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Site Investigation
Proposed Groundmount Solar Facility LP 1
9307 Union Drive
Strathroy, ON

Project Number
WSL-00002250-00

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Date Submitted
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Report Distributed To:

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Mr. Sam Qin
Future Solar Developments Inc.

Chapter 1 – Introduction & Background

1 Introduction & Background

Exp Services Inc. (**exp**) was retained by Mr. Sam Qin of Future Solar Developments Inc. to conduct a site investigation of natural heritage features located on and or in the surrounding areas of the proposed ground-mounted solar facility set for plot LP 1 located at 9307 Union Dr, Strathroy-Caradoc, Ontario. For the purpose of this report the entire Site including the 120 metre buffer from the solar panel will be identified as "subject property", those areas including the panel and construction limits will be identified as "Site". The project involves the design and construction of one (1) 100 kW solar farm. The natural history inventory along with ancillary comments in this report will be considered preliminary.

The purpose of this investigation was to confirm the presence or absence of natural heritage features outlined in the records review as completed by **exp** (2012).

1.1 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* (herein referred to as the 'REA Regulation') identifies the Renewable Energy Approval (REA) requirements for green energy projects in Ontario. In accordance with Section 4 of the REA Regulation, ground mounted solar facilities with a name plate capacity greater than 12 kilowatts (kW) are classified as a Class 3 solar facility and therefore, require a REA.

Section 25 of the REA Regulation requires the following natural heritage records review for Class 3 solar projects in order to identify whether the project is:

a) In or within 120 m of a provincial park or conservation reserve area;
b) In a natural feature;
c) Within 50 m of an area of natural or scientific interest (ANSI) (earth sciences); and,
d) Within 120 m of a natural feature that is not an ANSI (earth science).

Natural features are defined in Part 1.1 of the REA Regulation as:

a) An 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
h) A woodland

According to Subsection 3 of 26 the proponent (Future Solar Developments Inc.) shall conduct the following Site investigation in order to determine the following:

a) A physical investigation of the air, land and water within 120 metres of the project location in order to determine if:
    i. the results of the analysis summarized in the "records review" report are correct or require correction , and identify any required corrections;
    ii. Whether any additional natural features exist, other than those that were identified in the "records review" report;

iii. The boundaries, located within 120 metres of the project location, of any natural feature that was identified in the records review or the site investigation; and,

iv. The distance from the project location to the boundaries determined under clause (c).

b) The proponent must also prepare a report setting out the following as part of Subsection 3 of Section 26:

i. any corrections to the "records review" report and the determinations made as a result of conducting the site investigation;

ii. information that relates to each natural feature identified in the records review and in the site investigation including the type, attributes, composition and function of the feature.

iii. A map the shows the following features:

- The boundaries that are located within the 120 metres of the project location of any natural feature that was identified in the records review and site investigation;
- The location and type of each natural feature identified in relation to the project location; and,
- The distance of the boundaries from the project location.

iv. The date and time of the beginning and completion of the Site investigation;

v. The duration of the site investigation;

vi. The weather conditions at the time the Site visit was conducted;

vii. A summary of the methods used to make the observations for the purposes of the site investigation;

viii. The name and qualifications of any person conducting the site investigation; and,

ix. Field notes kept by the person conducting the site investigation.

This natural heritage site investigation report has been prepared to meet the above requirements as presented in subsection 3 section 26 of the REA Regulation. The methodology utilized as part of the site investigation follow the Ontario Ministry of Natural Resources Natural Heritage Assessment Guidelines for Renewable Energy Projects dated December 2010.

1.2 Summary of Results of Records Review

The Site has been identified to contain natural features, as presented in **Table 1-1** (**exp** Services Inc., 2012). The following site investigation will delineate the boundaries of those natural features identified.

Table 1-1: Summary of Records Review for LP1

REA Regulation	Natural Heritage Feature Existence as per Records Review (Yes/No/Unknown)	Records Review Result Requirements
Is in or within 120 m of a provincial park or conservation reserve?	No	Records searched in addition to the OMNR records review indicate no provincial parks or conservation reserves are located on-Site or within 120 m.
Is the project located in a natural feature?	Yes	The subject property is just within 120 m of a natural feature that is not an ANSI when considering construction limit boundaries. Site investigation required.
Is the project area located within 50 m of an ANSI (earth science)?	No	Records indicated the Site and subject property is not located within 50 m of an ANSI.
Is the project area located within 120 m of a natural feature that is not an ANSI?	Yes	The subject property is just within 120 m of a natural feature that is not an ANSI when considering construction limit boundaries. Site investigation required.

1.3 Site Visit

A visit to the Site was completed on January 12, 2012. Weather at the time of the visit was cloudy and raining. Temperature at the time of visit ranged from -2 to 2 °C. The Site visit was conducted over the course of two (2) hours, between 10:30 am and 12:30 pm.

During the Site visit, incidental observations of wildlife and birds were noted, in addition to terrestrial species observed.

1.3.1 Name and Qualifications of Person Conducting Site Investigation

Ms. Melissa Torchia, M.A.Sc, is a junior ecologist that specializes in ecological inventories for sites across the province of Ontario. In this regard she is familiar with methods required for natural heritage assessments that help quantify the natural environment in support of environmental assessments, environmental impact studies and endangered species screening. She is a certified Ontario Wetland Evaluator; in addition she has also completed natural heritage data sensitivity training provided by the Ontario Ministry of Natural Resources (OMNR). Examples of past studies include riparian habitats and forest investigations in cities such as, Brantford, Welland, Ivy Lea, Algonquin Park and Picton. These assessments were guided by the *Ontario Environmental Protection Act*, *Ontario Environmental Assessment Act*, *Ontario Endangered Species Act*, and the *Ontario Planning Act*. Melissa has also been involved with the preparation of a planting plan for the endangered species of butternut, in addition to planting plans for creek restoration projects. Melissa Torchia received her Honours Bachelor of Science degree in environmental science at York University. She then received her Master's in Applied Science degree, specializing in urban forestry from Ryerson University. Her Master's thesis focused on the use of trees to cool the urban microclimate, which was conducted in the downtown core of Toronto on the University of Toronto Campus.

1.4 Site Description

This Site is located in Strathroy-Caradoc, Ontario, and is proposed to contain one (1) 100 kW solar farm plot identified as LP 1. It is estimated that the size of the 100 kW plot is 0.24 hectares. A general land classification for the Site is noted as agricultural land. At the time the Site visit was conducted, the ground was covered with short vegetation.

