

Natural Heritage Assessment

Evaluation of Significance Report

SunE Westbrook

Solar Energy Project

FIT Contract Number: FIT-FDNXGQE

prepared for

SunEdison



ECOLOGICAL SERVICES

Report Author Signature

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Date

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1. Introduction

1.1 Project Description

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 Contract 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 (Figure 1.1). 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.

1.2 Renewable Energy Approval Legislative Requirements

Ontario Regulation (O. Reg.) 359/09 – *Renewable Energy Approvals Under Part V.0.1 of the Act*, made under the *Environmental Protection Act* identifies the Renewable Energy Approval (REA) requirements for renewable energy projects in Ontario. Ground-mounted solar facilities with a nameplate capacity greater than 10 kilowatts (kW) are classified as Class 3 solar facilities and require a REA in accordance with Section 4 of O. Reg. 359/09. Subsection 24 (1) of O. Reg. 359/09 requires proponents of Class 3 solar projects to undertake a natural heritage assessment consisting of a records review report, site investigation report and an evaluation of significance report for each natural feature identified during the natural heritage records review and site investigation.

Natural features are defined in subsection 1 (1) of O. Reg. 359/09 to be all or part of:

- a) an area of natural and scientific interest (ANSI) (earth science)
- b) an ANSI (life science)
- c) a coastal wetland
- d) a northern wetland
- e) a southern wetland
- f) a valleyland
- g) a wildlife habitat, or
- h) a woodland.

The *Natural Heritage Assessment Records Review Report (NHARR)* (Genivar, 2011) and *Natural Heritage Assessment Site Investigation Report (SI)* (Ecological Services, 2011) identified candidate significant wetlands, woodland and wildlife habitats on and within 120 m of the Project Location.

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

1.2.1 *Natural Heritage Assessment Evaluation of Significance Report (EOS)*

Section 27 of the REA Regulation requires proponents of Class 3 solar projects to prepare a *Natural Heritage Assessment Evaluation of Significance Report (EOS)* for natural features identified in the *NHARR* (Genivar, 2011) and *SI* (Ecological Services, 2011) that sets out:

- a determination of whether the natural feature is:
 - provincially significant or not provincially significant (i.e. wetlands and ANSI's)
 - significant or not significant (i.e. woodland, valleyland or wildlife habitat)
- summary of the evaluation criteria or procedures used to make the determination
- the name and qualifications of any person who applied to evaluation criteria or procedures.

This report has been prepared to meet these requirements. Maps showing the boundaries of significant natural features identified in this report have also been prepared. As mentioned in Section 1.2, there are wetlands, woodland and wildlife habitats on and within 120 m of the Project Location. Therefore, an evaluation to determine the level of significance of these features is required.

2. Evaluation of Candidate Significant Natural Features

2.1. Candidate Significant Wetlands

An unevaluated wetland complex comprised locally of two separate features was identified in the *SI* (Ecological Services, 2011). To the west is an extensive 160 ha riparian wetland system associated with Glenvale Creek of which 2.5 ha occurs within 120 m of the Project Location. To the north is a 9 ha palustrine maple swamp, of which 1.5 ha is within the 120 m setback (Figure 2.1). Due to the proximity (approx. 100 m) of these features and their hydrological connectivity via a small seasonal stream, they have been evaluated as a single complex.

2.1.1 Natural Heritage Assessment Wetland Evaluation

In order to determine the main functions and features associated with the identified wetland, an assessment was conducted as per Appendix C of the *Natural Heritage Assessment Guide for Renewable Energy Projects* (MNR 2011). The details of this assessment are provided in Table 2.1 below.

The assessment process was conducted using survey information gathered during field investigations in April and June of 2011, and from recent high resolution satellite mapping on the County of Frontenac Interactive Map Viewer Web Site at <http://www.frontenacmaps.ca>. Calculations used in determining scoring for hydrological and special features categories were found in relevant sections of the Ontario Wetland Evaluation System Southern Manual (OMNR 1993).

The primary ecological and hydrological features and functions associated with this wetland complex are provided in Table 2.1.

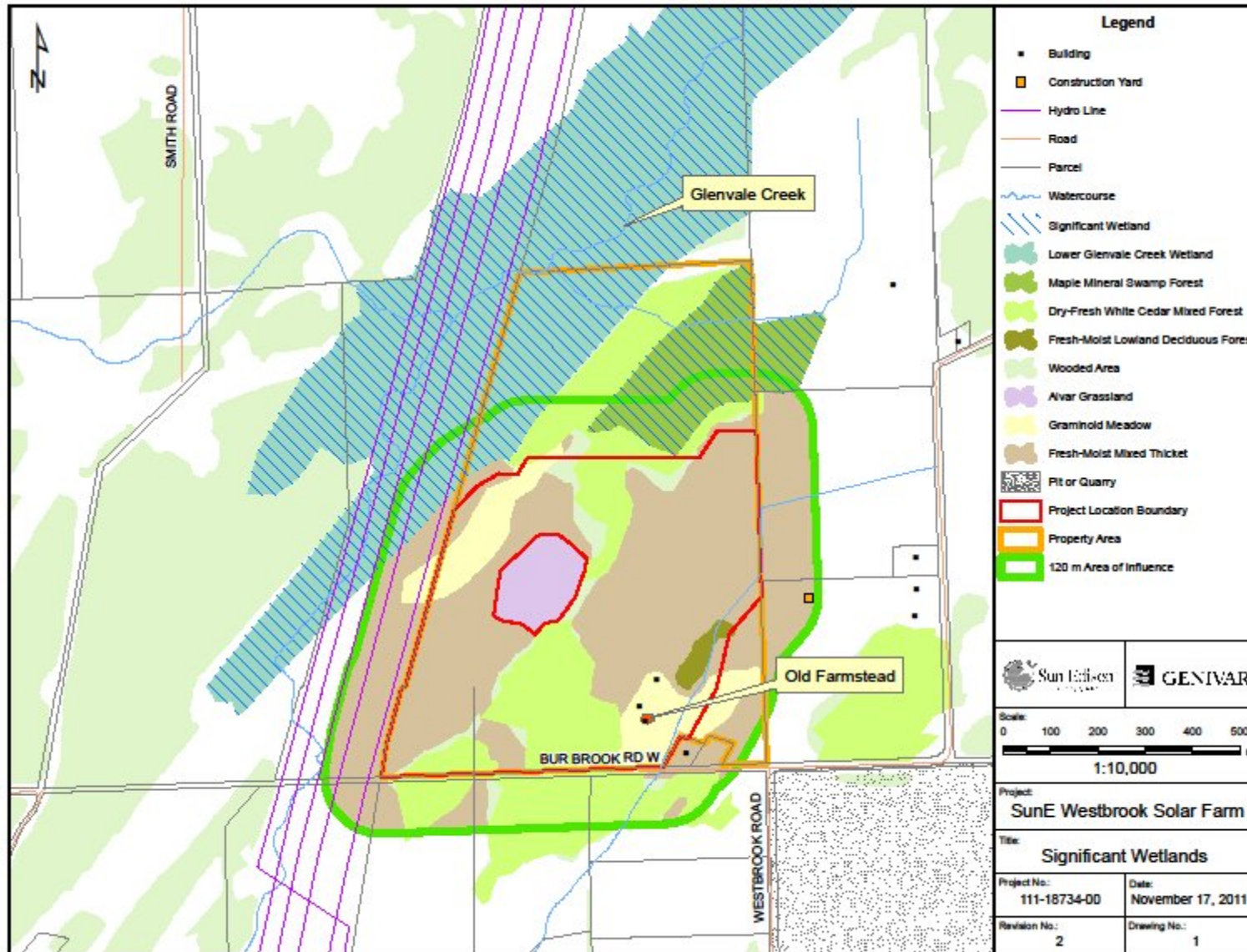
Evaluation – The Glenvale Creek wetland complex to the north and west of the Project Location will be treated as provincially significant as per Section 6.2.1 of the NHA Renewable Energy Guide (MNR 2011). This natural feature will be carried forward to the Natural Heritage Assessment Environmental Impact Study Report to assess potential negative environmental effects.

