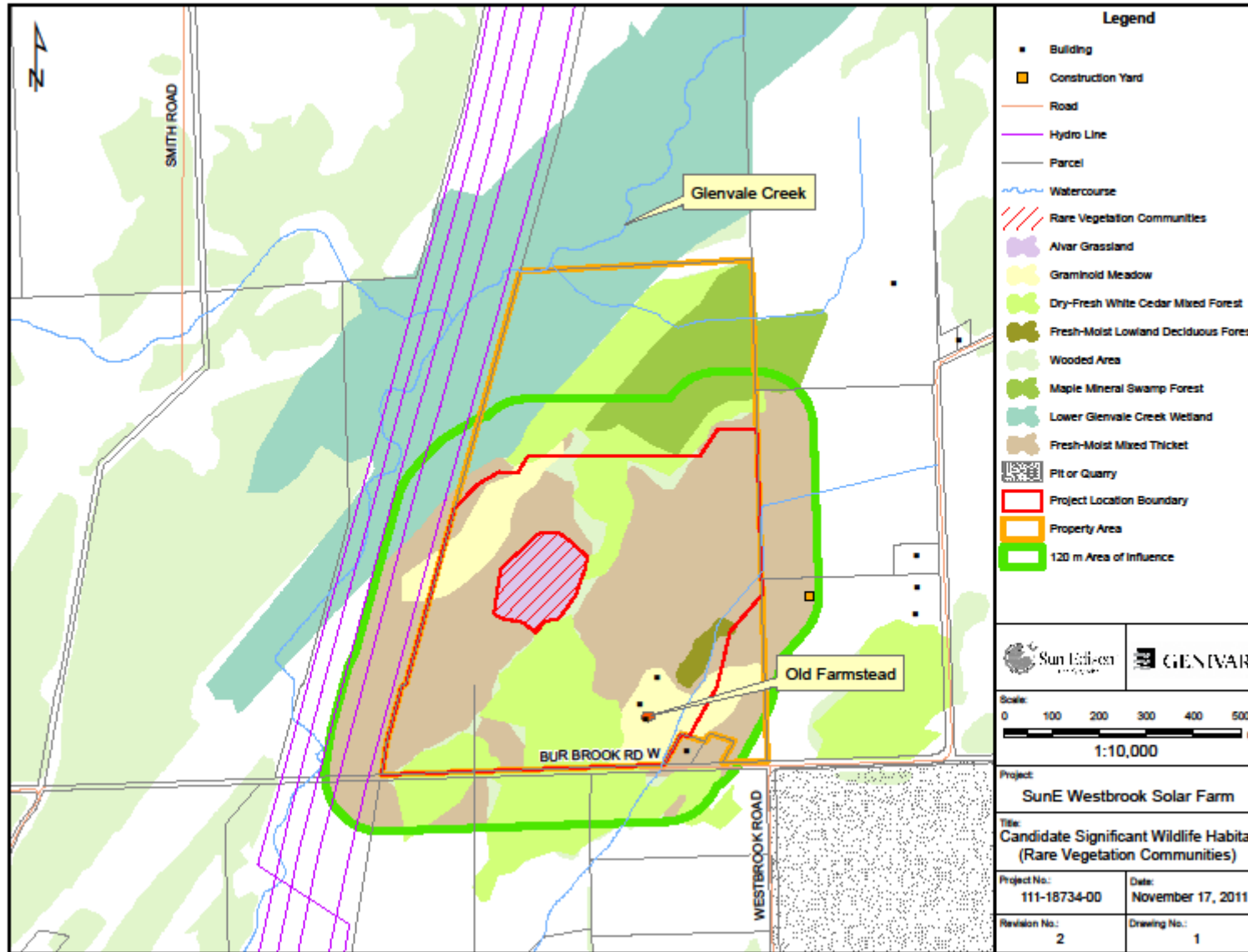
4.5.3. *Specialized Habitats for Wildlife*

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:

Figure 4.8 Candidate Significant Rare Vegetation Community Habitat



- i. **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. For a designation of significance the presence of 3 or more nesting pairs of listed species not including Mallard, or the presence of 10 or more nesting pairs of listed species including Mallard are required.

Waterfowl nesting area habitat may occur within the swamp thicket associated with Glenvale Creek to the west of the Project Location, but this habitat is confined to a riparian valley that is ecologically distinct from the uplands occurring within 120 m of the Project Location. Furthermore, none of the waterfowl species indicated in the *Ecoregion Criteria Schedules* (MNR 2009) for Site Region 6E were observed during the site investigations.

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

- ii. **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.

There are no aquatic habitats within 120 m of the Project Location that support osprey and osprey nesting. No ospreys or their nests were observed within 120 m of the Project Location during the site investigation.

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

- iii. **Woodland Raptor Nesting Habitat:** Several species of raptors require specialised nesting habitat for their long-term survival, which for Site Region 6E includes natural or conifer plantation forest stands >10 ha in size. The raptor species considered during the site investigation include: American Kestrel, Barred Owl, Broad-winged Hawk, Cooper's Hawk, Eastern Screech-Owl, Great Horned Owl, Long-eared Owl, Northern Goshawk, Northern Harrier, Northern Hawk Owl, Northern Saw-whet Owl, Red-shouldered Hawk, and Sharp-shinned Hawk.

No raptor species or their nests were encountered during the site investigations. However, potentially suitable nesting habitat occurs to the north of the Project Location within the mature swamp forest. Given the proximity to foraging areas within open meadow and thicket areas and the presence of woodland of sufficient size to support nesting raptors, candidate significant woodland raptor nesting habitat is considered to be present (Figure 4.9).

Conclusion: Candidate significant *woodland raptor nesting habitat found on or within 120 m of the Project Location* 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.

No turtles or evidence of nesting was observed within 120 m of the Project Location during the site investigations. Turtles may occur within the Glenvale Creek system to the west of the Project Location at distances >120 m. Soils on and within 120 m of the Project Location are not consistent with the requirements of most nesting species (i.e., sands and gravels) and there are no waterbodies or permanent watercourses supportive of turtles present. Vegetation across most of the Project Location consists of dense thicket or overgrown meadow, neither of which provides the solar exposure required for egg development (note: the alvar community within the centre of the Project Location is more exposed, but occurs on bedrock).

Conclusion: Candidate significant *turtle nesting habitat* will not 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 none are reported in the *NHARR* (Genivar, 2011aa).

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

4.5.3.1. Summary of Candidate Specialized Habitats for Wildlife

One candidate specialized habitats for wildlife was identified on and within 120 m of the Project Location and will be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report* (Figure 4.9).