The Site area for the proposed new solar panel is located just south of the existing gravel yards. The area was relatively flat at the time of investigation. The majority of the subject property is also located on agricultural land that has been previously disturbed. Only a small section extends just at the top of slope into the woodland.

South east of the agricultural field is a large woodland that extends along the eastern section of the Site. The woodland is fairly dense, with abundant new growth of deciduous trees. This woodland extends down slope into a valleyland, which then transitions into a marsh habitat. Also present in the valley along the eastern edge of the Site is a natural creek. This creek extends north and south east of the Site, which is a part of the Gold Creek Wetland complex (locally significant). Gold Creek is known to contain approximately 20 species of fish in accordance with the OMNR. The creek was approximately 1.5 to 2 m wide, and ranged in depth between 0.3 and 1.5 m. Water was turbid, but fast flowing. Also, ATV/snowmobile tracks were present throughout the woodland, with a bridge crossing over the creek. Forest cover was dominantly deciduous of both mature and immature stature, with an abundance of deadfall and windblown trees.

On the east side of the residential property is a large man-made pond. The pond was frozen over at the time the Site visit was conducted, but does not appear to be connected to the creek. Mature deciduous trees line the northern banks of the pond. This pond feature is outside of the subject property.

For natural feature boundaries refer to Figure 1; photos of the Site and surrounding areas are found in Appendix A.

Chapter 2 – Methodology

2 Methodology

Natural heritage features were identified within the records review prepared by **exp** (2012), whereby, unknown and known features were further investigated to identify their presence or absence within the subject property, as well as to delineate boundary limits.

The entire project location and lands within 120 m were investigated by the observer on foot in order to document and characterize the natural features present. Boundaries outside 120 metres were also investigated in order to better understand the ecological systems present within the subject property.

Photographs of the Site were taken in order to document the vegetation communities found on-Site in addition to any other natural features that may be considered for significance. Wildlife observations were made throughout the Site investigation either through visual sightings, auditory calls and tracks noted on the subject property. Areas searched as part of the investigation included the identification of habitat for wildlife, in addition to habitat for species of special concern.

A list of vegetation and wildlife species observed during the Site visit is documented in Chapter 3 of this Report.

Chapter 3 –
Site Investigation Observation Results

3 Site Investigation Observation Results

3.1 Stand Composition

A stand characteristic is the classification of a collection of plants having a relatively uniform composition and structure. The purpose of identifying the stand characteristics at a given Site is to categorize the habitats present in order to determine the types of natural features and to investigate the wildlife expected to be at the Site.

The Site and most of the subject property are located on agricultural land. During the Site investigation, the ground contained small patches of vegetation.

The woodland that is just within 120 metres from the Site contained both mature and immature deciduous trees that ranged between 10 and 25 metres in height. Composition of the woodland was fairly dense. The marsh area located inside the valleyland directly east of the Site is dominated by small shrubs and herbaceous plants. Gaps exist in the canopy as a result of deadfall and clearings for vehicle tracks and trails. The banks of the creek did lack vegetative cover due to the high velocity of flow and erosion that it experiences during flood stages. The presence of deadfall logs were approximately 10 metres in length and were found occasional throughout the woodland. There were also rare sightings of snags that were also approximately 10 metres in height. The overall community in the woodland can be described as Carolinian and between mid-age to mature.

3.2 Plant Community

A plant community is a unit of vegetation within a given area. Identifying a plant community within a Site is necessary to determine the type of environment present (e.g. shade-tolerant area) and to identify the type of wildlife expected to be at the Site, in addition to sensitive areas. This information will also aid in the identification of any locally, regionally or provincially rare, threatened or endangered vegetative species and communities on the Site. If identified, these species and/or communities will need to be preserved and protected.

The Site and majority of the subject property were devoid of woody vegetation. The active agricultural land contained some short crop vegetation. The plant community in the woodlands surrounding the Site and subject property consisted of mixed immature and mature deciduous trees as well as herbaceous plant species. Dominant trees found in the surrounding area include white elm (*Ulmus americana*), slippery elm (*Ulmus rubra*), American beech (*Fagus grandifolia*), sugar maple (*Acer saccharum*), black maple (*Acer nigrum*), silver maple (*Acer saccharinum*), red maple (*Acer rubrum*), red oak (*Quercus rubra*), eastern cottonwood (*Populus deltoides*), willow species (*Salix spp.*), black walnut (*Juglans nigra*), bitternut hickory (*Carya cordiformis*), and eastern white cedar (*Thuja occidentalis*).

The understory in the woodland consisted primarily of herbaceous plants and some small shrubs. This includes wild red raspberry (*Rubus idaeus ssp. strigosus*), wild grape vine (*Vitis spp.*), goldenrod (*Solidago* spp.), red osier dogwood (*Cornus sericea*), and hawthorn species (*Crataegus* spp.). A list of common vegetation found in the surrounding areas is provided in **Table 3-1**.

Table 3-1: List of dominant vegetation found in surrounding area

Vegetation Type	Scientific Name	Common Name
Trees / Shrubs	*Ulmus americana*	White Elm
	Ulmus rubra	Slippery Elm
	Fagus grandifolia	American Beech
	Acer saccharum	Sugar Maple
	Acer nigrum	Black Maple
	Acer saccharinum	Silver Maple
	Acer rubrum	Red Maple
	Quercus rubra	Red Oak
	Populus deltoides	Eastern Cottonwood
	Salix spp.	Willow Species
	Juglans nigra	Black Walnut
	Carya cordiformis	Bitternut Hickory
	Thuja occidentalis	Eastern White Cedar
	Cornus stolonifera	Red Osier Dogwood
	Crataegus spp.	Hawthorn Species
	Rubus idaeus	Wild Red Raspberry
	Vitis spp.	Wild Grape Vine
Herbaceous Plants	*Solidago spp.*	Goldenrod

3.3 Extent of Disturbance

A Site can also be described by the extent and intensity by which management or disturbance has occurred on the Site. It is important to note disturbance as it can influence community structure and function. Anthropogenic disturbances are usually more selective, and directly affect one (1) or several specific species, where as physical forces such as earthquakes or drought can affect the entire plant community.

Disturbances such as non-native species, gaps in forest canopy, plantations, tracks and trails, noise, disease and death of trees as well as wind throw (blown down) are recorded and observed at a given Site location.

The Site and subject property did not contain any signs of disturbance, aside from the active agricultural use. During the Site visit, there were no signs of flooding within the subject property, in addition to tracks by wildlife.

