

Pendleton Solar Energy Centre Design & Operations Report

FINAL DRAFT REPORT



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Sign-off Sheet

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Abbreviations

AC	Alternating current
DC	Direct current
EIS	Environmental Impact Study
Hydro One	Hydro One Networks Inc.
Km	Kilometre(s)
kV	Kilovolt(s)
L	Litre(s)
m	Metre(s)
MNRF	Ministry of Natural Resources and Forestry
MOECC	Ministry of the Environment and Climate Change
MTCS	Ministry of Tourism, Culture and Sport
MWac	Megawatt alternating current
O. Reg.	Ontario Regulation
PV	Photovoltaic
REA	Renewable Energy Approval
SCADA	Supervisory control and data acquisition
Stantec	Stantec Consulting Ltd.
SWH	Significant Wildlife Habitat
The Project	Pendleton Solar Energy Centre
The Proponent	Pendleton Energy Centre Limited Partnership
W	Watt(s)

1.0 INTRODUCTION

1.1 OVERVIEW

Pendleton Energy Centre Limited Partnership (the Proponent), is proposing the development of a 12 megawatt alternating current (MWac) solar energy generating facility, known as the Pendleton Solar Energy Centre (the Project) in the Township of Alfred and Plantagenet, United Counties of Prescott and Russell. The Project will require a Renewable Energy Approval (REA) as per Ontario Regulation (O. Reg.) 359/09 - Renewable Energy Approvals under Part V.0.1 of the Act, under the *Environmental Protection Act* (MOECC 2016).

The Proponent is proposing to develop, construct and operate the Project on approximately 53 hectares (ha; 130 acres) of land in response to the Government of Ontario's Large Renewable Procurement initiative to promote the development of renewable electricity in the province.

The Project is located at Lot 19-20, Concession 8 North Plantagenet, on land leased by the Proponent for 20 or more years. The Project Location is bounded to the north by County Road 2, to the east and south by forested lands, and to the west by County Road 19. A map showing the location of the Project is provided in **Figure 1, Appendix A**.

The term "Project Location" is defined by O. Reg. 359/09 as:

"a part of land and all or part of any building or structure in, on or over which a person is engaging in or proposes to engage in the project and any air space in which a person is engaging in or proposes to engage in the project" (MOECC 2009, amended 2016).

The Proponent has retained Stantec Consulting Ltd. (Stantec) to prepare a REA application, as required under O. Reg. 359/09. The proposed solar PV grid connected system would be considered a Class 3 Solar Facility under O. Reg. 359/09, s. 4.

Sections 2.0 outline the individual facility components illustrated on **Figure 2, in Appendix A** (also known as the Site Plan). Section 3.0 discusses the facility design and siting considerations. Section 4.0 describes the facilities operation plan, including a discussion on training, remote monitoring, and scheduled and unplanned maintenance. Negative environmental effects that may result from operations activities and their mitigation measures are discussed in Section 5.0. The Environmental Effects Monitoring Plan is outlined in Section 6.0 and the Emergency Response Plan and Communications Plan is outlined in Section 7.0.

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1.2 REPORT REQUIREMENTS

This Design and Operations Report describes the operational details of a renewable energy project so that all potential negative environmental effects may be identified. In addition, this report describes mitigation measures in respect of negative environmental effects that could result from activities that occur during the operations phase of the Project.

This Design and Operations Report is one component of the REA application for the Project, and has been prepared in accordance with O. Reg. 359/09, the Ministry of Natural Resources and Forestry (MNR) *Approval and Permitting Requirements Document for Renewable Energy Projects* (2009), and the Ministry of the Environment and Climate Change (MOECC)'s *Technical Guide to Renewable Energy Approvals* (2013). **Table 1.1** summarizes the requirements of this report for a Class 3 solar facility as specified under O. Reg. 359/09, and provides a cross-reference to where the information can be found in this report.

Table 1.1: Design & Operations Report Requirements (as per O. Reg. 359/09 – Table 1)

Requirements	Section Reference
<p>1. Set out a site plan of the project location at which the renewable energy project will be engaged in, including,</p> <ul style="list-style-type: none"> i. one or more maps or diagrams of, <ul style="list-style-type: none"> A. all buildings, structures, roads, utility corridors, rights of way and easements required in respect of the renewable energy generation facility and situated within 300 metres of the facility, B. any ground water and surface water supplies used at the facility, C. any things from which contaminants are discharged into the air, D. any works for the collection, transmission, treatment and disposal of sewage, E. any areas where waste, biomass, source separated organics and farm material are stored, handled, processed or disposed of, F. the project location in relation to any of the following within 125 metres: the portion of the Oak Ridges Moraine Conservation Plan Area that is subject to the Oak Ridges Moraine Conservation Plan, the area of the Niagara Escarpment Plan, the Protected Countryside, the Lake Simcoe watershed, and G. any noise receptors or odour receptors that may be negatively affected by the use or operation of the facility, ii. a description of each item diagrammed under subparagraph i, iii. one or more maps or diagrams of land contours, surface water drainage and any of the following, if they have been identified in complying with this Regulation: properties described in Column 1 of the Table to section 19, heritage resources, archaeological resources, water bodies, significant or provincially significant natural features and any other natural features identified in the Protected Countryside or in the portion of the Oak Ridges Moraine Conservation Plan Area that is subject to the Oak Ridges Moraine Plan. 	<p>Section 2.0 and Figures 1-5 (Appendix A)</p>

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Table 1.1: Design & Operations Report Requirements (as per O. Reg. 359/09 – Table 1)

Requirements	Section Reference
<p>2. Set out conceptual plans, specifications and descriptions related to the design of the renewable energy generation facility, including a description of,</p> <ul style="list-style-type: none"> i. any works for the collection, transmission, treatment and disposal of sewage, including details of any sediment control features and storm water management facilities, ii. any things from which contaminants are discharged into the air, iii. any systems, facilities and equipment for receiving, handling, storing and processing any waste, biomass, source separated organics, farm material and biogas, and iv. if the facility includes a transformer interconnection station, the works, facilities and equipment for secondary spill containment. 	<p>Table 2.1</p>
<p>3. Set out conceptual plans, specifications and descriptions related to the operation of the renewable energy generation facility, including,</p> <ul style="list-style-type: none"> i. in respect of any water takings, <ul style="list-style-type: none"> A. a description of the time period and duration of water takings expected to be associated with the operation of the facility, B. a description of the expected water takings, including rates, amounts and an assessment of the availability of water to meet the expected demand, and C. an assessment of and documentation showing the potential for the facility to interfere with existing uses of the water expected to be taken, ii. a description of the expected quantity of sewage produced and the expected quality of that sewage at the project location and the manner in which it will be disposed of, including details of any sediment control features and storm water management facilities, iii. a description of any expected concentration of air contaminants discharged from the facility, iv. in respect of any biomass, source separated organics and farm material at the facility, <ul style="list-style-type: none"> A. the maximum daily quantity that will be accepted, B. the estimated annual average quantity that will be accepted, C. the estimated average time that it will remain at the facility, and D. the estimated average rate at which it will be used, v. in respect of any waste generated as a result of processes at the project location, the management and disposal of such waste, including, <ul style="list-style-type: none"> A. the expected types of waste to be generated, B. the estimated annual average quantity that will be accepted, C. the estimated average time that it will remain at the facility, and D. the estimated average rate at which it will be used, vi. if the facility includes a transformer interconnection station, <ul style="list-style-type: none"> A. a description of the processes in place to prevent spills, B. a description of the processes to prevent, eliminate or ameliorate any adverse effects in the event of a spill, and C. a description of the processes to restore the natural environment in the event of a spill. 	<p>Section 3.0-5.0</p>

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Table 1.1: Design & Operations Report Requirements (as per O. Reg. 359/09 – Table 1)

Requirements	Section Reference
<p>4. Include an environmental effects monitoring plan in respect of any negative environmental effects that may result from engaging in the renewable energy project, setting out,</p> <ul style="list-style-type: none"> i. performance objectives in respect of the negative environmental effects, ii. mitigation measures to assist in achieving the performance objectives mentioned in subparagraph i, and iii. a program for monitoring negative environmental effects for the duration of the time that the project is engaged in, including a contingency plan to be implemented if any mitigation measures fail. 	Section 6.0
<p>5. Include a response plan setting out a description of the actions to be taken while engaging in the renewable energy project to inform the public, aboriginal communities and municipalities, local roads boards and Local Services Boards with respect to the project, including,</p> <ul style="list-style-type: none"> i. measures to provide information regarding the activities occurring at the project location, including emergencies, ii. means by which persons responsible for engaging in the project may be contacted, and iii. means by which correspondence directed to the persons responsible for engaging in the project will be recorded and addressed. 	Section 7.0
<p>6. If the project location is in the Lake Simcoe watershed, a description of whether the project requires alteration of the shore of Lake Simcoe, the shore of a fresh water estuary of a stream connected to Lake Simcoe or other lakes or any permanent or intermittent stream and,</p> <ul style="list-style-type: none"> i. how the project may impact any shoreline, including the ecological functions of the shoreline, and ii. how the project will be engaged in to, <ul style="list-style-type: none"> A. maintain the natural contour of the shoreline through the implementation of natural shoreline treatments, such as planting of natural vegetation and bioengineering, and B. use a vegetative riparian area, unless the project location is used for agricultural purposes and will continue to be used for such purposes. 	Not Applicable
<p>7. If it is determined that the project location is not on a property described in Column 1 of the Table to section 19, provide a summary of the matters addressed in making the determination.</p>	Not Applicable
<p>8. If section 20 applies in respect of the project and it is determined that the project location does not meet one of the descriptions set out in subsection 20 (2) or that the project location is not in an area described in subsection 20 (3), provide a summary of the matters addressed in making the determination.</p>	Not Applicable
<p>9. If subsection 21 (3) or 23 (2) applies, provide a summary of the matters addressed in making the determination,</p> <ul style="list-style-type: none"> i. under subsection 21 (3) or clause 23 (2) (a), as the case may be, including a copy of the document completed under the applicable provision, and ii. under clause 23 (3) (b), if applicable. 	Not Applicable

2.0 SITE PLAN

A detailed site plan is provided in **Appendix A (Figures 2)**. Additional information about site plan components is provided in **Table 2.1**.