- **Woodland Raptor Nesting Habitat**

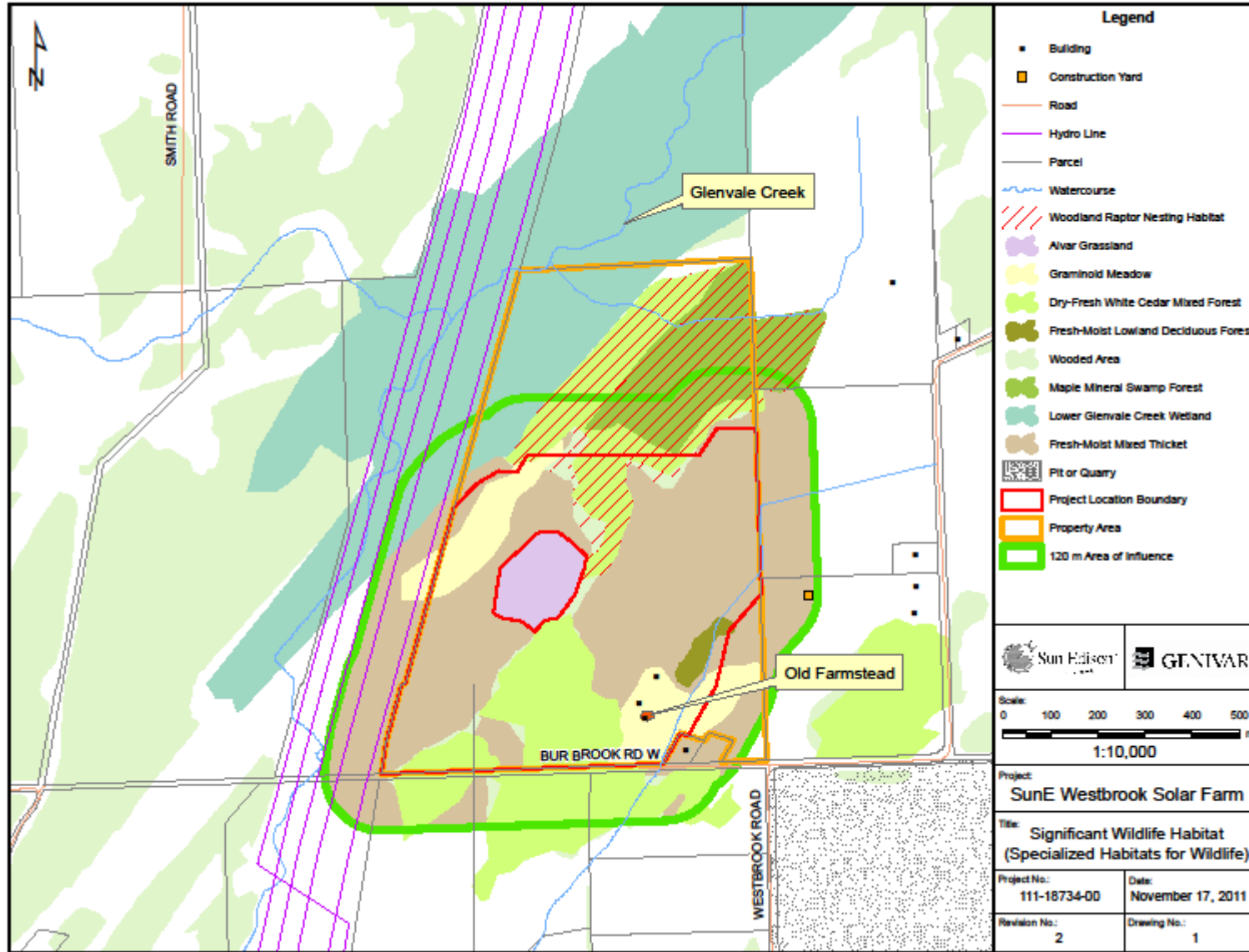
4.5.4. *Habitats for Species of Conservation Concern*

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, and locally significant within a planning authority's jurisdiction.

Figure 4.9 Candidate Significant Specialized Habitat for Wildlife



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* (Genivar, 2011a), 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 indicates marsh bird breeding habitat. 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.

Two marsh-associated bird species (Virginia Rail N=1, Wilson Snipe N=4) were observed during the June 5, 2011 breeding bird survey. A Virginia Rail was heard calling from the Glenvale Creek swamp thicket >120 m from the Project Location, and Wilson Snipe were heard calling from within the Project location. Marsh habitat does not occur within 120 m of the Project Location.

Conclusion: Candidate significant *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 from 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.

Ovenbirds were encountered at 2 locations on the Project Location during the breeding bird surveys; however, neither of the woodlands associated with the Project Location are of sufficient size nor possess sufficient interior habitat to meet the criteria indicated.

Conclusion: Candidate significant *area-sensitive bird breeding habitat* will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

- iii. ***Open country bird breeding habitat:*** This type of habitat is characterized by grassland 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). Surveys must 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.

Three open country bird species (Bobolink, Eastern Kingbird, Eastern Meadowlark) were encountered within a 10 ha area of managed hayfield southwest of the Project Location. The only other areas of meadow occurring on or within the Project Location are a 3 ha hayfield to the northwest and a 3 ha meadow to the southeast.

Conclusion: Candidate significant *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:*** This habitat is characterized by 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). For a designation of significance surveys 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 in the *SI* include: Alder Flycatcher, American Woodcock, Black-billed Cuckoo, and Prairie Warbler,

During the site investigations, 6 shrub/early successional habitat breeding bird species (Willow Flycatcher, Brown Thrasher, Eastern Towhee, Field Sparrow, Golden-winged Warbler) were encountered on or within 120 m of the Project Location. Golden-winged Warbler, a species of conservation concern was reported on June 5, 2011 at a single survey station on the western edge of the Project Location. The surveyor (Chris Grooms) reported that the birds were most likely within the shrub wetland area associated with the edge of Glenvale Creek.

Approximately 50 ha of mixed thicket (THMM2) occurs on and within 120 m of the Project Location and >250 ha of similar habitat occurs across the local region thus exceeding the minimum size criterion of 30 ha (see Figures 1.10 and 1.11).

Conclusion: Candidate significant *shrub/early successional bird breeding habitat found on and within 120 m of the Project Location 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.