Table 2.1 Wetland assessment as per Appendix C of the Natural Heritage Assessment Guide (MNR 2011)

Characteristic/ Ecological Function	Field visit	Primary Features	Primary Ecological Functions
Wetland Size (ha)		- Approximately 170 ha riverine wetland that runs 8-10 km north of the Project Location	
BIOLOGICAL COMPONENT			
Wetland Type		- Approx. 80% marsh and 20% swamp	
Site Type		- Mostly riverine with few minor palustrine components	
Vegetation Communities	June 1, 2011	Communities within 120 m of Project Location include: - S1 h, gc, ne, m h, Acer saccharinum, Acer rubrum, Ulmus americana; Fraxinus nigra; gc, ferns; ne, sedge species; m, mosses - S2 ts, gc, ne ts, Salix spp, Cornus spp.; gc Galium, Impatiens; ne, grasses - M1 re, ne, gc, ff re, Typha angustifolia; ne, sedges, rushes; gc, Mentha, Cicuta, Galium; ff Lemna, Hydrocharis	- Swamp and marsh communities provide habitat for species of conservation concern including amphibians, turtles and birds (estimated value: moderate to high)
Proximity to Other Wetlands		- Hydrologically connected by surface water to other wetlands (different dominant wetland type), or open lake or deep river within 1.5 km	- Hydrological and vegetation community connectivity allows for unrestricted movement of fish and wildlife species, maintaining populations across local region (estimated value: moderate to high)
Interspersion		- Wetland dominated by single long narrow vegetation community, interspersion would accordingly be at or near the lowest scoring level	- Community interspersion increases species diversity and habitat availability (estimated value: low)
Open Water Types		- Type 2. Open water occupies 5-25% of the wetland area, occurring in a central area.	- Open water components important for fish and waterfowl production, possible provision of aquatic habitat for turtle species (estimated value: low to moderate)
HYDROLOGICAL COMPONENT			
Flood Attenuation (Total)		- 170 ha wetland with detention area of approx. 250 ha (max. detention factor =1) - Total catchment area approx. 4500 ha (wetland attenuation factor = 0.4) - TOTAL = 70	- Flood attenuation reduces risk of flooding into adjacent low-lying habitats (estimated value: moderate to high)
Water Quality Improvement (Total)	June 1, 2011	- Watershed Improvement Factor = 0.94 - Catchment Land Use Factor (>50% agric.) = 1.0 - Pollutant Uptake Factor = 0.75 - WQI TOTAL = 42	- Rural farming areas may be associated with excessive nutrient loading that can be mitigated by high productivity within a wetland system, thus reducing downstream impacts to fish habitat and local water supply (estimated value: moderate to high)
Shoreline Erosion Control		- Although wetland is mostly marsh, it has a shoreline component of trees and shrubs	- Shoreline erosion potential in this local region low (estimated value: low)
Groundwater Recharge (Total)	June 1, 2011	- Site Type is 95% riverine (X20) = 19 - Soils are riverine sands, loams = 5 - TOTAL= 24	- Water storage across a large detention area maintains water availability particularly during times of drought (wildlife benefit) (estimated value: moderate to high))

SPECIAL FEATURES COMPONENT			
Species Rarity (Total)	June 5, 2011	<ul style="list-style-type: none"> - None identified within 120 m of Project Location - TOTAL= 0 	<ul style="list-style-type: none"> - No rare species identified, but presume occasional presence of 1 or more turtle species within Glenvale Creek system, including Stinkpot, Painted and Snapping (estimated value: moderate)
Significant Features and Habitats (Total)	June 5, 2011	<ul style="list-style-type: none"> - Waterfowl staging and/or moulting known to occur = 20 - Waterfowl breeding suitable =10 - TOTAL = 30 	<ul style="list-style-type: none"> - Local value to waterfowl for foraging and minor stopover, some seasonal movement of Canada Geese and Mallards observed during SI (estimated value: moderate)
Fish Habitat (Total)	June 1, 2011	<ul style="list-style-type: none"> - Scoring relevant to area within 120 m of Project Location - Spawning and Nursery Habitat: only high marsh present, cattail, bulrush, burreed = 5 - Migration and Staging Habitat: Significance unknown, fish staging and/or migration habitat present but does not fit scoring categories = 0 - TOTAL = 5 	<ul style="list-style-type: none"> - Fish presence (minnows) presumed based on characteristics of Glenvale Creek (estimated value: low to moderate)

Figure 2.1 Significant wetlands - SunE Westbrook Solar Energy Project



2.2. Candidate Significant Woodlands

The *NHARR* (Hatch Ltd., 2011a) and *SI* (Ecological Services 2011a) identified two candidate significant woodlands (*W1* and *W2*), portions of which occur on and within 120 m of the Project Location (Figure 2.2). These woodlands have been designated as significant in the natural heritage assessment of the region by the Cataraqui Region Conservation Authority (CRCA 2006). The following evaluation will assess these woodlands based upon the significance criteria given in Section 7 of the *Natural Heritage Reference Manual (NHRM)* (Ontario Ministry of Natural Resources (MNR), 2010a).

Woodlands are defined in subsection 1 (1) of the REA Regulation as:

- a) land that is south and east of the Canadian Shield
- b) land that has per hectare, at least
 1. 1000 trees of any size
 2. 750 trees measuring over 5 cm in diameter
 3. 500 trees measuring over 12 cm in diameter
 4. 250 trees measuring over 20 cm in diameter
- c) land that does not include a cultivated fruit or nut orchard or a plantation established for the purpose of producing Christmas trees.