Table 2.1: Site Plan Components

Site Plan Component	Additional Information and Site Plan Reference
FACILITY COMPONENTS	
Buildings or structures	The following buildings or structures are shown in Figures 1, 2 and 3 (Appendix A) : <ul style="list-style-type: none"> • Solar panel area • Inverters and inverter step-up transformers • Substation (including circuit breakers, disconnect switch, grounding transformer, surge arresters, auxiliary services transformer, and revenue metering equipment) • Operations and maintenance storage area
Access Roads, fencing and treed areas	The following is shown in Figures 1-4 (Appendix A) : <ul style="list-style-type: none"> • Permanent and temporary access roads • Tree Preservation Area and Tree Planting Areas The perimeter fence will be installed at or within the boundary of the Project Location shown on the site plan map.
Electrical equipment	An overhead 27.6 kilovolt (kV) connector line is shown in Figure 2 (Appendix A) . Underground direct current (DC) and alternating current (AC) cables are not shown in the Figures.
Utility corridors, rights of way or easements	No utility corridors or rights of way are required for the Project.
Temporary Staging Area	The temporary staging area used during construction is shown in Figure 2 (Appendix A) . The temporary staging area will be restored near the end of construction (see Section 2.2 of the Construction Plan Report).
OTHER FACILITY COMPONENTS: KEY PROCESS FEATURES	
Water taking: ground water	Groundwater takings are not anticipated during operation of the Project.
Water taking: surface water	Surface water takings are not anticipated during operation of the Project.
Sewage Works	No sewage works are required for the Project.
Stormwater Management	Based on the anticipated lack of changes to hydrology, no detention or treatment of stormwater is proposed as part of the Project. The site is predominantly sandy and well-drained.
Drainage	Site drainage will be developed as part of the detailed design by the general contractor to allow for proper water drainage. This would be

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Table 2.1: Site Plan Components

Site Plan Component	Additional Information and Site Plan Reference
	determined closer to the construction phase of the project.
Discharge of Contaminants to Air	Sources of localized emissions during operation are considered negligible under O. Reg. 419/05. The Project has no facilities or equipment that will discharge contaminants or pollutants to the air (e.g., exhaust gases from emergency backup diesel generators) during operation of the Project. Minor emissions would occur from maintenance staff vehicles (e.g., service trucks).
Waste Management Equipment	No waste management equipment or facilities are required for the Project. Small waste bin(s) will be located near the main access. Larger waste will be transported off-site for proper disposal.
EXISTING FEATURES WITHIN 300 m OF THE PROJECT LOCATION	
Buildings or structures	Buildings are shown on the aerial imagery on all Site Plan maps (Appendix A); these are primarily residential and agricultural buildings located along County Road 19 and County Road 2.
Municipal Roads	Public roads are shown in Figures 1, 2, 3 and 4 (Appendix A) . County Road 19 and County Road 2 are adjacent to the Project Location.
Utility corridors, rights of way, and easements	County Road 19 and County Road 2 road allowances include existing overhead 27.6 kV Hydro One distribution lines (County Road 19) and existing 27.6 kV Hydro One distribution lines (County Road 2). The Hydro One distribution line along County Road 19 (in the vicinity of the Point of Common Coupling) are shown in Figure 2 (Appendix A) .
Groundwater wells	Wells included in the MOECC Water Well Records database (2016) are shown in Figure 3 (Appendix A) .
Topographical land contours	Land contours are shown in Figure 3 (Appendix A) .
Surface water drainage	Drainage features obtained from the MNR's Land Inventory Ontario (LIO) mapping are shown in Figure 4 (Appendix A) outside of the Zone of Investigation (120 m surrounding the Project Location). Drainage features within the Zone of Investigation are mapped as identified through site investigation and assessment (as described in the <u>Water Assessment and Water Body Report</u>).
Natural Heritage Features	Significant wetlands, significant woodlands, and Candidate Generalized Significant Wildlife Habitat (SWH) are shown on the site plan maps (Figure 4, Appendix A).
Land Use	Land use, including agricultural, residential, and natural heritage, is shown on the aerial imagery in Figure 1 (Appendix A) .
Provincial Policy Areas	The Project is not located within 300 m of the Oak Ridges Moraine Conservation Plan Area, Niagara Escarpment Plan Area, Greenbelt Plan Area (Protected Countryside), or Lake Simcoe Watershed.
NOISE CONSIDERATIONS	
Noise receptors	Noise receptors are shown in Figure 5 (Appendix A) .
Inverters, Inverter Step-Up	The dominant noise sources for the Project are:

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Table 2.1: Site Plan Components

Site Plan Component	Additional Information and Site Plan Reference
Transformers and Grounding Transformer	<ul style="list-style-type: none"> • Six (6) inverters each with 2.0 MW (Power Electronics HEC 1500V model) inverters • Six (6) inverter step-up transformers rated at 2.5 MVA • one (1) grounding transformer rated at 12 MVA located within the substation. <p>The conceptual layout for these components is shown in Figure 2 (Appendix A).</p>
DEMONSTRATION OF COMPLIANCE WITH SETBACKS	
Project Location Boundary	The outer limit of all Project components, including temporary work areas during construction, is shown in Figure 2 (Appendix A) .
Protected properties	No protected properties were identified within 300 m of the Project Location.
Heritage resources	No heritage resources were identified within 300 m of the Project Location.
Archaeological resources	No archaeological resources were identified within 300 m of the Project Location.
Water bodies	Waterbodies (as per O. Reg. 359/09) identified within 300 m of the Project Location are shown in Figure 4 (Appendix A) , as verified through field investigations.
Significant or provincially significant natural features	Significant wetlands, significant woodlands, and Candidate Generalized Significant Wildlife Habitat (SWH) identified within 50 m of the Project Location are shown on the site plan maps (Figure 4, Appendix A).

3.0 FACILITY DESIGN PLAN

This section provides a description of the design of the main facility components identified in **Appendix A**.

3.1 GENERAL DESIGN AND SITING CONSIDERATIONS

The key mitigation strategy used to address potential environmental effects from operation of the facility was avoidance of significant natural and socio-economic features to the extent possible during siting of the Project.

The original Project Location encompassed the entirety of the lands leased by the Proponent and was assessed during technical studies conducted for the Natural Heritage, Water, Acoustic and Archaeological Assessments. Where necessary, the Project Location boundary was modified based on the findings of the technical studies, as outlined below.

Based on feedback from the local community, more than 1,200 trees (mostly white spruce, eastern white pine, and eastern white cedar) were planted along County Road 19, south of the primary access road, and along County Road 2 in the fall of 2016, outside of the Project Location. Approval was received from MOECC prior to tree planting. Additional trees will be planted in the spring of 2017 for a total of more than 1,300 new trees altogether. In time, the trees will gradually reduce the visual impact of the solar panels. In addition, tree planting within the Tree Preservation Area disturbed by construction will occur at the end of construction. The location of the Tree Preservation Area and Tree Planting Areas are provided in **Figure 2, Appendix A**.

While there are no water bodies (as per O. Reg. 359/09) located within the Project Location, there are multiple water bodies located within 50 m of the Project Location. Allan Presley Municipal Drain is located near the southeastern corner of the Project Location. There is also a watercourse that runs parallel to the eastern boundary of the Project Location and a roadside ditch located on the north and south sides of Country Road 2. The water bodies within 50 m of the Project Location provide seasonal fish habitat. The Project Location boundary has been sited a minimum of 15 m from the water bodies, and project components were sited a minimum of 30 m from water bodies.

Potential effects and mitigation measures associated with Project operations are discussed in Section 5.0.

3.2 FACILITY COMPONENTS OVERVIEW

The Project is being designed and constructed to generate a maximum of 12 MWac of power. The basic Project components include approximately 35,000 to 60,000 solar panels, associated racking system, electrical inverters and transformers, electrical cabling, access roads, perimeter fencing, parking/storage areas, and a main facility substation including a grounding transformer and control house. The Project will be interconnected to the existing 27.6 kV distribution grid line located in the road allowance on the west side of County Road 19 by Hydro One Networks Inc.

No equipment in the facility design relate to groundwater and surface water supplies, air discharges and/or water and biomass management.

3.2.1 Access Roads

Existing provincial and county roads will be used to transport project-related components, equipment and personnel to the Project Location. An existing access from County Road 19 to the west of the Project is anticipated to be used for permanent access to the site and may be modified as required. A temporary secondary gravel access road from County Road 19, north of the existing primary access road may be required for construction. At the end of construction, the temporary access road will be reclaimed and trees will be planted along the Project Location boundary. Gravel access roads will be constructed on-site to provide access to the facility for the duration of the Project.

3.2.2 Perimeter Fence, Security, and Landscaping

The facility will be surrounded with a chain link fence topped with barbed wire to prevent unauthorized access. A gate will be installed at the main access from County Road 19 to provide access for maintenance personnel and emergency vehicle access. A secondary access will be located north of the primary access during construction only. Perimeter fencing would be located within the Project Location boundary. The fence will be constructed according to Ontario Provincial Standards Drawings (OPSD) 972.130 (2012a) and OPSD 972.101(2012b). Manual locking gates will be installed at the facility access points (see Section 3.3.1).

Signage will be placed on access gates and on the fence, where appropriate, to advise the public that the facility is a solar energy centre and to provide warning of the hazards associated with unauthorized entry to the facility. The fence may affect animal movement patterns, however small mammals, amphibians and reptiles will be able to pass through the fence and cross the Project Location. A second chain link fence, located within the perimeter fence, will be constructed around the substation. The fence will be constructed per OPSD 972.130 (2012a) and OPSD 972.101 (2012b). To prevent soil erosion, provide dust control and maintain visual appeal during facility operation, the Proponent will implement a vegetation management plan related to the ground cover beneath the panels. While the species of vegetation to be established under the panels has not yet been selected, it is expected to be a native grassland species,

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such as clover. The Proponent intends to consult with SNCA to determine the appropriate species.

The existing trees located at the corner of County Road 19 and County Road 2 will be retained as a vegetation barrier. Additional trees were planted in the fall of 2016 along portions of the Project Location boundary on the outside of the Project Location boundary and perimeter fencing. Trees will also be planted within the Project Location boundary, north of the access road to refurbish the temporary secondary site access road area. The vegetation barrier is proposed to gradually reduce the visual impact of the facility from neighbouring residences along County Road 19 and County Road 2. The locations of the Tree Preservation Areas and Tree Planting Areas are provided in **Figure 2, Appendix A**.

3.2.3 Solar Panels

The Project will include the installation of approximately 35,000 to 60,000 solar panels. The exact make and model of the solar panels will be determined at a later date, but are anticipated to be monocrystalline/polycrystalline silicon technology with a rated power of 300-420 W per panel and measure approximately 2 m long by 1 m wide. Each solar panel will be mounted on a galvanized steel and/or aluminum rack system that is positioned approximately 0.5 to 1.5 m above finished grade either at an angle between 20 and 40 degrees (fixed tilt) or with a +/- 60-degree range of motion (single axis tracking). Fixed tilt panels would be installed in rows facing south and the tracking system would be tracking east/west on a north/south axis.

If any solar panels are damaged during operation of the Project, it is possible that they may be replaced with a different panel make and/or model available at the time.

The racks will be supported using one, or a combination, of the following types of foundations:

- generic helical pier, consisting of a central shaft with a circular helical steel blade welded at the bottom
- machine augured holes and poured concrete footings for the galvanized-steel rack upright support posts
- machine augured holes and compacted stone screenings as footings for the galvanized-steel rack upright support posts.

The foundations (if screwed or augered and poured) will be installed into the ground to a depth of approximately 2 m below the frost line. Alternatively, the pre-cast pads would be positioned on-grade.

3.2.4 Inverters and Inverter Step-Up Transformers

Six stations, each with one or more inverters, will convert the direct current (DC) electricity generated from the solar panels in to alternating current (AC) electricity. At the stations, the voltage level will be raised to 27.6 kV by one or more inverter step-up transformers co-located with each inverter. The electricity is then delivered to the local distribution grid level through the substation.

The specifications of the inverters and inverter step-up transformers will be determined by the Proponent during the preliminary design phase. In accordance with the specifications, the manufacturer of the inverters and inverter step-up transformers will be selected by the Proponent or the general contractor during the detailed design phase.

3.2.5 Substation

A main power transformer will not be required for this Project. The project will require a 27.6 kV substation comprised of circuit breakers, disconnect switches, grounding transformer, surge arresters, auxiliary services transformer and, revenue metering equipment. All of this equipment will be built in a fenced in area except the control building that may be located inside the fenced area of the substation, or may be located outside of the fenced area of the substation (but within the perimeter fence, see Section 4.3.7) to provide office space for maintenance personnel. All of this equipment is likely to be prefabricated and transported to site. The equipment will be supported by either cast-in place slab-on-grade concrete pads or structural steel piers and the entire substation area will be graded and overlaid with a clear stone granular material. The specific make of the associated electrical equipment will be selected by the Proponent or general contractor during the detailed design phase and based on the Proponent specifications. The equipment in the substation will also provide a supervisory control and data acquisition (SCADA) system for protection, control and monitoring of the substation and the facility.

3.2.6 Operations and Maintenance Storage Area

An operations and maintenance building is not currently planned for the site. Small permanent structures, such as storage containers will likely be located in an operations and maintenance storage area. The area would be comprised of compacted gravel and the container set upon a concrete pad. The storage containers will be used to store equipment, and spare parts used for maintenance activities, and spill response and containment materials.