Figure 4.10 Candidate Significant Habitats for Species of Conservation Concern

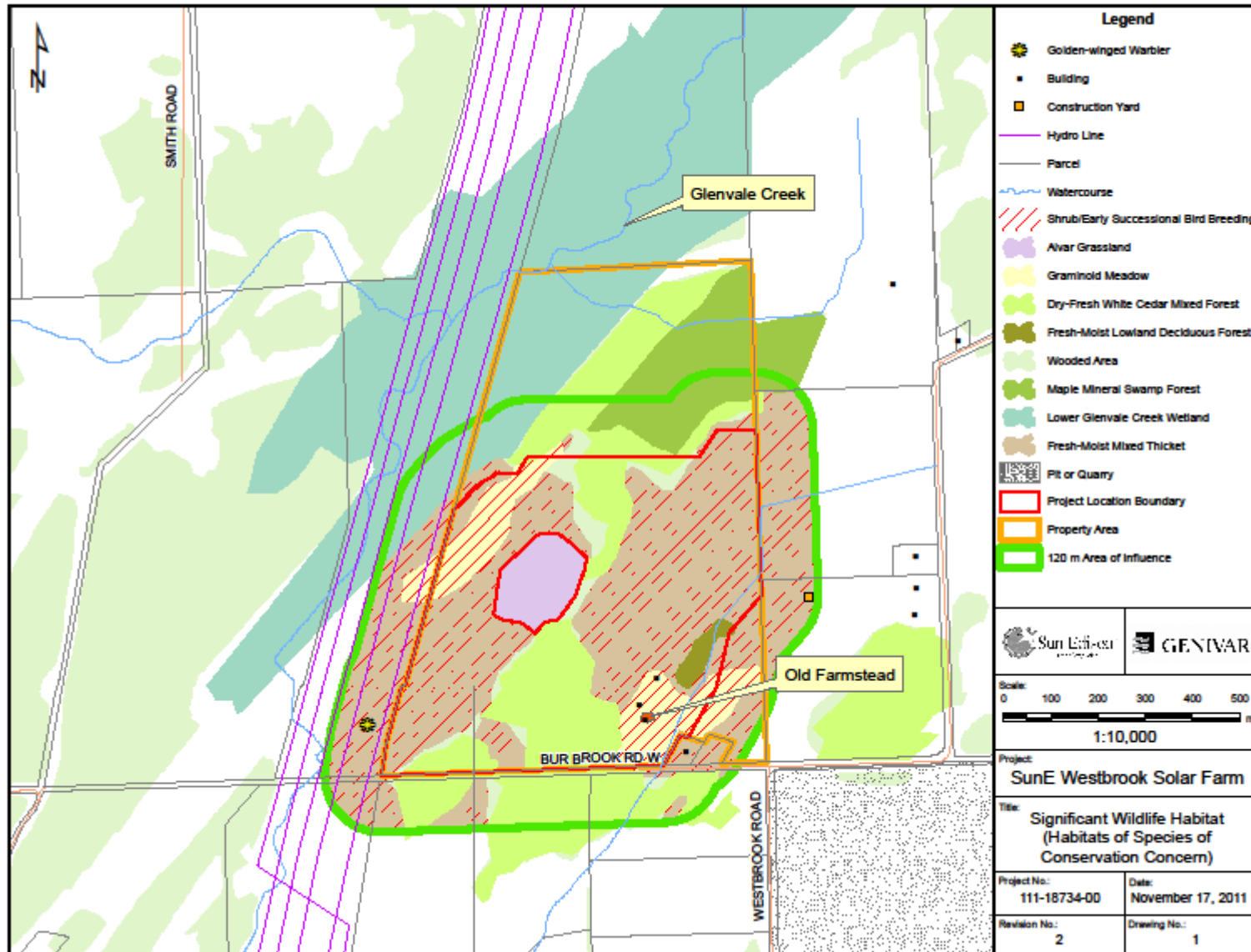


Figure 4.11 Shrub/early successional habitat available across local area.

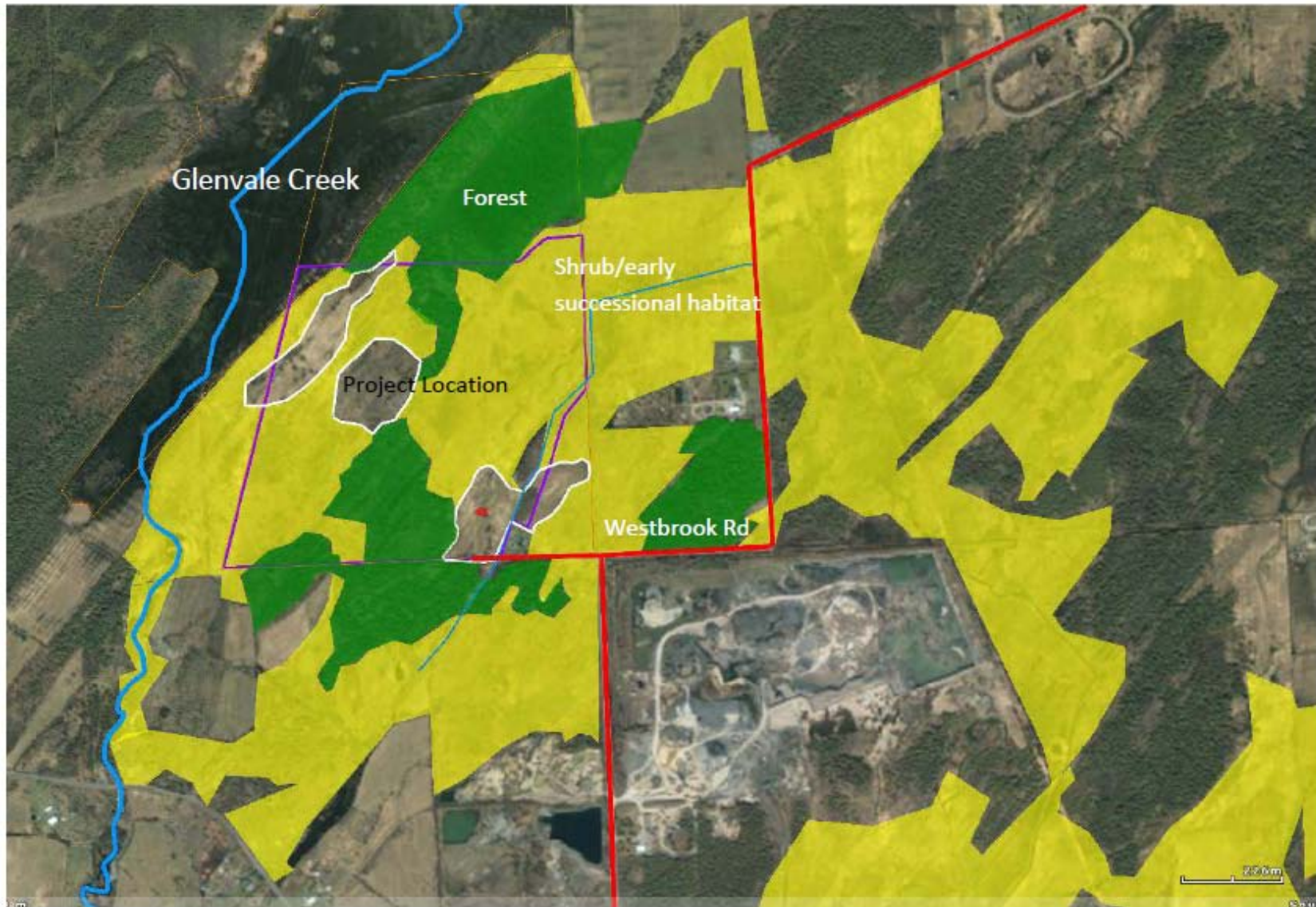


Table 4.3. Habitat requirements and occurrence for remaining species of conservation concern identified in the NHARR (Genivar, 2011a)