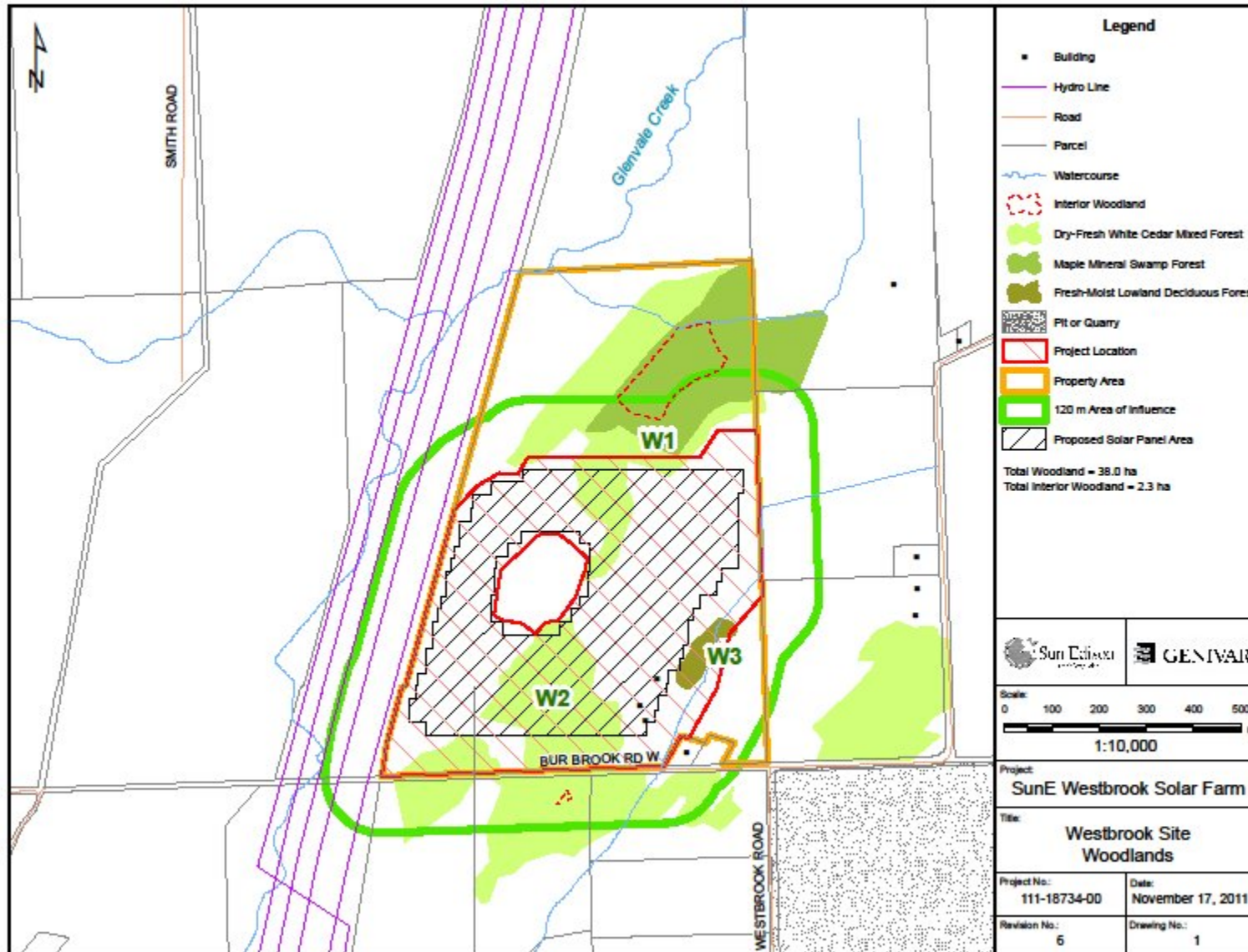
The boundaries of these woodlands were delineated based on observations made during the site investigations and air photo interpretation and follow the REA criteria for woodland. As a result the LIO woodland mapping shown in the *NHARR* (Genivar Ltd., 2011) requires minor revisions to the boundaries of these features.

The criteria for establishing woodland significance are identified in Section 7 of the *NHRM* and in the *Natural Heritage Assessment Guidelines for Renewable Energy Projects* (MNR, 2010b). Woodlands that meet a suggested minimum standard set out in the *NHRM* for any one of the criteria is considered significant. According to Henson and Brodribb (2005), this Ecodistrict (Madoc Ecodistrict 6E-9) has approx. 69% natural area coverage, of which most is forest. Satellite image analysis (Google Earth, LIO mapping) of the Kingston municipal region north of Hwy 401 confirms that woodlands cover >60% and this is the size baseline that will be applied to the assessment criteria categories.

Woodland W1

- **Woodland size** – Under *NHRM* REA guidelines (MNR, 2010b), the woodland size criterion is not applicable to municipalities in which forest cover is >60%. As *W1* is within a Site Region in which forest cover is >60%, it will not be assessed for size.
- **Ecological function**
 - *Woodland interior* – Where woodlands represent >60% of the land cover, 20 ha or more of interior habitat is considered significant (MNR, 2010). Woodland interior habitat is typically defined as habitat more than 100 m from a defined edge. The amount of interior woodland habitat within *W1* is only 2 ha. Therefore, the interior woodland criterion has not been met.

Figure 2.2 Woodlands - SunE Westbrook Solar Energy Project.



- *Linkages* – Woodlands >50 ha in size and providing a connecting link between two other significant features (i.e. within 120 m) are considered significant (MNR, 2010b). **WI** does not provide a linkage between significant features and is below the minimum size criterion. Accordingly this criterion has not been met.
- *Water protection* – Woodlands >4 ha within 50 m of a water feature (e.g. groundwater discharge / recharge area, headwater area, watercourse) are considered significant (MNR, 2010b). A small seasonal watercourse flows through **WI**, but there is less than 3 ha of woodland associated with it. This criterion has therefore not been met.
- *Woodland diversity* – A woodland is considered significant if it has: a naturally occurring composition of native forest species that have declined significantly south and east of the Canadian Shield and meet minimum area thresholds, a high native diversity through a combination of composition and terrain (e.g., a woodland extending from hilltop to valley bottom or to opposite slopes) and meets minimum area thresholds (i.e., 20 ha) (MNR, 2010b). **WI** includes native stand types of conservation value, but is below the minimum size limit; therefore this criterion is not considered to have been met.
- *Uncommon characteristics* – Woodlands >10 ha that include provincially rare plant species or vegetation communities (i.e. S-rank: S1 to S3) and/or old-growth trees (i.e., 10 or more trees / ha greater than 100 years old) are considered significant (MNR, 2010). No provincially rare species or communities were encountered within **WI**. This criterion is not considered to have been met.
- *Economic and social functional values* – Woodlands with high economic or social values (e.g. air-quality improvement, recreation, education, cultural and historical value) are considered significant (MNR, 2010a). **WI** is not used for any significant or recognized economic or social functions, other than for occasional hunting purposes by the landowner. Therefore, this criterion has not been met.