3.2.7 Collector Cables and Grid Interconnection

DC Cabling

There is a significant amount of DC collector cables required to interconnect the solar panels to the solar unit inverters. DC collector cables located within buried conduits or a duct system will be used to collect and transport electricity generated from the solar panels at 1500 volts (or

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below) to a termination box mounted at the end of each solar panel row. Each termination box will then be connected by DC collector cables located within buried conduits or a duct system to combiner boxes mounted above-grade on the support structure of one of the rows, and then from the combiner boxes to the inverter for each solar unit. All wiring will be in accordance with the Ontario Electrical Safety Code developed by the Electrical Safety Authority.

AC Cabling

At the inverter, the electricity will be converted from DC to AC. The inverter step-up transformers co-located with the inverters at the stations will then increase the voltage to 27.6 kV. The AC electricity is then transported via underground collector cables and associated junction boxes to the Project substation.

Interconnection

An overhead AC connection line, up to 140 m long, will be required from the substation to the Point of Common Coupling where the Project will be connected to the existing Hydro One 27.6 kV distribution grid line adjacent to the Project. The existing distribution line, located within the municipal road allowance on County Road 19, corresponds to the F3 feeder circuit incoming from the Hydro One Wendover Distribution Station.

The new overhead connection line will include 3 aluminum conductors on poles. To facilitate the transition from underground cable to overhead line, armoured, insulated medium-voltage “teck” type cable will be connected at the top of a pole located adjacent to the facility access.

3.2.8 Key Process Features

Water-taking

The taking of groundwater or surface water is not required for Project activities during operation. It is anticipated that water from precipitation will be sufficient for cleaning the solar panels; if not, the Proponent will hire a local supplier to provide water in tanker trucks from off-site sources for panel cleaning.

Sewage, Stormwater Management and Drainage

During operation, permanent on-site sanitation facilities are not required. If it is determined that sanitation facilities are required during temporary maintenance activities during operation, portable toilets and wash stations and will be provided by a local sanitation company.

A stormwater management facility is not being proposed as part of the Project. As the solar panels are mounted above the ground, infiltration, filtration through vegetation, and other natural hydrologic processes will continue similar to existing conditions. Surface water from rainfall and snow will infiltrate through the permeable ground surface. Excess sheet flow from significant rainfall events will flow to a passive system of ditches/swales alongside County Road 19 and County Road 2. The specific details of on-site surface drainage and any specific

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construction requirements will be established as part of an overall drainage plan to allow for proper drainage and developed for the site by the general contractor during detailed design.

Discharge of Contaminants to Air

The Project has no facilities or equipment that will discharge contaminants or pollutants to the air (e.g., exhaust gases from emergency backup diesel generators) during operation of the Project. Minor, localized air emissions would occur during operation from the use of maintenance staff vehicles and equipment.

Sources of localized emissions from maintenance vehicles during operation are considered negligible under O. Reg. 419/05.

Waste Management

No waste management equipment, facilities, or equipment are required during Project operation. A small waste bin(s) will be located near the main access to collect small quantities of domestic waste and debris resulting from maintenance activities (e.g., broken equipment parts and packaging). The Proponent will hire a licensed waste disposal company to periodically empty the bins.

Small amounts of waste lubricants and oils may be generated during regular maintenance activities of the equipment throughout the operation phase. A licensed contractor will be responsible for disposing waste at an approved facility when the need arises.

Any large waste generated during operation will be hauled off-site for disposal at an accredited waste disposal facility.

4.0 FACILITY OPERATIONS PLAN

Operation activities include continuous remote monitoring of the facility, maintenance and inspection activities.

4.1 SITE SUPERVISION AND STAFF TRAINING

The Proponent will have an Operations Manager, who will be responsible for the day-to-day management of all Project facility operations, including supervising site activities, site inspections, facility maintenance and repair.

During pre-operational mobilization, the Operations Manager will confirm that the facility is in compliance with all applicable municipal, provincial, and/or federal requirements. Responsibilities would include staff training, health and safety training and compliance, spill and emergency response plans and reporting, predictive/preventive maintenance, routine maintenance, unscheduled maintenance (including appropriate environmental mitigation measures), routine inspection of Project facilities, inspection of equipment and components, and procurement of spare parts and equipment. It would also include a schedule for regular inspections of the Project's facilities.

It is expected that approximately 2 part-time or full-time staff would be employed by the Project to conduct general monitoring and maintenance activities. Some maintenance activities may require temporary use of qualified professional contractors.

4.2 REMOTE MONITORING

The Project will be operated and monitored remotely and therefore no employees will regularly be on site other than to conduct maintenance and inspection activities. The remote monitoring would occur 24 hours a day, 7 days a week via a SCADA monitoring system connected to the data cabling installed in conjunction with the electrical collector system throughout the site. The operation staff would be able to monitor the performance of the PV panels and electrical systems in a real time basis from a remote location. The SCADA system will identify any potential damage or faults with the PV panels and electrical infrastructure so that proactive inspection and maintenance can be undertaken.

4.3 PLANNED MAINTENANCE

Routine maintenance of Project equipment will be a key method of mitigating potential effects such as equipment failure. Preventative maintenance activities would generally occur at regular intervals, depending on the activity, usually every one to six months and would include inspection of the solar panels, interconnections, inverters, and transformers. Repairs to damaged or malfunctioning parts or equipment will occur as needed based on inspections.

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Cleaning the solar panels is not anticipated to be required; natural precipitation will keep the panels sufficiently clean. However, if an accumulation of dust reduces the efficiency of the panels, they may be pressure-sprayed with water. No cleaning solutions are anticipated to be used. The water used for cleaning the panels will be trucked in from an off-site source.

In the winter, the access road will be ploughed when necessary for the maintenance activities. In terms of snow accumulation on the panels, it is expected that snow will melt or slide off due to the 20° - 40° tilt of the panels, however it is possible that in some cases removal will be necessary. In that event, maintenance staff would manually remove the snow using brushes.

Transformers will be routinely inspected, and spill response equipment will be provided on site or in the maintenance trucks should leaks be observed. Spill reporting will be completed by the maintenance personnel in accordance with provincial requirements. Copies of all spill reports will be provided to the Proponent for record keeping.

A licensed contractor will be tasked with emptying the small waste bin(s) located at the main access and disposing the waste at an approved facility as required.

The Proponent will implement a vegetation management plan related to the ground cover beneath the panels and the trees located immediately outside the perimeter fence. While the species of vegetation to be established under the panels has not yet been selected, the ground cover beneath the panels should require only minimal maintenance and would assist in preventing the invasion of non-native grassland species. The vegetation management plan may recommend mowing of the site for aesthetic purposes and to avoid vegetation from growing tall enough to shade the solar panels. It is expected that mowing would not occur frequently, as clover is likely to be selected for ground cover. The vegetation barrier would be maintained so that no shading of the panels occurs. If planted trees along the perimeter of the project do not survive, they will be replaced in order to provide a visual buffer to the project.

Routine visual inspections of the Project site for any drainage, erosion or sedimentation issues will be conducted and remediation activities undertaken as required. This includes identification of areas of bare soil and/or the formation of erosive gullies, presence of trash/debris or excess density of vegetation within the passive stormwater conveyance system that would affect flows, and areas of isolated ponding. Remediation measures would include applying sod or seeding, re-grading, removal of trash/debris, and vegetation management as required.

4.4 UNSCHEDULED MAINTENANCE

In addition to the regular scheduled maintenance, the Project will be inspected whenever the SCADA system indicates a potential concern requiring a visit by personnel. For example, a reduction in power output may be indicative of a mechanical problem, or dust or snow accumulation. Unscheduled maintenance will occur as required.

5.0 POTENTIAL ENVIRONMENTAL EFFECTS

O. Reg. 359/09 requires that any adverse environmental effects that may result from operation activities be described. The following section identifies and assesses potential environmental effects, environmental mitigation measures and net effects for operation activities.

A description of existing environmental features can be found within the technical reports completed as part of the REA application (i.e., Natural Heritage Assessment and Water Assessment and Water Body Report). A detailed analysis of the potential effects is provided in the associated technical reports, and has been summarized below.

A detailed description of existing archaeological and cultural heritage features can be found within the Ministry of Tourism, Culture and Sport (MTCS) REA Checklist and the Stage 1 - 2 Archaeological Assessments. Noise is assessed in the Acoustic Assessment Report.

In order to identify potential environmental effects that may result from operation of the Project, the following is a high level summary of the methodology that was applied:

- Collected information on the existing environment using available background information, consultation with stakeholders, and site investigations.
- Reviewed proposed Project activities in order to predict the potential interactions between the Project and environment.
- Identified potential interactions that could cause an adverse effect on the environment.
- Developed measures to avoid, mitigate, and monitor potential adverse effects.

The key mitigation strategy used to address potential environmental effects from operation of the Project was avoidance of natural and socio-economic features to the extent possible during siting design. Monitoring plans and contingency measures have also been outlined to assess if mitigation measures are functioning as intended. Monitoring plans and contingency measures are also outlined in Section 6.0.

Where net effects remain, they are assessed using the following descriptors, as applicable:

- Duration: the period of time until the element returns to baseline conditions
- Frequency: the number of times that an effect may occur
- Permanence: the degree to which an adverse residual effect will remain
- Spatial Extent: the area within which an effect may occur

Positive residual effects resulting from operation of the Project, such as an increase in the supply of renewable energy, reduction in greenhouse gas emissions, employment or property tax revenue, have not been assessed.

5.1 ARCHAEOLOGICAL AND CULTURAL HERITAGE RESOURCES

The following sections describe the potential effects, recommended mitigation measures, and net effects for heritage and archaeological resources.

In accordance with O. Reg. 359/09, a Ministry of Tourism, Culture and Sport (MTCS) REA Checklist: Consideration of Potential for Heritage Resources (REA Checklist) and Stage 1 - 2 Archaeological Assessment were completed for the Project, and are included under separate cover as part of the REA application.

Through completion of the MTCS REA Checklist, no built resources were identified within the Project Location and no cultural heritage landscapes or protected properties were identified in, or adjacent to, the Project Location. It has been determined that no further cultural heritage investigations are required.

A Stage 1 archaeological assessment of the study area determined that archaeological potential was still present. Based on the results of assessment, a Stage 2 archaeological assessment was recommended and undertaken. The Stage 2 archaeological assessment was conducted using pedestrian and test pit survey methods and no archaeological resources were identified and no further archaeological investigations were recommended. Upon completion of both assessments, a Stage 1-2 Archaeological Assessment Report was completed.

Potential Effects

There are no areas that would be excavated during the operation phase that would not have been previously assessed prior to construction, therefore, no effects are anticipated to archaeological or heritage resources during operation.

Mitigation Measures

There are no anticipated effects to known archaeological resources during operation of the Project. No mitigation measures or monitoring activities were recommended in the Stage 2 Archaeological Assessment.

Mitigation measures are not required for built resources, cultural heritage landscapes or protected properties as none exist within or adjacent to the Project Location.

Net Effects

No significant adverse net effects on archaeological or cultural heritage resources are anticipated during operation of the Project.

5.2 NATURAL HERITAGE RESOURCES

The following Sections provided a summary of the findings discussed in the Natural Heritage Assessment. As required by O. Reg. 359/09, a Zone of Investigation (ZOI) has been identified

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around the outer limits of the Project Location. The ZOI was measured 50 m from the Project Location.

More information regarding natural heritage features is provided in the [Natural Heritage Assessment Report](#).

5.2.1 Significant Wetlands

Key information sources reviewed to identify wetlands include consultation with the MNRF Kemptville District, Land Information Ontario (LIO) mapping and the Natural Heritage Information Centre (NHIC), the Township of Alfred and Plantagenet (2009), and the United Counties of Prescott and Russell Official Plan (2016). The records review identified nine unevaluated wetlands within the ZOI with four located within the Project Location.

The site investigation confirmed the presence of one significant wetland. It is a mixed swamp adjacent to the Project Location. The closest project component to the wetland are solar panels, located 15 m away. No wetlands were recorded in the Project Location.