Species Of Conservation Concern	Preferred Habitat Description	Notes and Habitat Assessment from SI	Observed during SI	Species Occurrence Potential
Plants				
Moss (<i>Grimmia olneyi</i>)	Exposed wet calcareous or acidic rock faces	1868 record only; no exposed relief features	<i>no</i>	<i>nil</i>
Carolina Whitlow Grass (<i>Draba reptans</i>)	Dry meadow, alvars	Small open alvar within Project Location surveyed, but species not found	<i>no</i>	<i>nil</i>
Bowman's-root (<i>Porteranthus trifoliatius</i>)	Rich mesophytic forests	No rich mesophytic forest within 120 m (1886 record)	<i>no</i>	<i>nil</i>
Branching Burreed (<i>Sparganium androcladum</i>)	Muddy shorelines, peaty swamps and marshes	Glenvale Creek riparian area >120 m from Project Location (1897 record)	<i>no</i>	<i>nil</i>
Reptiles				
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; open talus slopes, barren rock; breeds in forest floor litter; forages in open woodlands, in sandy areas; hibernates under rock piles, in rock crevices, under logs and in stumps	Deciduous swamp present, as well as mixed woodlands. No rock piles or barren bedrock areas. No records of occurrence in this area.	<i>no</i>	<i>nil</i>
Map turtle (<i>Graptemys geographica</i>)	large waterbodies with soft bottoms, and aquatic vegetation; basks on logs or rocks or on beaches and grassy edges; uses 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) are required for movement	No large wetlands or suitable waterbodies present within 120m. Substrates on site are shallow loam over calcareous bedrock. No supportive nesting habitat present.	<i>no</i>	<i>nil</i>

<i>Species Of Conservation Concern</i>	<i>Preferred Habitat Description</i>	<i>Notes and Habitat Assessment from SI</i>	<i>Observed during SI</i>	<i>Species Occurrence Potential</i>
Snapping turtle (<i>Chelydra serpentina</i>)	permanent, semi-permanent fresh water; marshes, swamps or bogs; rivers and streams with soft muddy banks or bottoms; often uses soft soil or clean dry sand on south-facing slopes for nest sites; may nest at some distance from water; often hibernate together in groups in mud under water	No suitable wetlands or waterbodies present within 120m. Substrates on site are shallow loams over calcareous bedrock. No supportive nesting habitat present	<i>no</i>	<i>nil</i>
Eastern Ribbonsnake (<i>Thamnophis sauritus</i>) Great Lakes Population	grassy areas with low dense vegetation near bodies of shallow permanent quiet water; wet meadows, grassy marshes or sphagnum bogs; borders of ponds, lakes or streams; hibernates in groups	No wetlands or permanent water bodies within 120m of Project Location.	<i>no</i>	<i>nil</i>
Milksnake (<i>Lampropeltis triangulum</i>)	farmlands, 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	Most of site is dense thicket with patches of dry mixed forest. Species in local area but no milksnakes encountered during area searches	<i>no</i>	<i>low</i>

Conclusion: Candidate habitat supportive of remaining species of conservation concern is not found on or within 120 m of the Project Location and will not be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report*.

4.5.4.1. *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:

- ***Shrub/early successional bird breeding habitat*** (including habitat for Golden-winged Warbler).

Candidate significant specialized habitats for species of conservation concern will be carried forward to the *Natural Heritage Assessment Evaluation of Significance Report* (Figure 4.10).

4.5.5. *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*.

- i. *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). Amphibian breeding habitat was noted within both the Glenvale Creek wetland to the west of the Project Location and within the swamp forest to the north. There is a potential amphibian movement corridor between these wetlands along a seasonal creek located approximately 500 m north of the Project Location setback. No other potential movement corridor habitats were identified within 120 m of the Project Location.

Conclusion: Candidate *amphibian movement corridor* is 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*.

- ii. *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* (Genivar, 2011a) 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*.

- iii. *Bat movement corridors:* Suitable bat migration corridors include areas along shorelines of large lakes or areas of high elevation (i.e. escarpment). The Project Location is located >5 km from the Lake Ontario shoreline, there are no records of bat movement corridors reported in the *NHARR* (Genivar, 2011aa) for this site and no habitat features supportive of significant movements (e.g., escarpments, treed corridors) were observed. 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*.

4.5.5.1. 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. Candidate significant wildlife habitat will therefore 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* (Genivar, 2011a) 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 candidate significant natural features.

Wetlands – Approximately 2.1 ha of a 9 ha deciduous swamp forest (*SWDM3*) occurs within 120 m of the Project Location to the north, and 0.1 ha of a 53 ha thicket swamp associated with Glenvale Creek occurs within 120 m of the Project Location in the northwest.

Woodlands – Portions of three woodlands were identified as occurring on or within 120 m of the Project Location.

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

- **Seasonal Concentration Areas** – *amphibian breeding habitat*
- **Rare Vegetation Communities** – *alvar*
- **Specialized Habitats for Wildlife** – *woodland raptor nesting habitat*
- **Habitats of Species of Conservation Concern** – *shrub/early successional bird breeding habitat*

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

Table 5.1. Summary of Corrections Required to NHARR (Genivar Ltd. 2011).

RECORDS REVIEW			SITE INVESTIGATION				
Natural Feature	In Project Location?	In 120 m buffer?	Type	Functions and Attributes	Composition	Distance from Project Location (PL)	Corrections to Records Review?
Wetlands	No	Yes	Candidate Significant Wetland	A. Glenvale Creek wetland west of Project Location has hydrological and pollutant uptake values and provides fish and wildlife habitat B. Treed swamp hydrologically connected to Glenvale Creek wetland. Provision of wildlife habitat.	A. 170 ha riparian marsh and thicket and treed swamp components B. Mineral maple swamp consists of mature silver and red maple	A. 2.5 ha within 120 m setback B. 1.5 ha within 120 m setback	No
Woodlands	Yes	Yes	Candidate Significant Woodland	W1 - 17 ha woodland north of the Project Location provides amphibian habitat and protection for a small seasonal watercourse	<i>Maple Mineral Deciduous Swamp</i> <i>White Cedar Mixed Forest</i>	2 ha within 120 m setback 2.0 ha within 120 m setback and 2.0 ha within PL	No
				W2 - 15 ha woodland south of the Project Location provides protection for a small seasonal watercourse	<i>White Cedar Mixed Forest</i>	7 ha within PL	No
				W3 - 0.5 ha woodland provides protection for a small seasonal watercourse	<i>Lowland Deciduous Forest</i>	0.5 ha within PL	No
Wildlife Habitat	Not identified	Not identified	Seasonal Concentration Areas	<i>Amphibian breeding habitat</i>	- Maple Mineral Deciduous Swamp - Glenvale Creek Wetland	4 ha wetland habitat within 120 m of PL	Yes
			Rare Vegetation Community	<i>Alvar</i>	- Tufted Hairgrass – Canada Bluegrass – Philadelphia Panic Grass Alvar Grassland Type interior habitat	3 ha within PL	
			Specialized Habitats for Wildlife	<i>Woodland Raptor nesting habitat</i>	- 9 ha mature swamp forest - 2 ha interior habitat - Meadow and thicket foraging area available	2 ha of potential nesting habitat within 120 of PL	
			Animal Movement Corridors	<i>Shrub/early successional bird breeding habitat</i>	- Local shrub thicket communities present - Indicator species noted	23.5 ha shrub thicket within PL	

