

# CONSTRUCTION PLAN REPORT

## *Southgate Solar Project*

Final April 2015

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## 1. INTRODUCTION

Southgate Solar LP proposes to develop a solar facility with a maximum nameplate capacity of 50 megawatts alternating current (MWac), located near Mount Forest, in the Township of Southgate, County of Grey, Ontario (Figure 1). The renewable energy facility will be known as the Southgate Solar Project (the “Project”).

Southgate Solar LP has initiated the Project through a Power Purchase Agreement (PPA) with the Ontario Power Authority. The Project will require approval under Ontario Regulation 359/09 (O. Reg. 359/09) – Renewable Energy Approval (REA) under Part V.0.1 of the *Ontario Environmental Protection Act*.

This Construction Plan Report (CPR) provides detailed information on the installation of all project components, potential negative environmental effects at and within 300 m of the Project Location (as they relate to construction activities and temporary facility components<sup>1</sup>), and mitigation and/or monitoring measures with respect to those negative environmental effects as detailed in Table 1.

Table 1: Checklist for Requirements under O.Reg. 359/09 – Construction Plan Report

Required Documentation	Location in Report
Details of any construction or installation activities.	Section 6, <i>Construction Activities</i>
The location and timing of any construction or installation activities for the duration of the construction or installation.	Section 3, <i>Project Location</i>  Section 5.1, <i>General Timing</i>
Negative environmental effects that may result from construction or installation activities.	Section 7, <i>Negative Environmental Effects and Proposed Mitigation Measures and Monitoring Activities</i>
Mitigation measures in respect of negative environmental effects mentioned in paragraph 3.	

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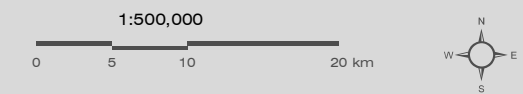
<sup>1</sup> Refer to the *Design and Operations Report* for technical specifications of permanent project components (i.e. those present for the lifetime of the solar facility).





**SOUTHGATE SOLAR PROJECT**

**FIGURE 1  
GENERAL PROJECT LOCATION**



MAP DRAWING INFORMATION:  
DATA PROVIDED BY MNR

MAP CREATED BY: GM  
MAP CHECKED BY: MB  
MAP PROJECTION: NAD 1983 UTM Zone 17N

FILE LOCATION: I:\GIS\149154 - Samsung Southgate\mxd\PDR\



PROJECT: 149154  
STATUS: DRAFT  
DATE: 11/12/2014

## 2. THE PROPONENT

In the course of developing renewable energy projects, Southgate Solar LP strives to satisfy various environmental approval requirements and obtains regulatory approvals that vary depending on the jurisdiction, project capacity and site location. In addition, Southgate Solar LP aims to build long-term relationships with the communities that host its projects. Southgate Solar LP is committed to the health and welfare of the residents of the Township of Southgate, and to ensure that the Southgate Solar Project is successful for stakeholders.

Contact information for the Proponent is as follows:

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- A. José De Armas, Manager, Project Development

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Dillon Consulting Limited is the prime contractor for the preparation of this report. The contact at Dillon is:

Full Name of Company: Dillon Consulting Limited

Prime Contact: Michael Enright, Project Manager

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### 3. PROJECT LOCATION

The proposed Class 3 Solar Facility is to be located within the Township of Southgate, in the County of Grey, approximately 11 kilometres north of the community of Mount Forest. Figure 1 shows the general location of the Project in Southwestern Ontario. The proposed Project Location consists of approximately 235 hectares (581 acres) and is contained within an area bounded on the north by Southgate Road 24, Southgate Road 14 to the south, Southgate Road 47 to the east, and Highway 6 to the west. The proposed Project Location, consisting of multiple privately-owned parcels, is to be leased by Southgate Solar LP. It has an approximate centroid at the following geographic coordinates:

- Latitude: 44° 6' 7.78" N
- Longitude: 80° 44' 49.91" W

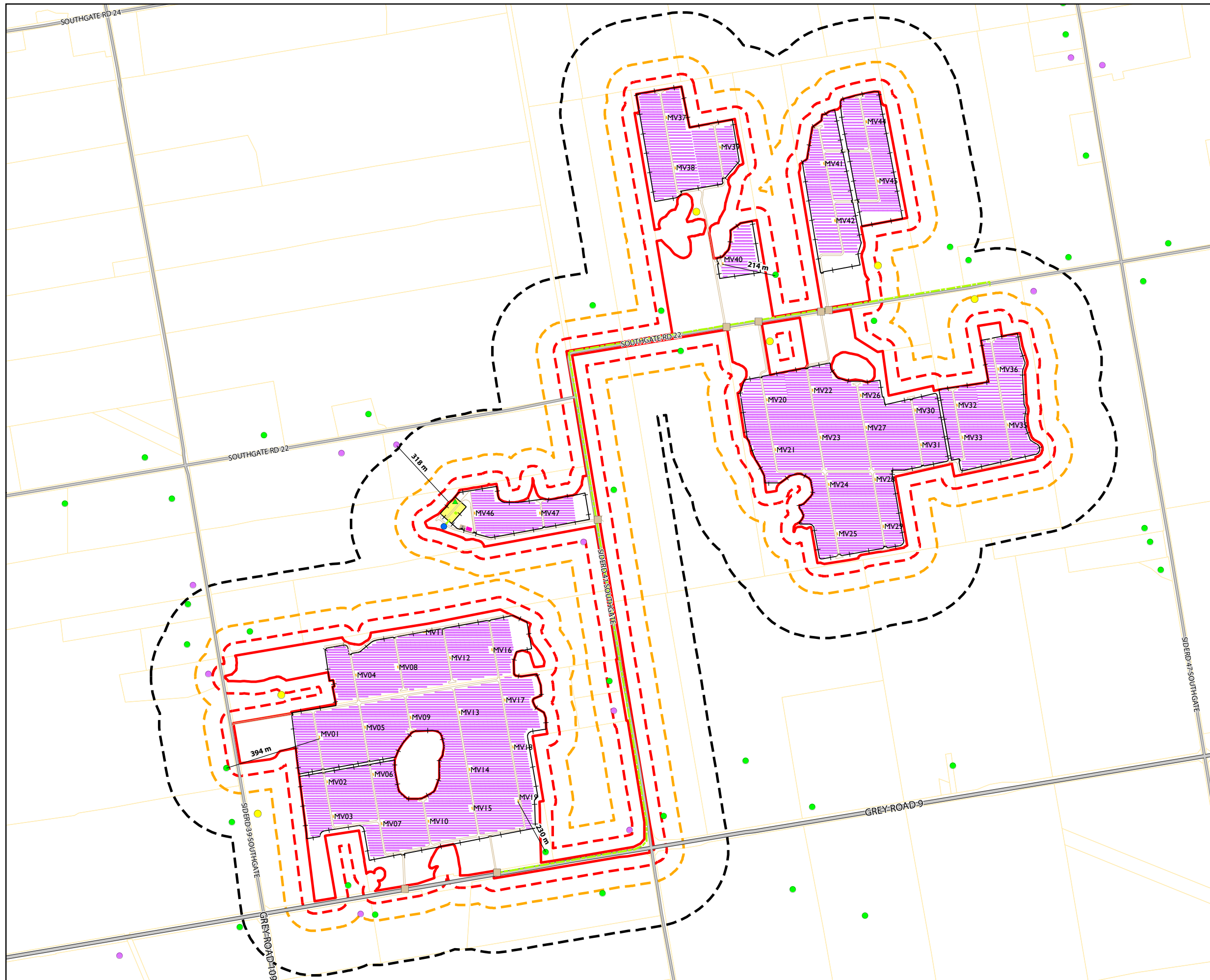
The Project Location is defined in Ontario Regulation 359/09 to be “a part of land and all or part of any building or structure in, on or over which a person is engaging in or proposes to engage in the project”.

Figure 2 shows the proposed conceptual layout and location of all project components. Further information on facility components making up the Project Location is provided in Sections 5 and 6 of the *Design and Operations Report*.

Figure 3 identifies the Project Location boundary in relation to natural features and water bodies.

Figure 4 depicts the land uses in the Project Location and within 300 m based on information from multiple sources including Ecological Land Classification surveys, Canada Land Inventory mapping and Official Plans.





## SOUTHGATE SOLAR PROJECT

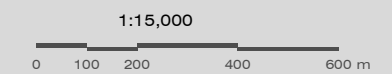
**FIGURE 2  
SITE PLAN -  
CONCEPTUAL COMPONENT LAYOUT**

- Site Entrance
- Point of Common Coupling
- Communications Tower
- Noise Receptor
- Noise Receptor Involved with the Solar Project as Land Owners
- Vacant Lot Noise Receptor
- Overhead Cable
- Fence
- Access Road
- Solar Panel
- Project Location
- Project Location 50 m Setback
- Project Location 120 m Setback
- Project Location 300 m Setback
- Inverter
- Substation Transformer
- Substation
- Operations and Maintenance Building
- Parking Lot
- Parcel Boundary

The area between the fence line and the Project Location is the Area of Operational Flexibility.

Below ground collection system will primarily follow access roads. Cabling on municipal roads will be within the municipal right-of-way.

Temporary construction laydown areas will be located within the project location boundary where the internal access roads meet the parcels to be developed.



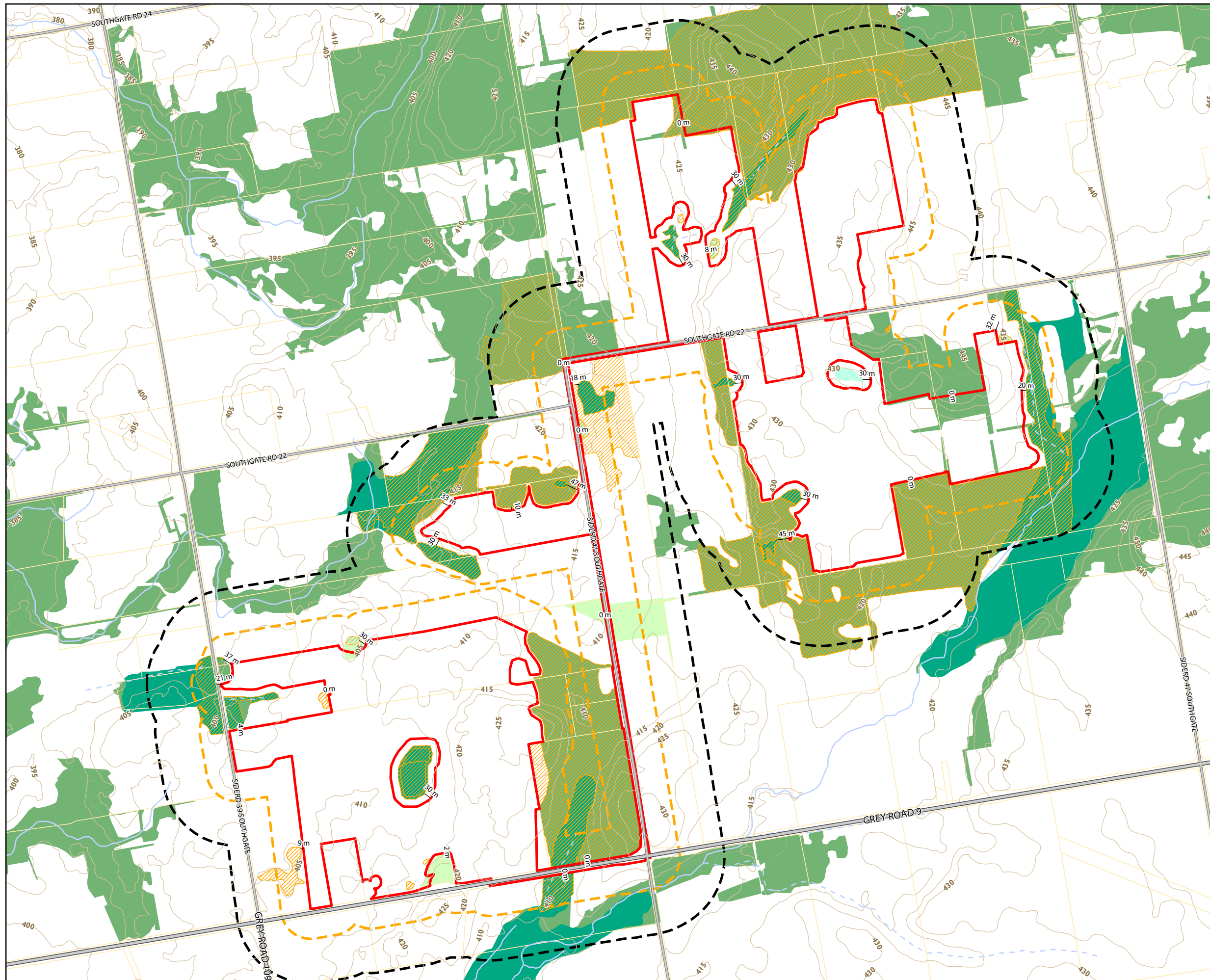
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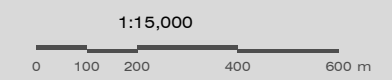
## SOUTHGATE SOLAR PROJECT

**FIGURE 3  
SITE PLAN -  
NATURAL HERITAGE FEATURES**

- Permanent Watercourse
- Intermittent Watercourse
- 5 m Contour
- Project Location
- Project Location 120 m Setback
- Project Location 300 m Setback
- Parcel Boundary
- Significant / Treated as Significant Wildlife Habitat
- Assumed Provincially Significant Wetland
- Dillon Delineated Wetland (Non-Provincially Significant)
- Significant Woodland
- Dillon Delineated Woodland (Non-Significant)

An Environmental Impact Study has been submitted to the Ministry of Natural Resources and Forestry for natural features deemed significant.

A Water Bodies Report has been prepared.