According to the Wetland Characteristics and Ecological Functions Assessment, the one wetland confirmed during site investigations is considered significant. The significant wetland feature is shown on **Figure 4, Appendix A**.

Potential Effects

The Project Location is sited outside the significant wetland boundaries and, therefore, no direct effects on significant wetlands are anticipated during operation of the Project.

Some materials, such as fuel, lubricating oils and other fluids and waste materials associated with the operation phase of the Project have the potential for discharge to the natural environment through accidental spills and thus potentially enter significant wetlands.

Mitigation Measures

Avoidance was the main strategy used to minimize effects to significant wetlands within 50 m of the Project Location. All components of the Project (i.e., the Project Location) are sited outside the wetland feature boundaries and, as such, no special mitigation measures are required during operation. Standard management practices will be implemented during maintenance activities.

Mitigation measures for material waste disposal and accidental spills are listed in Section 5.7.

Net Effects

Maintenance activities are expected to occur occasionally and will be short term in duration and spatially limited. No direct effects to the wetland are anticipated.

5.2.2 Significant Woodlands

Woodlands are defined as treed areas, woodlots or forested areas other than cultivated fruit, nut orchards, or Christmas tree plantations that are located east and south of the Canadian Shield (MNRF 2012).

A review of aerial imagery and the United Counties of Prescott and Russell Official Plan (2016) indicate that the Project is located in a rural area that is predominantly agricultural, with portions of wooded areas. The United Counties of Prescott and Russell Official Plan (2016) states that 26% of the land base contained within their Official Plan consists of forest cover. The records review identified four woodland features within the ZOI with one located partially within the Project Location.

Site investigations confirmed the presence of the four woodland features identified during the records review. However, vegetation clearing within the Project Location for the purposes of agricultural production was completed in 2010 and was not reflected in the records review sources. As a result, the boundaries of the woodland feature identified within the Project Location during site investigations are different than the boundaries identified during the records review.

Three of the four woodlands met the criteria for significance based on criteria standards within the NHAG (MNRF 2012). The relatively small woodlot located within the Project Location did not meet the criteria for significance. Woodland features are shown on **Figure 4, Appendix A**.

Potential Effects

The Project Location is sited outside the significant woodland boundaries and, therefore, no direct effects on significant woodlands are anticipated during operation of the Project. However, tree pruning may occur around the Project components, as necessary, to maintain safe operation of electrical equipment during operation.

Mitigation Measures

Avoidance was the main strategy used to minimize effects to significant woodlands within 50 m of the Project Location.

The Proponent will implement a vegetation management plan to monitor and maintain vegetation.

Net Effects

Maintenance activities are expected to occur occasionally and will be short term in duration and spatially limited. With the implementation of the above mitigation measures, no significant adverse residual effects on significant woodlands are anticipated.

5.2.3 Wildlife and Wildlife Habitat

Wildlife habitat is defined in O. Reg. 359/09 as an area where plants, animals and other organisms live, including areas where species concentrate at a vulnerable point in their life cycle and that are important to migratory and non-migratory species.

Based on a review of background resources, one species of butterfly, 102 species of birds, 20 species of mammals, six species of amphibians, and six species of reptiles are known to occur within the vicinity of the Project. A complete list of species identified during the records review is provided in the [Natural Heritage Assessment](#).

During the site investigation, wildlife habitats within the ZOI were identified based on the presence of generalized landscape and geography (i.e., ELC assessment), in accordance with the NHAG (MNRF 2012). These habitats have been grouped together and are collectively referred to as "Generalized Candidate SWH".

No Generalized Candidate SWH is located within the Project Location, however, there is Generalized Candidate SWH abutting the Project Location. Generalized Candidate SWH is shown on **Figure 4, Appendix A**.

Potential Effects

The Project Location is sited outside the Generalized Candidate SWH boundaries and, therefore, no direct effects on Generalized Candidate SWH are anticipated during operation of the Project.

Noise disturbance of wildlife inhabiting Generalized Candidate SWH is a potential indirect effect that may occur during operation of the Project.

Mitigation Measures

- Mitigation measures for the significant wetland and woodland features will be applied as outlined above (in Section 5.2.1 and 5.2.2), as Generalized Candidate SWH is contained within these features.
- Mitigation measures for environmental noise are listed in Section 5.4.2.

Net Effects

With the implementation of the above mitigation measures, no significant adverse residual effects on significant woodlands are anticipated.

5.2.4 Areas of Natural and Scientific Interest (ANSIs)

MNRF identifies two types of ANSIs: Life Science and Earth Science. Life Science ANSIs are significant representative areas of Ontario's biodiversity and natural landscapes, while Earth

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Science ANSIs are geological in nature and consist of significant representative examples of bedrock, fossils and landforms in Ontario.

No Life Science or Earth Science ANSIs were identified within the Project Location or ZOI (LIO 2016; NHIC 2015; MNRF 2016a).

Potential Effects

Since no ANSIs were identified within 300 m of the Project Location, potential effects on ANISs are not anticipated.

Mitigation Measures

No mitigation measures are recommended because potential effects on ANISs are not anticipated.

Net Effects

No significant adverse residual effects on ANSIs are anticipated.

5.2.5 Provincial Parks and Conservation Reserves

No provincial parks or conservation reserves were identified within the Project Location or ZOI (LIO 2016; NHIC 2015; Ontario Parks 2016).

Potential Effects

Since no provincial parks or conservation reserves were identified within 300 m of the Project Location, potential effects on provincial parks or conservation reserves are not anticipated.

Mitigation Measures

No mitigation measures are recommended because potential effects on provincial parks or conservation reserves are not anticipated.

Net Effects

No significant adverse residual effects on provincial parks or conservation reserves are anticipated.

5.3 WATER BODIES AND AQUATIC RESOURCES

5.3.1 Groundwater

According to the MOECC Water Well Records database (2016), there are three (3) water wells located within 300 m of the Project Location (**Figure 3, Appendix A**). All three wells are classified as domestic use and were completed within the overburden. Only two water wells have reported static water levels; they are 2.44 meters below ground (mbg) and 15.24 mbg. The water well records indicate that there is approximately 15 - 30 centimeters (cm) of topsoil

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underlain by sand. The nearest identified water well is located on the southern boundary of the Project Location. The homes in the vicinity of the Project Location are not serviced by municipal water.

According to the Preliminary Geotechnical Investigation completed for the Project by Houle Chevrier Engineering Ltd. (Houle Chevrier), groundwater was noted at depths ranging from about 2.1 to 5.0 mbg, averaging 3.2 mbg. This assessment was based on a summary of seven (7) boreholes and seven (7) test pits excavated at the Project Location (2015). A surficial layer of topsoil was encountered at all borehole and test pit locations, except one. The topsoil generally consists of dark brown silty sand, sandy silt or clayey silt with trace to some organic material. The topsoil ranges in thickness from about 10 to 46 cm, averaging 33 cm (Houle Chevrier 2015). A deposit of sand with varying amounts of silt and clay was encountered at all borehole locations. The composition of the sand generally ranges from sand with trace silt to sandy silt. Trace to some clay can be found within the sand deposit (Houle Chevrier 2015).

The Project Location is found in the South Nation Source Protection Area. Municipal drinking water in the Township of Alfred and Plantagenet is sourced from surface water intakes along the Ottawa River in Wendover and Lefavre. The closest groundwater sourced municipal drinking water system is the Limoges Drinking Water System, and the wellhead protection areas for the associated groundwater wells are found over 20 km southwest of the Project Location. The Project Location is not found within a significant groundwater recharge area.

No dewatering activities are anticipated during operation of the Project.

Potential Effects

There are no municipal wells within 20 km of the Project Location, and therefore under the *Clean Water Act* (2006) operation of the facility does not pose a threat to the groundwater drinking supply.

Negative environmental effects to water wells are not anticipated during operation of the Project. Water taking activities are not anticipated during operation of the Project. Water is not anticipated to be required for solar panel washing as rain water and snow should be sufficient for the cleaning of panels. If required, water for cleaning the panels will be trucked in from an off-site source.

Mitigation Measures

Groundwater investigations and/or monitoring requirements will be verified during the REA process. The Proponent is in consultation with landowners neighboring the Project to determine appropriate proactive well testing measures to verify that the construction of the Project does not have an impact on well water supply in the area.

Spill response and clean up should be conducted in a timely fashion to prevent contamination from reaching the groundwater table. If adverse effects have occurred due to operation

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activities, a potable water supply should be provided by the Proponent and the water well should be repaired or restored as required.

Net Effects

With the implementation of the above mitigation measures, no significant adverse residual effects on groundwater or private wells are anticipated.

5.3.2 Surface Water, Fish and Fish Habitat

The following section provides a summary of the findings discussed in the Water Assessment and Water Body Report. As required by O. Reg. 359/09, the Water Assessment and Water Body Report assessed the Project Location, as well as a ZOI that included 120 m around the outer limits of the Project Location. More information regarding surface water, fish and fish habitat is provided in the Water Assessment and Water Body Report.

The Project is located within the Springbrook Creek subwatershed. Water flows south from the Project Location toward the confluence of Springbrook Creek with the South Nation River, which is approximately 5.5 km downstream. The subwatershed is a mix of rural and natural heritage land uses, with agricultural land, rural residences, and forested areas (MNR 2014).

Two water bodies (per O. Reg. 359/09) were identified within the ZOI. No water bodies were identified within the Project Location. Water body features are shown on **Figure 4, Appendix A**.

The MNR did not have any background information for fish communities or habitats in watercourses in or downstream of the Project Location (MNR 2016a). The South Nation River supports a warm water fish community that includes Walleye, Goldeye, Sauger, Northern Pike, Common Carp and a diversity of baitfish species (MNR 2016b). During the spring site investigation, small-bodied fish were observed in the roadside ditches along County Road 2. The two identified water bodies provide fish habitat on a seasonal basis and contribute flow and nutrients to habitats located farther downstream.

Potential Effects

No direct effects to waterbodies are anticipated during operation of the Project.

Mitigation Measures

General mitigation measures for operation activities near a water body within 50 m of the Project Location include:

- refuel and maintain equipment at least 100 m from water bodies
- report spills to the MOECC Spills Action Centre
- for the duration of the work, keep on-site and readily accessible, all material and equipment needed to contain and clean-up releases of sediment-laden water and other deleterious substances.

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Mitigation measures for accidental spills are provided in Section 5.7.

Net Effects

With the implementation of the above mitigation measures, no significant adverse residual effects on surface water, fish and fish habitat are anticipated.

5.4 AIR QUALITY AND ENVIRONMENTAL NOISE

The following sections describe the potential effects, recommended mitigation measures, and net effects for air, dust and noise.

5.4.1 Air Emissions

Potential Effects

During the operational phase of the Project, no substantive emissions of air contaminants are expected. Minor localized air emissions would occur from the periodic use of equipment for general repairs, maintenance of panels and from personnel vehicles travelling to and from the property. The Project has no facilities or equipment that will discharge contaminants or pollutants to the air (e.g., exhaust gases from emergency backup diesel generators) during operation of the Project.

Sources of localized emissions during operation are considered negligible under O. Reg. 419/05.

Mitigation Measures

To reduce emissions from equipment and vehicles, several mitigation measures may be employed:

- multi-passenger vehicles should be utilized to the extent practical
- company and maintenance personnel should avoid idling of vehicles when not necessary for operations activities
- equipment and vehicles should be maintained in good working order with functioning mufflers and emission control systems as available
- all operations equipment and vehicles should meet the emissions requirements of the MOECC and/or Ministry of Transportation

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Net Effects

The application of the recommended mitigation measures during operations should limit air emissions to the work areas and limit the magnitude of combustion emissions. As a result, any adverse net effects to air quality from air emissions during operation of the Project are anticipated to be short-term in duration and highly localized.

5.4.2 Environmental Noise

The Project's dominant noise sources would consist of noise radiating from:

- six (6) inverters each with 2.0 MW (Power Electronics HEC 1500V model) inverters
- six (6) inverter step-up transformers rated at 2.5 MVA
- one (1) grounding transformer located within the substation.