In the woodland and wetland area located outside the subject property, trail signs for recreational vehicles were present, indicating heavy uses of snowmobiles, ATV's etc, in addition to the creation of bridges to cross over the creek. Evidence of rubbish material and dumping was found throughout the woodlot, mainly along the edge of the valley, and at the bottom of the slope. There was evidence of moderate deer (*Odocoileus virginianus)* browse activity in the woodland, as tracks were noted throughout, in addition to presence of skat. Tracks from other wildlife were also recorded in the woodlot along with tracks and footprints along the banks of the creek.

Overall, there appeared to be no non-native species that would be considered invasive species of concern at the time of observation. In addition, there were no signs of noise during the time the Site visit was conducted, however, the Site is located next to a gravel mill, and therefore noise is likely present during period of use.

3.4 Wildlife and Wildlife Habitat

In terms of wildlife and wildlife habitat, the Site may contain elements that can provide suitable habitats for wildlife. For example, small mammals and birds often inhabit soils or use fallen logs. In addition, the presence of trees, or species of trees that produce fruits such as nuts or berries, may prove to be an important food source for some species.

The Site did not contain any areas for wildlife or wildlife habitat. The Site is presently used for agricultural and is devoid of trees and shrubs.

The woodland that exists within 120 metres of the Site did contain few tree species that produce nuts (for example, trees like *Juglans nigra* and *Fagus grandifolia*) and seeds (trees like *Acer spp.*) that local animals and birds may feed upon. The density of the forest cover in the area in addition to the creek does suggest an area where local animals do forage at certain time periods of the year. The creek did not contain any fish at the time the Site visit was conducted, but they are expected at certain time periods of the year. This wetland area may also contain habitat for snakes, frogs, and turtles.

On the whole, the only wildlife sightings at the time the Site visit was conducted included tracks and skat of white-tailed deer in the woodland. However, all tracks and evidence of wildlife were outside of the subject property down within the valleyland.

The presence of long grass and wildflowers located in certain areas in the woodland and wetland could indicate a suitable area for species of Lepidopetera (butterfly) and Odonata (damselflies and dragonflies) to exist.

3.5 Adjacent Land

The adjacent land to the property consists mainly of maintained agricultural land. Topography is mainly flat, with some rolling hills and depressions. The meandering creek located to the east of the Site continues north east through adjacent properties.

Located north of the Site is another residential property that contains farmland for horses.

Chapter 4 –
Confirmation of Records Review Results

4 Confirmation of Records Review Results

4.1 Key Natural Heritage Features

Natural heritage features and like areas are defined as those that contain significant wetlands, fish habitat, significant woodlands, significant valleylands, significant portions of habitat for endangered and threatened species, significant wildlife habitat, and significant areas of natural and scientific interest (ANSIs). All of these features are important for their environmental and social values as a legacy of the natural landscapes of an area as defined within Ontario's *Planning Act* and explained within the Provincial Policy Statement (PPS, 2005).

The following sections confirm the presence or absence of natural features on-Site and within the subject property that were identified or unknown in the records review prepared by **exp** (2012).

4.1.1 Provincial Parks & Conservation Reserve

The records review concluded that no provincial parks or conservation reserves are located within the subject property.

4.1.2 Surface Water Bodies, Wetlands and Fish Habitat

Wetlands are those areas that are seasonally or permanently covered by shallow water, as well as lands where the water table is close to or at the surface (Lee *et al.*, 1998). A significant wetland is an area identified as provincially significant by the OMNR using evaluation procedures established by the province, as amended from time to time (Lee *et al.,* 1998).

Fish habitats are identified as spawning grounds and nursery, rearing, food supply, and migration areas on which fish depend directly and or indirectly in order to carry out their life processes (Lee *et al.,* 1998). Fish can be identified as fish, shellfish, crustaceans, and marine animals, at all stages of their life cycle (PPS, 2005). Lakes, rivers, streams, ponds and wetlands are known fish habitats (Lee *et al.*, 1998). Fish habitats commonly occur in many other natural heritage areas such as wetlands, valleylands, woodlands and ANSIs.

Record Review Results:

The NHIC database indicated that there are no provincially significant wetlands located on the Site or within the subject property. The search did reveal a locally significant wetland as a natural area within one (1) to two (2) km^2 east of the Site, as presented in **Table 4-1**.

Table 4-1: Natural Areas within surrounding of Site Location

Area Name	Type	Significance Level	Location
Gold Creek Wetland	Wetland	Local	East

Aerial imagery indicated a large pond exists on the east side of the residential home. This pond is located outside the subject property.

OMNR Records Review has indicated that a part of the Gold Creek, locally significant wetland complex, has two (2) wetland communities on the property; one (1) community is located 120 metres away and the other is 220 metres away. A third community is located adjacent the rear of the property approximately 400 metres from the Site. Therefore, OMNR verified that this natural feature was present in or within the subject property, and a site investigation was required to delineate the boundary of this natural feature.

Site Investigation Results:

The site investigation confirmed the presence of this natural feature inside the valleyland. Given the characteristics of this feature and its boundaries, it can be considered outside of the subject property, given the steep slope of the valley. Therefore, the site investigation concludes that no wetlands, surface waterbodies, or fish habitat exist on-Site or within the subject property and no impact will be received to this known feature during construction activities.

4.1.3 Significant Woodlands

Woodlands are treed areas that provide environmental or economic benefits such as erosion prevention, water retention, recreation and the sustainable harvest of woodland products. Woodlands include treed areas, woodlots or forested areas, and vary in their level of significance (PPS, 2005). Woodland significance is typically determined by evaluating key criteria which relate to woodland size, ecological function, uncommon woodland species, and economic and social value.

Larger woodlands are more likely to contain a greater diversity of plant and animal species and communities than smaller woodlands, and are better buffered against edge effects or agricultural and urban activities.

Records Review Results:

The NHIC database and Strathroy-Caradoc Official Plan (S-COP) indicated that there are no significant woodlands located at the Site. Aerial Imagery indicated a woodland is located within the subject property.

According to the Records Review conducted by the OMNR, there is a woodland present within the subject property. Therefore, due to the verification of the presence of this natural feature on or within the subject property, a site investigation was required to verify the boundaries.

Site Investigation Results:

The site investigation confirmed the presence of this feature within the subject property. The edge of the woodland is approximately 105 metres from the construction limit boundary. Once construction is finished, the solar farm will be approximately 115 metres to 120 metres from the edge of the woodland.

Given the present disturbance on the Site, in terms of agricultural clearing and planting, in addition to existing buffers, it is unlikely any additional impacts will be received as a consequence to the construction of this solar farm.