Woodland W2

- **Woodland size** – Under **NHRM** REA guidelines (MNR, 2010b), the woodland size criterion is not applicable to municipalities in which forest cover is >60%. As **W2** is within a Site Region in which forest cover is >60%, it will not be assessed for size.
- **Ecological function**
 - *Woodland interior* – Where woodlands represent >60% of the land cover, 20 ha or more of interior habitat is considered significant (MNR, 2010). Woodland interior habitat is typically defined as habitat more than 100 m from a defined edge. The amount of interior woodland habitat within **W2** is only 0.3 ha, which is within 120 m of the Project Location. The woodland interior criterion has not been met.
 - *Proximity to other significant natural features* – Woodlands >50 ha in size within 30 m of a significant natural feature receiving ecological benefit from the woodland are considered significant (MNR, 2010b). **W2** is not within 30 m of a candidate significant feature, and does not meet the minimum size criterion. Accordingly, this criterion has not been met.

- *Linkages* – Woodlands >50 ha in size and providing a connecting link between two other significant features (i.e. within 120 m) are considered significant (MNR, 2010b). **W2** does not provide a linkage between significant features and is below the minimum size criterion. Accordingly this criterion has not been met.
- *Water protection* – Woodlands >4 ha within 50 m of a water feature (e.g. groundwater discharge / recharge area, headwater area, watercourse) are considered significant (MNR, 2010b). A 1 ha portion of **W2** is within 50 m of a seasonal watercourse, which is below the minimum size. Therefore this criterion has not been met.
- *Woodland diversity* – A woodland is considered significant if it has: a naturally occurring composition of native forest species that have declined significantly south and east of the Canadian Shield and meet minimum area thresholds, a high native diversity through a combination of composition and terrain (e.g., a woodland extending from hilltop to valley bottom or to opposite slopes) and meets minimum area thresholds (i.e., 20 ha) (MNR, 2010b). **W2** includes native stand types of conservation value, but is below the minimum size criterion; therefore this criterion is not considered to have been met.
- *Uncommon characteristics* – Woodlands >10 ha that include provincially rare plant species or vegetation communities (i.e. S-rank: S1 to S3) and/or old-growth trees (i.e., 10 or more trees / ha greater than 100 years old) are considered significant (MNR, 2010). No provincially rare species or communities were encountered within **W2**. This criterion is not considered to have been met.
- *Economic and social functional values* – Woodlands with high economic or social values (e.g. air-quality improvement, recreation, education, cultural and historical value) are considered significant (MNR, 2010a). **W2** is not used for any significant or recognized economic or social functions, other than for occasional hunting purposes by the landowner. Therefore, this criterion has not been met.

Woodland W3

- **Woodland size** – Under *NHRM* REA guidelines (MNR, 2010b), the woodland size criterion is not applicable to municipalities in which forest cover is >60%. As **W3** is within a Site Region in which forest cover is >60%, it will not be assessed for size.
- **Ecological function**
 - *Woodland interior* – Where woodlands represent >60% of the land cover, 20 ha or more of interior habitat is considered significant (MNR, 2010). Woodland interior habitat is typically defined as habitat more than 100 m from a defined edge. There is no interior woodland habitat within **W3**. The woodland interior criterion has therefore not been met.
 - *Proximity to other significant natural features* – Woodlands >50 ha in size within 30 m of a significant natural feature receiving ecological benefit from the woodland are considered significant (MNR, 2010b). **W3** is not within 30 m of a candidate significant feature, and does not meet the minimum size criterion. Accordingly, this criterion has not been met.

- *Linkages* – Woodlands >50 ha in size and providing a connecting link between two other significant features (i.e. within 120 m) are considered significant (MNR, 2010b). **W3** does not provide a linkage between significant features and is below the minimum size criterion. Accordingly this criterion has not been met.
- *Water protection* – Woodlands >4 ha within 50 m of a water feature (e.g. groundwater discharge / recharge area, headwater area, watercourse) are considered significant (MNR, 2010b). **W3** is within 50 m of a watercourse, but is below the minimum stand size, therefore this criterion has not been met.
- *Woodland diversity* – A woodland is considered significant if it has: a naturally occurring composition of native forest species that have declined significantly south and east of the Canadian Shield and meet minimum area thresholds, a high native diversity through a combination of composition and terrain (e.g., a woodland extending from hilltop to valley bottom or to opposite slopes) and meets minimum area thresholds (i.e., 20 ha) (MNR, 2010b). **W3** includes native stand types of conservation value, but is below the minimum size criterion; therefore this criterion is not considered to have been met.
- *Uncommon characteristics* – Woodlands >10 ha that include provincially rare plant species or vegetation communities (i.e. S-rank: S1 to S3) and/or old-growth trees (i.e., 10 or more trees / ha greater than 100 years old) are considered significant (MNR, 2010). No provincially rare species or communities were encountered within **W3**. This criterion is not considered to have been met.
- *Economic and social functional values* – Woodlands with high economic or social values (e.g. air-quality improvement, recreation, education, cultural and historical value) are considered significant (MNR, 2010a). **W3** is not used for any significant or recognized economic or social functions, other than for occasional hunting purposes by the landowner. Therefore, this criterion has not been met.

Evaluation – To be considered significant woodland, at least one of the above *NHRM* evaluation criteria must be met. *The EOS* determined that none of the three woodlands identified on and within 120 m of the Project Location meets a listed criterion. Accordingly, *significant woodlands will not be carried forward to the Natural Heritage Assessment Environmental Impact Study Report.*

2.3. Candidate Significant Wildlife Habitat

Wildlife habitat assessment guidelines indicated in the *Draft Significant Wildlife Habitat Ecoregion Criteria Schedules (MNR, 2009b)* for Site Region 6E identifies 5 main types of wildlife habitat that can be classified as significant: seasonal concentrations areas, rare vegetation communities, specialized habitats for wildlife, habitats of species of conservation concern, and animal movement corridors. Within each of these 5 types of wildlife habitat are specific habitat types to reflect the life history requirements of an individual or group of species.

The criteria that were considered during this evaluation and how they were assessed are discussed for each of the candidate significant habitat types for the candidate significant wildlife habitat features identified in the *SI* (Ecological Services, 2011).

2.3.1 Seasonal Concentration Areas

Specific criteria used to evaluate *seasonal concentration areas* are identified in Tables Q-1 (and Q-2), Appendix Q in the *SWHTG* (MNR, 2000). The *Draft Significant Wildlife Habitat Ecoregion Criteria Schedules* (MNR, 2009b) was also used to supplement information obtained in the *SWHTG* (MNR, 2000). The criteria that were considered during this evaluation and how they were assessed are discussed for the candidate significant habitat identified in the *SI* (Ecological Services, 2011).

- ***Amphibian Breeding Habitat:*** 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). Table 2.1 below presents the evaluation determinations of in terms of the *SWHTG* criteria used to establish significance for amphibian breeding within a terrestrial site (Figure 2.3). Amphibian breeding habitat is also present within the Glenvale Creek Wetland to the west of the Project Location given the habitat characteristics contained therein, including permanent water flow and shallow flooded emergent marsh and thicket communities.