Sound levels for the inverters were based on equipment manufacturer submittals. The sound levels for the transformers were estimated based on the provided rating, and dimensional data from typical transformers from other similar projects.

A total of 111 Points of Reception (PORs; Vacant, Commercial, and Existing PORs) were considered in all directions within approximately 1 km of the Project Location. A full description of environmental noise is available in the [Draft Acoustic Assessment Report](#).

Potential Effects

The Project is predicted to comply with performance limits at PORs which are situated within 1 km of the Project without the need for noise control measures.

Mitigation Measures

The Project would be required to operate according to the terms and conditions of the REA. In the event the Project does not operate according to the terms and conditions of the REA, the non-compliant components may be shut down until the problem is resolved. A regular maintenance program would help mitigate potential effects related to noise from damaged components.

Net Effects

Regular maintenance of Project components during operation should limit noise emissions and mitigate potential effects related to noise from damaged components. The noise assessment has concluded that the environmental noise effects from the operation of the Project would be in compliance with the applicable MOECC environmental noise guidelines. No significant adverse residual effects from environmental noise are anticipated.

5.5 LAND USE AND SOCIO-ECONOMIC RESOURCES

The following sections describe the potential effects, recommended mitigation measures, and net effects for Land Use.

The Project Location and surrounding land uses are designated by the United Counties of Prescott and Russell and the Township of Alfred and Plantagenet. An assessment of land use at the Project Location and within 300 m was conducted through a review of the *United Counties of Prescott and Russell Official Plan (2016)*, the *Township of Alfred and Plantagenet Zoning By-law 2009-50 (2009)*, and other provincial planning documents. Additionally, visits to the Project Location by the Project team and air photo interpretation were used to identify existing land use in the vicinity of the Project Location that could be affected by the Project.

The Project Location is currently used for agricultural operations. Lands within the Project Location are privately owned and would be leased for a 20 or more year term. Lands to the south and east of the Project Location are primarily forested. Lands to the north and west are forested with residential dwellings and agricultural operations interspersed. No recreational facilities or cultural features have been identified within the Project Location or on immediately adjacent lands. The Project Location does not include or border local hiking or cycling routes, or fishing or conservation areas or parks. It is possible that hunting activities occur within the Project Location or on adjacent lands. No impacts are expected to surrounding land uses.

United Counties of Prescott and Russell

The United Counties of Prescott and Russell is an upper-tier municipality. The *United Counties of Prescott and Russell Official Plan* was adopted by Council in 2015. The Project Location is located within a designated Rural Policy Area. Rural Policy Areas are those which are located outside of primary development and agricultural resource areas. According to s. 3.6.1 of the *United Counties of Prescott and Russell Official Plan (2016)*, "Alternative and/or renewable energy systems shall be permitted in all land use designations within the County, subject to the development and use of alternative and/or renewable energy systems being in accordance with Provincial and Federal requirements, including appropriate separation distances to address land use compatibility." The Official Plan also identified the Project Location as containing Significant Woodland and extending into a Wildlife Travel Corridor. However, the wooded area within the Project Location has been cleared for agricultural operations since in 2010. Since 2015, the Project Location has been farmed with corn. Two Former Mineral Aggregate Operations have been identified on adjacent properties to the west and northwest of the Project Location.

Township of Alfred and Plantagenet

The Township of Alfred and Plantagenet is a lower-tier municipality in the United Counties of Prescott and Russell. The *Township of Alfred and Plantagenet Zoning By-law 2009-50* was adopted by Council in June, 2009. The Project Location is located on lands currently zoned as

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Rural (RU). According to s. 23.1 of the Township of Alfred and Plantagenet Zoning By-law (2009), solar conversion systems are permitted non-residential uses within RU zones.

Provincial Planning Documents

The Project Location does not contain areas protected under Provincial Plans and Policies specified in O. Reg. 359/09, such as the *Greenbelt Plan (2005)*, *Niagara Escarpment Plan (2005)*, or the *Oak Ridges Moraine Conservation Plan (2002)*.

The Project Location does not contain prime agricultural land, which is defined by the Ministry of Prime Agriculture, Food and Rural Affairs (OMAFRA), as agricultural land predominated by Canada Land Inventory (CLI) Classes 1 to 3 soils. The OMAFRA Agricultural Information Atlas (OMAFRA 2016) identified the Project Location as containing CLI Class 4 and 5 soils. Class 4 soils have severe limitations that restrict the choice of crops, or require special conservation practices and very careful management, or both. Class 5 soils have very severe limitations that restrict their capability to producing perennial forage crops, and improvement practices are feasible.

Residential uses include rural residences associated with the agricultural lands and smaller residential properties including dwellings located along County Road 19 and County road 2.

Potential Effects

The Project was confirmed by the Proponent to be in compliance with the agricultural land use requirements of the IESO's LRP I program.

As noted above, solar facilities are permitted in the municipal land use and zoning designations, and thus no impacts to municipal land use or zoning designations will occur.

Visual or sensory nuisance to the community may occur due to the presence of the facility and noise created during occasional maintenance activities during the operational phase of the Project.

The Project will take the current Project Location lands out of agricultural production, but will return those lands to a state similar to the current state at the time of decommissioning (or another state, in accordance with the zoning by-law, as determined by the landowner at the time of decommissioning). Operational activities have the potential to alter the agricultural capacity of the land following decommissioning of the Project. Compaction of topsoil and erosion or surface soil may occur during operation and can potentially decrease crop yields.

Impacts to mineral, aggregate or petroleum resources, local hiking or cycling routes, fishing or conservation areas, or parks are not anticipated.

Mitigation Measures

Trees will be retained along the corner of County Road 2 and County Road 19 to act as a vegetation barrier which will gradually reduce the visual impact during operation of the facility.

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In addition, trees were planted in fall 2016 adjacent the Project Location boundary along County Road 2 (east of the Tree Preservation Area) and County Road 19 (south of the Tree Preservation Area) (**Appendix A**). The Proponent will monitor and maintain the vegetation barrier.

Soil compaction will be addressed during the decommissioning phase of the Project and is discussed in the [Decommissioning Plan Report](#).

Net Effects

Above grade project infrastructure is removable and, as a result, the visual impact is considered temporary and reversible.

The agricultural productivity of the Project Location will be lost during construction and operation of the Project, however, the effects to the agricultural soils are expected to be temporary and spatially limited (i.e., during the life of the project only).

With the implementation of the above mitigation measures, no significant adverse residual effects on land use or socio-economic resources are anticipated. It is anticipated that the lands can be returned to agricultural production following the decommissioning of the Project.

5.6 EXISTING LOCAL INFRASTRUCTURE

5.6.1 Municipal Infrastructure

There are two roadways located within 300 m of the Project Location, both of which are maintained by the United Counties of Prescott and Russell. County Road 19 runs north south along the western boundary of the Project Location, and County Road 2 runs east-west along the northern boundary of the Project Location. Both roadways have a 26 m road allowance, according to the United Counties of Prescott and Russell Official Plan (2016).

No water mains or sewer mains have been identified along County Road 19 or County Road 2.

Potential Effects

Potential effects on municipal infrastructure are not anticipated during operation of the Project.

Mitigation Measures

As no potential effects are anticipated on municipal infrastructure during operation of the Project, no mitigation measures are recommended.

Net Effects

Significant adverse residual effects to municipal infrastructure are not anticipated to occur during operation of the Project.

5.6.2 Other Utilities and Infrastructure

Overhead electrical distribution lines owned and operated by Hydro One are located on the west side of County Road 19 and the south side of County Road 2. The Project will be interconnected to the 27.6 kV distribution line located on the west side of County Road 19.

No railways, hydrocarbon pipelines, phone lines, or other buried utilities have been identified within 300 m of the Project Location.

Potential Effects

If utilities are not properly located and marked prior to planned or unplanned maintenance activities, there is potential to strike or interfere with a buried or overhead utility which could result in damage to the infrastructure and injury to personnel.

Mitigation Measures

The contractor will be responsible for locating and marking existing pipelines and utilities on lands which may be affected by Project maintenance. Machine operators will be informed where electrical lines are present overhead. Lines that may interfere with the operation of equipment will be aptly identified by the general contractor.

Net Effects

With the implementation of the above mitigation measures, no significant adverse residual effects on utilities or infrastructure are anticipated.

5.7 WASTE MATERIAL DISPOSAL & ACCIDENTAL SPILLS

The following sections describe the potential effects, recommended mitigation measures, and net effects for waste material disposal and fuel spills.

Potential Effects

Wastes such as equipment packaging, wrappings and scraps (wood and metal) will be generated during operation activities and require reuse, recycling, and/or disposal at an appropriate MOECC-approved off-site facility. Improper disposal of waste material generated during operation may result in contamination to soil, and/or surface water resources on and off Project lands. Litter generated during operation may also become a nuisance to nearby residences, if not appropriately contained and allowed to blow off the construction site.

Mitigation Measures

During operation, the Proponent and/or the operation and maintenance contractor will implement a site-specific waste collection and disposal management program, which may include:

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- the Proponent and/or contractors will remove all waste materials from Project Location during maintenance activities
- labelling and proper storage of liquid wastes (e.g. used oil and solvents) in a secure area that would contain materials in the event of a spill
- as appropriate, spill kits (e.g. containing absorbent cloths and disposal containers) will be provided on-site during maintenance activities and at the control building
- dumping or burying wastes within the Project sites would be prohibited
- non-hazardous waste will be disposed at a registered waste disposal site(s)
- if waste is generated that is not solid non-hazardous waste, a Generator Registration Number is required from the MOECC and the generator would have obligations regarding manifesting of waste. Compliance with Schedule 4 of O. Reg. 347 is mandatory when determining waste category
- implementation of an on-going waste management program consisting of reduction, reuse, and recycling of materials.

Equipment maintenance and refueling, and other potentially contaminating activities, will occur in designated areas. Large quantities of fuel, lubricating oils, and other fluids associated with maintenance activities will not be stored at the site. The storage of minor quantities of fuels and lubricants on-site do not represent a significant potential adverse effect on the groundwater in the event of accidental spills. Standard containment facilities and emergency response materials would be maintained on-site as required.

In the unlikely event of an accidental spill, the response procedures noted in Section 3.7 of the Construction Plan Report will be implemented. Follow-up monitoring /inspections would be implemented in the event of an accidental spill/leak, as appropriate. Remedial actions may be required in the event that follow-up monitoring indicates adverse effects to natural features.

Net Effects

Accidental spills are anticipated to occur infrequently, if at all, and be spatially limited. With the implementation of the above mitigation measures, no significant adverse residual effects from waste material disposal or accidental spills are anticipated.

5.8 PUBLIC HEALTH AND SAFETY

Potential Effects

Given the installation of large scale electrical equipment, there is a potential risk of fire associated with an accident or malfunction. However, the solar panels and associated equipment result in a negligible increase in fire potential.

During operation, failure of poles suspending overhead lines is a possibility. In the event of a pole failure during operation, an on-site power outage may occur. The duration of the outage would depend on the number of poles affected, the extent of the damages, weather conditions at the time of the incident and the availability of response personnel. All poles owned and operated by the Proponent are expected to be installed within the perimeter fence. The probability of pole failure occurring during operation is considered low.

Mitigation Measures

The primary method of minimizing potential public health and safety risks will be by installing perimeter fencing to restrict site access and prevent trespassing and vandalism (see Section 3.3.2).

The Proponent will reduce accidents and malfunctions by providing proper training and education of staff operating the control system and maintaining the Project infrastructure. Solar panels and associated electrical equipment will be installed and maintained in accordance with applicable safety standards.

The primary preventative measure taken to avoid pole failure during operation is at the design stage. Overhead lines will be designed and constructed in accordance with applicable codes and standards.

Should maintenance activities be required within a municipal road allowance, access to residential properties should be maintained at all times. Safety fences should be installed at the edge of the maintenance areas where public safety considerations are required. Traffic controllers and appropriate signage should be used as necessary.