4.1.4 Significant Valleylands

The PPS (2005) identifies significant valleylands as a “natural area that occurs in a valley or landform depression that has water flowing through or standing for some period of the year”.

Records Review Results:

No valleylands were documented in the S-COP, or indicated by the NHIC database.

The OMNR has not yet evaluated the presence of valleylands at this Site, and was therefore unable to provide information about this natural feature in their Records Review. Therefore, the OMNR has indicated that a site investigation was required to gather more information about this feature.

Site Investigation Results:

The site investigation confirmed the presence of a valleyland east of the Site; located at the edge of the woodland approximately 105 metres from the constriction limit. This valleyland includes both the woodland and wetland areas mentioned above.

Given the present disturbance on the Site, in terms of agricultural clearing and planting, in addition to existing buffers, it is unlikely any additional impacts will be received as a consequence to the construction of this solar farm.

4.1.5 Areas of Natural and Scientific Interest (ANSIs)

Significant ANSIs are defined as areas of land and water containing natural landscapes or features. Such features concern life science or earth science values related to protection, scientific study or education.

An area is identified as provincially significant by the MNR using evaluation procedures established by the province, as amended from time to time (PPS, 2005). The ANSIs are divided into two (2) types: life science ANSI and earth science ANSI. Specifically, a life science ANSI can contain specific types of forests, valleys, prairies and wetlands of ecological importance. That is, they represent examples that are relatively undisturbed in terms of vegetation community and/or landforms associated with that vegetation. Those listed as provincially significant life science ANSIs are the best examples of the particular natural heritage features in the province. In contrast, earth science ANSIs includes representative examples of bedrock, fossil, and landforms in Ontario, and on-going geological processes.

Records Review Results:

The NHIC database, S-COP and OMNR District office indicated that there are no provincially or regionally identified ANSIs located at the Site or on the subject property.

Site Investigation Results:

No site investigation was required, as this natural feature was deemed absent during the records review.

4.1.6 Significant Wildlife Habitat

Wildlife habitats are defined as areas where plants, animals and other organisms live and are able to find adequate amounts of food, water, shelter and space needed to sustain their populations. Specific wildlife habitats of concern may include areas where species concentrate at a point in their annual life cycle, and those areas which are important to migratory and non-migratory species.

A wildlife habitat is referred to as significant if it is deemed ecologically important in terms of feature, function, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or Natural Heritage System (PPS, 2005).

A significant wildlife habitat is described under four (4) categories:

- Seasonal concentrations of animals;
- Rare vegetation communities or specialized habitats for wildlife;
- Animal movement corridors; and,
- Habitats of species of conservation concern.

4.1.6.1 Seasonal Concentration Areas

Areas of seasonal concentrations of animals are defined as “areas where animals occur in relatively high densities at specific periods in their life cycle and/or during particular seasons” (Lee *et al.*, 1998; PPS, 2005). Areas of seasonal concentrations are typically small in comparison to larger habitat areas that the species uses at other times of the year.

An assessment of the potential for the Site as a wildlife concentration area was carried out. Resources outlined in both the OMNR Significant Wildlife Habitat Technical Guide (2000) and the Significant Wildlife Habitat Ecoregion 7E Criterion Schedule were utilized to evaluate the potential for species concentration occurrence.

4.1.6.2 Deer Winter Congregation Areas

Deer and moose often inhabit forested regions and may venture onto disturbed areas. Deer winter congregation areas are defined by woodlots that are greater than 100 hectares in size or larger, or if those areas are in rare woodlots that are greater than 50 hectares in size. Deer movements in this ecoregion (7E) are not constrained by snow depth.

Records Review Results:

Aerial imagery indicates the Site is located in a farm field with limited tree cover. A woodland is located within the subject property, which may serve as a deer winter congregation area.

The OMNR has not yet identified deer winter congregation areas at this Site, and was therefore unable to provide information about this natural feature in their Records Review. They advised in their Records Review that this information must be identified by OMNR.

A site investigation will be conducted to identify the presence or absence of this natural feature.

Site Investigation Results:

A woodland was located within the subject property, approximately 105 metres from the construction limit. Given the steepness of the valley, and observations made along the edge of the woodland, there were no signs of deer tracks or skat. Therefore, this concentration area is likely absent within the subject property. The confirmation of deer winter congregation areas from OMNR is required.

4.1.6.3 Waterfowl Stopover and Staging Areas (Terrestrial & Aquatic)

Terrestrial waterfowl stopover and staging areas are usually comprised of fields that contain flooding and/or sheet water during spring snowmelt and run-off. These habitats often contain important invertebrate foraging opportunities for migrating waterfowl such as American wigeon (*Anas americana*) and American black duck (*Anas rubripes*). Aquatic stopover and staging areas contain ponds, marshes, lakes, bays, coastal inlets and watercourses that may be used during their migration. Reservoirs managed as a large wetland or pond/lake are also included.

Records Review Results:

The OMNR has not yet evaluated the presence of terrestrial or aquatic waterfowl stopover and staging areas at this Site, and was therefore unable to provide information about this natural feature in their Records Review. The OMNR indicated that a site investigation was required to gather more information about this feature.

Site Investigation Results:

Rain had been received on-Site during and prior to the site investigation. Given the Sites present condition, there was no evidence of flooding on the Site, or within the subject property.

Given that the Site is actively disturbed and the absence of water features, it can be confirmed that no terrestrial or aquatic waterfowl stopover and staging areas exist on Site or within the subject property.

4.1.6.4 Shorebird Migratory Stopover Area

These habitats include shorelines of lakes, rivers, and wetlands, including beach areas, bars, and seasonally flooded, muddy and un-vegetated shoreline habitats. Great Lakes coastal shorelines, including groynes and other forms of armour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October. Sewage treatment ponds and storm water ponds do not qualify as a significant wildlife habitat.

Records Review Results:

The OMNR has not yet evaluated the presence of shorebird migratory stopover areas at this Site, and was therefore unable to provide information about this natural feature in their Records Review. The OMNR indicated a site investigation was required to gather more information about this feature.

Aerial imagery and Site information provided by the client indicate that the Site is located on a presently used agricultural field, therefore deeming it disturbed. As such, this habitat is likely absent

Site Investigation Results:

The site investigation confirmed the absence of this natural feature within the subject property.

4.1.6.5 Raptor Wintering Area

Raptor wintering areas can be described as a combination of fields and woodlands that provide roosting, foraging and resting for wintering raptors. These areas need to greater than 20 hectares with a combination of forest and upland. These habitats are often least disturbed sites, idle/fallow or lightly grazed fields and/or meadows.