Evaluation –Significant amphibian breeding habitat (terrestrial and wetland) occurs within 120 m of the Project Location and will be carried forward to the Natural Heritage Assessment Environmental Impact Study Report to assess potential negative environmental effects.

Figure 2.3 Significant seasonal concentration areas - SunE Westbrook Solar Energy Project.

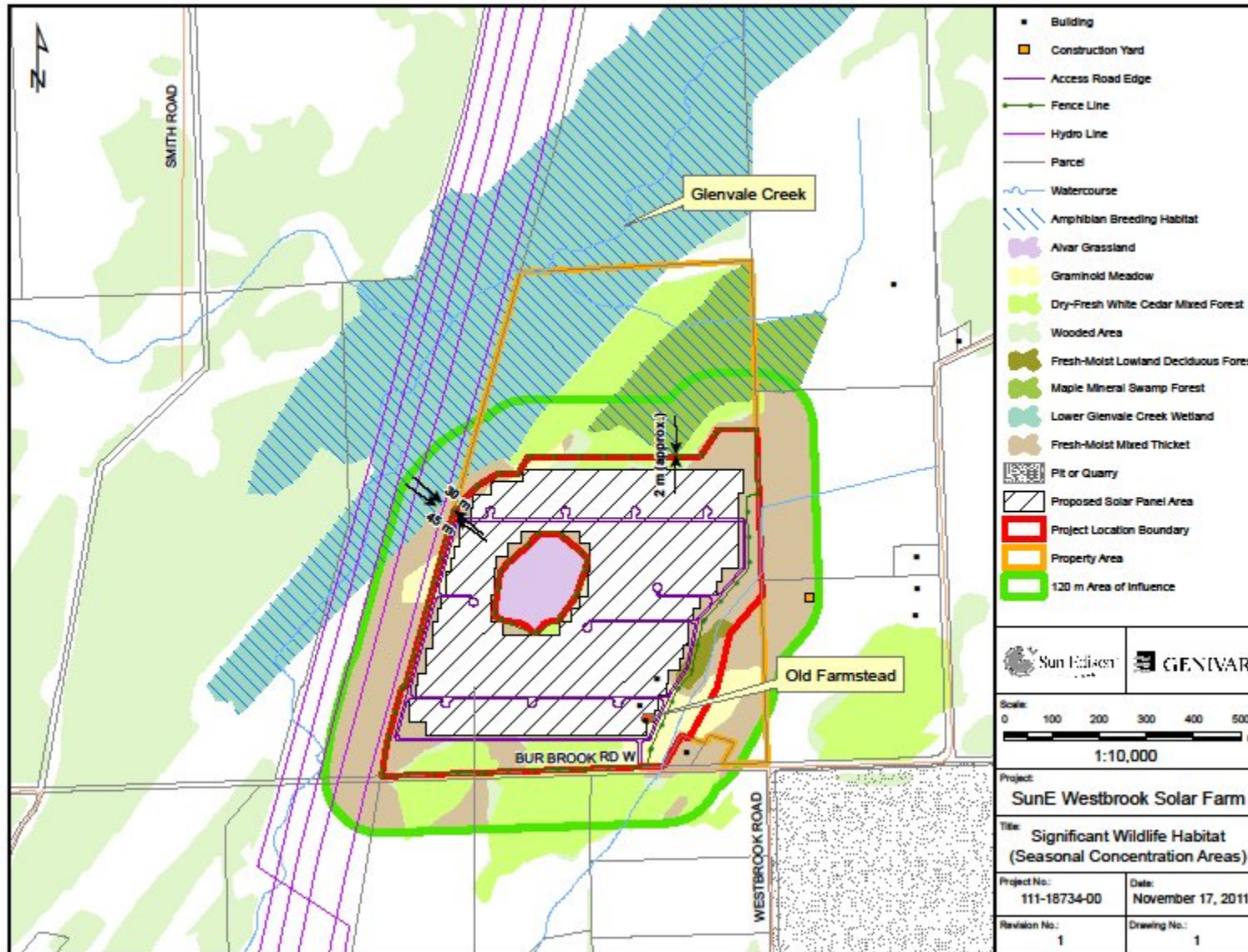


Table 2.2 Evaluation criteria for candidate significant amphibian breeding habitat (terrestrial).

Criterion	Requirements	Description of Amphibian Breeding Habitat Features from SI	Criterion Met
Provision of significant wildlife habitat	<ul style="list-style-type: none"> • Presence of a wetland, lake, or pond within or adjacent (within 120m) to a woodland • Woodlands providing several significant wildlife habitats (e.g., forest interior habitat, raptor nesting, abundant tree cavities and down woody debris) are most significant. 	<ul style="list-style-type: none"> • Mature maple swamp encompassing the breeding site has 2 ha of interior habitat and down woody debris 	✓
Degree of permanence	<ul style="list-style-type: none"> • Woodlands with permanent ponds or those containing water in most years until at least mid July are most significant. 	<ul style="list-style-type: none"> • The aquatic features are formed by seasonal flooding which does not persist into summer 	
Species diversity of pond	<ul style="list-style-type: none"> • Ponds supporting high species diversity are more significant • At least 2 species with a minimum of 20 individuals 	<ul style="list-style-type: none"> • One species of frog (gray tree frog) noted, but others presumed to be present as well (wood frog, spring peeper) • At least 20 individuals present 	✓
Presence of rare species	<ul style="list-style-type: none"> • Ponds supporting rare amphibian species are more significant than ponds supporting only common species. 	<ul style="list-style-type: none"> • Rare species not identified during SI investigations 	
Size and number of ponds	<ul style="list-style-type: none"> • In general, woodlands with larger and/or several ponds are more significant 	<ul style="list-style-type: none"> • Site is 9 ha in size, but seasonally connected to inundated sections of shrub habitat within Project Location 	✓
Diversity of submergent and emergent vegetation	<ul style="list-style-type: none"> • Ponds with a good diversity of emergent and submergent aquatic vegetation are most significant. 	<ul style="list-style-type: none"> • Vernal pond features temporary, hydric soils present with some facultative wetland plant species 	
Presence of shrubs, logs at edge of pond	<ul style="list-style-type: none"> • Presence of shrubs and logs increase significance of pond for some amphibian species because of increased structure for calling, foraging, and escape and concealment from predators. 	<ul style="list-style-type: none"> • Shrubs and logs evident throughout site 	✓
Adjacent forest habitat	<ul style="list-style-type: none"> • More significant areas will have closed canopy forest providing shaded, moist understory and abundance of down woody debris for cover habitat. • Breeding ponds with shortest distance to forest habitat are more significant with reduced risk to moving amphibians and are more likely to be used. 	<ul style="list-style-type: none"> • Closed canopy present with abundance of down woody debris 	✓
Water quality	<ul style="list-style-type: none"> • Prefer unpolluted waters. 	<ul style="list-style-type: none"> • Woodland pools appear clean 	✓
Level of disturbance	<ul style="list-style-type: none"> • Woodlands with little or no disturbance (e.g., forest management, roads between breeding pond and forest habitat) are more significant. 	<ul style="list-style-type: none"> • Woodland is undisturbed 	✓

2.3.2 Rare Vegetation Communities

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 S-ranks of S1 to S3 (i.e., extremely rare to rare – uncommon in Ontario).