MAP DRAWING INFORMATION:  
DATA PROVIDED BY MNR

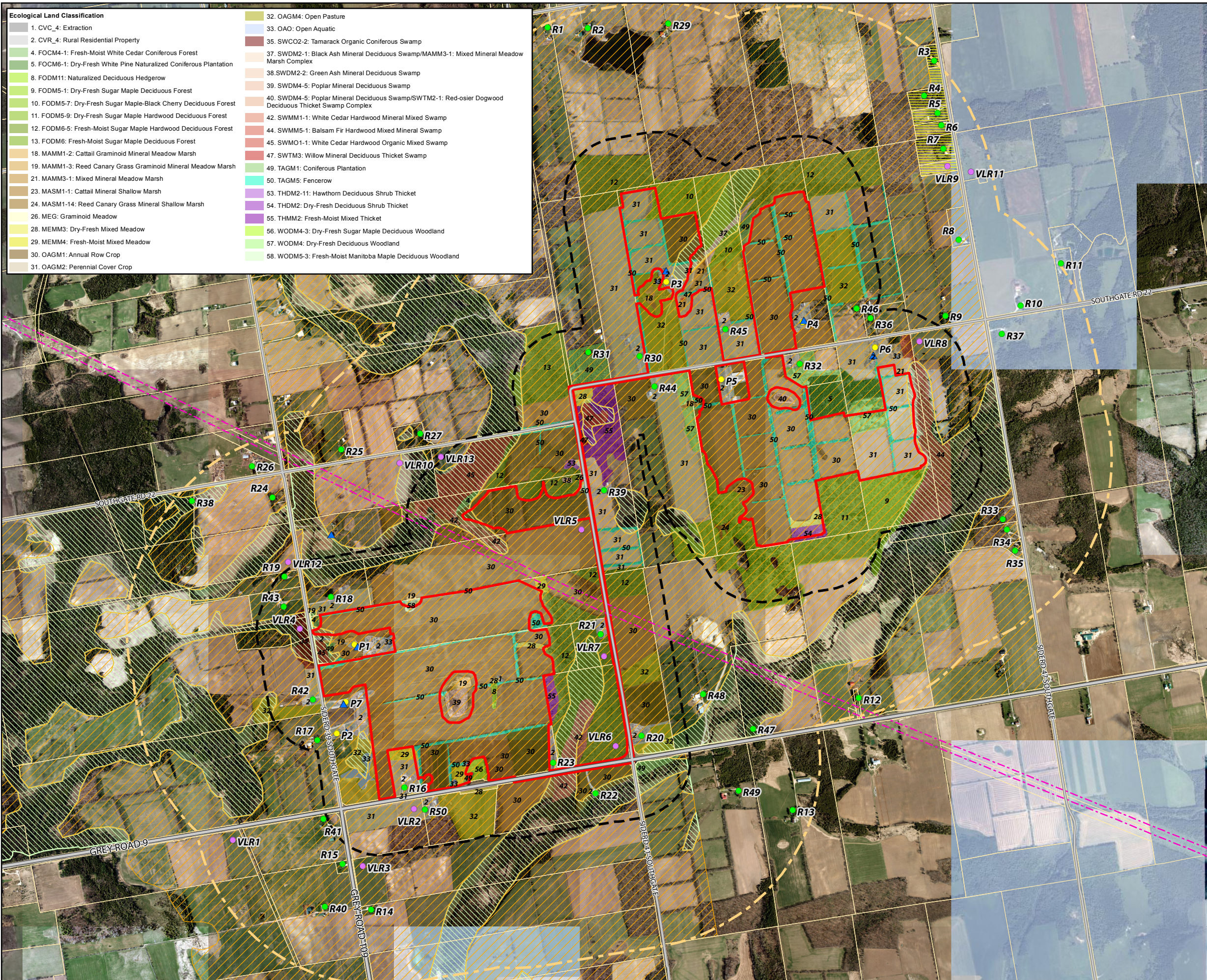
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Ecological Land Classification	
1. CVC_4: Extraction	32. OAGM4: Open Pasture
2. CVR_4: Rural Residential Property	33. OAO: Open Aquatic
4. FOCM4-1: Fresh-Moist White Cedar Coniferous Forest	35. SWCO2-2: Tamarack Organic Coniferous Swamp
5. FOCM6-1: Dry-Fresh White Pine Naturalized Coniferous Plantation	37. SWDM2-1: Black Ash Mineral Deciduous Swamp/MAMM3-1: Mixed Mineral Meadow Marsh Complex
8. FODM11: Naturalized Deciduous Hedgerow	38. SWDM2-2: Green Ash Mineral Deciduous Swamp
9. FODM5-1: Dry-Fresh Sugar Maple Deciduous Forest	39. SWDM4-5: Poplar Mineral Deciduous Swamp
10. FODM5-7: Dry-Fresh Sugar Maple-Black Cherry Deciduous Forest	40. SWDM4-5: Poplar Mineral Deciduous Swamp/SWTM2-1: Red-osier Dogwood Deciduous Thicket Swamp Complex
11. FODM5-9: Dry-Fresh Sugar Maple Hardwood Deciduous Forest	42. SWMM1-1: White Cedar Hardwood Mineral Mixed Swamp
12. FODM6-5: Fresh-Moist Sugar Maple Hardwood Deciduous Forest	44. SWMM5-1: Balsam Fir Hardwood Mixed Mineral Swamp
13. FODM6: Fresh-Moist Sugar Maple Deciduous Forest	45. SWMO1-1: White Cedar Hardwood Organic Mixed Swamp
18. MAMM1-2: Cattail Graminoid Mineral Meadow Marsh	47. SWTM3: Willow Mineral Deciduous Thicket Swamp
19. MAMM1-3: Reed Canary Grass Graminoid Mineral Meadow Marsh	49. TAGM1: Coniferous Plantation
21. MAMM3-1: Mixed Mineral Meadow Marsh	50. TAGM5: Fencerow
23. MASM1-1: Cattail Mineral Shallow Marsh	53. THDM2-11: Hawthorn Deciduous Shrub Thicket
24. MASM1-14: Reed Canary Grass Mineral Shallow Marsh	54. THDM2: Dry-Fresh Deciduous Shrub Thicket
26. MEG: Graminoid Meadow	55. THMM2: Fresh-Moist Mixed Thicket
28. MEMM3: Dry-Fresh Mixed Meadow	56. WODM4-3: Dry-Fresh Sugar Maple Deciduous Woodland
29. MEMM4: Fresh-Moist Mixed Meadow	57. WODM4: Dry-Fresh Deciduous Woodland
30. OAGM1: Annual Row Crop	58. WODM5-3: Fresh-Moist Manitoba Maple Deciduous Woodland
31. OAGM2: Perennial Cover Crop	

## SOUTHGATE SOLAR PROJECT

**FIGURE 4  
SITE PLAN AND LAND USE**

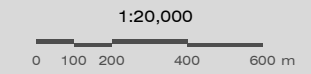
- ▲ Heritage Resource
  - Noise Receptor
  - Noise Receptor Involved with the Solar Project as Land Owners
  - Vacant Lot Noise Receptor
  - - - HONI Transmission Line Easement
  - Project Location
  - Project Location 300 m Setback
  - Project Location 1000 m Setback
  - Parcel Boundary
- Zone (Township of Southgate Zoning Bylaw)**
- Agricultural
  - Environmental Protection
  - Residential

Based on the results of the Heritage Assessment, the entire Project Location is considered to be a cultural heritage

The project location is not on or adjacent to areas subject to Land Use Plans.

The project location is not on or adjacent to a protected property as described in S.19(1) of Ontario Regulation 359/09. Cultural heritage features were identified at the project location and are discussed in the Cultural Heritage Assessment and shown in this figure.

Archaeological resources were identified within the Project Location. Stage 3 and 4 Archaeological Assessments will be undertaken if development in these areas cannot be avoided. Please refer to Section 6.1 of the Construction Plan Report.



MAP DRAWING INFORMATION:  
DATA PROVIDED BY MNR  
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#### 4. OPERATIONAL FLEXIBILITY

As part of the design of the Project, Southgate Solar LP is requesting to pre-approve changes that may be made to the Project at the time of detailed design. These changes include, but are not limited to general modifications to the site plan that result in a decrease in the Project Location size within the current boundary, and a decrease in the number of project components or infrastructure (including MV Stations). Adjustments to project components may also occur, however, it is not expected that noise components would be moved greater than 10 m from their current locations. In all cases where an operational or technical change is necessary, the project will remain within the bounds of the Project Location boundary as shown on Figure 2 and commitments made in the various technical reports. During operations, routine modifications to the facility may be implemented (e.g., repaving of entrance, repairs to fencing, etc.) provided their effects are environmentally insignificant and do not exceed the boundaries of the constructed Project.

REA documents and technical reports are developed for a Project Location which incorporates lands in excess of those required for the construction of solar facility components sufficient to generate 50 MWac. The classification (Class 3 Solar Facility) and nameplate capacity (50 MWac) of the Project are not subject to change. The approved layout will be refined during detailed design to incorporate only the quantity of project components required for a 50 MWac facility.

## 5. PROJECT OVERVIEW

The Project is designed to generate a maximum nameplate capacity of 50 MWac of electricity. PV panels will be the technology used to convert solar energy into electricity. With exposure to sunlight, the solar modules convert solar radiation into direct current (DC) electricity through a PV process. The PV process occurs when the energy from the sunlight is transferred to semiconductors contained in the modules. DC electricity generated from the panels will be collected and converted to AC electricity through inverters, which will be contained in multiple Medium Voltage (MV) Stations. An MV Station houses multiple components, including inverters, and an MV transformer. The AC electrical energy output from the MV Stations will be collected via underground cables within the private property, and overhead poles in the right-of-way (ROW), and connected to the main HV substation transformer. At the main HV substation transformer, the voltage will be stepped up to 230 kV and connected to the IESO transmission grid.

The construction phase of any project has the potential to adversely affect the environment. A construction program will be designed by Southgate Solar LP and the contractor to minimize the potential for adverse environmental effects. These potential effects, the level of magnitude for each effect and mitigation and/or monitoring measures for construction activities, are discussed below and summarized in Table 4 at the end of Section 7. For a description of the land prior to construction see the Site Investigation Report and Environmental Impact Study (EIS), provided as part of the *Natural Heritage Assessment* (NHA).

As part of the construction program, best practices and procedures will be implemented. These practices will include policies regarding the management of any excavated material, erosion, sediment, noise, dust control, the handling of wastes, on-site safety management and emergency response procedures. These are discussed in Section 7 as part of the mitigation measures and monitoring activities. They are expanded upon in the Emergency Response and Communications Plans discussed in the *Design and Operations Report*. Southgate Solar LP's staff and contractors will be made aware of the environmental management commitments contained in these reports to ensure they are implemented. All construction-related activities will be conducted on-site within the Project Location as identified in Figure 2.

### 5.1 General Timing

It is anticipated that construction would last approximately 10-12 months. Pending receipt of all necessary approvals and permits, construction is tentatively scheduled to begin in early 2016. Table 2 outlines the anticipated duration of construction activities. Upon award of the construction contract, the selected contractor will be required to provide an updated schedule. It is expected that the Project will remain operational for a period of at least 20 years.

Table 2: Anticipated Duration of Construction Activities

Construction Activity	Estimated Timing
Site Preparation	Q1/2016-Q3/2016
Installation of solar components (structural supports, racking, modules, collection system)	Q1/2016-Q4-2016
Installation of substation and operations and maintenance building	Q2/2016-Q4/2016
Site Clean-up and restoration	Q3/2016-Q4-2016

## 5.2 Overview of Materials and Equipment

In general, the raw materials for construction will include standard building materials such as concrete, wood, aggregate, and metal. To the extent possible, these materials will be procured from local and/or regional sources where they are available in sufficient quality and quantity, and at competitive prices. Beyond the materials required for construction of the solar facility, resource requirements for ongoing operation of the project include sunlight and the land-base required for the solar facility location, and for the maintenance of the solar facility, access roads and electrical lines.

Hazardous materials used during construction are limited to fuels, lubricants and coolants that are associated with machinery, vehicles and equipment. No hazardous materials will be stored on site, although equipment may require their use. These materials will be managed according to best management practices and recommendations made as part of an Environmental Effects Mitigation and Monitoring Plan (EEMMP) developed by the contractor that is consistent with the EEMMP provided in the *Design and Operations Report*. The contractor's plan will be outlined in the Emergency Response and Communications Plans. Disposal of hazardous wastes will only be required in the case of accidental spills and will follow the procedures outlined in a Spills Response Plan. Decisions on waste disposal or recycling during, and immediately after construction, will be made by the on-site contractor (who will abide by the requirements of the *Environmental Protection Act*).

Table 3 summarizes the construction activities, their duration and the equipment and materials needed during this phase. Construction equipment and vehicles, including those that transport materials, will access the site via the entrances off Southgate Road 22, Southgate Sideroad 41, and Grey Road 9 (Figure 2). It is expected that dump trucks and semi-trailer trucks will transport



materials and equipment to the site. The transportation of materials will occur throughout the construction phase; however, the majority of trips will occur in months 1 - 4 (with the transport of materials for access roads, solar panels and associated racking/support structures). Materials requiring on-site storage will be held within the temporary construction areas, located within the Project Location boundary shown on Figure 2. It should be noted that while an attempt has been made to identify all solar facility and construction equipment, the exact size, weight and technical specifications of the materials and equipment will not be known until a supplier and on-site contractor have been selected. It is anticipated that the types and sizes of equipment used will be similar, regardless of which supplier and on-site contractor is selected for the Project.