Records Review Results:

The OMNR has not yet evaluated the presence of raptor wintering areas at this Site, and was therefore unable to provide information about this natural feature in their Records Review. The OMNR indicated a site investigation was required to gather more information about this feature.

Aerial imagery and Site information provided by the client indicate that the Site is located on a presently used agricultural field, therefore deeming it disturbed. As such, this habitat is likely absent.

Site Investigation Results:

The site investigation confirmed the absence of this natural feature within the subject property.

4.1.6.6 Bat Hibernacula, Maternity and Migratory Stopover Areas

Bat hibernacula are often not well known, but may be found in caves, mine shafts, underground foundation and karsts.

Bat maternity colonies are normally found in tree cavities and in buildings, however, habitats found in buildings are not considered significant wildlife habitat. Maternity roosts are not found in caves or mines in Ontario. Maternity colonies are located in mature deciduous or mixed forest stands that are greater than 10 hectares in area with tree snags that are greater than 25 centimetres diameter-at-breast-height (dbh). Female bats tend to prefer tree snags in the early stages of decay. Northern myotis (*Myotis septentrionalis*) prefer contiguous tracts of older

forest cover for foraging and roosting in snags and trees. Silver-haired bats (*Lasionycteris noctivagans*) tend to prefer mature forest stands comprised of deciduous or mixed deciduous species, and those older areas that have approximately 21 snags per hectare.

Migratory bats that travel long distances typically migrate during the late summer and early fall from summer breeding habitats throughout Ontario to southern wintering areas. During migration in the fall, bats tend to congregate at unknown areas at stopover habitats.

Records Review Results:

The OMNR has not yet evaluated the presence of bat hibernacula or maternity colonies at this Site, and was therefore unable to provide information about this natural feature in their Records Review. The OMNR indicated a site investigation was required to gather more information about this feature.

Additionally, according to the Records Review conducted by the OMNR, bat migratory stopover areas only apply to the Long Point region, and is therefore not relevant to this Site.

Site Investigation Results:

The site investigation revealed no habitat for bat hibernacula or maternity colonies existed within the subject property.

4.1.6.7 Turtle Wintering Areas

Turtle wintering areas are normally the same area as their regular habitat. The water at these sites need to be deep enough not to freeze during the winter months and must contain soft mud substrates. Over winter sites are those that typically contain permanent waterbodies, large wetlands, bogs and fens that contain adequate amounts of dissolved oxygen.

Records Review Results:

According to the Records Review, OMNR has not yet evaluated the presence of turtle wintering areas at this Site, and was therefore unable to provide information about this natural feature in their Records Review. The OMNR indicated a site Investigation was required to gather more information about this feature.

Aerial imagery indicated the Site is located on an active agricultural field, however, there may be turtle wintering areas inside the wetland area located north east of the Site, but this is outside of the subject property.

Site Investigation Results:

The site investigation confirmed the absence of this natural feature to exist within the subject property.

4.1.6.8 Snake Hibernaculum

Snake hibernaculum is usually found in burrows, rock crevices and other natural locations below the frost line. Key areas are those that contain broken or fissured rock, which can provide access to subterranean sites below the frost line. Wetlands are also important over-wintering habitat in conifer or shrub swamps and swales, poor fens, or depressions in bedrock terrain with sparse trees or shrubs with sphagnum moss or sedge hummock ground cover.

Records Review Results:

The OMNR has not yet evaluated the presence of snake hibernacula at this Site, and was therefore unable to provide information about this natural feature in their Records Review. The OMNR indicated a site investigation was required to gather more information about this feature.

Aerial imagery indicated the Site is located on an active agricultural field, however, there may be snake hibernaculum inside the woodland and wetland area located north east of the Site.

Site Investigation Results:

The site investigation confirmed the absence of this natural feature to exist within the subject property.

4.1.6.9 Colonial Nesting Bird Breeding Habitat (Bank and Cliff)

Colonial nesting bird breeding habitat near banks and cliffs consist of areas with exposed soil banks, are undisturbed or naturally eroding, and those which are not a licensed/permitted aggregate area. This does not include man-made structures such as bridges or buildings, or recently disturbed soil areas such as berms, embankments, soil and/or aggregate stockpiles.

Records Review Results:

According to the Records Review conducted by the OMNR using OMNR contour maps, there were no colonial nesting bird breeding habitats (bank and cliff swallows) on or within the subject property.

Site Investigation Results:

No site investigation was required, as this natural feature was deemed absent during the records review.

4.1.6.10 Colonial Nesting Breeding Bird Habitat (Trees/Shrubs)

Tree and shrub habitat for colonial nests can be found in live or dead standing trees in wetlands, lakes, island and peninsulas. Shrubs and occasionally emergent vegetation may also be used. Most nests in trees are 11 to 15 metres from the ground near the top of the tree.

Records Review Results:

The OMNR has not yet evaluated the presence of colonial nesting bird breeding habitat (trees/shrubs) at this Site, and was therefore unable to provide information about this natural feature in their Records Review. The OMNR indicated a site investigation was required to gather more information about this feature.

Aerial imagery indicated the Site is located on an active agricultural field. Hence, this habitat is likely absent.

Site Investigation Results:

The site investigation confirmed the absence of this natural feature to exist within the subject property.

4.1.6.11 Colonial Nesting Bird Breeding Habitat (Ground)

Colonial ground nesting birds, such as gulls and terns are typically located on islands or peninsulas associated with open water or in marshy areas.

Records Review Results:

The OMNR has not yet evaluated the presence of colonial nesting bird breeding habitat (ground) at this Site, and was therefore unable to provide information about this natural feature in their Records Review. The OMNR indicated a site investigation was required to gather more information about this feature.

Site Investigation Results:

The site investigation confirmed the absence of this natural feature to exist within the subject property.

4.1.6.12 Migratory Butterfly Stopover Area

Migratory butterfly stopover areas are typically at a minimum of 10 hectares in size with a combination of field and forest habitat present, and located within 5 kilometres of Lake Ontario and Lake Erie. This habitat typically provides an area for stopover during migration. They cannot be disturbed areas, and must contain fields or meadows with an abundance of nectar plants.

Records Review Results:

According to Records Review conducted by the OMNR and aerial imagery, migratory butterfly stopover areas are not relevant to this Site because it is not within 5 kilometres of Lake Erie.

Site Investigation Results:

No site investigation required for this natural feature, as it was deemed absent during the records review.