One rare vegetation community (*Alvar Grassland*) was found on the Project Location during the *SI*. This community is approximately 3 ha in size, locally distinctive and surrounded by white cedar-white spruce (Figure 2.4). 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 a Tufted Hairgrass – Canada Bluegrass – Philadelphia Panic Grass Alvar Grassland Type (ELC Code: RBOA1-4).

Evaluation – A 3 ha Alvar Grassland occurs centrally within the Project Location. **Accordingly, this significant rare vegetation community will be carried forward to the *Natural Heritage Assessment Environmental Impact Study Report* to assess potential negative environmental effects.**

2.3.3 Specialized Habitats for Wildlife

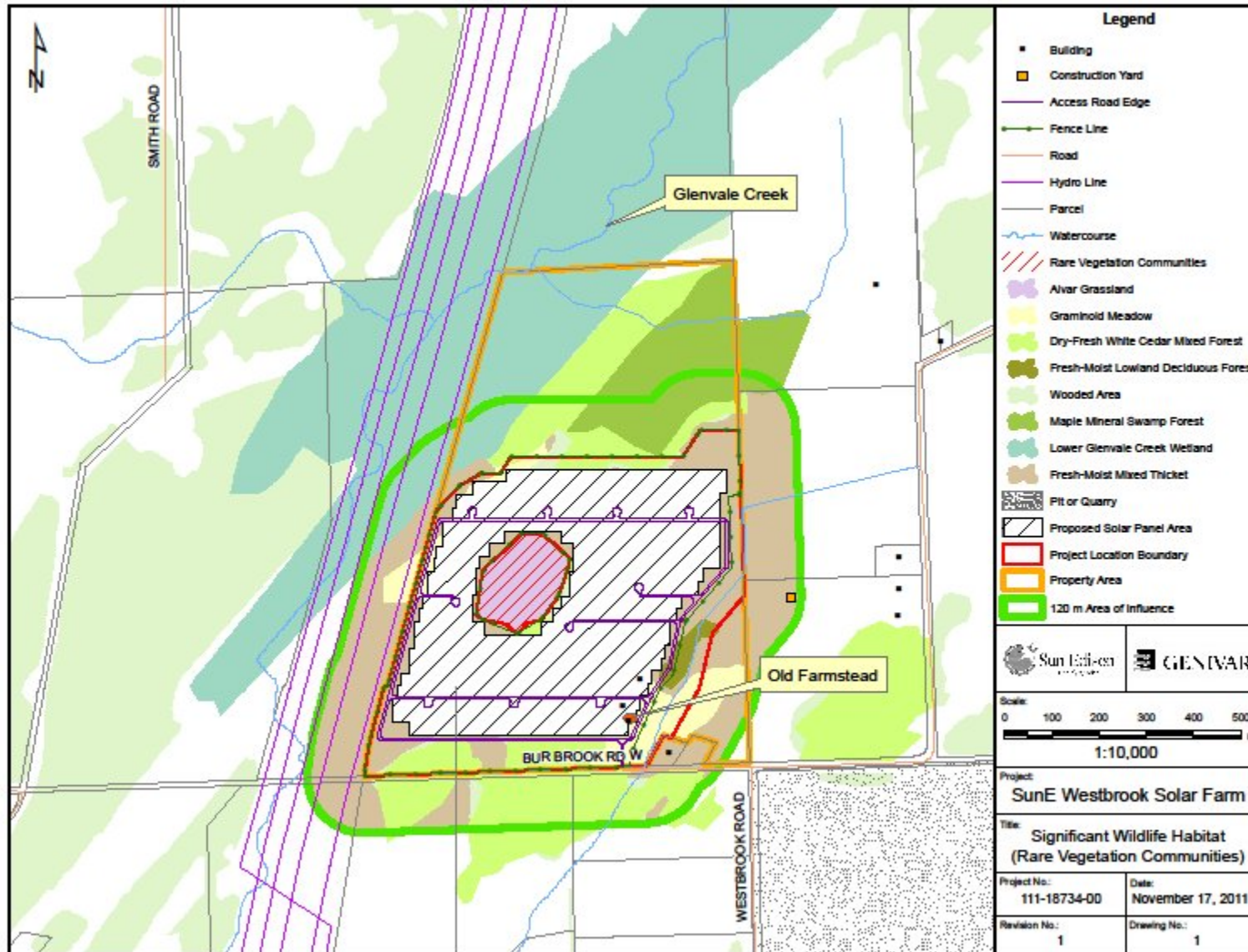
Criteria used to evaluate *specialized habitats for wildlife* are identified in Table Q-3 of Appendix Q in the *SWHTG* (MNR, 2000). The *Draft Significant Wildlife Habitat Ecoregion Criteria Schedules (MNR, 2009b)* was also used to supplement information obtained in the *SWHTG*. The criteria that were considered during this evaluation and how they were assessed are discussed for each of the candidate significant habitats of species of conservation concern identified in the *SI* (Ecological Services 2011).

- ***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.

Potentially suitable woodland raptor nesting habitat was identified during the site investigation within the mature deciduous swamp and surrounding mixed conifer forest to the north of the Project Location, of which a small portion (2 ha) overlaps the 120 m setback zone. However, no raptors or their nests were encountered within 120 m of the Project Location, which included site surveys in early April and June, 2011. Based on the lack of observations, potential habitat for nesting woodland raptors is presumed to not occur within 120 m of the Project Location.

Evaluation – Significant *woodland raptor nesting habitat* will not be carried forward to the *Natural Heritage Assessment Environmental Impact Study Report* to assess potential negative environmental effects.

Figure 2.4 Significant rare vegetation community - SunE Westbrook Solar Energy Project.



2.3.4 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); within a planning authority's jurisdiction.

Five categories of habitat that support species of conservation concern are listed in the *Ecoregion Criteria Schedules* (MNR, 2009b) for Site Region 6E of which one was identified as candidate significant natural features in the *SI* (Ecological Services, 2011).

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

Approximately 50 ha of mixed thicket (THMM2) occurs on and within 120 m of the Project Location thus exceeding the minimum size criterion of 30 ha (Figures 2.5, 2.6). Locally, there are nearly 300 ha of shrub/early successional habitat present, although portions of this are fragmented by a secondary road, a gravel quarry and several farm fields (Figure 2.7). During the site investigations, 6 shrub/early successional habitat breeding bird species (Willow Flycatcher, Brown Thrasher, Eastern Towhee, Field Sparrow, and 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 during the *SI*. The surveyor (Chris Grooms) indicated that they were likely using the shrub wetland habitat associated with Glenvale Creek west of the Project Location.