An annual meeting and site visit would be arranged with municipal emergency response staff to review site security procedures. Specialized equipment beyond what is typically required to respond to electrical fires is not required for fires involving solar panels. The Emergency Response and Communications Plan is provided in Section 7.0.

Net Effects

With the implementation of the above mitigation measures and adherence to safety policies and regulations, any new risk to public health and safety is anticipated to be minimal during operation of the Project.

6.0 ENVIRONMENTAL EFFECTS MONITORING PLAN

The environmental effects monitoring plan for Project operation has been designed to monitor implementation of the proposed mitigation, monitoring and contingency measures provided in Section 5.0.

Environmental monitoring can provide data on key functions of natural environment and socio-economic features that may be affected during operation of the Project, and on the effectiveness of mitigation strategies measures implemented as part of the Project. The monitoring procedures noted herein are linked to the potential effects and mitigation measures discussed throughout Section 5.0.

The environmental effects monitoring plan associated with construction activities, including a description of post-construction monitoring, is provided in the Construction Plan Report.

Table 6.1 summarizes the potential negative effects, performance objectives, mitigation strategies, monitoring plan and contingency measures for the operational stage of the Project.

Table 6.1: Summary of the Potential Negative Effects, Performance Objectives, Mitigation Strategies, Monitoring Plan And Contingency Measures for the Operational Stage of the Project

Feature	Potential Environmental Effects	Performance Objectives	Mitigation Measures	Net Effects	Monitoring and Contingency Measures
Section 5.1 Cultural Heritage and Archaeological Resources	<ul style="list-style-type: none"> None. No cultural heritage landscapes, protected properties or archeological resources were identified. 	<ul style="list-style-type: none"> No impacts to cultural heritage landscapes, protected properties and archeological resources 	<ul style="list-style-type: none"> None Required. 	<ul style="list-style-type: none"> None. 	<ul style="list-style-type: none"> None Required.
Section 5.2.1 Significant Wetlands	<ul style="list-style-type: none"> No direct effects on significant wetlands are anticipated during operation of the Project. 	<ul style="list-style-type: none"> No impacts to significant wetland features. 	<ul style="list-style-type: none"> Avoidance was the main strategy used to minimize effects to significant wetlands within 50 m of the Project Location. 	<ul style="list-style-type: none"> With the implementation of suggested mitigation measures, no significant adverse residual effects on significant wetlands are anticipated. 	<ul style="list-style-type: none"> None required.
Section 5.2.2 Significant Woodlands	<ul style="list-style-type: none"> No direct effects on significant woodlands are anticipated during operation of the Project. Tree pruning may occur around the Project components, as necessary, to maintain safe operation of electrical equipment during operation. 	<ul style="list-style-type: none"> No impacts to significant woodland features. 	<ul style="list-style-type: none"> Avoidance was the main strategy used to minimize effects to significant woodlands within 50 m of the Project Location. The Proponent will implement a vegetation management plan to monitor and maintain vegetation. 	<ul style="list-style-type: none"> With the implementation of suggested mitigation measures, no significant adverse residual effects on significant wetlands are anticipated. 	<ul style="list-style-type: none"> None required.
Section 5.2.3 Wildlife and Wildlife Habitat	<ul style="list-style-type: none"> No direct effects on Generalized Candidate SWH are anticipated during operation of the Project. Noise disturbance of wildlife inhabiting Generalized Candidate SWH is a potential indirect effect that may occur during operation of the Project. 	<ul style="list-style-type: none"> Minimize impacts to wildlife habitat. 	<ul style="list-style-type: none"> Mitigation measures for the significant wetland and woodland features will be applied as outlined above, as Generalized Candidate SWH is contained within these features. Mitigation measures for environmental noise are listed in Section 5.4.2. 	<ul style="list-style-type: none"> Noise disturbances will be temporary and are reversible. With the implementation of suggested mitigation measures, no significant adverse residual effects on significant wetlands are anticipated. 	<ul style="list-style-type: none"> None required.
Section 5.2.4 Areas of Natural and Scientific Interest (ANSIs)	<ul style="list-style-type: none"> None. No ANSIs were identified within 300 m of the Project Location. 	<ul style="list-style-type: none"> No impacts to ANSIs. 	<ul style="list-style-type: none"> None required. 	<ul style="list-style-type: none"> No significant adverse residual effects on ANSIs are anticipated. 	<ul style="list-style-type: none"> None required.
Section 5.2.5 Provincial Parks and Conservation Areas	<ul style="list-style-type: none"> None. No provincial parks or conservation reserves were identified within 300 m of the Project Location. 	<ul style="list-style-type: none"> No impacts to Provincial Parks and Conservation Reserves. 	<ul style="list-style-type: none"> None required. 	<ul style="list-style-type: none"> No significant adverse residual effects on provincial parks or conservation reserves are anticipated. 	<ul style="list-style-type: none"> None required.

Table 6.1: Summary of the Potential Negative Effects, Performance Objectives, Mitigation Strategies, Monitoring Plan And Contingency Measures for the Operational Stage of the Project

Feature	Potential Environmental Effects	Performance Objectives	Mitigation Measures	Net Effects	Monitoring and Contingency Measures
Section 5.3.1 Groundwater	<ul style="list-style-type: none"> There are no municipal wells within 20 km of the Project Location, and therefore under the Clean Water Act (2006) operation of the facility does not pose a threat to the groundwater drinking supply. Negative environmental effects to water wells are not anticipated during operation of the Project. 	<ul style="list-style-type: none"> No impacts to Groundwater. 	<ul style="list-style-type: none"> The Proponent is in consultation with landowners neighboring the Project to determine appropriate proactive well testing measures to verify that the construction of the Project does not have an impact on well water supply in the area. Groundwater investigations and/or monitoring requirements will be verified during the REA process. Spill response and clean up should be conducted in a timely fashion to prevent contamination from reaching the groundwater table. If adverse effects have occurred due to operation activities, a potable water supply should be provided by the Proponent and the water well should be repaired or restored as required. 	<ul style="list-style-type: none"> With the implementation of suggested mitigation measures, no significant adverse residual effects on significant wetlands are anticipated. 	<ul style="list-style-type: none"> None required.
Section 5.3.2 Surface Water, Fish and Fish Habitat	<ul style="list-style-type: none"> No direct effects to waterbodies are anticipated during operation of the Project. 	<ul style="list-style-type: none"> No impacts to surface water, fish and fish habitat. 	<ul style="list-style-type: none"> General mitigation measures for operation activities near a water body within 50 m of the Project Location include: <ul style="list-style-type: none"> refuel and maintain equipment at least 100 m from water bodies report spills to the MOECC Spills Action Centre For the duration of the work, keep on-site and readily accessible, all material and equipment needed to contain and clean-up releases of sediment-laden water and other deleterious substances. 	<ul style="list-style-type: none"> With the implementation of the suggested mitigation measures, no significant adverse residual effects on surface water, fish and fish habitat are anticipated. 	<ul style="list-style-type: none"> Drainage ditches and general flow patterns will be monitored during operation to maintain proper site drainage.
Section 5.4.1 Air & Dust Emissions	<ul style="list-style-type: none"> Minor localized air emissions from periodic use of equipment for general repairs, maintenance of panels and from personnel vehicles. 	<ul style="list-style-type: none"> Minimize duration and magnitude of emissions 	<ul style="list-style-type: none"> Use of multi-passenger vehicles where practical. Avoid idling. Maintain equipment and vehicles in good working order with functioning mufflers and emission control systems as available. Ensure all equipment and vehicles meet emissions requirements of the MOECC and/or MTO 	<ul style="list-style-type: none"> Any adverse net effects are anticipated to be short-term in duration and highly localized. 	<ul style="list-style-type: none"> Adherence to Complaint Response Protocol.

Table 6.1: Summary of the Potential Negative Effects, Performance Objectives, Mitigation Strategies, Monitoring Plan And Contingency Measures for the Operational Stage of the Project

Feature	Potential Environmental Effects	Performance Objectives	Mitigation Measures	Net Effects	Monitoring and Contingency Measures
Section 5.4.2 Environmental Noise	<ul style="list-style-type: none"> Noise from operation and maintenance of the Project. 	<ul style="list-style-type: none"> Predicted sound levels at all non-participating receptors to meet MOECC Guidelines. 	<ul style="list-style-type: none"> Comply with MOECC environmental noise guidelines. In the event the project does not operate in accordance with the terms and conditions of the REA, non-compliant components may be shut down until the problem is resolved. Regular maintenance program to proactively identify operational issues and keep equipment operating in accordance with manufacturer's specifications. Adherence to Complaint Response Protocol 	<ul style="list-style-type: none"> No significant net effects are anticipated. 	<ul style="list-style-type: none"> Noise monitoring (if required), would be conducted in accordance with the REA for the Project. Routine maintenance and monitoring would also help minimize the likelihood of malfunctioning equipment resulting in excessive noise emissions.
Section 5.5 Land Use and Socio-Economic Resources	<ul style="list-style-type: none"> Visual or sensory nuisance to the community may occur due to the presence of the facility and noise created during occasional maintenance activities during the operational phase of the Project. The Project will take the current Project Location lands out of agricultural production, but will return those lands to a state similar to the current state at the time of decommissioning (or another state, in accordance with the zoning by-law, as determined by the landowner at the time of decommissioning). Operation activities have the potential to alter the agricultural capacity of the land following decommissioning of the Project. Compaction of topsoil and erosion or surface soil may occur during operation and can potentially decrease crop yields. Impacts to mineral, aggregate or petroleum resources, local hiking or cycling routes, fishing or conservation areas, or parks are not anticipated. 	<ul style="list-style-type: none"> Minimize nuisance to surrounding landowners. Preserve quality of agricultural lands. 	<ul style="list-style-type: none"> Trees will be retained along the corner of County Road 2 and County Road 19 to act as a vegetation barrier which will gradually reduce the visual impact during operation of the facility. Trees were planted in fall 2016 adjacent the Project Location boundary along County Road 2 (east of the Tree Preservation Area) and County Road 19 (south of the Tree Preservation Area). The Proponent will monitor and maintain the vegetation barrier. Soil compaction will be addressed during the decommissioning phase of the Project and is discussed in the Decommissioning Plan Report. 	<ul style="list-style-type: none"> Above grade Project infrastructure is removable and, as a result, the visual impact is considered temporary and reversible. The agricultural productivity of the Project Location will be lost during construction and operation of the Project, however, the effects to the agricultural soils are expected to be temporary and spatially limited (i.e., during the life of the project only). It is anticipated that the lands can be returned to agricultural production following the decommissioning of the Project. With the implementation of the above mitigation measures, no significant adverse residual effects on land use or socio-economic resources are anticipated. 	<ul style="list-style-type: none"> The Proponent will implement a vegetation management plan to monitor and maintain the vegetation barrier. The Proponent should review Project complaints on a regular basis and respond accordingly in a timely manner, in accordance with the Complaint Response Protocol. The Proponent should monitor compliance with the Emergency Response and Communications Plan.