4.1.6.13 Landbird Migratory Stopover Area

Landbird migratory stopover areas are those that contain woodlots of 5 hectares in size or greater and within 5 kilometres of Lake Ontario. Woodlands that are less than 2 kilometres from Lake Erie or Lake Ontario are more significant. These sites can contain a wide variety of habitats that consist of forests, grasslands, and wetland areas.

Records Review Results:

According to Records Review conducted by the OMNR, and aerial imagery, landbird migratory stopover areas are not relevant to this Site because it is not within 5 kilometres of Lake Erie.

Site Investigation Results:

No site investigation required for this natural feature, as it was deemed absent during the records review.

4.1.7 Rare Vegetation Communities or Specialized Habitat

Rare or specialized habitats include rare vegetation communities or concentrations of rare plants. These specialized areas may also provide habitat to rare animal species. According to the Significant Wildlife Habitat Technical Guide (2000), the following definitions of each was provided:

Rare vegetation communities include:

- Areas that contain a provincially rare vegetation communities or one that is rare within a planning area.

Specialized Habitats include:

- Areas that support wildlife species that have highly specific habitat requirements;
- Areas with high species and community diversity; and,
- Areas that provide habitat that greatly enhance species survival.

Habitat types that meet these definitions were considered during the site investigation and their occurrence within 120 metres of the Site location. Both records review and site investigation results are presented in **Table 4-2** and **4-3** below.

Table 4-2: Rare Vegetation Communities

Habitat	Records Observation (Data & Imagery) Results	OMNR Records Review	Site Investigation Results
Cliff & Talus Slope	Habitat not present on-Site or within subject property.	Habitat not present on-Site or within subject property according to OMNR contour maps.	No Site Investigation required. Vegetation community absent.
Sand Barren	Habitat not present on-Site or within subject property.	Habitat not present on-Site or within subject property according to NRVIS soil survey complex clay soils.	No Site Investigation required. Vegetation community absent.
Alvar	Habitat not present on-Site or within subject property.	Habitat not present on-Site or within subject property according to NRVIS soil survey complex clay soils.	No Site Investigation required. Vegetation community absent.
Old Growth Forest	A woodland exists just within 120 metres of the subject property. Site investigation required.	No data from OMNR. Site investigation required.	The woodland is not considered old-growth. Therefore, this vegetation community is absent.
Savannah	Habitat not present on-Site or within subject property.	OMNR verified this natural feature is not present in or within subject property.	No Site Investigation required. Vegetation community absent.
Tall Grass Prairie	Habitat not present on-Site or within subject property.	OMNR verified this natural feature is not present in or within subject property.	No Site Investigation required. Vegetation community absent.
Other Rare Vegetation Communities	A woodland and other natural features exist just within the subject property. Site investigation required.	No data from OMNR. Site investigation required.	There were no rare vegetation communities found within the subject property. Therefore this vegetation community was deemed absent.

Table 4-3: Specialized Habitat for Wildlife

Habitat	Records Observation (Data & Imagery) Results	OMNR Records Review	Site Investigation Results
Waterfowl Nesting Area	Unknown. Site investigation required.	No data from OMNR. Site investigation required.	Site Investigation confirmed absence of this habitat within subject property.
Bald Eagle and Osprey Nesting, Foraging and Perching Habitat	Unknown. Site investigation required.	No data from OMNR. Site investigation required.	Site Investigation confirmed absence of this habitat within subject property.
Woodland Raptor Nesting Habitat	Site is located on active agricultural field; habitat not likely present.	No data from OMNR. Site investigation required.	Site Investigation confirmed absence of this habitat within subject property.
Turtle Nesting Areas	Site is located in agricultural field; habitat may exist in woodland/wetland. Site investigation required.	No data from OMNR. Site investigation required.	Site Investigation confirmed absence of this habitat within subject property.

Habitat	Records Observation (Data & Imagery) Results	OMNR Records Review	Site Investigation Results
Seep and Springs	Unknown. Site investigation required.	No data from OMNR. Site investigation required.	Site Investigation confirmed absence of this habitat within subject property.
Amphibian Breeding Habitat (Woodland)	A woodland is found within subject property. Site investigation required.	No data from OMNR. Site investigation required.	Site Investigation confirmed absence of this habitat within subject property.
Amphibian Breeding Habitat (Wetland)	A wetland is known to exist within the subject property. Site investigation required.	No data from OMNR. Site investigation required.	Site Investigation confirmed absence of this habitat within subject property.

The Site investigation confirmed the absence of both rare vegetation communities and specialized wildlife habitat. The Site is located on active agricultural field. Although the woodland exists within the subject property (approximately 105 metres from the construction limit), none of these natural features were present along the woodland edge, or mid-way down the valley slope. In addition, given the already present disturbance on-Site and within the majority of the subject property, wildlife have likely already adapted and do not venture outside of the woodland and wetland area.

4.1.8 Animal Movement Corridors

Animal movement corridors listed for this Site as per OMNR Records Review, and Significant Wildlife Habitat Ecoregion 7E Criterion Schedule include amphibian movement corridors.

Records Review Results:

The OMNR has not yet evaluated the presence of amphibian movement corridors at this Site, and was therefore unable to provide information about this natural feature in their Records Review. The OMNR indicated that a site investigation was required to gather more information about this feature.

Site Investigation Results:

The site investigation confirmed the absence of amphibian movement corridors to exist within the subject property. The Site and majority of the subject property are located in an active agricultural field. The woodland that does extend into the subject property from the construction limit does not contain proper habitat for amphibians.

4.1.9 Species of Conservation Concern

Habitats for species of conservation concern include those species that are identified as special concern or rare. These habitats do not include those that pertain to threatened or endangered species that are protected by the *Endangered Species Act, 2007*. A summary of species of conservation concern habitats that may potentially exist on-Site or within the subject property is presented in **Table 4-4**.

Table 4-4: Species of Conservation Concern

Habitat	Records Observation (Data & Imagery) Results	OMNR Records Review	Site Investigation Results
Marsh Bird Breeding Habitat	Unknown. Site investigation required.	No data from OMNR. Site investigation required.	Site Investigation confirmed absence of this habitat within subject property.
Woodland Area – Sensitive Bird Breeding Habitat	Unknown. Site investigation required.	No data from OMNR. Site investigation required.	Site Investigation confirmed absence of this habitat within subject property.
Open Country Breeding Bird Habitat	Unknown. Site investigation required.	No data from OMNR. Site investigation required.	Site Investigation confirmed absence of this habitat within subject property.
Shrub/Early Successional Bird Breeding Habitat	Unknown. Site investigation required.	No data from OMNR. Site investigation required.	Site Investigation confirmed absence of this habitat within subject property.
Special Concern Species	Unknown. Site investigation required.	No data from OMNR. Site investigation required.	Site Investigation confirmed absence of this habitat within subject property.
S1-S3, SH Species and Communities	Unknown. Site investigation required.	No data from OMNR. Site investigation required.	Site Investigation confirmed absence of this habitat within subject property.
Terrestrial Crayfish	Unknown. Site investigation required.	No data from OMNR. Site investigation required.	Site Investigation confirmed absence of this habitat within subject property.