Table 3: Construction Materials and Equipment

Construction Activity	Material and Equipment Brought On-site <sup>2</sup>					Material Generated and Taken Off-site			
	Type of Material (Estimate Quantity)	Number of Truck Loads	Vehicle used to Transport material	Equipment used during activity	Weight (Tonnes)	Type (Estimated Quantity)	Stored On-site?	Number of Truck Loads	Vehicle used to Transport Material Off-site
Survey and staking of project location	Survey stakes (TBD)	3	Pickup Truck	Pickup Truck	3	None	N/A	N/A	N/A
Equipment used to transport, unload and move materials and equipment.	Transportation of bulldozers, excavators and other large equipment.	6-10	Flatbed Semi-Trailer Trucks	Semi-Trailer Track-Type Tractor (Bulldozer) Rough Terrain Crane Telescopic Handler Scraper Excavator Wheel Loader Backhoe Motor Grader Soil Compactor Pile Driving/Drilling Equipment	Empty: 7-16 Loaded: 40-70 44 23 10 25 26 20 9 20 13 20	None	Equipment temporarily stored on-site	N/A	N/A
Clearing, ground levelling, compacting and grading.	N/A	N/A	On-Site	Track-Type Tractor (Bulldozer) Scraper Motor Grader Soil Compactor Dump Truck Wheel Loader	44 25 20 25 20 20	Topsoil Removed vegetation	Yes* Yes**	TBD TBD	Dump Truck
Installation of perimeter fence and security lighting.	Fence poles and chain-link fence (2500 metres est.)	5	Semi-Trailer	Backhoe w/ Auger (TBD) Skid Steer Telescopic Handler Pickup Truck	9 9 10 3	None	No	N/A	N/A

<sup>3</sup> Estimates based on typical construction standards/techniques for a typical 50 MW Solar Project. All construction materials and equipment (when not in use) will be temporarily stored in the construction laydown area until they are used.

Construction Activity	Material and Equipment Brought On-site <sup>2</sup>					Material Generated and Taken Off-site			
	Type of Material (Estimate Quantity)	Number of Truck Loads	Vehicle used to Transport material	Equipment used during activity	Weight (Tonnes)	Type (Estimated Quantity)	Stored On-site?	Number of Truck Loads	Vehicle used to Transport Material Off-site
Construction of access roads, temporary storage and construction areas and base for the main HV substation transformer.	Granular A and B	2500	Dump Truck	Bulldozer Scraper	44 25	Topsoil	Yes*	(TBD)	N/A
	Miscellaneous Access Road and Base Materials (TBD)	5	Semi-Trailer	Motor Grader Soil Compactor Dump Truck Wheel Loader	20 25 20 20				
Construction of foundations for MV Stations and main HV substation transformer (concrete caissons recommended).	Concrete (TBD)	50	Semi-Trailer	Excavator Wheel Loader	26 20	Topsoil	Yes*	(TBD)	N/A
	Rebar and sonotubes for footing construction (TBD)			Backhoe Rough Terrain Crane Dump Truck	9 23 20				
Installation of support, racking and PV modules.	Steel posts & helical piers (20,000-55,000 posts)	30-60	Semi-Trailer	Pile Driving/Drilling Equipment	20	None	N/A	N/A	N/A
	Steel and aluminum racking (5,000 - 6,000 racks)	100-200	Semi-Trailer	Rough Terrain Crane Telescopic Handler	23 10				
	Solar PV panels (197,000-207,000)	180-550	Semi-Trailer						
Installation of wiring, MV Stations, electrical collection system and main HV substation transformer.	MV Stations (34) Inverters (63), & main HV substation transformer (1)	55	Semi-Trailer	Rough Terrain Crane	23	None	N/A	N/A	N/A
	AC & DC electrical cabling, conduit, connectors, ground wire, etc. (Lump Sum - TBD).	150	Semi-Trailer	Telescopic Handler Excavator Backhoe Dump Truck Pickup Truck Backhoe w/ Auger (TBD)	10 26 9 20 3 9				
Remediation and clean-up of work areas.	None	N/A	N/A	Pickup Truck	3	Construction waste and miscellaneous materials	No***	(TBD)	Semi-Trailer
				Service vehicles (TBD)	--				Dump Truck Pickup Truck

Construction Activity	Material and Equipment Brought On-site <sup>2</sup>					Material Generated and Taken Off-site			
	Type of Material (Estimate Quantity)	Number of Truck Loads	Vehicle used to Transport material	Equipment used during activity	Weight (Tonnes)	Type (Estimated Quantity)	Stored On-site?	Number of Truck Loads	Vehicle used to Transport Material Off-site
Site landscaping and vegetation.	Native seed (to cover 173 hectares approx.)  Imported Topsoil (TBD)	15	Pickup Truck	Pickup Truck  Hydroseeding Device (TBD) Dump Truck	4  -- 20	None	N/A	N/A	N/A
Testing and commissioning.	None	N/A	N/A	Pickup Truck Service vehicles (TBD)	3 --	None	N/A	N/A	N/A

\* Topsoil will be temporarily stored on-site within the construction laydown area and covered until it can be redistributed within the Project Location.

\*\* Waste vegetation from site preparation will be temporarily stored along the internal access roads until it can be removed.

\*\*\* Construction waste will be removed from the project location by a licensed contractor who will recycle and reuse materials where possible. Material that cannot be recycled or reused will be transported to an appropriate disposal facility.

### 5.3 Temporary Uses of Land

During the construction phase, there will be several temporary uses of land, including sediment and erosion control structures, construction laydown areas, temporary fencing, site trailers, washrooms, first aid station, parking, and temporary access roads. Temporary sediment, dust and erosion control measures will be in place for the duration of the construction of the solar facility.

Construction laydown areas will be used during project construction, and will be located within the Project Location boundary shown on Figure 2. Pending the final design, any part of the Project Location may be used as temporary storage, which will be dependent on how construction will be staged. These areas are where construction equipment such as excavators, bulldozers and graders, and materials for construction (including panels) will be stored. Laydown areas will be surrounded by temporary construction fencing which will be removed at the end of the construction phase. Site trailers, temporary washrooms, and the first aid station will only be required during construction of the facility and will be located within the laydown areas. Temporary laydown areas may remain during the operations phase of the Project to be used for parking or other uses, as required. They would then be considered as permanent components. All temporary and disturbed areas may be rehabilitated after the construction of the solar facility is complete. Temporary fencing, trailers and construction equipment will be removed from the site. Temporary sediment structures will also be removed, as no sediment or dust will be created during the operation of the solar facility. Areas of compacted soil due to the presence of heavy machinery may be rehabilitated by tilling to restore soil density and drainage, and the spreading of existing topsoil. These areas may also be planted with a low-growing species, such as clover to control erosion, as necessary.

### 5.4 Temporary Water Takings

During the construction phase, the installation of racking support poles and underground cables may require temporary water taking if groundwater starts to collect in the trenches and holes dug for these project components. Any water taking would only involve small quantities (<50,000L/day) and will be restricted to low-flow time periods, where possible. The mitigation measures for temporary water takings are described in Table 4.

### 5.5 Construction Workforce

The workforce will include construction supervisors, general and skilled labour, equipment operators, technicians for electrical systems and commissioning, plant installation and operation staff, security and general maintenance staff. The construction workforce is estimated to require 300-400 workers on average over the –10-12 month construction period. Construction hours will occur in accordance with any local municipal By-laws (see Section 7.5).

## 6. CONSTRUCTION ACTIVITIES

As discussed in Section 4, the Project has been designed such that it allows for operational flexibility during the detailed design stage. The Project Layout may be subject to changes during detailed design through a reduction in the number of project components. Any changes made during detailed design will remain within the Project Location boundary as shown on Figure 2.

### 6.1 Survey and Staking of Project Location

Prior to the construction phase, the site will be surveyed and staked to delineate the boundaries for fencing, access roads, excavations and foundation locations. The survey will identify the location of any underground utilities and/or infrastructure. Any significant or provincially significant environmental features and their applicable setbacks (e.g. water bodies, significant wildlife habitat, etc.) will also be clearly demarcated. Areas to be avoided will be fenced and/or flagged, as appropriate.

### 6.2 Clearing, Ground Levelling, Compacting and Grading

The Project Location will be minimally graded to facilitate construction activities based on a grading plan, and a stormwater management plan (see the *Design and Operations Report*) will be implemented to maintain the pre-construction off-site drainage patterns as much as possible. As noted in Table 3, graders, bulldozers, scrapers, soil compactors, dump trucks, wheel loaders and backhoes will be used to prepare the site. Since the Project Location is predominantly agricultural fields, limited vegetation clearing will be required for the installation of panels and racking. All vegetation that is removed will be temporarily stockpiled along the access roads until it can be loaded on trucks and removed from the site.

Major excavation works or fill placement are not expected for the Project. The primary excavation work is likely to be limited to soil removal for various foundations, access roads and the digging of trenches to run underground electrical cables. Topsoil removed from the permanent access roads will be distributed across the Project Location. Any excess topsoil may be used to infill low-lying areas, if appropriate. Temporarily stockpiled topsoil will be stored and will be covered to minimize erosion from wind and precipitation.

### 6.3 Drainage and Erosion Control

Construction activities associated with the Project are not anticipated to significantly increase the peak-flow of drainage from the Project Location (see the Preliminary Stormwater Management Report as part of the *Design and Operations Report*). To minimize the potential for impairment of the quality of any receiving waters during construction, an Erosion and Sediment Control (ESC) plan will be developed in detail and implemented prior to and during construction. A detailed ESC plan should not be completed until the final site grading and layout, the phasing of construction, and construction methodology have been confirmed. As outlined in the



*Stormwater Management Report*, the following measures are recommended for consideration when developing the ESC plan:

- Identifying and protecting all trees and plants not shown for removal that are contained within the construction area;
- Installing silt fences (placed at the downslope side of proposed grading activities, proposed stockpile areas, and the site limits) and all necessary erosion control measures prior to commencing construction activities;
- Installing an additional row of silt fence during grading and clearing activities to provide additional protection to adjacent watercourses and sensitive natural features;
- Installing construction entrances (mud mats) at all vehicle access points adjacent to paved roads to limit the potential transport of materials off-site;
- Phasing construction, where possible, to limit areas with and the duration of exposed soils;
- Implementing proper dewatering techniques to ensure the site and excavations are free from water. These techniques include diverting water into a dewatering trap with a filter bag on the outlet hose or to a well-vegetated area a minimum of 30 m from any waterbody/wetland;
- Using appropriate grading techniques to prevent increased run-off potential and maintain positive drainage;
- Utilizing sedimentation basins or sediment traps to treat relatively large drainage areas (i.e., greater than 2 ha);
- Implementing temporary water passages techniques for proposed in-water works with appropriate approvals confirmed prior to construction;
- Re-vegetation of disturbed areas after grading has been completed and prior to construction activities where feasible (either through natural re-growth or planting, as necessary);
- Protecting stockpiled areas with silt fencing and locating the areas a safe distance from sensitive natural features;
- Stabilizing with vegetation or other erosion and sediment control measures, all disturbed areas that are not under immediate construction (i.e. areas not under construction within 30 days).

All ESC measures should be designed and implemented in accordance with local guidelines and regulations.

#### 6.4 Installation of Perimeter Fence and Security Lighting

For the safety of the public and for security purposes, a perimeter fence will be installed. This will be a chain link fence of standard height (approximately 1.8 m) that will be installed around the entire Project Location. Alternatively, consideration will also be given to the installation of an anti-climb fence or predator-proof fence to facilitate potential livestock grazing during operations. The fencing is a requirement of the Electrical Safety Authority (ESA) and will be built to their specifications. Gated entrances will be installed at the site entrances off of Southgate Road 22, Southgate Sideroad 41 and Grey Road 9. Temporary entrances may be in place during the construction phases.

For security and maintenance purposes, lights may be installed near the entrances of the solar facility and task-specific lights will be provided as necessary. They may also be motion-sensored to address potential negative impacts.

During construction, the site will be monitored by the supervising construction staff and if necessary, 24-hour on-site security will also be utilized. Lights will be installed near the main HV substation transformer and site entrances to the facility and task-specific lights will be installed where necessary.

#### 6.5 Installation of Water Crossings

It is not anticipated that the design of the Project will require the installation of new water crossings. Appropriate buffers have been applied to water bodies found within 300 m of the Project Location. For more information, please refer to the *Water Assessment Report* and *Water Body Report*.

#### 6.6 Construction of Access Roads and Installation of Temporary Power

A series of access roads will be needed for construction vehicles and equipment transport. They will also provide long-term access to the site for on-going maintenance and will allow a service vehicle to access each MV Station directly. The main entrances to the solar facility will be located off Southgate Road 22, Southgate Sideroad 41 and Grey Road 9. The roads will be granular and approximately 6 m wide and will be constructed as appropriate for the Project and engineering design.

Row to row rack spacing will be large enough such that service vehicles can access modules and wiring for maintenance. The location of the internal access roads and their nature may change but it is expected that the majority will remain as permanent roads during operations to provide access for maintenance vehicles.

Where roads are deemed necessary only for construction, the area(s) will be rehabilitated as per instructions in the *Decommissioning Plan Report* prior to solar facility operation.

During construction of the access roads, the topsoil will be stripped and stored. Some cut and fill may be required; however, it is expected that the subgrade material will be comprised of existing native granular deposits. The subgrade will be cut as cleanly as possible to minimize disturbance and will be proofrolled with heavy rollers to locate any loose or disturbed areas. Should weak areas or other incompatible material be detected during proofrolling, further excavation and subsequent backfill with approved native deposits or imported granular materials may be required. The depth of the roadbed will be constructed as required to transport loads associated with the construction and maintenance of the project. Geo-grid and geotextile fabric may be used, as needed, to improve the structural integrity of the road base and to preserve the granular. If necessary, culverts may be installed beneath the access roads to provide greater stability and at locations where conveyance of surface water drainage is required.

During the construction period, it is anticipated that on-site electricity to power equipment will be obtained from the local distribution utility from nearby suitable distribution lines/ temporary generators supplied by the contractor to provide the project location with auxiliary power as required to power equipment and for temporary construction offices, lighting and other purposes. If no distribution supply is available nearby, the requirements for an auxiliary generator will be determined once the layout of the solar facility is reviewed in detail.