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

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Appendix 1. Field notes from site investigations.

Location: Bar Brook Rd Date: Apr 14/11
 Project / Client: Asio Power
 - prelim. site investigation

Weather: Overcast, light snow -3C
 → Rob Snodgrass & Dale Kristensen
 START TIME: 07:45. END 10:30

→ abandoned pastureland, now largely shrubby & mixed conifer with remnants of fields
 → several drainage swales N-25. Encumbered
 → lots of Red dogwood, Elm, Gray dogwood, Elm, G. Oak and Red cedar
 → mixture mixed conifer forest to NW (Bar Brook)
 → cedar/juniper cluster near stream/natural line to west
 → most of area regularly cleared with 23-41" brushy water pooled in low lying ~~drainage~~ swales
 → lots of conifer & deer track & scat
 → no ~~conifer~~ ~~drainage~~ indicated near

Location: WESTBROOK RD. Date: June 1/11
 Project / Client: Asio Power
 TIME: 09:10 - 12:15

Weather: 25°C light wind, CLEAR
 FARMHOUSE FIELD: Sunflower, Pea, Vicia cracca, Hop Clover, Milkweed
 Stomach, Timothy, Sedum, Chamae
 soft shallow open field
 → Frsp. Ash, Syc, Lilac, Man. Maple, Red Cedar, Elm, ~~Yucca~~ Dogwood, ~~Wormsuckle~~, ~~Prunus~~ 1872

①
 Creek bed - ~~dry~~, upland soils (WAD 3) within drainage
 → Riparian corridor of 30-50 year Bass, Elm, Persimmon, pooling, some muddy soils, Buckthorn, NO amphibians.
 → portions are dry but catch narrow creek (.2m) showing southward. 6 or 7 deep V-shaped gull with gravel & red ash (Photo) barren low number older trees within creek

Project / Client

surrounding land ^{seasonally inundated} to EAST
mainly Ag. Elm (<20 yr)
Gr. Dgw., Spiraea, C. gracillima,
Sol. can., C. flava, C. noronensis,
Pop. can.

WEST of creek drier, Young Ag. Elm
woodlands. Honey suckler, Spiraea.
Photo Silky Dgw.

G.C.F.C.
* shallow flooded pool within Ag.
grass, Phalaris, Ag. Dgw. ~ 20x30 m
* w/ 30 m of creek Bur. Oak,
Tg. Aspen

Photo -> mature Ag lining creek
no mature mixed forest to
N. also shows area of regem
within loc. location Salix pet.
Red Maple

Approaching forest at NE corner
Mixed-Hdw / Conifer with decd
trees (100+) & younger regem (25)
Ob. Pn, S., Blue Beech,
Am Ag, Balsam, Cedar. Fresh/Moist

Project / Client

Understory rich, C. gracillima,
Midribbed, Virg. Creeper, C. rosea,
Sens. str, Ab, Lady Fern
Trillium, Mr, C. cornuta

Mr &
Silver Maple stand, with several
pools Photo Sp. Fern, C. intima

Probable amphib. habitat
Note: This is the main stand type
along N. edge -> some older
trees >90-100 yr. OVEN,

AMCR. Sol. Junco R&M
-> Edge of regem bordering wet
forest has exposed structure
grykes, 1- patches. no snags
encountered

* definite 1-1.5 m drop from edge
of regem into wet forest area
follows NE-SW edge of forest
toward open drier area

Photo: upland forest bordering
M/Mr stand -> Pn, S. Pop. with
co. Junco -> M & Ob

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Location _____ Date _____

Project / Client _____

drive upland mixed forest project. SW
 across Proj location. mix of
 conifers / hardwoods as (noted)

* ~~ENR~~ open meadow at NW
 (Hydro corridor visible to west)
 → Patchy Red Cedar, Juniper, &
 huckleberry with open meadow

* ~~small~~ walk area SW to determine
 alvar presence. Balsam Poplar
 & Green Ash. Sol. plantain
 C. aurea. Photo

* Alvar patch confined to 2 ha
 centre. → grades upward to meadow
 as walk to hydro line.

Appendix 2. Breeding bird survey results.

Date: June 5, 2011

Time: 05:50-08:00

Weather: Overcast, 17C, no wind

Common Name	Station A		Station B		Station C		Station D		Station E		Station F		Station G		Station H		Station I		Station J		Station K	
	<100m	>100m	<100m	>100m	<100m	>100m	<100m	>100m	<100m	>100m	<100m	>100m	<100m	>100m	<100m	>100m	<100m	>100m	<100m	>100m	<100m	>100m
Canada Goose									22													155
Great Blue Heron									1	1												1
Ruffed Grouse		1																				
Virginia Rail					1																	
Wilson's Snipe					1						1				1		1					
Ring-billed Gull												2										
Rock Pigeon																					1	
Mourning Dove							2														3	
Northern Flicker																					1	
Willow Flycatcher			1								1	1			1		1					
Eastern Kingbird																	1					
Red-eyed Vireo						1																
Blue Jay	2		2						1				2	1	2	2	1	2	1	4	1	
American Crow	1	4								1					2					3		1
Tree Swallow					1		1														1	2
Black-capped Chickadee											1										1	2
Wood Thrush		1																				
American Robin		4	1	5	1	2	1	1	3	1	1	3	2	4	2	3	3	3	2	2	3	2
Gray Catbird					3		1															
Brown Thrasher		2					1		1		1						1	1				1
European Starling								1														
Golden-winged Warbler																	1	1				
Yellow Warbler			1				1				2						1			1		
Black-and-white Warbler	1																					1
Ovenbird													2									
Mourning Warbler				2																	1	1
Common Yellowthroat		1	2	1					2	1	4	1			1	2	1					
Eastern Towhee		1	2	1		1	2				1		3				1			3		
Field Sparrow	1	1	1							1												2
Song Sparrow	2	1					5		2	2	2	1			1	1	3			1		
Swamp Sparrow					1																	
White-throated Sparrow																					1	