- ***Evaluation – Shrub/early successional bird breeding habitat is present on and within 120 m of the Project Location. Accordingly, this feature will be carried forward to the Natural Heritage Assessment Environmental Impact Study Report.***



Figure 2.5 Typical shrub-thicket community on Westbrook Project Location.

Figure 2.6 Significant habitats for species of conservation concern - SunE Westbrook Solar Energy Project.

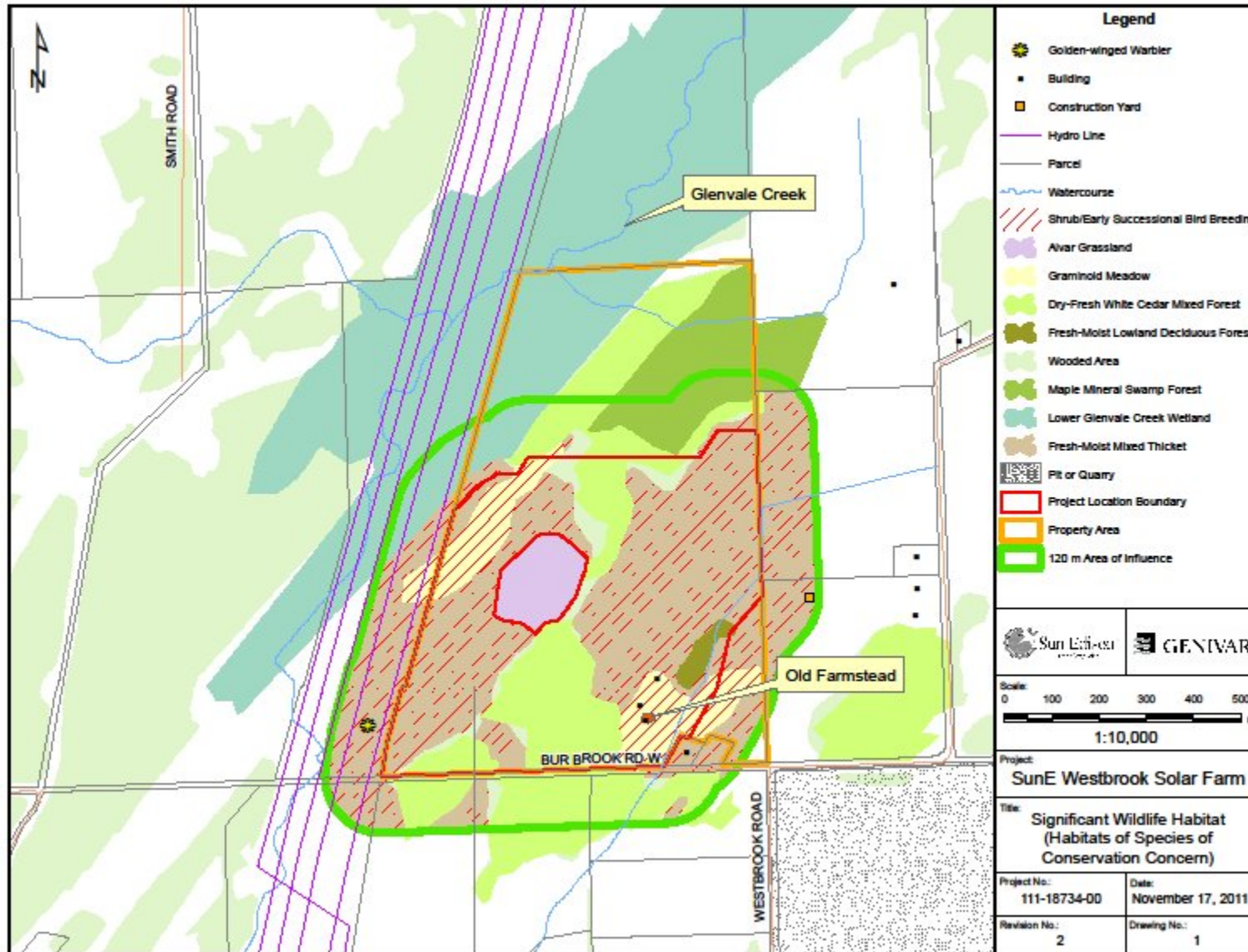
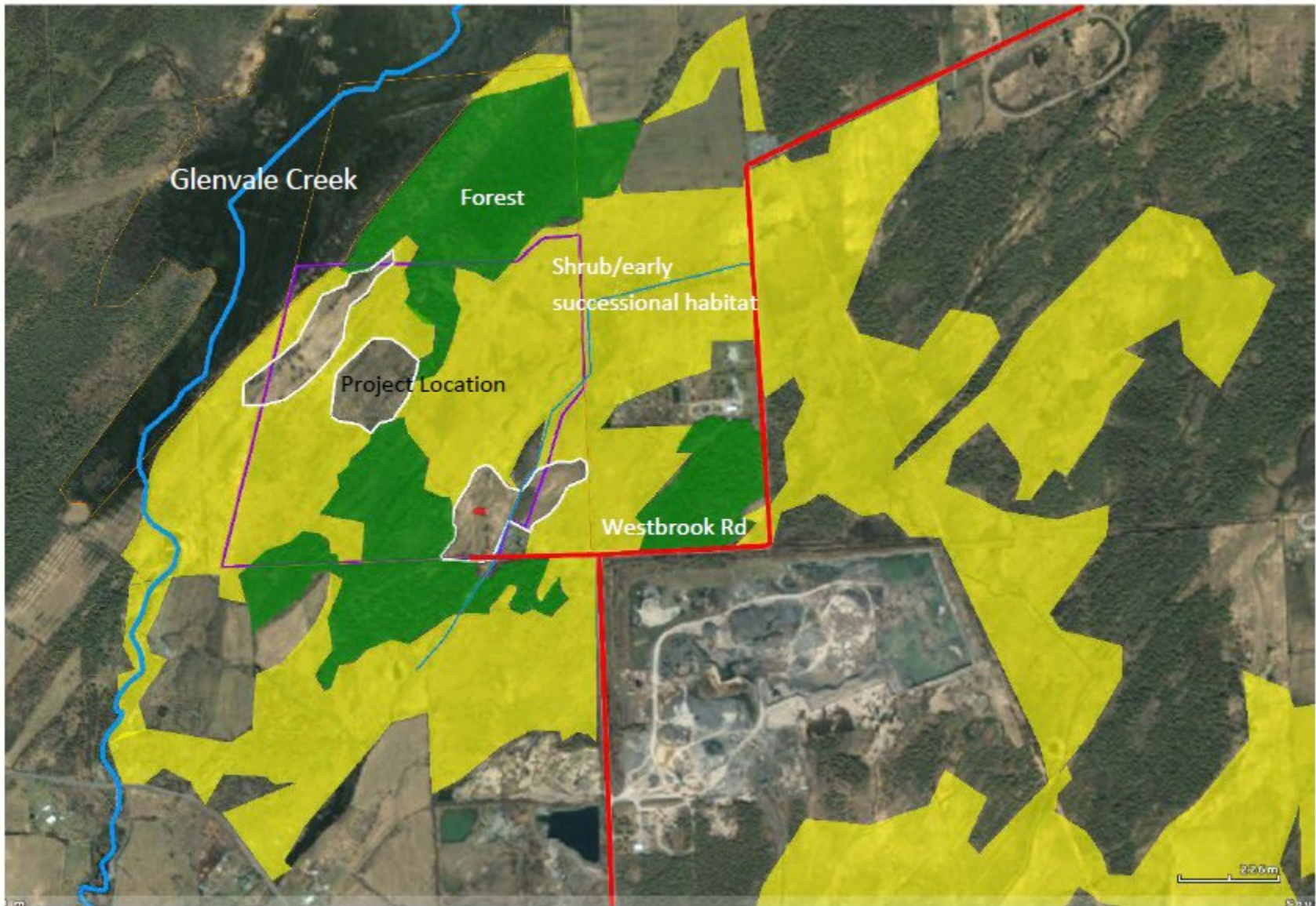