A geographical search for significant or endangered species presence and associated habitat was conducted using the Ontario MNR NHIC (2011) database. A search was conducted on the one (1) km^2 to two (2) km^2 area surrounding and including the subject lands. The search revealed records of 25 species including those identified by OMNR as presented in **Table 4-5**.

Overall, none of these species were observed at the Site or on the subject property during the time the Site visit was conducted. It is important to note, however, that all species have not been observed within the surrounding areas of the Site for over two (2) decades. Given the level of disturbance present on-Site and on the subject property in terms of active agricultural lands, it is unlikely any of these species would be utilizing these areas as potential habitats.

Therefore, the site investigation confirmed the absence of habitats for special concern species to exist within the subject property.

Table 4-5: Rare, Endangered, Threatened and/or Special Concern Species in vicinity of the Site

Type of Organism	Scientific Name	Common Name	Global/Ontario Provisional Ranking	COSEWIC & SARO Ranking	Canada & Ontario General Status	Most Recent Years Observed	Relative Location
Birds	*Ammodramus henslowii*	Henslow's Sparrow	G4 SHB	END	At Risk	1975	Within one (1) km
	Hirundo rustica	Barn Swallow	G5 S4B	THR	Secure	N/A	MNR reported a potential for this Species at Risk to exist on-Site even though no known occurrences documented
	Dolichonyx oryzivorus	Bobolink	G5 S4B	THR	Secure	N/A	
Mammals	*Myotis leibii*	Small-footed Bat	G3 S2S3		May be at risk	1929	Within one (1) km
Butterflies and Skippers	*Asterocampa celtis*	Hackberry Emperor	G5 S2			1977	Within one (1) km
	Asterocampa clyton	Tawny Emperor	G5 S2S3			1977	Within two (2) km
Moncotyledons	*Arisaema dracontium*	Green Dragon	G5 S3	SC	Sensitive	1973	Within one (1) km
	Carex careyana	Carey's Sedge	G4G5 S2		May be at risk	1934	Within one (1) km
	Carex trichocarpa	Hairy-fruited Sedge	G4 S3		Sensitive	1988	Within one (1) km
	Aletris farinosa	Colicroot	G5 S2	THR	At risk	1891	Within one (1) km
	Spiranthes ochroleuca	Yellow Ladies'-tresses	G4 S2		Sensitive / May be at risk	1928	Within one (1) km
Dicotyledons	*Desmodium canescens*	Hoary Tick-trefoil	G5 S2		May be at risk	1888	Within one (1) km
	Desmodium illinoense	Illinois Tick-trefoil	G5 SX	EXP	EXP	1888	Within one (1) km

Type of Organism	Scientific Name	Common Name	Global/Ontario Provisional Ranking	COSEWIC & SARO Ranking	Canada & Ontario General Status	Most Recent Years Observed	Relative Location
Dicotyledons	*Draba reptans*	Carolina Whitlow-grass	G5 S3		May be at risk	1986	Within one (1) km
	Fraxinus quadrangulata	Blue Ash	G5 S3	SC	Sensitive	1983	Within one (1) km
	Lupinus perennis	Sundial Lupine	G5 S3		Sensitive	1936	Within one (1) km
	Monarda punctata	Spotted Beebalm	G5 S1		Sensitive	1984	Within one (1) km
	Polygonum erectum	Erect Knotweed	G5 SH		May be at risk	1934	Within one (1) km
	Pterospora andromedea	Woodland Pinedrops	G5 S2		Sensitive / May be at risk	1888	Within one (1) km
	Sanicula canadensis var. grandis	Long-stlyed Canadian Sanicle	G5T3T5 S2			1935	Within one (1) km
	Zizia aptera	Heart-leaved Alexanders	G5 S1		Secure / May be at risk	1891	Within one (1) km
Ferns and Fern Allies	*Cystopteris protrusa*	Lowland Brittle Fern	G5 S2		May be at risk	1984	Within one (1) km
Reptiles & Turtles	*Emydoidea blandingii*	Blanding's Turtle	G4 S3	THR	Maybe at risk/ At risk	N/A	MNR reported a potential for this Species at Risk to exist on-Site even though no known occurrences documented
	Apalone spinifera spinifera	Spiny Softshell	G5 S3	THR	At risk	N/A	
	Heterodon platirhinos	Eastern Hog-nosed Snake	G5 S3	THR	At risk	N/A	

COSEWIC = Committee on the Status of Endangered Wildlife in Canada; END = Endangered; SC = Special Concern; G1 = extremely rare; G2 = very rare; G3 = Rare to uncommon; G4 = Common; G5 = Very common; GH = historic (no records in past 20 years); GNR = Unranked; NAR = Not At Risk; SARO = Species At Risk in Ontario; SC = Special Concern; S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable; S4 = Apparently Secure; S#S# = range of uncertainty between ranks; SH = Possibly Extirpated; THR = Threatened

Chapter 5 – Summary

5 Summary

Based on the current Site and subject property the following **Table 5-1** summarizes the results as they pertain to the natural heritage features that are known to exist and confirmed during the site investigation, as described in subsection 3 section 26 of the REA Regulation.

Table 5-1: Summary of Results after Site Investigation

REA Regulation	Natural Heritage Feature Existence as per Records Review (Yes/No/Unknown)	Description Of Records Result Requirements	Site Investigation Results	Natural Heritage Feature Existence as per Site Investigation Results (Yes/No)
Is in or within 120 m of a provincial park or conservation reserve?	No	Records search in addition to the OMNR records review indicate no provincial parks or conservation reserves are located on-Site or within 120 m.	Site investigation not required, as this feature is not located within the subject property.	No
Is the project located in a natural feature.	Yes	The subject property is located within natural features. Site investigation required.	A woodland exists just within the subject property when considering the construction limit boundaries.	Yes. A natural feature (woodland) is within 120 metres of construction limit boundary only.
Is the project area located within 50 m of an ANSI (earth science)	No	Records indicated the Site and subject property is not located within 50 m of an ANSI.	Site investigation not required, as this feature is not located within the subject property.	No
Is the project area located within 120 m of a natural feature that is not an ANSI	Yes	The Site and subject property is just within 120 m of a natural feature that is not an ANSI.	A woodland exists just within the subject property when considering the construction limit boundaries.	Yes. A natural feature (woodland) is within 120 metres of construction limit boundary only.