Common Name	Station A		Station B		Station C		Station D		Station E		Station F		Station G		Station H		Station I		Station J		Station K		
	<100m	>100m	<100m	>100m	<100m	>100m	<100m	>100m	<100m	>100m	<100m	>100m	<100m	>100m	<100m	>100m	<100m	>100m	<100m	>100m	<100m	>100m	
Bobolink							2																
Red-winged Blackbird					6	1											2	1					
Eastern Meadowlark	1	1																					
Common Grackle			1																				
Brown-headed Cowbird	1				1		1								3								
Baltimore Oriole																	1						
American Goldfinch							1										1						

Date: June 12, 2011

Time:05:58- 08:00

Weather: Clear, 20C, light wind

Common Name	Station A		Station B		Station C		Station D		Station E		Station F		Station G		Station H		Station I		Station J		Station K		
	<100m	>100m	<100m	>100m	<100m	>100m	<100m	>100m	<100m	>100m	<100m	>100m	<100m	>100m	<100m	>100m	<100m	>100m	<100m	>100m	<100m	>100m	
Canada Goose																						30	
Great Blue Heron			2			1																	
Osprey						1																	
Downy Woodpecker			1																				
Hairy Woodpecker													1										
Northern Flicker																					1		
Pileated Woodpecker													1									1	
Eastern Wood-Pewee																	2	1					
Willow Flycatcher			1					1										1				1	
Eastern Kingbird							3																1
Red-eyed Vireo							1															1	
Blue Jay					4				2				2	4	1	1	2	1	1				
American Crow	1		1		1		1		1													1	
Black-capped Chickadee	2																						1
House Wren	3		1						1	1													
American Robin	2		2		3	3	1	1	1	1			2	4		4	1	3	1	3	3		
Gray Catbird							1		1														
Brown Thrasher								1									1						
European Starling																							1
Cedar Waxwing			4																				
Yellow Warbler	1				1		2										2						
Chestnut-sided Warbler																							
Black-and-white Warbler		1											1	2					2				
Ovenbird													2	1									1
Common Yellowthroat	2	1	1	1	2	1		1	1	1			1	1	2	2	1	1					
Eastern Towhee	1			1				1							1								1
Field Sparrow	2			1					1				1						1	1			2
Song Sparrow	2		1	1			2			1					1		1						
Swamp Sparrow						1																	
White-throated Sparrow																					1		1
Northern Cardinal									1														
Rose-breasted Grosbeak				1	1		1																3

Common Name	Station A		Station B		Station C		Station D		Station E		Station F		Station G		Station H		Station I		Station J		Station K		
	<100m	>100m	<100m	>100m	<100m	>100m	<100m	>100m	<100m	>100m	<100m	>100m	<100m	>100m	<100m	>100m	<100m	>100m	<100m	>100m	<100m	>100m	
Bobolink							1																
Red-winged Blackbird					1	2	1										2		1				
Eastern Meadowlark							1																
Common Grackle																							2
Baltimore Oriole	1																						1
American Goldfinch																					1		1

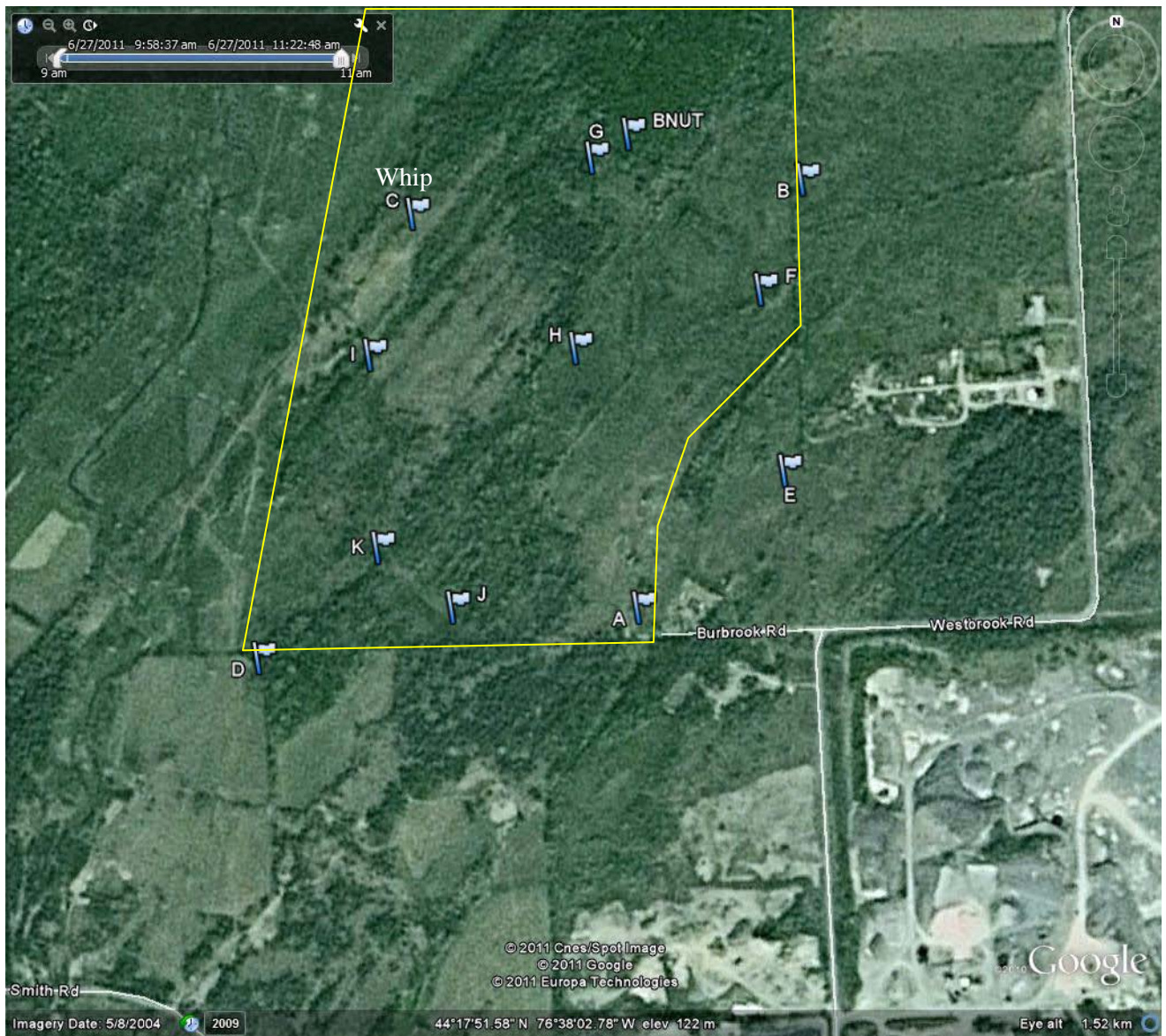
Date: June 14, 2011

Time:21:20-22:30

Weather: Clear, 22C, light wind, full moon

1 or 2 Whip-poor-will heard calling for no more than 10 minutes near point C and to the north of the Project Location.