#### 6.7 Delineation of Temporary Storage and Construction Areas and Installation of Temporary Facilities

Temporary laydown and construction staging areas will be located within the Project Location boundary as shown on Figure 2. Pending the final design, any part of the Project Location may be used as temporary storage, which will be dependent on how construction will be staged. These areas will be used for the construction office trailers, portable washrooms, first aid stations, vehicle parking, construction equipment parking, storage sheds, truck unloading/loading, waste disposal pick-up areas, and equipment and material laydown. After site grading (discussed above) a layer of granular material will be installed to provide an adequate base for construction vehicles, heavy equipment and material laydown. All temporary facilities will be removed when the construction period is finished; however, as discussed in Section 5.3, a portion of the construction laydown area(s) may be maintained after construction for maintenance vehicle parking.

#### 6.8 Construction of Foundations

Engineered foundations will be constructed for the solar PV racking systems, MV Stations, main HV substation transformer components and the operations and maintenance building. The

substation area and up to 34 MV Stations will be prepared and/or excavated as needed and foundations for the equipment will be installed. Based on the results of a geotechnical investigation, the soil conditions are such that several foundation types may be installed, including:

- concrete pre-cast pads which are transported to the site by truck and subsequently put into position with a crane;
- concrete cast-in-place pads constructed on-site by pouring ready-mix concrete into forms. A mixer truck from a local supplier would deliver ready-mix concrete to the site and pour it into forms; or
- ground screws or plate-mounted steel beams which would be either installed using a vibratory pile hammer or driven (screwed) into the ground.

The final foundation selection will occur during the detailed design stage of the project prior to construction, however it is anticipated that helical ground screws will be used.

#### 6.9 Installation of Supports, Racking and PV Modules

The panels will be aligned in rows approximately 8 to 12 m apart, and will be mounted on racking structures. The modules will be arranged with 18 modules in series and 11,111 strings in parallel. The racking system will be in a fixed position and tilted to 28-42 degrees, subject to refined modeling to achieve optimal energy yields. It is estimated that approximately 5,000 - 6,000 racks will be required for the Project, which will be arranged in long rows and spacing set to maximize the site area. Each of the racking structures will be assembled on site. To support the racks, an estimated approximately 20,000-55,000 piles will be installed for the 50 MWac solar facility. The final foundation selection will occur during the detailed design stage of the Project prior to construction. Based on the results of a geotechnical assessment, it is anticipated that helical ground screws will be used to minimize potential negative environmental effects. These would be installed using a mechanical, hydraulic drive motor that would rotate the screw pile into the ground mounted on a specialized rig, excavator or boom truck. Earth excavation, soil disposal or the use of concrete is not required.

#### 6.10 Installation of Wiring and Inverters/Transformers

The electricity generated by the PV panels will be in the form of direct current (DC). Inverters will be required to convert the DC output of the PV cells into alternating current (AC) suitable for supplying the electrical grid. DC wiring mounted to the back side of the racks is connected to a combiner box.

From the combiner box, the DC current will be transmitted using underground cable to one of approximately 63 inverters configured to 793 kW, contained in MV Stations which contain multiple components including inverters and an MV transformer. The AC voltage created by the

inverters will be “stepped-up” to 34.5 kV through the multiple MV stations. The AC electrical energy output from the MV Stations will be collected via underground/overhead cables and connected to the main HV substation transformer. At the substation, the voltage will be stepped up to 230 kV and connected to the IESO transmission grid.

The underground cables will be direct buried in excavated trenches on private property. A tape will be installed above the underground cabling system to serve as a marker warning future excavators, as per ESA standard.

After all major construction activities are complete the components will be commissioned. If any problems or issues arise, remedial corrections and calibration of equipment will be made prior to start-up.

#### 6.11 Clean-up of Work Areas

After all major construction activities are completed; work areas will be returned to their pre-construction condition or similar. All construction-related waste and excess materials brought to the site will be removed and reused, recycled, or disposed of as applicable by a licensed contractor in accordance with provincial guidelines. Trucks will be used to remove all non-permanent equipment from the Project Location, along with any debris.

#### 6.12 Site Landscaping and Vegetation

Site restoration and reclamation is planned for as much of the Project Location as possible, including along access roads. The restoration and reclamation strategy may include re-contouring of the land to natural drainage patterns (in accordance with a detailed design stormwater management plan to be prepared prior to construction), management and replacement of subsoil (if applicable) and topsoil and re-vegetation. Disturbed areas may be seeded with a low-growing species such as clover, or allowed to re-vegetate naturally as needed, to help stabilize soil conditions, enhance soil structure and increase soil fertility. Alternatively, the grounds may potentially be grazed by livestock (sheep), thus the disturbed areas may be seeded with pasture grasses. This may occur during several phases of construction, including after grading activities are completed in areas where limited disturbance is anticipated for the remainder of the construction period.

#### 6.13 Testing and Commissioning

The components will be tested prior to start-up and connection to the power grid. If any problems or issues arise, remedial corrections will be made prior to commissioning of the solar facility.

## 7. NEGATIVE ENVIRONMENTAL EFFECTS AND PROPOSED MITIGATION MEASURES AND MONITORING ACTIVITIES

The construction phase of the Project has the potential to affect the environment, and this section examines the interactions between these environmental effects and the Project. For each environmental feature/concern, the following is described:

- Existing Conditions – describes the existing environmental feature.
- Potential Effects – describes the potential effects, both positive and negative, to the environmental feature that may occur as a result of the Project.
- Proposed Mitigation and/or Monitoring Plans – recommends specific mitigative measures that will be implemented to minimize any potential negative effect of the Project on environmental features as well as recommended monitoring plans.

As part of the construction program, best management practices and procedures will be implemented to further reduce the environmental effects as identified in this *Construction Plan Report*. These practices will dictate the way the following elements are managed:

- excavated material;
- stormwater runoff;
- sediment;
- dust;
- noise;
- soil compaction;
- natural heritage resources;
- cultural heritage resources;
- agricultural resources;
- hazardous materials; and
- local traffic.

Staff and on-site contractors involved with the Project during the construction phase will be made aware of the environmental commitments contained in this report and their requirements for implementation. The on-site contractor will be responsible for creating an Environmental Effects Mitigation and Monitoring Plan (EEMMP) that is consistent with the EEMMP discussed in the *Design and Operations Report*.

### 7.1 Heritage and Archaeological Resources

#### 7.1.1 Existing Conditions

Stantec Consulting Limited was retained by Dillon Consulting to complete a Heritage Assessment and Stage 1 and 2 Archaeological Assessment as required under Ontario Regulation 359/09,



A Heritage Assessment Report was undertaken to identify resources of potential cultural heritage value or interest. The assessment included background research, consultation with appropriate agencies, review of historical and archival documents, and field surveys. The assessment identified nine heritage resources within the study area, however only seven built heritage resources and one cultural heritage landscape were determined to satisfy criteria under *Ontario Regulation 9/06* indicating the presence of cultural heritage value or interest.

The Stage 1 Archaeological Assessment included a desktop background study and property investigation, and was conducted in June 2014, in accordance with the Ministry of Tourism, Culture and Sport (MTCS) 2011 *Standards and Guidelines for Consultant Archaeologists*. The Stage 1 Assessment identified the potential for archaeological finds to occur, citing moderate to high potential for pre-contact Aboriginal, post-contact Aboriginal, and Euro-Canadian sites to be discovered. The Stage 1 Archaeological Assessment recommended that the Project Location be subject to a Stage 2 archaeological assessment.

The Stage 2 Archaeological Assessment was undertaken between July 23, 2014 and December 1, 2014. Nine archaeological finds were identified, including four pre-contact Aboriginal sites and five Euro-Canadian sites. Further archaeological investigation was recommended for all nine finds prior to development.

#### *7.1.2 Potential Effects*

Construction activities at the Project Location have the potential to cause negative effects on archaeological or cultural heritage resources by altering, disrupting and/or destroying historic materials. An assessment of potential project impacts involved identifying any destruction, alteration, shadows, isolation, direct or indirect obstruction, change in land use or land disturbances as a result of construction activities.

The Heritage Assessment identified one potential indirect impact from the Project: the potential for vibration during construction where resources of cultural heritage value or interest occur within 50 m of the Project Location. This has potential to impact five built heritage resources.

The Stage 1 Archaeological Assessment determined that the archaeological potential for the Project Location is moderate to high. The Stage 2 Archaeological Assessment identified nine archaeological finds within the Project Location that could potentially be impacted by construction.

#### *7.1.3 Proposed Mitigation and/or Monitoring Plans*

Based on the results of the Heritage Assessment, a preventive approach to mitigation measures using planning mechanisms will best serve to reduce the risk of indirect impacts. The Assessment recommended the following mitigation measures:

- Where construction/ decommissioning activities may occur a 50 m buffer zone be established around each heritage resource to indicate where all construction/ decommissioning activities must be avoided.
- Where construction/decommissioning activities cannot be avoided within the 50 metre buffer zone, maximum acceptable vibration levels, or peak particle velocity (PPV) levels, should be determined by a qualified engineer prior to any construction activities.
- Implementation of site plan controls, including fencing to indicate where Project activities are restricted.

Monitoring of cultural heritage resources is to occur during construction and decommissioning phases of the project. The Ministry of Tourism, Culture and Sport (MTCS) provided their acceptance of the Heritage Assessment and agreement with recommended mitigation measures in their comment letter dated December 10, 2014. A copy of this letter is provided as part of the *Heritage Assessment*.

The Stage 2 Archaeological Assessment recommended further archaeological investigation for all nine sites prior to development. Additional archaeological investigation will occur prior to development for finds within 20 m of planned infrastructure. Specific mitigation measures for potential impacts during construction may be recommended as part of this work. MTCS provided their acceptance of the Stage 2 Archaeological Assessment on March 6, 2015. MTCS recommended that Stage 3 Assessments be undertaken prior to construction should development occur within 20 m of the sites. A copy of this letter is provided as part of the *Stage 2 Archaeological Assessment*.

## 7.2 Natural Heritage Resources

Southgate Solar LP has undertaken an NHA consisting of a Records Review, Site Investigation, Evaluation of Significance and Environmental Impact Study to identify all natural features within the Project Location and surrounding 50 m. Specific details related to the identification, evaluation and mitigation of environmental effects are available in the NHA reports. The following provides a summary of both significant and non-significant natural heritage features, along with potential environmental effects during construction and recommended mitigation measures. No residual effects are anticipated after mitigation measures are implemented. Environmental effects for which mitigation measures require subsequent monitoring have been included in Table 4.

### 7.2.1 Existing Conditions

The NHA identified the following natural heritage features within 50 m of the Project Location:

- 21 unevaluated wetlands
- 11 unevaluated woodlands

- Candidate Significant Wildlife Habitat, including:
  - Colonially- Nesting Bird Breeding Habitat (Bank and Cliff) (1 unit)
  - Colonially- Nesting Bird Breeding Habitat (Tree/ Shrub) (11 units)
  - Colonially- Nesting Bird Breeding Habitat (Ground) (2 units)
  - Turtle Nesting Area (1 unit)
  - Woodland Raptor Nesting Area (1 unit)
  - Amphibian Breeding Habitat (Wetlands) (13 units)
  - Amphibian Breeding Habitats (Woodlands) (5 units)
  - Marsh Breeding Bird Habitat (6 units)
  - Woodland Area- sensitive Bird Breeding Habitat (1 unit)
  - American Gromwell Habitat (6 units)
  - Hill's Pondweed Habitat (5 units)
  - Scarlet Beebalm Habitat (7 units)
  - Soft-hairy False Gromwell (6 units)
  - Common Nighthawk Habitat (5 units)
  - Redheaded Woodpecker Habitat (1 unit)
  - Golden-winged Warbler Habitat (1 unit)
  - Harlequin Darter Habitat (11 units)
- Generalized Candidate Significant Wildlife Habitat, including:
  - Waterfowl Stopover and Staging Areas (Aquatic)
  - Shorebird Migratory Stopover Areas
  - Bat Maternity Colonies
  - Turtle Wintering Areas
  - Hill's Pondweed
  - Scarlet Beebalm
  - Seeps and Springs
  - Marsh Bird Breeding Habitat
  - Woodland Area- Sensitive Bird Breeding Habitat

After these features were evaluated for significance using procedures and criteria approved by the Ministry of Natural Resources and Forestry (MNRF), the following determinations were made:

- 17 unevaluated southern wetlands were assumed to be provincially significant using the MNRF's Rapid Assessment to determine wetland characteristics and ecological functions.
- 6 woodland units were determined to be significant based on factors like size, interior habitat, and proximity to significant habitats.

The following candidate significant wildlife habitats were determined to be significant:

- Amphibian Breeding Habitat (Woodland) (4 units);

- Woodland Area- Sensitive Bird Breeding Habitat (1 unit);
- Redheaded Woodpecker Habitat (1 unit).

The following candidate significant wildlife habitats were treated as significant and pre-construction surveys will be completed to determine significance:

- Turtle Nesting Area (1 unit);
- Turtle Wintering Areas (2 units);
- Amphibian Breeding Habitat (Wetland) (11 units);
- Amphibian Breeding Habitat (Woodland) (1 unit);
- Amphibian Movement Corridors; and
- Hill's Pondweed Habitat (5 units).

American Gromwell Habitat (1 unit), Soft- hairy False Gromwell Habitats (2 units), and Harlequin Darner Habitat (2 units), are within areas adjacent to the Project Location for which access was not granted. These habitats have been treated as significant and addressed in the *Environmental Impact Study*. No pre-construction surveys will be completed.

The following candidate significant wildlife habitats were determined not to be significant:

- Colonially- Nesting Bird Breeding Habitat (Bank and Cliff) (1 unit);
- Colonially- Nesting Bird Breeding Habitat (Tree/ Shrub) (11 units);
- Colonially- Nesting Bird Breeding Habitat (Ground) (1 unit);
- Woodland Raptor Nesting Area (1 unit);
- Amphibian Breeding Habitat (Wetland) (1 unit);
- Amphibian Breeding Habitat (Woodland) (1 unit);
- Marsh Breeding Bird Habitat (6 units);
- American Gromwell Habitat (5 units);
- Scarlet Beebalm Habitat (8 units);
- Soft- hairy False Gromwell Habitat (4 units);
- Common Nighthawk Habitat (5 units); and
- Harlequin Darner Habitat (9 units).