Table 6.1: Summary of the Potential Negative Effects, Performance Objectives, Mitigation Strategies, Monitoring Plan And Contingency Measures for the Operational Stage of the Project

Feature	Potential Environmental Effects	Performance Objectives	Mitigation Measures	Net Effects	Monitoring and Contingency Measures
Section 5.6.1 Municipal Infrastructure	<ul style="list-style-type: none"> None. 	<ul style="list-style-type: none"> None. 	<ul style="list-style-type: none"> None required. 	<ul style="list-style-type: none"> None. 	<ul style="list-style-type: none"> None required.
Section 5.6.2 Other Utilities and Infrastructure	<ul style="list-style-type: none"> If utilities are not properly located and marked prior to planned or unplanned maintenance activities, there is potential to strike or interfere with a buried or overhead utility which could result in damage to the infrastructure and injury to personnel. 	<ul style="list-style-type: none"> No interference with utilities and other infrastructure. 	<ul style="list-style-type: none"> The contractor will be responsible for locating and marking existing pipelines and utilities on lands which may be affected by Project maintenance. Machine operators will be informed where electrical lines are present overhead. Lines that may interfere with the operation of equipment will be aptly identified by the general contractor. 	<ul style="list-style-type: none"> With the implementation of the above mitigation measures, no significant adverse residual effects on utilities or other infrastructure are anticipated. 	<ul style="list-style-type: none"> None.
Section 5.7 Waste Material Disposal & Spills	<ul style="list-style-type: none"> Wastes such as equipment packaging, wrappings and scraps (wood and metal) will be generated during operation activities and require reuse, recycling, and/or disposal at an appropriate MOECC-approved off-site facility. Improper disposal of waste material generated during operation may result in contamination to soil, and/or surface water resources on and off Project lands. Litter generated during operation may also become a nuisance to nearby residences, if not appropriately contained and allowed to blow off the construction site. Accidental spills of fuels or lubricants could result in contamination of soil and or groundwater if not properly contained. 	<ul style="list-style-type: none"> No contamination as a result of improper disposal of waste. No spills. 	<ul style="list-style-type: none"> During operation, the Proponent and/or the operation and maintenance contractor will implement a site-specific waste collection and disposal management program, which may include: <ul style="list-style-type: none"> the Proponent and/or contractors will remove all waste materials from Project Location during maintenance activities labelling and proper storage of liquid wastes (e.g. used oil and solvents) in a secure area that would contain materials in the event of a spill as appropriate, spill kits (e.g. containing absorbent cloths and disposal containers) will be provided on-site during maintenance activities and at the control building dumping or burying wastes within the Project sites would be prohibited non-hazardous waste will be disposed at a registered waste disposal site(s) if waste is generated that is not solid non-hazardous waste, a Generator Registration Number is required from the MOECC and the generator would have obligations regarding manifesting of waste. Compliance with Schedule 4 of O. Reg. 347 is mandatory when determining waste category implementation of an on-going waste management program consisting of reduction, reuse, and recycling of materials. Equipment maintenance and refueling, and other potentially contaminating activities, will occur in designated areas. Large quantities of fuel, lubricating oils, and 	<ul style="list-style-type: none"> Accidental spills are anticipated to occur infrequently, if at all, and be spatially limited. 	<ul style="list-style-type: none"> Records of waste generation and hauling should be maintained, as appropriate. Where a third party's activities are identified as non-compliant or insufficient, the Proponent would seek out an alternative recycling or disposal solution. The Proponent should inspect that the maintenance contractor is following the spill response protocols outlined in this CPR and the Emergency Response and Communications Plan. In the event that previously unknown materials or contaminated soils are uncovered or suspected of being uncovered, maintenance activities in the find location should cease immediately. In such an instance, the Proponent should retain expert advice on assessing and developing a plan for soil sampling, handling, disposal and remediation.

Table 6.1: Summary of the Potential Negative Effects, Performance Objectives, Mitigation Strategies, Monitoring Plan And Contingency Measures for the Operational Stage of the Project

Feature	Potential Environmental Effects	Performance Objectives	Mitigation Measures	Net Effects	Monitoring and Contingency Measures
			<p>other fluids associated with maintenance activities will not be stored at the site. The storage of minor quantities of fuels and lubricants on-site do not represent a significant potential adverse effect on the groundwater in the event of accidental spills. Standard containment facilities and emergency response materials would be maintained on-site as required.</p> <ul style="list-style-type: none"> If an accidental spill occurs, the response procedures noted in Section 3.7 of the <u>Construction Plan Report</u> will be implemented. Follow-up monitoring /inspections would be implemented in the event of an accidental spill/leak, as appropriate. Remedial actions may be required in the event that follow-up monitoring indicates adverse effects to natural features. 		
<p>Section 5.8 Public Health and Safety</p>	<ul style="list-style-type: none"> Potential risk of fire associated with an accident or malfunction. Possible failure of overhead line poles. 	<ul style="list-style-type: none"> Zero project related injuries. 	<ul style="list-style-type: none"> The primary method of minimizing potential public health and safety risks will be by installing perimeter fencing to restrict site access and prevent trespassing and vandalism (see Section 3.3.2). The Proponent will reduce accidents and malfunctions by providing proper training and education of staff operating the control system and maintaining the Project infrastructure. Solar panels and associated electrical equipment will be installed and maintained in accordance with applicable safety standards. The primary preventative measure taken to avoid pole failure during operation is at the design stage. Overhead lines will be designed and constructed in accordance with applicable regulatory guidelines. Should maintenance activities be required within a municipal road allowance, access to residential properties should be maintained at all times. Safety fence should be installed at the edge of the construction area where public safety considerations are required. Traffic controllers and appropriate signage should be utilized as necessary. An annual meeting and site visit would be 	<ul style="list-style-type: none"> None. 	<ul style="list-style-type: none"> The Proponent should review Project complaints on a regular basis and respond accordingly in a timely manner, in accordance with the Complaint Response Protocol.

Table 6.1: Summary of the Potential Negative Effects, Performance Objectives, Mitigation Strategies, Monitoring Plan And Contingency Measures for the Operational Stage of the Project

Feature	Potential Environmental Effects	Performance Objectives	Mitigation Measures	Net Effects	Monitoring and Contingency Measures
			arranged with municipal emergency response staff to review site security procedures. • Specialized equipment beyond what is typically required to respond to electrical fires is not required for fires involving solar panels.		

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7.0 EMERGENCY RESPONSE AND COMMUNICATIONS PLAN

The following sets out a general description of the actions to be taken during all Project phases to inform the public, Aboriginal communities, the host municipalities, and relevant government ministries regarding activities occurring at the Project Location (including emergencies), and means by which stakeholders and Aboriginal communities can contact the Proponent and the Proponent will record and address correspondence.

The Proponent will create an Emergency Response and Communications Plan for use by employees, which will include up-to-date contact information and will be maintained at an accessible location during all Project phases. The Emergency Response and Communications Plan will be reviewed by the Proponent during each phase of the Project. Notification of any changes to the Emergency Response and Communications Plan would be communicated to relevant stakeholders as outlined in Section 7.2.

7.1 EMERGENCY RESPONSE

The Emergency Response and Communications Plan will be implemented throughout the life of the Project (from construction to decommissioning) and will be updated as required. The purpose of the Emergency Response and Communications Plan is to establish and maintain emergency procedures required to effectively deal with an emergency situation and to minimize potential effects. Copies of the detailed Emergency Response and Communications Plan will be kept on-site (construction office trailer during construction and control building during operation) and will be accessible to on-site personnel at all times. Regular contact with municipal emergency response staff will occur so that they stay aware of the status of construction on site and understand how to deal with any potential accidents and malfunctions resulting from the operation of the Project.

Emergency medical services (ambulance) are provided by the United Counties of Prescott and Russell. The Township of Alfred and Plantagenet is responsible for fire services. The Proponent will provide the Emergency Response Plan to the County and Township emergency services departments for review and approval. Policing in the United Counties of Prescott and Russell is provided by the Ontario Provincial Police from the Hawkesbury detachment. The Emergency Response Plan will include key contact information for emergency service providers, a description of the chain of communications and how information would be disseminated between the Proponent and the relevant responders. This information will be obtained during consultations with the Township and County emergency services departments.

In the event of an emergency, the Proponent will initiate the following Emergency Response Plan and will contact (via phone or in-person) Project stakeholders who may be directly impacted so that the appropriate actions can be taken to protect health and safety. Potential emergency scenarios that could occur on the Project site include fire, personal injury and

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accidental spills. The following sections provide procedures to follow in the event of these potential emergency scenarios.

All Project personnel will be trained in the emergency response and communication plan procedures outlined. Any non-Project personnel visiting the site will need to be accompanied by Project personnel when on the site, will be required to attend and participate in safety awareness training before entering the site, and must wear appropriate personal protective equipment when on the site.

During operation of the Project, the site will be monitored using the SCADA system on a real-time basis, 24 hours a day, 7 days a week. If an emergency is detected on the site, the Proponent will respond by sending Project personnel to the site to address the emergency and communicate with the appropriate authorities.

7.1.1 Fire

Fire extinguishers will be located throughout the Project site at health and safety points (e.g., the access to the site, the substation, etc.); these points will be determined by the general contractor for the construction and decommissioning phases and by the Operations Manager during the operation phase. Fire extinguishers will also be located in personnel vehicles. If a fire occurs on the site, Project personnel will follow all safety procedures and attempt to extinguish the fire only if it is safe to do so. Project personnel will not attempt to extinguish the fire if there is a potential risk to personal safety. If personal safety is a concern, the Project area will be evacuated immediately and Project personnel will call 911 to contact the local fire department (and ambulance if required) and the Operations Manager. If there is potential for the fire to spread off-site, the Project personnel will notify adjacent property owners immediately. All Project personnel that will be on-site during the life of the Project will be trained in the proper procedures for dealing with a fire and on how to properly use a fire extinguisher.

For the duration of Project operation, a sign will be placed in a visible location on the access gate to the Project site providing important instructions in the case of an emergency situation. It will identify that the passerby should call 911 and the Proponent. An additional sign may also be added along County Road 2.

A record of all incidents that occur at the site will be kept on file by the Proponent. The record will include the date of the incident, date of reporting, name of reporter, description of the incident, cause of the incident, actions taken, communications to internal and external groups, and follow-up required.

7.1.2 Personal Injury

First-aid supplies and maps providing the location and routes to the local hospital will be kept on-site for the life of the Project. A list of Project personnel certified in first-aid and CPR will be posted with the first-aid supplies on-site. In the event of a personal injury, the injured worker will

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be treated on-site if it is a minor injury; otherwise, the person will be transported to the hospital directly or by ambulance. If an ambulance is required for an injury, Project personnel will call 911 and assist the injured worker as required until emergency personnel arrive on-site.

The general contractor (during construction and decommissioning) or the Operations Manager (during operations) will be immediately notified of personal injuries.

A record of all incidents on the site will be kept on file by the Proponent. The record will include date of the incident, date of reporting, name of reporter, description of the incident, cause of the incident, actions taken, communications to internal and external groups, and follow-up, as required by Health and Safety Regulations.

7.1.3 Accidental Spills

The MOECC *Spills Reporting – A Guide to Reporting Spill and Discharge* (2007) provides the procedures to be used in the event of an accidental spill on the Project site. The *Environmental Protection Act* (1990) and O. Reg. 675/98 provide the definition of spills that are required to be reported.

The most likely sources of potential accidental spills on-site include transformer oil, vehicle or equipment fuel or oil, and liquid wastes stored on-site. Accidental spills may result from the improper handling of equipment or materials, or a leak from spill containment material.

Measures to prevent potential effects of accidental spills on the natural environment can be found in the Natural Heritage Report. Project personnel on-site during the life of the Project will be trained to properly respond to accidental spills. Spill kits (e.g. containing absorbent cloths and disposal containers) will be located at health and safety points for the life of the Project. The following procedures will be followed if an accidental spill occurs:

- potential health and safety issues will be identified before entering the scene of the spill
- the spill will be stopped, if safe to do so
- if the spill may cause harm to human health, 911 will be called immediately and Project personnel will notify any other on-site personnel who could be potentially impacted
- the appropriate Project personnel will be notified of the spill (general contractor during construction and decommissioning and the Operations Manager during operations)
- a spill kit, located on-site or in the vehicle of Project personnel, will be used to clean and contain the spill, if safe to do so
- an outside spill response contractor will be contacted to help clean up major spills beyond the spill kit's capabilities
 - if required the spill will be reported to the MOECC's Spills Action Centre and any other relevant outside agencies, as required.

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In accordance with O. Reg. 675/98, the MOECC Spills Action Centre will be notified if any of the following types of spills occur on-site:

- non-approved releases/discharges to the land, air or water
- vehicle fluid discharges greater than 100 litres (L)
- electrical transformer releases of mineral oil greater than 100 L
- any discharges to waterbodies (e.g., sediment).