Appendix 3. Map of breeding bird point count plots. Image from Google Earth maps.



Appendix 4. Checklist of wildlife species observed. (Note: mammals listed based on presumed occurrence only).

Scientific Name	Common Name	SRANK	FAMILY
<i>Agelaius phoeniceus</i>	Red-winged Blackbird	S5B	ICTERIDAE
<i>Ardea herodias</i>	Great-blue Heron	S5B	ARDEIDAE
<i>Bombycilla cedrorum</i>	Cedar Waxwing	S5B	BOMBYCILLIDAE
<i>Branta canadensis</i>	Canada Goose	S5B	ANATIDAE
<i>Bonasa umbellus</i>	Ruffed Grouse	S5B	PHASIANIDAE
<i>Butorides virescens</i>	Green Heron	S5B	ARDEIDAE
<i>Caprimulgus vociferous</i>	Whip-poor-will	S4B	CAPRIMULGIDAE
<i>Colaptes auratus</i>	Northern Flicker	S5B	PICIDAE
<i>Columba livia</i>	Rock Pigeon	S5B	COLUMBIDAE
<i>Cyanocitta cristata</i>	Blue Jay	S5B	CORVIDAE
<i>Contops virens</i>	Eastern Wood Pewee	S5B	TYRANNIDAE
<i>Dendroica petechia</i>	Yellow Warbler	S5B	PARULIDAE
<i>Dolichonyx oryzivorus</i>	Bobolink	S4B	ICTERIDAE
<i>Dumetella carolinensis</i>	Gray Catbird	S5B	MIMIDAE
<i>Empidonax traillii</i>	Willow Flycatcher	S5B	TYRANNIDAE
<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>Icterus balbula</i>	Baltimore Oriole	S5B	ICTERIDAE
<i>Larus delawarensis</i>	Ring-billed Gull	S5B	LARIDAE
<i>Melospiza melodia</i>	Song Sparrow	S5B	EMBERIZIDAE
<i>Meleagrus gallapavo</i>	Wild Turkey	S4	PHASIANIDAE
<i>Melospiza georgiana</i>	Swamp Sparrow	S5B	EMBERIZIDAE
<i>Mniotilta varia</i>	Black-and-white Warbler	S5B	PARULIDAE
<i>Molothrus ater</i>	Brown-headed Cowbird	S5B	ICTERIDAE
<i>Oporornis philadelphia</i>	Mourning Warbler	S5B	PARULIDAE
<i>Pipilo erythrophthalmus</i>	Eastern Towhee	S4B	EMBERIZIDAE
<i>Poecile atricapillus</i>	Black-capped Chickadee	S5	PARIDAE
<i>Quiscalda quiscula</i>	Common Grackle	S5B	ICTERIDAE
<i>Rallus limicola</i>	Virginia Rail	S4B	RALLIDAE
<i>Seiurus aurocapilla</i>	Ovenbird	S5B	PARULIDAE
<i>Spinus tristis</i>	American Goldfinch	S5b	FRINGILLIDAE
<i>Spizella pusilla</i>	Field Sparrow	S5B	EMBERIZIDAE
<i>Sturnus vulgaris</i>	European Starling	SNA	STURNIDAE
<i>Tachycineta bicolor</i>	Tree Swallow	S5B	HIRUNDINIDAE
<i>Toxostoma rufum</i>	Brown Thrasher	S5B	MIMIDAE
<i>Troglodytes aedon</i>	House Wren	S5B	TROGLODYTIDAE
<i>Turdus migratorius</i>	American Robin	S5B	TURDIDAE
<i>Tyrannus tyrannus</i>	Eastern Kingbird	S5B	TYRANNIDAE
<i>Vermivora chrysoptera</i>	Golden-winged Warbler	S4B	PARULIDAE
<i>Vireo olivaceus</i>	Red-eyed Vireo	S5B	VIREONIDAE
<i>Zenaidura macroura</i>	Mourning Dove	S5B	COLUMBIDAE
<i>Zonotrichia albicollis</i>	White-throated Sparrow	S5B	EMBERIZIDAE
<i>Pseudacris spp.</i>	Chorus Frog	S3?	HYLIDAE
<i>Canis latrans</i>	Coyote	S5	CANIDAE
<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>Sylvilagus floridanus</i>	Eastern Cottontail	S5	LEPORIDAE
<i>Tamias striatus</i>	Eastern Chipmunk	S5	SCIURIDAE
<i>Tamiasciurus hudsonicus</i>	Red Squirrel	S5	SCIURIDAE
<i>Ursus americanus</i>	Black Bear	S5	URSIDAE
<i>Vulpes vulpes</i>	Red Fox	S5	CANIDAE

Appendix 5. Checklist of plant species observed at Project Location.