Figure 3 is a summary of natural heritage features within and adjacent to the Project Location and is based on the results of the *NHA Evaluation of Significance Report*.

The Ministry of Natural Resources and Forestry provided a letter of confirmation for the Natural Heritage Assessment on April 14, 2015.

### 7.2.2 Potential Effects

Based on the field studies conducted, the Project Location was refined to avoid impacts to significant natural heritage features. The layout of the Project has been developed to minimize its footprint and prioritize the protection of natural features.

The potential natural environmental effects to significant natural features during construction may include:

- Change in land topography associated with vegetation clearing, grubbing, and subsequent grading;
- Soil mobilization resulting in sedimentation of adjacent habitat;
- Change in surface water runoff volumes/ patterns;
- Potential changes to water quality;
- Dewatering during installation of underground project components may affect local hydrological regime (groundwater);
- Overland dispersal of water during dewatering may increase surface runoff;
- Increased vulnerability of cleared areas to invasion by non-native species;
- Reduction in habitat;
- Damage to woodland/ wetland edge species through soil compaction and trenching where tree roots may occur;
- Obstacle to wildlife movement after construction of perimeter security fence; and
- Disturbance/ incidental mortality to wildlife species from project activities.

A summary of the potential negative environmental effects is provided in Table 4 located at the end of Section 7.

### *7.2.3 Proposed Mitigation and/or Monitoring Plans*

In consideration of the above potential environmental effects, mitigation measures have been proposed to address these effects and maintain the ecological integrity and functionality of significant natural features. Proposed mitigation and/ or monitoring measures include:

- Erosion and sediment control measures prior to site clearing and regularly maintained until the Project is operational and vegetative ground cover is re-established;
- Re-vegetate land with native grassland species and/or monitor the Project Location to ensure natural re-vegetation occurs;
- Develop and implement a stormwater management plan which maintains pre-construction surface water flows to adjacent lands (quantity, quality, infiltrations, conveyance patterns and seasonality of water flow);
- Use controlled work procedures in order to eliminate release of dust from construction works. Mist can be applied to reduce dust release (e.g., water mist or non-chloride based materials);
- Avoid construction (including clearing) and decommissioning activities during the breeding season to minimize impacts on breeding birds and amphibians. Should clearing be required during the breeding bird season, nest searches conducted by a qualified person must be completed 48 hours in advance of clearing. If nests are found, then work cannot occur within the timing window;

- Maximize the distance of all construction equipment used from significant features; operate machinery in the Project Location areas only;
- Visual monitoring for and avoidance of wildlife species encountered during activities; and
- Limit vehicular speeds on internal access roads and monitor for wildlife that may be on access roads.

The Project has been developed to retain the value of all significant natural features identified and to mitigate any negative effects that will occur. For the natural features deemed significance, the layout of the Project will allow for the persistence of all these natural features after this Project is constructed and operational.

### 7.3 Water Bodies

Southgate Solar LP has undertaken a *Water Assessment Report* and completed a *Water Body Report* to identify all water bodies within the Project Location and lands within 120 m. Specific details related to the identification and mitigation of environmental effects are available in the *Water Body Report*.

Under Ontario Regulation 359/09, the definition of a water body includes lakes, permanent and intermittent streams and seepage areas, but does not include grassed waterways, temporary channels for surface drainage, rock chutes and spillways, roadside ditches that do not contain a permanent or intermittent stream, temporary ponded areas that are normally farmed, dugout ponds or artificial bodies of water that are intended for the storage, treatment, or recirculation of runoff from farm animal yards, manure storage facilities and outdoor confinement areas.

The following provides a summary of water bodies identified during the records review and site investigation, along with potential environmental effects that have been mitigated through the selection and location of project components and the implementation of management practices for construction.

No residual effects are anticipated after mitigation measures have been implemented. Environmental effects whose mitigation measures require subsequent monitoring have been included in Table 4.

#### 7.3.1 Existing Conditions

As outlined in Sections 30 and 31 of Ontario Regulation 359/09, a records review and site investigation were undertaken to fulfill the requirements of the *Water Assessment Report*. The records review identified one potential water body mapped within the Project Location and the surrounding 120 m. The site investigation confirmed the presence of this water body and also identified ten additional water bodies that meet the definition of a water body as defined by Ontario Regulation 359/09. Each of these eleven water bodies and the results of the site investigation are discussed below:

- The Beatty Saugeen River was found to occur as mapped in the records review. It is a natural permanent stream. It originates northeast of the Project Location, flows generally south-westward, enters the 120 m setback at a location approximately 120 m south of the southern boundary of the Project Location near the intersection of Grey Road 9 and Southgate Sideroad 41, flows generally westward, crosses under Southgate Sideroad 41 via a bridge, then exits the 120 m setback approximately 50 m west of Southgate Sideroad 41.
- Tributary 1 to the Beatty Saugeen River was found during the site investigation to occur within the Project Location 120 m setback. It originates approximately 30 m east of the Project Location and 250 m south of Southgate Township Road 22, flows generally southward for approximately 370 m, then turns south-eastward and exits the 120 m setback. It is a natural intermittent stream within an associated wetland.
- Tributary 2 to the Beatty Saugeen River was found during the site investigation to occur within the Project Location and the 120 m setback. Within the project location it crosses under Grey Road 9 where the collector line will connect the various areas of the Project. Tributary 2 flows generally southward and is within 120 m of the Project Location approximately 330 m west of Southgate Sideroad 41. It is a natural intermittent stream within an associated wetland.
- Unnamed Stream 1 was found during the site investigation to originate within the 120 m setback north of the Project Location within an associated wetland. It is a natural intermittent stream. From its origin, it flows generally south-westward approximately 170 m in the setback, and then dissipates near the south-western perimeter of the associated wetland.
- Unnamed Stream 2 was found during the site investigation to occur within the 120 m setback. It is a natural intermittent stream. It originates from a groundwater seepage area (Seepage Area 1), flows south-westward for approximately 10 m into a dugout pond, empties from the pond over a concrete weir, continues generally southward for approximately 70 m, forms a confluence with Unnamed Stream 3 from the east, continues generally southward for approximately 60 m, then empties into and dissipates within an area of shallow water in a meadow marsh wetland.
- Unnamed Stream 3 was found during the site investigation to occur within the 120 m setback. It is a natural intermittent stream. It originates from a groundwater seepage area (Seepage Area 2) located approximately 120 m southeast of Seepage Area 1, flows generally westward approximately 100 m and forms a confluence with Unnamed Stream 2.
- Unnamed Stream 4 was found during the site investigation to occur within the 120 m setback. It is a natural intermittent stream. It originates from a dugout pond located approximately 5 m west of Southgate Sideroad 39, flows from an outlet on the southwest corner of the pond generally westward for approximately 30 m through a



cedar swamp wetland, exits the 120 m setback, continues for approximately 360 m, then dissipates below the ground surface in the agricultural field.

- Unnamed Stream 5 was found during the site investigation to occur within the 120 m setback. It is an intermittent stream within a channelized ditch on a residential property. It originates from a groundwater seepage area (Seepage Area 3), flows generally westward for approximately 180 m through the channelized ditch, then dissipates in a wetland located immediately east of Southgate Sideroad 39.
- Seepage Area 1 was found during the site investigation to occur within the 120 m setback, near the northwest area of the Project location (44° 06' 49.15", 80° 44' 39.63"). It occurs as a point source of groundwater emerging from the ground near a fence line adjacent to a cattle pasture. The Seepage Area was surrounded by a horizontal circular steel cylinder with an approximate diameter of 1 m, set into a substrate base of sand, gravel and organic soil. Groundwater was emerging from the substrates, filling the cylinder, flowing over its wall and feeding Unnamed Stream 2.
- Seepage Area 2 was found during the site investigation to occur within 120 m setback, near the northwest area of the Project Location (44° 06' 45.89", 80° 44' 37.83"), and approximately 120 m southeast of Seepage Area 1. It occurs as a point source of groundwater emerging from the ground in a cattle pasture. The Seepage Area was surrounded by a horizontal circular steel cylinder with an approximate diameter of 1 m, set into a substrate base of sand, gravel and organic soil. Groundwater was emerging from the substrates, filling the cylinder, flowing over its wall and feeding Unnamed Stream 3.
- Seepage Area 3 was found during the site investigation to occur within the 120 m setback, near the western portion of the Project Location (44° 05' 44.26", 80° 45' 56.72"). It occurs as a single point source of groundwater emerging from a west-facing hillside on a residential property, approximately 30 m west of a house. The Seepage Area was surrounded by a horizontal circular concrete cylinder with an approximate diameter of 1.0 m, set into a substrate base of sand and gravel. Groundwater was emerging from the substrates, filling the concrete cylinder, flowing over its wall and feeding Unnamed Stream 5.

For a detailed description of water bodies within 120 m of the Project Location, refer to the *Water Assessment Report*. For those features determined to meet the definition of a water body under Ontario Regulation 359/09, mitigation measures to minimize potential environmental effects will be implemented according to Sections 39 and 40 of the regulation.

### 7.3.2 Potential Effects

The potential negative effects to water bodies within 120 m of the Project Location may include:

- Changes in natural drainage, including increased or decreased surface runoff.

- Increased or decreased stream flows and redirection of surface flow.
- Soil mobilization and erosion resulting in increased sedimentation and turbidity.
- Decreased surface permeability and redirection surface runoff.
- Increased inputs of nutrients.
- Contamination of soil and/or water bodies from accidental spills from equipment and machinery.
- Changes to fish habitat (e.g., spawning areas, food sources, benthic composition) from changes in sedimentation, turbidity, nutrient input, or stream flow, and/or from contamination of water bodies.
- Changes in water body conditions from changes to local hydrological regime (groundwater) from temporary water takings and/or from overland dispersal of water during temporary water takings.

### 7.3.3 Proposed Mitigation and/or Monitoring Plans

No solar photovoltaic panels or devices and no transformer substations will be constructed, installed or expanded within 30 m of the average annual high water mark of a water body. Therefore, potential negative environmental effects of the Project (outlined in Table 4) are considered to be indirect effects associated with the drainage area for each water body. None of the project activities is expected to have any direct or indirect effect on a water body provided the appropriate mitigation measures are implemented. Mitigation measures proposed to minimize and/or eliminate negative environmental effects to water bodies within 120 m of the Project Location will be implemented during each phase. Details regarding mitigation measures can be found in the *Water Bodies Report*, and include:

- An erosion and sediment control (ESC) plan will be developed and implemented for the Project Location through the construction and decommissioning phases of the Project. This plan will include standard erosion and sediment control measures, including:
  - Identifying and protecting trees and plants not shown for removal that are contained within the construction area;
  - Installing silt fences (placed at the downslope side of proposed grading activities, proposed stockpile areas, and the site limits) and necessary erosion control measures prior to commencing construction activities;
  - Utilize best management practices to reduce the transport of materials (e.g. soil, vegetation, etc.) off site. This may include installing construction entrance (mud mat) at vehicle access points adjacent to paved roads or as otherwise agreed to with the municipality;

- Phasing construction, where possible, to limit areas with and duration exposed soils. Implementing proper dewatering techniques to ensure the site and excavations are free from water. These techniques include diverting water into a dewatering trap with a filter bag on the outlet hose or to a well vegetated area a minimum of 30 m from any sensitive receiving water body/wetland;
  - Using appropriate grading techniques to prevent increased run-off potential and maintain positive drainage;
  - Utilizing sedimentation basins or sediment traps to treat relatively large drainage areas (i.e., greater than 2 ha);
  - Planting of vegetation on disturbed areas after construction activities have ceased (e.g. construction laydown area);
  - Protecting stockpiled areas with silt fencing and locating the areas a safe distance from sensitive natural features;
  - Stabilizing with vegetation or other erosion and sediment control measure disturbed areas that are not under immediate construction (i.e., 30 days); and
  - Conducting routine checks of ESC measures at regular frequencies appropriate to each measure, and after rain events greater than 10 mm.
- Appropriate grading techniques will be used to prevent increased run-off potential, and to maintain positive drainage. Changes to land contours will be minimized; physical land alterations (i.e., grading, cut and fill, etc.) required will be designed to remain consistent with the pre-existing drainage patterns. Visual checks of drainage patterns will be conducted throughout construction areas at regular intervals and following rain events greater than 10 mm until grading is complete.
  - Grading and water flow management plans will be developed to emulate pre-construction conditions. Access roads will be designed to promote water infiltration. Visual checks of surface conditions will be conducted at access roads and where ESC measures are implemented, at regular intervals and following rain events greater than 10 mm until vegetative cover is established.
  - The rate and timing of water pumping will be controlled. Water will be pumped onto vegetated surfaces if possible or into a temporary retention basin, ensuring pumped water re-infiltrates the ground without causing increased run-off or significant changes to local hydrological regime. Water takings will be restricted to less than 50,000 L per day.
  - Construction equipment and materials will be primarily stored in construction laydown area(s), protected by silt fencing. No equipment or materials will be stored within 30 m of a water body. Best management practices will be used to reduce the transport of materials (e.g. soil, vegetation, etc.) off site. This may include installing construction entrance (mud mat) at vehicle access points adjacent to paved roads or as otherwise

agreed to with the municipality. Routine checks of equipment and machinery storage, mats and municipal roads will be made at facility entry points regularly during construction.

- Each solar panel will be elevated, tilted and mounted to a rack. The area below the panels will be vegetated with low-growing vegetation, either through seeding or natural re-vegetation. Following the construction phase and prior to vegetation establishment, areas of soil compaction will be rectified by methods such as scarification, etc. ESC controls will remain in place until soils are stabilized by vegetative growth. Visual checks will be made throughout the Project Location, Weekly during growing season (May 1 to August 30) until evidence of growth is observed, then monthly until all areas are vegetated or re-vegetated.
- Transformers will be located more than 30 m from water bodies. Spill containment structures will be constructed in association with the main HV substation transformer. The Emergency Response and Communication Plan will be followed should a spill occur (as outlined in the Design and Operations Report). Routine checks of transformers, to ensure appropriate working order, will be made at transformer locations throughout the Project lifespan.