Figure 2.7 Local shrub/early successional bird breeding habitat within vicinity of Project Location.



3. Summary of Evaluation

Based on the findings in this report, the following natural features have been evaluated as significant:

- **Significant Wetlands** – Portions of 2 wetlands occur within 120 m of the Project Location.
- **Significant Wildlife Habitat** – The following wildlife habitat types have been evaluated as significant:
 - **Seasonal Concentration Areas** – *amphibian breeding habitat*
 - **Rare Vegetation Communities** – *alvar*
 - **Habitats of Species of Conservation Concern** – *shrub/early successional bird breeding habitat*

Therefore, the significant natural features identified above will be carried forward to the *Natural Heritage Assessment Environmental Impact Study Report* to assess the potential negative environmental effects on these features. Maps showing the locations of these habitat types are provided herein. Table 3.1 is a summary of natural features identified in the *SI* and *EOS* reports for the Westbrook Project Location.

Table 3.1. Summary of Corrections Required to SI (Ecological Services, 2011).

SITE INVESTIGATION					EVALUATION OF SIGNIFICANCE		
Type	Features, Functions and Attributes	Composition	Distance from Project Location (PL)	Corrections to Records Review?	Evaluation Criteria/ Procedures Used	Significant Natural Feature Confirmed?	Defining Criteria
Significant Wetland (Complex)	A. 160 ha Glenvale Creek riparian wetland complex represents 4% of upstream catchment and 70% of detention area; provides habitat for waterfowl	A. Glenvale Creek wetland consists of 80% riparian marsh with 20% palustrine swamp components	A. 2.5 ha within 120 m setback;	Yes	Appendix C of Natural Heritage Assessment Guide for REA	Treated as Provincially Significant	<ul style="list-style-type: none"> - Significant flood attenuation and water quality improvement functions - Provision of wildlife habitat for waterfowl and other species of concern
	B. 9 ha treed swamp north of Project Location hydrologically connected to Glenvale Creek wetland.	B. Mineral maple swamp consists of mature silver and red maple with mix of other species (black ash, sensitive fern, sedge)	B. 1.5 ha within 120 m setback				
Non Significant Woodlands	W1 - Woodland north of the Project Location does not meet NHRM woodland significance criteria - Portion of W1 is part of Glenvale Wetland complex	<i>Maple Mineral Deciduous Swamp</i> <i>White Cedar Mixed Forest</i>	2 ha within 120 m setback 2 ha within 120 m setback and 2 ha within PL	Yes	NHRM Woodland Evaluation Criteria	No	None met
	W2 - Woodlands in the south of the Project Location do not meet any NHRM woodland significance criteria	<i>White Cedar Mixed Forest</i>	7 ha within PL	Yes		No	None met
	W3 Woodlands east of the Project Location do not meet any NHRM woodland significance criteria	<i>Lowland Deciduous Forest</i>	0.5 ha within PL	Yes		No	None met

SITE INVESTIGATION					EVALUATION OF SIGNIFICANCE		
Type	Functions and Attributes	Composition	Distance from Project Location (PL)	Corrections to Records Review?	Evaluation Criteria/ Procedures Used	Significant Natural Feature Confirmed?	Defining Criteria
Seasonal Concentration Areas	<i>Amphibian breeding habitat</i>	<ul style="list-style-type: none"> - Maple Mineral Deciduous Swamp includes vernal pools - Glenvale Creek Wetland has extensive marsh and swamp habitat 	<ul style="list-style-type: none"> - 2 ha within 120 m of PL - 2 ha within 120 m of PL 	Yes	See above	Yes	<ul style="list-style-type: none"> - 2 species noted - Gray treefrog numbers exceed criteria - Appropriate habitat within swamp forest for breeding
Rare Vegetation Community	<i>Alvar</i>	<ul style="list-style-type: none"> - Tufted Hairgrass – Canada Bluegrass – Philadelphia Panic Grass Alvar Grassland Type interior habitat 	3 ha within PL	Yes	See above	Yes	<ul style="list-style-type: none"> - Identified rare vegetation community based on species assemblage and soil conditions
Specialized Habitats for Wildlife	<i>Woodland Raptor nesting habitat</i>	<ul style="list-style-type: none"> - 23 ha contiguous White Cedar Mixed Forest in local area - 9 ha mature swamp forest - 2 ha interior habitat - Meadow and thicket foraging area available 	Potential nesting habitat on and within 120 m of PL	No	See above	No	<ul style="list-style-type: none"> - Woodland habitat conditions appropriate within mature deciduous swamp north of PL - No raptors or nests encountered within PL
Habitats of Species of Conservation Concern	<i>Shrub/early successional bird breeding habitat</i>	<ul style="list-style-type: none"> - Approx. 300 ha of shrub thicket communities present across local area - Dominant shrub species dogwood, red cedar, honeysuckle - Indicator bird species noted 	23.5 ha shrub thicket within PL	Yes	See above	Yes	<ul style="list-style-type: none"> - extensive habitat available locally - several indicator species present

4. Next Steps

- A *Natural Heritage Assessment Environmental Impact Study Report* conducted according to the requirements of Subsection 38 (2) of O. Reg. 359/09 will be required in order to assess the potential effects, and recommend mitigation and monitoring requirements for the construction, operating and decommissioning of Project components within 120 m of these significant natural features.

5. Date of Beginning and Completion of Report

Start: 1st Draft: August 29, 2011

Completion: November 30, 2011.

6. Names and Qualifications of Persons Conducting the Evaluation of Significance

The EOS assessment and report were completed by:

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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>.

CURRICULUM VITAE OF DALE KRISTENSEN

Relevant Employment Experience

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)
- Biology of Sex (BIOL 210)
- Field ecology module at Lake Opinicon (BIOL 344)
- Restoration Ecology (BIOL 522)
- Field Botany (BIOL 320)
- 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 for St. Lawrence Islands National Park. Provincially Certified Butternut Health Assessor

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