Scientific Name	Common Name	SRANK	FAMILY
<i>Abies balsamea</i>	Balsam Fir	S5	PINACEAE
<i>Acer negundo</i>	Box Elder	S5	ACERACEAE
<i>Acer rubrum</i>	Red Maple	S5	ACERACEAE
<i>Acer saccharum var. saccharum</i>	Sugar Maple	S5	ACERACEAE
<i>Acer saccharinum</i>	Silver Maple	S5	ACERACEAE
<i>Achillea millefolium var. millefolium</i>	Common Yarrow	SNA	ASTERACEAE
<i>Apocynum androsaemifolium</i>	Spreading Dogbane	S5	APOCYNACEAE
<i>Arctium minus ssp. minus</i>	Common Burdock	SNA	ASTERACEAE
<i>Asclepias syriaca</i>	Kansas Milkweed	S5	ASCLEPIADACEAE
<i>Barbarea vulgaris</i>	Yellow Rocket	SNA	BRASSICACEAE
<i>Bromus inermis ssp. inermis</i>	Awnless Brome	SNA	POACEAE
<i>Carex aurea</i>	Golden Fruited Sedge	S5	CYPERACEAE
<i>Carex bebbii</i>	Bebb's Sedge	S5	CYPERACEAE
<i>Carex crinita</i>	Fringed Sedge	S5	CYPERACEAE
<i>Carex flava</i>	Yellow Sedge	S5	CYPERACEAE
<i>Carex granularis</i>	Meadow Sedge	S5	CYPERACEAE
<i>Carex normalis</i>	A Sedge	S4	CYPERACEAE
<i>Carex rosea</i>	Stellate Sedge	S5	CYPERACEAE
<i>Carex scoparia</i>	Pointed Broom Sedge	S5	CYPERACEAE
<i>Carex vulpinoidea</i>	Fox Sedge	S5	CYPERACEAE
<i>Carya ovata</i>	Shag-bark Hickory	S5	JUGLANDACEAE
<i>Cichorium intybus</i>	Chicory	SNA	ASTERACEAE
<i>Cornus foemina</i>	Stiff Dogwood	S5	CORNACEAE
<i>Cornus sericea</i>	Red-osier Dogwood	S5	CORNACEAE
<i>Cynanchum rossicum</i>	European Swallow-wort	SNA	ASCLEPIADACEAE
<i>Daucus carota</i>	Wild Carrot	SNA	APIACEAE
<i>Dianthus armeria</i>	Deptford-pink	SNA	CARYOPHYLLACEAE
<i>Echium vulgare</i>	Common Viper's-bugloss	SNA	BORAGINACEAE
<i>Erigeron acris</i>		S5	ASTERACEAE
<i>Euthamia graminifolia</i>	Flat-top Fragrant-golden-rod	S5	ASTERACEAE
<i>Festuca rubra</i>	Red Fescue	S5	POACEAE
<i>Fragaria virginiana</i>	Virginia Strawberry	S5	ROSACEAE
<i>Fraxinus americana</i>	White Ash	S5	OLEACEAE
<i>Fraxinus pennsylvanica</i>	Green Ash	S5	OLEACEAE
<i>Fraxinus niger</i>	Black Ash	S5	OLEACEAE
<i>Geum laciniatum</i>	Rough Avens	S4	ROSACEAE
<i>Geum triflorum</i>	Prairie Smoke	S4	ROSEACEAE
<i>Hedeoma pulegioides</i>	American Pennyroyal	S4	LAMIACEAE
<i>Hemerocallis fulva</i>	Orange Daylily	SNA	LILIACEAE
<i>Hieracium aurantiacum</i>	Orange Hawkweed	SNA	ASTERACEAE
<i>Hieracium praealtum</i>	King Devil	SNA	ASTERACEAE
<i>Juncus tenuis</i>	Path Rush	S5	JUNCACEAE
<i>Juniperus communis</i>	Ground Juniper	S5	CUPRESSACEAE
<i>Juniperus virginiana</i>	Eastern Red Cedar	S5	CUPRESSACEAE
<i>Leucanthemum vulgare</i>	Oxeye Daisy	SNA	ASTERACEAE
<i>Lonicera tatarica</i>	Tartarian Honeysuckle	SNA	CAPRIFOLIACEAE
<i>Lycopus americanus</i>	American Bugleweed	S5	LAMIACEAE
<i>Melilotus albus</i>	White Sweet Clover	SNA	FABACEAE
<i>Melilotus altissimus</i>	Tall Yellow Sweetclover	SNA	FABACEAE
<i>Packera paupercula</i>	Balsam Ragweed	S5	ASTERACEAE
<i>Panicum dichotomiflorum</i>	Spreading Panicgrass	SNA	POACEAE

<i>Phalaris arundinacea</i>	Reed Canary Grass	S5	POACEAE
<i>Phleum pratense</i>	Meadow Timothy	SNA	POACEAE
<i>Picea alba</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>Potentilla recta</i>	Sulphur Cinquefoil	SNA	ROSACEAE
<i>Prunella vulgaris ssp. lanceolata</i>	Self-heal	S5	LAMIACEAE
<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>Quercus rubra</i>	Northern Red Oak	S5	FAGACEAE
<i>Ranunculus acris</i>	Tall Butter-cup	SNA	RANUNCULACEAE
<i>Rhamnus cathartica</i>	Buckthorn	SNA	RHAMNACEAE
<i>Rheum rhabarbarum</i>	Rubarb	SNA	POLYGONACEAE
<i>Rhus aromatica</i>	Fragrant Sumac	S5	ANACARDIACEAE
<i>Rhus typhina</i>	Staghorn Sumac	S5	ANACARDIACEAE
<i>Rosa blanda</i>	Smooth Rose	S5	ROSACEAE
<i>Rubus idaeus ssp. strigosus</i>		S5	ROSACEAE
<i>Sambucus racemosa</i>	European Red Elder	S5	CAPRIFOLIACEAE
<i>Scirpus atrovirens</i>	Dark-green Bulrush	S5	CYPERACEAE
<i>Scirpus cyperinus</i>	Cottongrass Bulrush	S5	CYPERACEAE
<i>Solidago canadensis var. canadensis</i>		S5	ASTERACEAE
<i>Solidago juncea</i>	Early Goldenrod	S5	ASTERACEAE
<i>Solidago ptarmicoides</i>	Prairie Goldenrod	S5	ASTERACEAE
<i>Spiraea alba</i>	Narrow-leaved Meadow-sweet	S5	ROSACEAE
<i>Symphotrichum lanceolatum ssp. lanceolatum</i>	Panicked Aster	S5	ASTERACEAE
<i>Symphotrichum lateriflorum var. lateriflorum</i>	Small White Aster	S5	ASTERACEAE
<i>Symphotrichum novae-angliae</i>	New England Aster	S5	ASTERACEAE
<i>Syringa vulgaris</i>	Common Lilac	SNA	OLEACEAE
<i>Taraxacum officinale</i>	Brown-seed Dandelion	SNA	ASTERACEAE
<i>Tilia americana</i>	American Basswood	S5	TILIACEAE
<i>Toxicodendron radicans ssp. negundo</i>	Poison Ivy	S5	ANACARDIACEAE
<i>Tragopogon dubius</i>	Meadow Goat's-beard	SNA	ASTERACEAE
<i>Trichostema brachiatum</i>	False Pennyroyal	S4	LAMIACEAE
<i>Trifolium campestre</i>	Low Hop Clover	SNA	FABACEAE
<i>Trifolium hybridum</i>	Alsike Clover	SNA	FABACEAE
<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>Ulmus americana</i>	American Elm	S5	ULMACEAE
<i>Ulmus rubra</i>	Slippery Elm	S5	ULMACEAE
<i>Verbascum thapsus</i>	Great Mullein	SNA	SCROPHULARIACEAE
<i>Veronica americana</i>	American Speedwell	S5	SCROPHULARIACEAE
<i>Viburnum lentago</i>	Nannyberry	S5	CAPRIFOLIACEAE
<i>Viburnum rafinesquianum</i>	Downy Arrowwood	S5	CAPRIFOLIACEAE
<i>Vicia cracca</i>	Tufted Vetch	SNA	FABACEAE
<i>Vitis riparia</i>	Riverbank Grape	S5	VITACEAE
<i>Zanthoxylum americanum</i>	Northern Prickley Ash	S5	RUTACEAE