#### 7.4 Air, Odour and Dust

##### *7.4.1 Existing Conditions*

Based on site investigation, the majority of the Project Location for the Project is Zoned and actively used for agricultural purposes. Farming equipment such as tillage and harvesting equipment have the potential to create odour and dust during the planting and harvesting seasons.

##### *7.4.2 Potential Effects*

During construction, increases in particulate matter (dust) may be experienced in the adjacent areas, which are zoned for agriculture, aggregate extraction, wetland protection and environmental protection. Activities that could produce higher levels of dust include, but are not limited to: construction of access roads; travel of construction vehicles and equipment over gravel access roads; clearing and grubbing; and grading and levelling. The majority of these dust-producing activities are expected to occur during the first two months of the construction phase.

Additionally, there will be emissions from the diesel engines of construction machinery and equipment which may adversely impact local air quality. The impacts may be localized and temporary and will not have a significant impact on regional air quality or climate change. Appropriate air quality mitigation measures will be implemented during construction to ensure limited impacts to neighbouring properties.

#### 7.4.3 *Proposed Mitigation and/or Monitoring Plans*

The following air quality mitigation measures will be implemented during construction where appropriate:

- vehicle idling will be prohibited where possible in order to minimize particulate matter from vehicles and equipment;
- equipment will be maintained in good working order;
- vehicular traffic will be minimized on exposed soils and high traffic areas will be stabilized with fresh gravel; and,
- gravel roads will be watered down as required to reduce dust during construction, as necessary.

#### 7.5 Noise

##### 7.5.1 *Existing Conditions*

Noise levels within the Township of Southgate are governed by Bylaw 25-2006. The bylaw stipulates that noise as a result of construction will not be permitted within the hours of 9PM and 7AM, except in the case of an emergency. As stated in Section 7.4.1, the proposed location of the Project is Zoned for agriculture.

##### 7.5.2 *Potential Effects*

During the construction period, activities may lead to elevated levels of noise in the area. Activities that could produce higher levels of noise include, but are not limited to: clearing and grubbing of trees; compacting and grading; and operation of construction vehicles. These activities are expected to occur during months 1 - 4 of the construction period.

##### 7.5.3 *Proposed Mitigation and/or Monitoring Plans*

All efforts will be made to minimize noise during construction. The following mitigation measures will reduce the impact of noise on surrounding land uses:

- vehicle and equipment idling will be limited where possible;
- construction activities resulting in noise emissions will typically take place in accordance with local municipal By-laws;
- where work may need to be conducted after the normal hours or on weekends, this will be done in accordance with local municipal requirements in order to minimize any impacts to the surrounding community; and
- all equipment will be maintained in good working order with effective muffling devices where appropriate.

## 7.6 Land Use and Resources

### 7.6.1 *Existing Conditions*

The proposed solar facility will be located primarily within lands Zoned by the Township of Southgate as Agricultural. The Official Plan for the Township of Southgate designates the project location as Agricultural, with some land designated as Hazard Lands and Rural. The upper-tier municipality (County of Grey) designates the lands as Agricultural and Rural, with some Hazard Lands. Figure 4 depicts the land uses in the Project Location and within 300 m based on information from multiple sources including Ecological Land Classification surveys, and Canada Land Inventory mapping and Official Plans.

### 7.6.2 *Potential Effects*

The solar facility will temporarily alter the land use. The Project Location will be restored to its pre-construction condition or a similar state after decommissioning. The proposed Project is low-profile and non-obtrusive in nature and does not interfere with other nearby land uses. Potential environmental effects resulting from a change in land use include visual impacts to neighbouring landowners.

### 7.6.3 *Proposed Mitigation and/or Monitoring Plans*

The temporary use of the land for the solar facility will not impact future uses of the land, or current operations of adjacent lands. Significant setbacks from the surrounding road network and adjacent property lines are being applied and the majority of the surrounding uses are employment and agricultural. Mitigation measures to address temporary changes in land use include landscaping (as required to minimize the view of the Project Location) and visual impact studies as necessary.

## 7.7 Provincial and Local Infrastructure

The use of roads will be the only local infrastructure required during construction. No other municipal infrastructure is anticipated to be required.

### 7.7.1 *Existing Conditions*

Existing municipal roads in the vicinity of the Project Location may be required for use during the construction phase of the Project. This may include (but is not limited to) paved roads (including Southgate Sideroad 39 and Grey Road 9), and gravel roads (including Southgate Sideroad 41, Southgate Sideroad 47, and Southgate Road 22).

An existing transmission line exists, in a SE-NW direction, across the layout of the Project within a HONI easement.

### 7.7.2 *Potential Effects*

Existing roads in the vicinity of the Project Location including (but not limited to) Grey Road 9, Southgate Sideroad 39, Southgate Sideroad 41, and Southgate Road 22 may be required for use during the construction phase of the Project and may experience additional wear from heavy construction loads. Road damage will be repaired by Southgate Solar LP based on a Road Use Agreement to be established between Southgate Solar LP and the Township of Southgate. Periodic traffic disruptions are possible along the aforementioned roads, and some local roads, during the construction phase of the Project.

Connection to the provincial grid has been considered as part of the Project and commissioning of the solar facility and interconnection into the IESO controlled grid may cause temporary power outages to local customers, however this is unlikely.

### 7.7.3 *Proposed Mitigation and/or Monitoring Plans*

Mitigation measures to minimize disruption and impacts to roads will be identified during development of traffic studies. These may include a Traffic Management Plan to be completed after the receipt of the REA approval from the Ministry of the Environment and Climate Change (MOECC). The Traffic Management Plan will outline the haul routes for construction materials and will consider the load limits on local roads in the area of the Project Location. The Proponent will compensate the Municipality and/or County for road damage if there is abnormal wear that can be attributed to the construction of the Project, based on a Road User Agreement to be established between the proponent and the Municipality and/or County after Project approval by the MOECC.

Any mitigation measures to minimize power outages will be undertaken by HONI.

## 7.8 Public Health and Safety

### 7.8.1 *Existing Conditions*

The Project Location for Southgate Solar Project is Zoned as Agricultural and poses minimal risk to public health and safety.

### 7.8.2 *Potential Effects*

Potential impacts to public health and safety are minimal but include those generally related to construction of the Project. The following potential impacts are unlikely but possible:

- noise, vibration, equipment emissions and dust can be attributed to human health impacts;
- injury or death of construction workers or members of the public due to accidents involving heavy equipment and construction vehicles; and,



- electrical fires at the Project Location causing a risk to firefighters and neighbouring properties.

It should be noted that there is limited potential for wildfires or fires at the Project Location. The solar PV panels and related equipment represent a negligible increase in fire potential. Risk for vegetative fuel build-up is minimal (vegetation will be managed as per Section 5.12) and will be no greater than when the land was used for agricultural purposes.

### 7.8.3 Proposed Mitigation and/or Monitoring Plans

Safety is a primary objective and the goal of Southgate Solar LP is to maintain a safe work environment for workers and the public at all times during construction. The following mitigation and monitoring activities will be implemented during the construction phase:

- All construction activities will be conducted by licensed on-site contractors in accordance with required standards and codes and all activities will abide by all applicable regulations.
- All equipment will be maintained in good working order.
- The project will comply with all applicable Ontario *Occupational Health and Safety Act* (OHS) regulations and requirements during the construction period.
- It will be the on-site contractor's responsibility to prepare a site-specific custom Health and Safety Plan and a safety and compliance officer will be assigned to the Project to ensure that the plan is implemented and adhered to.
- During construction, the area will be under surveillance and temporary and permanent fencing will prevent unauthorized access and ensure public safety during the construction and operational phases. Areas to be avoided will be flagged and/or fenced for public safety, as appropriate.
- Southgate Solar LP will work with the Township of Southgate fire department to develop an emergency response plan for the Project Location that includes the construction phase. This plan will be outlined in the Emergency Response and Communications Plans.
- An Emergency Response and Communications Plan will be prepared in the event of an emergency on the site and will provide key contact information for relevant responders, regulators, landowners and other stakeholders. This plan is discussed in the *Design and Operations Report*.

## 7.9 Areas Protected under Provincial Plans and Policies

### 7.9.1 *Existing Conditions*

A search and analysis of available records identified that the project location is not in or adjacent to areas subject to Land Use Plans. Specifically, the project does not lie within the Niagara Escarpment, Lake Simcoe Watershed, Oak Ridges Moraine or the Greenbelt. The Project supports the goals of the Province's *Green Energy and Green Economy Act, 2009* and *Long-Term Energy Plan (LTEP), 2013*.

### 7.9.2 *Potential Effects*

No impact is expected to areas protected under provincial plans and policies.

### 7.9.3 *Proposed Mitigation and/or Monitoring Plans*

No mitigation measures or monitoring plans are proposed.

## 7.10 Summary of Potential Environmental Effects

Table 4 outlines how the potential negative environmental effects from construction activities will be mitigated and how monitoring will occur to meet the requirements set out in Ontario Regulation 359/09. Overall, the potential environmental effects during construction are anticipated to be short-term and indirect.

Table 4: Summary of Potential Environmental Effects

Potential Effect	Affected Feature(s) or Environmental Component	Likelihood	Magnitude	Performance Objective	Mitigation Measures	Monitoring <sup>3</sup>		Contingency Measures
						Monitoring Location	Frequency and Duration	
Cultural Heritage and Archaeological Resources								
Disruption or destruction of cultural or archaeological materials.	Cultural heritage resources.	Low	Low	N/A	It is recommended that cultural heritage features be avoided by placing a 50 m buffer around them during construction. If construction must occur within 50 m of cultural heritage resources, a vibration impact assessment will be completed prior to construction by a Professional Engineer.  Mitigation for archaeological resources will be implemented as outlined by the Stage 3 and Stage 4 Assessments, if required.	N/A	N/A	Should a previously undocumented cultural heritage or archaeological resource be discovered, alteration of the site will immediately cease, and additional fieldwork will be undertaken by a heritage professional or licensed archaeologist in accordance with Section 48(1) of the <i>Ontario Heritage Act</i> .  Should human remains be found, the police or regional coroner's office, the Registrar of Cemeteries and any applicable Aboriginal Communities will be contacted in accordance with the <i>Cemeteries Act</i> .
	Archaeological resources.	Low	Low	Minimize impacts to archaeological resources				
Natural Heritage Features								
<u>Direct/ Physical Impact</u> Permanent removal of 0.88 ha of Woodland A and Significant Amphibian Breeding (Woodland) Habitat ABHWO1 and Deer Winter Congregation Area Habitat (DWCA1)	(Assumed) Provincially Significant Wetlands 4, 6, 7, 9, 11, 13, 14, 17, 18, 20, 21, 22, 23, 26, 29, 30, 32  Colonially- Nesting Bird	High. Permanent removal of 0.88 ha of Woodland A and ABHWO1 and DWCA1 habitat.	Low	N/A  Continued use of the natural feature by wildlife where habitat will persist	Cleared lands to be vegetated as soon as practical following construction activities.  Internal project access roads to be constructed at or near grade and the	ESC measures to be monitored where implemented according to the ESC plan.	Monitor ESC measures regularly during construction.  ESC monitoring	Repair deficiencies in ESC structures as soon as possible upon notification of breach in ESC structure and buffer fencing.

<sup>3</sup> Please refer to the *Natural Heritage Assessment Environmental Impact Study* for additional monitoring information for natural features and to the *Water Bodies Report* for additional monitoring information for water bodies

Potential Effect	Affected Feature(s) or Environmental Component	Likelihood	Magnitude	Performance Objective	Mitigation Measures	Monitoring <sup>3</sup>		Contingency Measures
						Monitoring Location	Frequency and Duration	
<p>Potential for removal of 0.1 ha of Treated as Significant Hill's Pondweed Habitat (HP5* and HP6*)</p> <p><u>Indirect/Disturbance Effects</u></p> <p>Change in surface water run-off volumes/ patterns</p> <p>Potential changes to water quality</p> <p>Reduction in quality of habitat</p> <p><u>Incidental</u></p> <p>Mortality to wildlife species from project activities.</p> <p>Obstacle to wildlife movement after construction of the fence.</p> <p>*Denotes features to be treated as significant until pre-construction surveys can be completed.</p>	<p>Breeding Habitat (Tree/Shrub) CNTS5*, CNTS6*</p> <p>Turtle Nesting Areas TNA1*</p> <p>Significant and Treated as Significant Amphibian Breeding (Wetland) Habitat ABHWE1*, ABHWE2*, ABHWE5*, ABHWE6*, ABHWE7*, ABHWE8*, ABHWE9*, ABHWE11, ABHWE12*, ABHWE13*, ABHWE14*, ABHWE15*</p> <p>Significant Amphibian Breeding (Woodland) Habitat ABHWO 1, ABHWO 2, ABHWO 3</p> <p>Treated as Significant Hill's Pondweed Habitat HP1*, HP3*, HP4*, H 5*, HP6*</p> <p>Treated as Significant Harlequin Darner Habitat HD 5*, HD6*, HD10*</p> <p>Generalized Candidate Significant Wildlife Habitat</p> <p>*Denotes features to be treated as significant until pre-construction surveys can be completed.</p>	<p>Low likelihood for indirect/disturbance effects to wetlands, woodlands and wildlife habitats.</p>		<p>post-construction and to minimize temporary impacts.</p>	<p>use of impermeable materials</p> <p>Maintain a clearly demarcated boundary where no works occur within 30 m of a wetland boundary.</p> <p>Maximize the distance of all construction equipment used from wetlands; operate machinery in the areas disturbed for construction only, if applicable.</p> <p>A spill contingency plan will be in place for the Project. Spills are to be reported to the Ontario Spills Action Centre (1-800-268-6060).</p> <p>Storage of materials for the Project should not occur within 30 m of a wetland boundary.</p> <p>Secondary containment is to be used for hazardous substances stored in the Project Location.</p> <p><u>Setbacks</u></p> <p>Setbacks between significant woodlands and the project perimeter fence to follow ISA Arborist standards.</p> <p>A minimum 5 m setback to be applied to significant wildlife habitat within the Project Location within areas of operational flexibility.</p> <p><u>Erosion and Sediment Control</u></p> <p>Minimize soil exposure.</p> <p>Install erosion and sediment control measures prior to vegetation clearing, grubbing and grading to prevent</p>	<p>Monitor for surface water quality at locations identified in the SWM Plan and/or REA issued by the MOECC</p> <p>Monitoring location for significant natural features in the same location as pre-construction surveys (see Appendix B of the <i>NHA Evaluation of Significance Report</i> and Appendix A of the <i>NHA EIS</i>).</p>	<p>to occur monthly or after rain events 10 mm or greater (within 24 hrs) until vegetation is re-established.</p> <p>Monitor for surface water quality at a frequency and duration identified in the SWM Plan and/or REA issued by the MOECC</p> <p>One-year of post-construction monitoring for significant wildlife habitat, with the exception of TNA1*.</p> <p>Post-construction monitoring at TNA1* should occur during the first two nesting seasons following the completion of construction to determine if turtles are isolated within feature.</p>	<p>Health assessment by a qualified biologist if visual evidence suggests loss of significant species from habitats during construction phase.</p>