A woodland exists approximately 105 metres from the construction boundary. Given the present disturbance on-Site and within the subject property up to the edge of the woodland boundary it is **exp's** opinion that no negative effects will come from the construction of this solar panel. In addition, no habitats were observed along the edge of the woodland, or down the steep slope into the valleyland.

After construction occurs, the panels will be just outside of the 120 metre boundary from the edge of the woodland. As such, no evaluation of significance report or environmental impact study (EIS) will be prepared for this Site.

6 Closure

We trust this report is satisfactory for your purposes. We would be pleased to provide additional information, to clarify any questions that arise following the review of this report.

Sincerely,

exp Services Inc.

DRAFT

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DRAFT

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7 References

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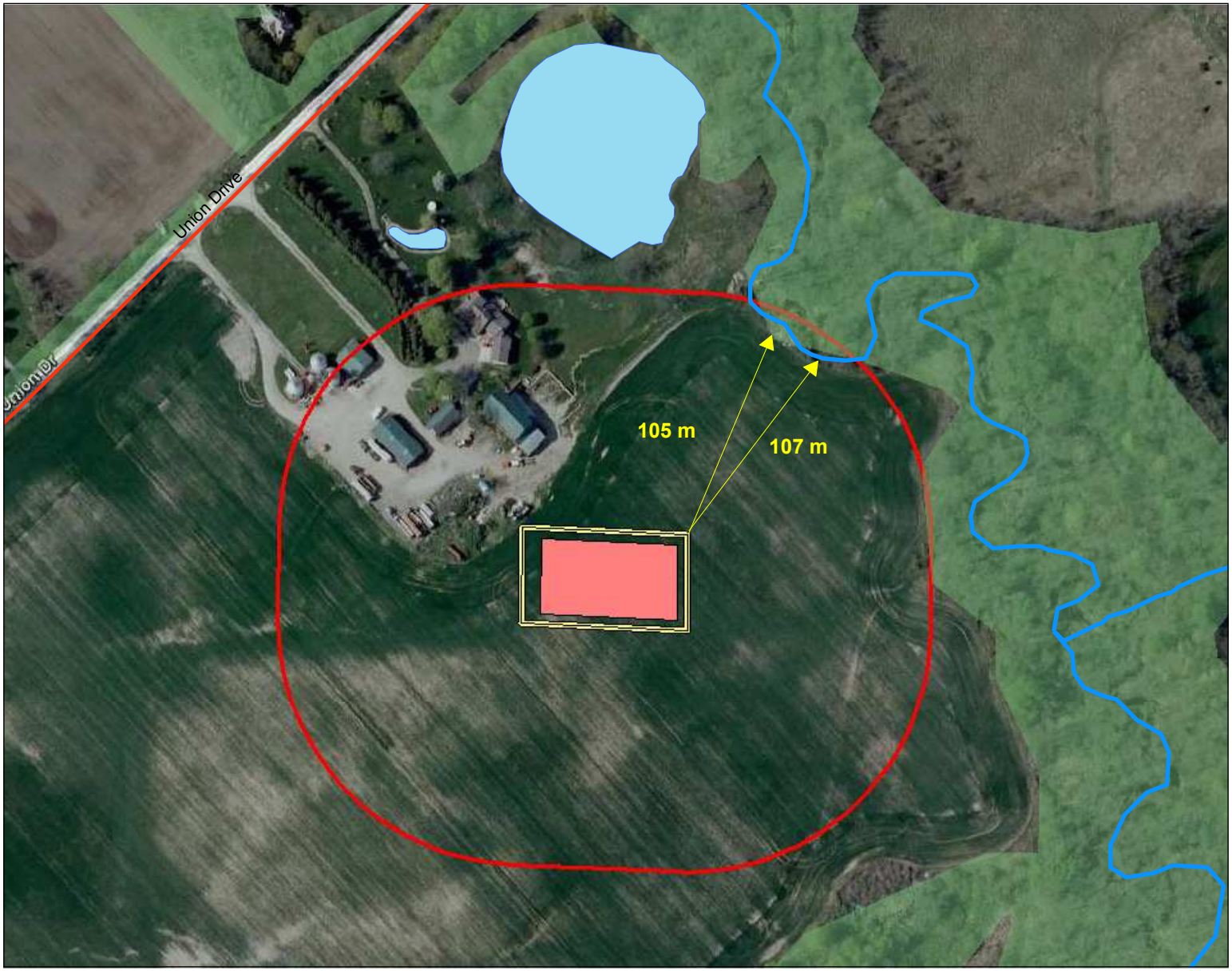
Figures



N

Legend

- Surface Water Feature
- Pond
- Wooded Area
- Proposed Solar Panel
- Construction Limit
- 120 m Buffer

Source: Google Maps, accessed 2012

0 12.5 25 50 75 100 125 Meters

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PROJECT TITLE:
FUTURE SOLAR DEVELOPMENTS INC. LP1
304 PHASE NATURAL HERITAGE STUDY
9307 UNION DRIVE
STRATHROY, ONTARIO

DRAWING TITLE:
NATURAL HERITAGE
ASSESSMENT SITE MAP

PROJECT No.: WSL-00002250-00	DWN: EE
SCALE: AS NOTED	CHKD: DF
DATE: JULY 2012	FIG. No.: 1

Appendix A –

Site Photographs

Photograph No. 1: Proposed site of solar panel facing south; land use dominantly agricultural with slight depressions

Photograph No. 2: Northern edge of proposed site facing west

Photograph No. 3: South western corner of the proposed site, facing north; slightly lower topography

Photograph No. 4: Southern woodlot facing south; species dominantly deciduous with manmade clearings for vehicle use

Photograph No. 5: Wetland area located within the southern woodlot; predominately grasses and sedges, with less than a foot of water accumulation

Photograph No. 6: Eastern edge of proposed site, adjacent to unmaintained fields, slated for sheep pastures

Photograph No. 7: Approximately 2.5 meter wide, 3 ft deep meandering creek located in the eastern woodlot. Creek runs the length of the property with high, cut banks. Woodlot is predominately deciduous and fairly dense with manmade clearings for vehicles

Photograph No. 8: North eastern corner of property, meandering creek runs through a large culvert under the road (Union Dr)