Potential Effect	Affected Feature(s) or Environmental Component	Likelihood	Magnitude	Performance Objective	Mitigation Measures	Monitoring <sup>3</sup>		Contingency Measures
						Monitoring Location	Frequency and Duration	
					<p>mobilization of sediment and other contaminants from the Project Location into the surrounding landscape.</p> <p>Restrict vegetation clearing to lands within Project Location identified for development.</p> <p>Where exposed soils occur between wetland features and the Project (relict areas that were agricultural fields), these areas to be monitored to ensure vegetation establishes to add to the wetland buffer where possible.</p> <p>Minimize activities with potential for dust releases, especially during windy and prolonged dry periods.</p> <p>Restore disturbed areas as soon as possible to minimize the duration of soil exposure.</p> <p>Stabilize areas of stockpiled or exposed soils when construction activities are not active (i.e., no works within 30 days scheduled).</p> <p>Minimize vehicle traffic adjacent to wetlands, or exposed soils. All traffic to use designated areas.</p> <p><u>Stormwater Management</u></p> <p>Develop and implement a stormwater management plan to ensure drainage patterns are not significantly altered from existing conditions due to road drainage, reduction in surface permeability, etc.</p> <p>A plan to address/mitigate soil compaction throughout the Project Location to be developed as part of the detailed design to promote</p>			

Potential Effect	Affected Feature(s) or Environmental Component	Likelihood	Magnitude	Performance Objective	Mitigation Measures	Monitoring <sup>3</sup>		Contingency Measures
						Monitoring Location	Frequency and Duration	
					<p>infiltration.</p> <p>Flow retention features may be used in access road ditches to mitigate increases in surface water runoff (e.g., straw bales, or rock check dams).</p> <p>Soil stabilization to occur as soon as practical upon completion of work activities to attenuate runoff,</p> <p>Internal project access roads to be constructed at or near grade and the use of impermeable materials avoided to promote infiltration and surface roughness.</p> <p><u>Vegetation Considerations</u></p> <p>If construction occurs within 5 m of significant habitat during the growing season, the habitat will be searched for the target plant species and each located target plant flagged to increase awareness of its location to avoid incidental trampling.</p> <p><u>Wildlife Considerations</u></p> <p>Construct perimeter fencing prior to installing core project components to prevent entry of larger wildlife within construction area.</p> <p>After perimeter fencing is constructed, a visual search of the Project Location to be undertaken to identify wildlife that may be within fencing.</p> <p>Limits of construction works to be staked in the field in order to minimize disturbance to the wildlife. Construction envelope to be clearly</p>			

Potential Effect	Affected Feature(s) or Environmental Component	Likelihood	Magnitude	Performance Objective	Mitigation Measures	Monitoring <sup>3</sup>		Contingency Measures
						Monitoring Location	Frequency and Duration	
					<p>demarcated and kept as small as possible.</p> <p>Utilize fencing (e.g. Perimeter fencing and/or silt fencing) to deter wildlife from entering the construction site during construction and decommissioning.</p> <p>The construction workforce will be educated on local wildlife that may be encountered on the Project Location and will be instructed to take measures for avoiding wildlife. A protocol will be provided to contractors to follow in the event wildlife is encountered. This protocol will include specific measures for dealing with turtles, breeding birds and other wildlife.</p> <p>Wildlife located within the Project Location will be re-located to an area outside the Project Location (and into an area of appropriate habitat) as necessary.</p> <p>Relocate turtles observed within Wetland 21 to suitable habitat within the general area (i.e., within 1 km).</p> <p>Use of galvanized fencing with chain links large enough for turtle hatchlings to move through following the construction phase. Prevent movement of turtle hatchlings through the perimeter fence during the construction phase to reduce potential for mortality.</p> <p>Minimize impacts to any breeding birds (April 1 to August 31) by clearing naturalized vegetation outside of the breeding bird season. Should any clearing be required during the breeding bird season, nest searches</p>			



Potential Effect	Affected Feature(s) or Environmental Component	Likelihood	Magnitude	Performance Objective	Mitigation Measures	Monitoring <sup>3</sup>		Contingency Measures
						Monitoring Location	Frequency and Duration	
					<p>conducted by a qualified person must be completed 48 hours prior to clearing activities. If nests are found, works within 10 m will cease until nest has fledged. If no nests are present, clearing can occur. This is in accordance with the federal <i>Migratory Bird Convention Act</i>.</p> <p>The area of ABHWO1 habitat associated with Woodland A is to be removed outside of the amphibian breeding season (i.e., April 1- June 30) if seasonal vernal pools are observed prior to clearing activities. A visual inspection of the breeding habitat (i.e., wetland pockets/ pools) will be undertaken prior to removal to verify if 1) habitat occurs and 2) if breeding amphibians are observed. If observed, construction within 30 m of the breeding pool will be delayed until a subsequent site visit confirms no visual evidence of amphibian breeding.</p> <p>Vehicle speeds to be restricted to 15 km/hr or less on the Project site and speed limit signage posted.</p> <p><u>Generalized Candidate Significant Wildlife Habitat</u></p> <p>No access roads are to be constructed or operated within 50 m of the boundaries of generalized habitat for plant species of special concern or amphibian breeding habitat in accordance with Appendix D of the Natural Heritage Assessment Guide for Renewable Energy Projects (MNR 2012).</p>			
<u>Direct/ Physical Impact</u>	Significant Woodlands A, C, D, E, I	Permanent removal of 0.88 ha of Woodland A	High.	Continued use of the	Cleared lands to be vegetated as soon as practical following construction	Staked vegetation Clearing boundary.	Monitoring of woodland clearing boundary to	Repair deficiencies in ESC structures as soon

Potential Effect	Affected Feature(s) or Environmental Component	Likelihood	Magnitude	Performance Objective	Mitigation Measures	Monitoring <sup>3</sup>		Contingency Measures
						Monitoring Location	Frequency and Duration	
<p>Permanent removal of 0.88 ha of Woodland A and Amphibian Breeding Habitat (Woodland) (ABHWO 1)</p> <p>Permanent removal of 0.88 ha of Deer Winter Congregation Areas DWCA1</p> <p>Permanent removal of 0.88 ha of Woodland Area-sensitive Bird Breeding Habitat (ASBB1)</p> <p><u>Indirect/Disturbance Effects</u></p> <p>Change in surface water run-off volumes/ patterns.</p> <p>Potential changes to water quality.</p> <p>Reduction in quality of habitat.</p> <p><u>Incidental</u></p> <p>Mortality to wildlife species from project activities.</p> <p>Obstacle to wildlife movement after construction of the fence.</p>	<p>Deer Winter Congregation Areas DWCA1</p> <p>Amphibian Breeding Habitat (Woodland) ABHWO1, ABHWO2, ABHWO3</p> <p>Woodland Area-sensitive Bird Breeding Habitat ASBB1</p> <p>Treated as Significant Colonially- Nesting Bird Breeding Habitat (Tree/ Shrub) CNTS5*, CNTS6*</p> <p>Treated as Significant Habitat for American Gromwell AG2*</p> <p>Treated as Significant Habitat for Soft-Hairy False Gromwell SHFG4*, SHFG5*, SHFG6*</p> <p>Significant Redheaded Woodpecker Habitat RHW1</p> <p>Generalized Candidate Significant Wildlife Habitat</p>	<p>and ABHWO1* habitat. Low likelihood for indirect/disturbance effects to woodlands and wildlife habitats.</p>	<p>Low.</p>	<p>natural feature by wildlife and minimized temporary impacts.</p>	<p>activities.</p> <p>Internal project access roads to be constructed at or near grade and the use of impermeable materials</p> <p>A spill contingency plan will be in place for the Project. Spills are to be reported to the Ontario Spills Action Centre (1-800-268-6060).</p> <p>Secondary containment is to be used for hazardous substances stored in the Project Location.</p> <p>Setbacks</p> <ul style="list-style-type: none"> <li>• Setbacks between significant woodlands and the project perimeter fence to follow ISA Arborist standards.</li> <li>• A minimum 5 m setback to be applied to significant wildlife habitat within the Project Location within areas of operational flexibility.</li> </ul> <p>Erosion and Sediment Control</p> <p>Minimize soil exposure.</p> <p>Install erosion and sediment control measures prior to vegetation clearing, grubbing and grading to prevent mobilization of sediment and other contaminants from the Project Location into the surrounding landscape.</p> <p>Restrict vegetation clearing to lands within Project Location identified for development.</p> <p>Where exposed soils occur between wetland features and the Project (relict areas that were agricultural fields), these areas to be monitored to ensure vegetation establishes to</p>	<p>Around the perimeter of project location where ESC measures implemented.</p> <p>Monitor for surface water run-off flow and evidence of erosion to the wetland area.</p>	<p>occur when vegetation is being cleared.</p> <p>Monitor ESC measures regularly during construction.</p>	<p>as possible upon notification of breach in ESC structure and buffer fencing.</p> <p>Health assessment by a qualified biologist if visual evidence suggests loss of significant species from habitats during construction phase.</p>

Potential Effect	Affected Feature(s) or Environmental Component	Likelihood	Magnitude	Performance Objective	Mitigation Measures	Monitoring <sup>3</sup>		Contingency Measures
						Monitoring Location	Frequency and Duration	
					<p>add to the wetland buffer where possible.</p> <p>Minimize activities with potential for dust releases, especially during windy and prolonged dry periods.</p> <p>Restore disturbed areas as soon as possible to minimize the duration of soil exposure.</p> <p>Stabilize areas of stockpiled or exposed soils when construction activities are not active (i.e., no works within 30 days scheduled).</p> <p>At detailed design, efforts will be made to keep the elevation of overhead cable below the height of the trees or on the road opposite the habitats.</p> <p>Stormwater Management</p> <p>Develop and implement a stormwater management plan to ensure drainage patterns are not significantly altered from existing conditions due to road drainage, reduction in surface permeability, etc.</p> <p>A plan to address/mitigate soil compaction throughout the Project Location to be developed as part of the detailed design to promote infiltration.</p> <p>Flow retention features may be used in access road ditches to mitigate increases in surface water runoff (e.g., straw bales, or rock check dams).</p> <p>Soil stabilization to occur as soon as practical upon completion of work activities to attenuate runoff. Internal project access roads to be</p>			

Potential Effect	Affected Feature(s) or Environmental Component	Likelihood	Magnitude	Performance Objective	Mitigation Measures	Monitoring <sup>3</sup>		Contingency Measures
						Monitoring Location	Frequency and Duration	
					<p>constructed at or near grade and the use of impermeable materials avoided to promote infiltration and surface roughness.</p> <p>Vegetation Considerations</p> <p>If construction occurs within 5 m of significant habitat during the growing season, the habitat will be searched for the target plant species and each located target plant flagged to increase awareness of its location to avoid incidental trampling.</p> <p>No woodland removal is proposed for Woodland C, D, E or I. According to the ISA Arborists' Certification Study Guide (2010), a general tree protection zone should be 0.3 m diameter for each 2.5 cm of trunk diameter. Given to dominant size class of trees in the Woodlands is approximately 24 cm DBH, the minimum tree protection distance will be the greater of the drip line or 2.9 m from the trunk.</p> <p>Wildlife Considerations</p> <p>Construct perimeter fencing prior to installing core project components to prevent entry of larger wildlife within construction area.</p> <p>After perimeter fencing is constructed, a visual search of the Project Location to be undertaken to identify wildlife that may be within fencing.</p> <p>Limits of construction works to be staked in the field in order to minimize disturbance to the wildlife. Construction envelope to be clearly demarcated and kept as small as</p>			

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					<p>possible.</p> <p>If possible, avoid clearing vegetation during the breeding bird season to minimize impacts on breeding birds. Should clearing be required during the breeding bird season, nest searches conducted by a qualified person must be completed 48 hours in advance of clearing. If nests are found and the species protected by the Migratory Bird Convention Act, work within 10 m of the nest will cease until the nest has fledged.</p> <p>If there are no nests, then clearing can occur. Construction may occur on cleared lands during the breeding season once vegetation has been removed (if applicable). The majority of the Project Location consists of agricultural fields that were in production in 2014.</p> <p>Utilize fencing (e.g. Perimeter fencing and/or silt fencing) to deter wildlife from entering the construction site during construction and decommissioning.</p> <p>The construction workforce will be educated on local wildlife that may be encountered on the Project Location and will be instructed to take measures for avoiding wildlife. A protocol will be provided to contractors to follow in the event wildlife is encountered. This protocol will include specific measures for dealing with turtles, breeding birds and other wildlife.</p> <p>Wildlife located within the Project Location will be re-located to an area</p>			



Potential Effect	Affected Feature(s) or Environmental Component	Likelihood	Magnitude	Performance Objective	Mitigation Measures	Monitoring <sup>3</sup>		Contingency Measures
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					<p>outside the Project Location (and into an area of appropriate habitat) as necessary.</p> <p>Minimize impacts to breeding birds (April 1 to August 31) by clearing naturalized vegetation outside of the breeding bird season. Should any clearing be required during the breeding bird season, nest searches conducted by a qualified person must be completed 48 hours prior to clearing activities. If nests are found, works within 10 m will cease until nest has fledged. If no nests are present, clearing can occur. This is in accordance with the federal <i>Migratory Bird Convention Act</i>.</p> <p>The area of ABHW01 habitat associated with Woodland A is to be removed outside of the amphibian breeding season (i.e., April 1- June 30) if seasonal vernal pools are observed prior to clearing activities. A visual inspection of the breeding habitat (i.e., wetland pockets/ pools) will be undertaken prior to removal to verify if 1) habitat occurs and 2) if breeding amphibians are observed. If observed, construction within 30 m of the breeding pool will be delayed until a subsequent site visit confirms no visual evidence of amphibian breeding.</p> <p>Vehicle speeds to be restricted to 15 km/hr or less on the Project site and speed limit signage posted.</p> <p>Generalized Candidate Significant Wildlife Habitat</p> <p>No access roads are to be constructed or operated within 50 m of the</p>			

Potential Effect	Affected Feature(s) or Environmental Component	Likelihood	Magnitude	Performance Objective	Mitigation Measures	Monitoring <sup>3</sup>		Contingency Measures
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					boundaries of generalized habitat for plant species of special concern or amphibian breeding habitat in accordance with Appendix D of the Natural Heritage Assessment Guide for Renewable Energy Projects (MNR 2012).			
Water Bodies								
Vegetation clearing and grading may cause soil erosion and mobilization resulting in increased sedimentation, turbidity and inputs of nutrients and/or contaminants in adjacent water bodies, which may affect fish habitat (e.g., spawning areas, food sources, benthic composition).	Tributary 1 Tributary 2 Stream 1 Stream 2 Stream 3 Stream 5 Seepage Area 1 Seepage Area 2 Seepage Area 3	Low	Low	Minimization of surface runoff and soil mobilization to receiving water bodies.	<ul style="list-style-type: none"> <li>• Appropriate grading techniques will be used to prevent increased run-off potential, and to maintain positive drainage. Changes to land contours will be minimized; physical land alterations (i.e., grading, cut and fill, etc.) required will be designed to remain consistent with the pre-existing drainage patterns.</li> <li>• Mitigation measures from the ESC plan will be implemented, including:</li> <li>• Identifying and protecting all trees and plants not shown for removal that are contained within the construction area;</li> <li>• Maintaining existing riparian vegetation buffers around water bodies. With the exception of Stream 3 and Seepage Area 2, all project components are a minimum of 30 m away from a water body. For Stream 3 and Seepage Area 2, the water bodies are no within 30 m of a solar panel; the closest project component is an access road 22 m from the water body. This is similar to pre—construction</li> </ul>	At areas where ESC measures are constructed.	Checks to occur monthly and/or after rain events greater than 10 mm until vegetative cover is established.	Breaches to ESC measures will be repaired within 24 hours of identification.

Potential Effect	Affected Feature(s) or Environmental Component	Likelihood	Magnitude	Performance Objective	Mitigation Measures	Monitoring <sup>3</sup>		Contingency Measures
						Monitoring Location	Frequency and Duration	
					<p>conditions as there is a laneway currently in place; and,</p> <ul style="list-style-type: none"> <li>Installing silt fences (placed at the downslope side of proposed grading activities, proposed stockpile areas, and the site limits) and necessary erosion control measures prior to commencing construction activities.</li> </ul>			
<p>Construction of access roads and soil compaction may cause decreased surface permeability and redirection of runoff, and/or soil erosion and mobilization resulting in increased sedimentation, turbidity and inputs of nutrients and/or contaminants into adjacent water bodies, potentially impacting water quality and fish habitat (e.g., spawning areas, food sources, benthic composition).</p>	<p>Stream 1 Stream 2 Stream 3 Stream 5 Seepage Area 1 Seepage Area 2 Seepage Area 3</p>	Low	Low	<p>Maintenance of surface infiltration and minimization of surface runoff and soil mobilization to receiving water bodies.</p>	<ul style="list-style-type: none"> <li>Access roads will be designed to promote infiltration; roadways within the Project Location will be constructed to promote water infiltration.</li> <li>Mitigation measures from the ESC plan may be implemented, including:</li> <li>Maintaining existing riparian vegetation buffers around water bodies;</li> <li>Installing silt fences (placed at the downslope side of proposed grading activities, proposed stockpile areas, and the site limits) and all necessary erosion control measures prior to commencing construction activities; and</li> <li>Reducing soil compaction by scarifying land (or by other appropriate means) following the construction phase.</li> </ul>	<p>At access roads and areas where ESC measures are constructed.</p>	<p>Checks to occur monthly and/or after rain events greater than 10 mm until vegetative cover is established.</p>	<p>Breaches to ESC measures will be repaired within 24 hours of notification.</p>

Potential Effect	Affected Feature(s) or Environmental Component	Likelihood	Magnitude	Performance Objective	Mitigation Measures	Monitoring <sup>3</sup>		Contingency Measures
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Temporary water takings during installation of underground project components may affect local hydrological regime (groundwater), and overland dispersal of water during temporary water takings may increase surface runoff and increase erosion and sedimentation to adjacent water bodies.	Tributary 1 Stream 1 Stream 2 Stream 5 Seepage Area 1 Seepage Area 3	Low	Low	Minimization of impacts to hydrological regime. Maintenance of surface runoff volume.	The rate and timing of water pumping will be controlled. Water will be pumped onto vegetated surfaces if possible or into a temporary retention basin, ensuring pumped water re-infiltrates the ground without causing increased run-off or significant changes to local hydrological regime. Water takings will be restricted to less than 50,000 litres per day.  Temporary water taking is not anticipated in appreciable volumes for this Project. Temporary water takings activities may be required after significant rainfall events, etc.  ESC measures will be implemented and monitored as indicated above.	Where installation requires temporary water takings.	Once during construction/during installation of project components.	If temporary water takings cause increased soil mobilization or surface run-off in areas of exposed soil, temporary water taking activities will be stopped until additional ESC measures can be implemented. If water taking needs to exceed 50,000 L/day, the MOECC will be consulted.
Storage and use of construction materials and equipment may cause contamination of soils and/or water bodies from accidental spills, from surface runoff, from wind, or from the transport of materials by equipment and machinery onto paved public roads and subsequent surface runoff or wind.	Beatty Saugeen River Tributary 1 Tributary 2 Stream 1 Stream 2 Stream 4 Stream 3 Stream 5 Seepage Area 1 Seepage Area 2 Seepage Area 3	Low	Low	Ensure equipment and materials are stored more than 30 m from a water body, with surrounding silt fencing. Ensure mud mats are in place and preventing off-site transport. Ensure any materials transported off-site are washed away from water bodies. Keep public roads clear of construction debris.	Construction equipment and materials will be primarily stored in construction laydown area(s), protected by silt fencing. No equipment or materials will be stored within 30 m of a water body.  Utilize best management practices to reduce the transport of materials (e.g. Soil, vegetation, etc.) off site. This may include installing construction entrance (mud mat) at vehicle access points adjacent to paved roads or as otherwise agreed to with the municipality.  Following the construction phase and prior to vegetation establishment, areas of soil compaction will be rectified by methods such as	Main facility entrance points (on Grey Road 9, Side Road 39 Southgate, Side Road 41 Southgate, and Southgate Road 22) and in the construction laydown areas.	Regularly, during the construction phase.	If soil is mobilized onto paved public roads by equipment, clearing activities to avoid moving soil into nearby water bodies

Potential Effect	Affected Feature(s) or Environmental Component	Likelihood	Magnitude	Performance Objective	Mitigation Measures	Monitoring <sup>3</sup>		Contingency Measures
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					scarification, etc. A spill response plan and spill kits will be developed and kept on-site during construction.			
Air, Odour and Dust								
Deposition of dust on adjacent lands.	Neighbouring land uses.	Low	Low	Minimize dust and odour resulting from construction activities.	Vehicle idling will be limited where possible. Equipment will be maintained in good working order. Vehicular traffic will be minimized in areas of exposed soils and high traffic areas will be stabilized with fresh gravel. Gravel roads will be watered down during construction as needed to reduce dust. Construction activities causing increased odour or dust will be carried out in accordance with applicable regulations and standards.	N/A	N/A	N/A
Odour nuisance.	Neighbouring landowners.							
Noise								
Increased noise disturbance due to construction activities such as compacting and grading, and driving of foundation piles for solar panel supports.	Neighbouring landowners	Moderate	Low	Minimization of noise resulting from construction.	Vehicle idling will be prohibited, where possible. Noise levels within the Township of Southgate are governed by Bylaw 25-2006. Noise as a result of construction will not be permitted within the hours of 9PM to 7AM, except in the case of an emergency. Construction activities resulting in noise emissions will typically take place during normal business hours. Should work need to be conducted on weekends, this work will be done in	N/A	N/A	Documentation of any complaints as outlined in the Design and Operations Report (Section 8.3.2) and follow up as required.



Potential Effect	Affected Feature(s) or Environmental Component	Likelihood	Magnitude	Performance Objective	Mitigation Measures	Monitoring <sup>3</sup>		Contingency Measures
						Monitoring Location	Frequency and Duration	
					accordance with local regulations and policies to minimize disturbance to the surrounding community. All equipment will be maintained in good working order, with muffler devices, where appropriate.  Any noise complaints will be investigated as discussed in the Communications Plan (see the Design and Operations Report).			
Land Use and Resources								
Removal of land from agricultural production.	Land use at the Project Location.	High	Moderate	N/A	N/A	N/A	N/A	Lands could be restored to their pre-construction condition, or a similar state at the time of decommissioning and adjacent lands will most likely continue to be used for agriculture.
Visual impact.	Neighbouring landowners.	Low	Low	N/A	Required setbacks from all neighbouring landowners have been applied. Visual impacts during construction will be temporary in nature and may be mitigated through the installation of visual screenings.	N/A	N/A	N/A
Provincial and Local Infrastructure								
Periodic traffic disruption.	Grey Road 9, Southgate Sideroad 39, Southgate Sideroad 41, Southgate Road 22	Moderate	Low	Limit traffic flow disruption.	If necessary a Traffic Management Plan will be prepared during detailed design in consultation with the Township and County.	N/A	N/A	N/A
Damage to local roads.	Grey Road 9, Southgate Sideroad 39, Southgate Sideroad 41, Southgate Road 22	Moderate	Low	N/A	Roads will be returned to or maintained at pre-construction condition in accordance with consultation with the Township of Southgate.	N/A	N/A	N/A

Potential Effect	Affected Feature(s) or Environmental Component	Likelihood	Magnitude	Performance Objective	Mitigation Measures	Monitoring <sup>3</sup>		Contingency Measures
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Temporary power outages to local customers during commissioning of the facility.	Neighbouring landowners and local community.	Low	Low	N/A	Any mitigation measures to minimize outages will be undertaken by Hydro One.	N/A	N/A	N/A
<b>Public Health and Safety</b>								
Noise, vibration and equipment emissions.	Neighbouring landowners and other members of the community.	Low	Low	N/A	The Project will comply with the Occupational Health and Safety Act regulation requirements during the construction phase.	N/A	N/A	N/A
Injury or death to construction workers or members of the public due to accidents related to construction equipment or traffic.	Construction workers. Neighbouring landowners and other members of the community.	Low	High	No injuries or deaths	All equipment will be operated by licensed contractors.	N/A	N/A	Implementation of a site-specific health and safety plan Emergency Response and Communications Plans.
Fires (electrical, wildfire, etc.) at the Project Location during construction.	Construction workers. Neighbouring landowners and other members of the community. Municipal firefighters.	Low Low  Low	Moderate Low  Moderate	Minimize fire potential at Project Location.	All construction activities will be conducted by licensed contractors in accordance with required standards and codes. All activities will abide by local laws and regulations.  The contractor will create a site-specific health and safety plan. The contractor will also provide job safety assessment information prior to construction start up.  All equipment will be maintained in good working order.  The Project Location will be under surveillance during construction and a fence with locked gates will be installed to ensure public safety. Restricted areas will also be flagged, as appropriate.  Southgate Solar LP will work with the Township of Southgate fire department to develop an emergency response plan for the Project Location that includes the construction phase. This plan will be outlined in the Emergency Response and Communications Plans. (See the	N/A	N/A	Implementation of Emergency Response and Communications Plans.

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					Design and Operations Report). An Emergency Response and Communications Plan will be prepared in the event of an emergency on the site and will provide key contact information for relevant responders, regulators, landowners and other stakeholders.			
Areas Protected Under Provincial Plans and Policies								
No potential negative effects are anticipated to the Greenbelt Protected Countryside, Greenbelt Natural Heritage System, Oak Ridges Moraine and/or Lake Simcoe Watershed.								

## 8. CONCLUSIONS

This *Construction Plan Report* has been completed to fulfill regulatory requirements as mandated by the provincial government for the development of the Project. This report is consistent with the provisions of Ontario Regulation 359/09 for a Class 3 Solar Facility.

Sufficient fieldwork and data collection was performed to assist in the determination of potential construction effects to environmental and social features. Various mitigation measures to manage these potential effects have been identified. Significant adverse effects from construction activities to the natural and social environment will be avoided through careful solar facility layout planning, the application of appropriate mitigation measures, and adherence to all regulatory requirements.

The overall conclusion of this *Construction Plan Report* is that the Project can be constructed without any significant adverse residual effects to the environment.