The MOECC Spills Action Centre can be contacted 24-hours a day through their toll-free number: 1- 800-268-6060. This phone number will be posted on the Project access gate and at each health and safety point on the Project site.

All accidental spills will be documented by the Proponent and the reports will be provided to the MOECC, as required. Reporting will include the date of the incident, date of reporting, name of reporter, description of the accidental spill, cause of the accidental spill, type and amount of spill, actions taken, methods and actions taken to dispose of contaminated material, communications to internal and external groups, and follow-up as required.

7.2 NON-EMERGENCY COMMUNICATIONS

7.2.1 Project Updates and Activities

The Proponent will maintain contact with Project stakeholders (public, Aboriginal communities, and the municipalities) during the operation of the Project, as needed. Methods of communication could include providing Project updates on the Project website (<http://www.edf-en.ca/project/pendleton-solar-energy-centre/>), letters, newsletters, newspaper notices, and/or direct contact via phone or email. As a long-term presence in the community, the Proponent will continue to build new contacts, local relationships and channels of communication.

Should federal, provincial or municipal agencies require notification, the information will be sent to them by email, mail or direct contact (via phone or in person). The Proponent will keep a record of all communications on file.

7.2.2 Complaint Response Protocol

A sign will be posted during all phases of the Project at the gate of the facility which will include a telephone number, email and mailing address for contacting the Proponent. The telephone number, along with the mailing and/or email address would also be posted on the Project website (<http://www.edf-en.ca/project/pendleton-solar-energy-centre/>) and provided directly to the Township, County and MOECC.

PENDLETON SOLAR ENERGY CENTRE DESIGN & OPERATIONS REPORT

Emergency Response and Communications Plan
January 27, 2017

The telephone number provided for the reporting of questions, concerns and/or complaints would be equipped with a voice message system used to record the complainant's name, address, telephone number, time and date of the complaint, and details of the complaint. All messages would be recorded in a Complaint Response Document. All reasonable commercial efforts would be made to take appropriate action as a result of concerns as soon as practicable. The actions taken to remediate the cause of the complaint and the proposed actions to be taken to prevent reoccurrences of the same complaint in the future would also be recorded within the Complaint Response Document. Correspondence would be shared with other stakeholders, such as the municipality or MOECC, as required and/or as deemed appropriate.

Ongoing stakeholder communication will allow the Proponent to receive and respond to any general community issues on an ongoing basis.

DRAFT

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**APPENDIX A:
PROJECT LOCATION MAP**

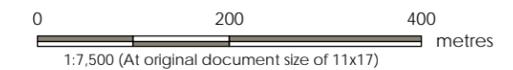


Legend

-  Project Location
-  300 m from Project Location
- Existing / Natural Features**
-  Major Road
-  Minor Road
-  Property Boundary and PIN

The Oak Ridges Moraine Conservation Plan Area, the Niagara Escarpment and the Lake Simcoe watershed are not within 300 m of the Project Location

No protected properties, heritage resources or archaeological resources were identified within 300 m of the Project Location



Notes

1. Coordinate System: NAD 1983 UTM Zone 18N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2016. Base data modified by Stantec.
3. Imagery Source: Ontario Ministry of Natural Resources and Forestry, Digital Raster Acquisition Project East 2014 (DRAPE2014)

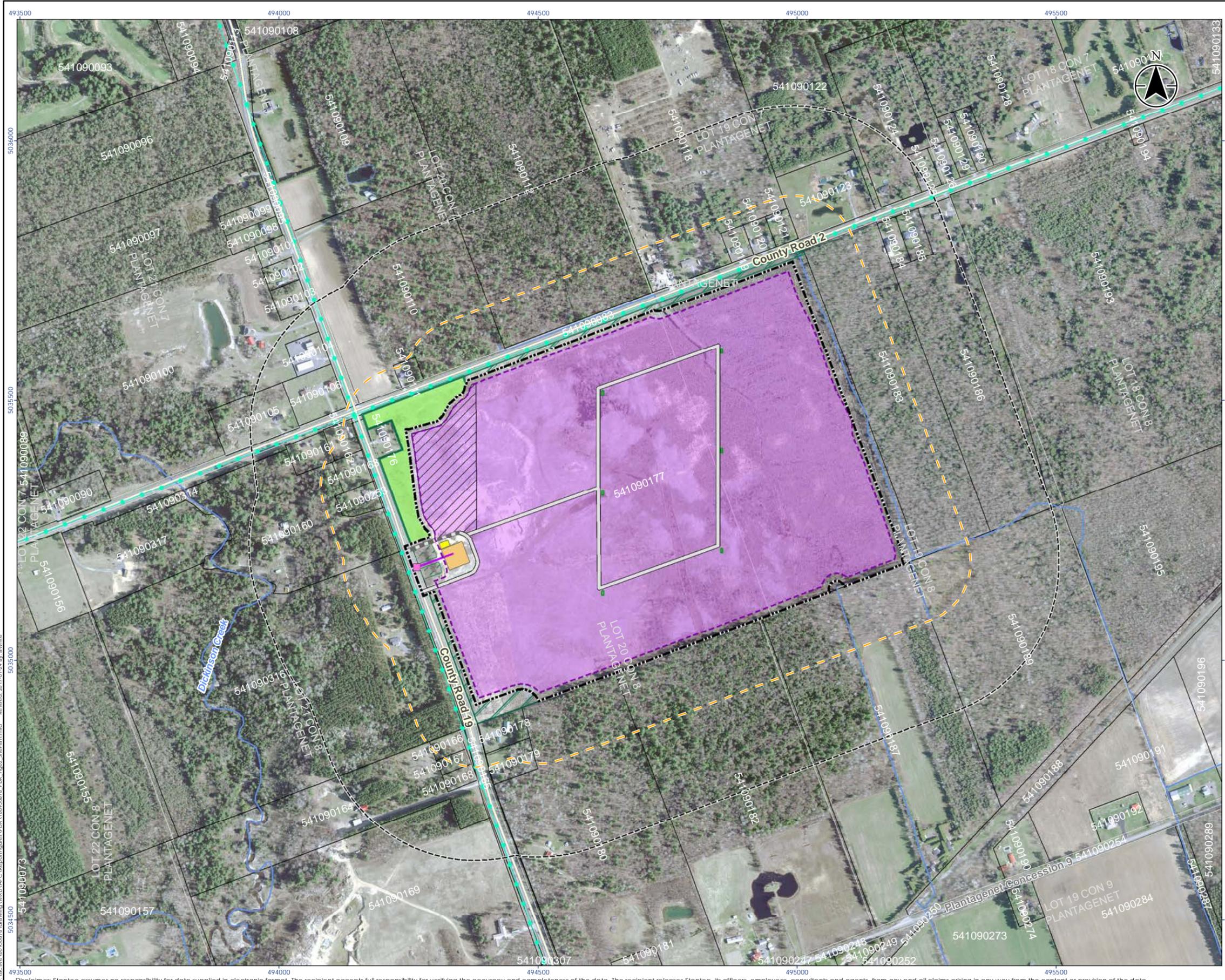


Project Location: 160950878 REVA
 United Counties of Prescott and Russell Prepared by SE on 2017-01-23
 Technical Review by RN on 2016-12-08
 Independent Review by RN on 2016-12-08

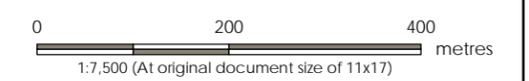
Client/Project:
PENDLETON ENERGY CENTRE LP
PENDLETON SOLAR ENERGY CENTRE

Figure No. **1**
 Title **Project Location**

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- Legend**
- Zone of Investigation (120 m from Project Location)
 - Point of Common Coupling
 - Connection Line
 - Inverter Step-up Transformer and Inverter
 - Permanent Access
 - Temporary Access During Construction
 - 300 m from Project Location
 - Buildable Area
 - Operations & Maintenance Storage Area
 - Project Location
 - Solar Panel Area
 - Substation
 - Temporary Construction Laydown and Parking Area
 - Tree Preservation Area
 - Tree Planting Area (Post-Construction)
 - Tree Planting Area (Post-Construction)
 - Existing / Natural Features
 - Major Road
 - Minor Road
 - Distribution Line (Hydro One)
 - Watercourse
 - Property Boundary and PIN
 - Waterbody



- Notes**
- Coordinate System: NAD 1983 UTM Zone 18N
 - Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2016. Base data modified by Stantec.
 - Imagery Source: Ontario Ministry of Natural Resources and Forestry, Digital Raster Acquisition Project East 2014 (DRAPE2014)
 - Waterbody and watercourse mapping within 120 m of the Project Location has been updated based on field studies completed as part of the REA process under O. Reg. 359/09. See the Water Assessment and Water Body Report for details.



Project Location: 160950878 REVE
 United Counties of Prescott and Russell
 Prepared by SE on 2017-01-24
 Technical Review by RN on 2016-12-08
 Independent Review by RN on 2016-12-08

Client/Project:
 PENDLETON ENERGY CENTRE LP
 PENDLETON SOLAR ENERGY CENTRE

Figure No.:
 2

Title:
 Site Plan: Conceptual Project Component Layout

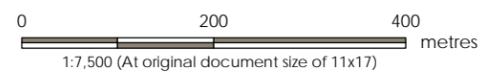
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Legend

- 300 m from Project Location
- Project Location
- Water Well Location
- Contour (10 m Interval, masl)
- Contour (2 m Interval, masl)
- Major Road
- Minor Road
- Watercourse
- Property Boundary
- Waterbody

The Project Location is currently used for agricultural operations. Surrounding lands are primarily forested with residential dwellings and agricultural operations interspersed. The Project Location is within lands designated Rural and Significant Woodland (as per the United Counties of Prescott and Russell Official Plan), however the wooded area within the Project Location was cleared in 2010 for agricultural operations.



- Notes
- Coordinate System: NAD 1983 UTM Zone 18N
 - Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2016. Base data modified by Stantec.
 - Imagery Source: Ontario Ministry of Natural Resources and Forestry, Digital Raster Acquisition Project East 2014 (DRAPE2014)
 - MOECC Water well locations are approximate and have been positioned based on published UTM coordinates © Queen's Printer for Ontario, 2016.
 - Waterbody and watercourse mapping within 120 m of the Project Location has been updated based on field studies completed as part of the REA process under O. Reg. 359/09. See the Water Assessment and Water Body Report for details.



Project Location: United Counties of Prescott and Russell
 Prepared by AW on 2017-01-23
 Technical Review by RN on 2016-12-08
 Independent Review by RN on 2016-12-08

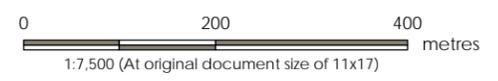
Client/Project: PENDLETON ENERGY CENTRE LP
 PENDLETON SOLAR ENERGY CENTRE

Figure No.: 3
 Title: Socio-Economic Features

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- Legend**
- | | |
|--|---|
| Generalized Candidate Significant Wildlife Habitat | Substation |
| Significant Wetland | Temporary Construction Laydown and Parking Area |
| Significant Woodland | Tree Preservation Area |
| Zone of Investigation (50 m from Project Location) | Tree Planting Area |
| Point of Common Coupling | Tree Planting Area (Post-Construction) |
| Connection Line | Existing Features |
| Inverter Step-up Transformer and Inverter | Major Road |
| Permanent Access | Minor Road |
| Temporary Access During Construction | Contour (10 m Interval, masl) |
| Buildable Area | Contour (2 m Interval, masl) |
| Operations & Maintenance Storage Area | Distribution Line (Hydro One) |
| Project Location | Watercourse |
| Solar Panel Area | Waterbody |



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 18N
 2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2016.
 3. Imagery Source: © First Base Solutions, 2008 and Ontario Ministry of Natural Resources and Forestry, Digital Raster Acquisition Project East 2014 (DRAPE2014)
 4. Waterbody and watercourse mapping within 120 m of the Project Location has been updated based on field studies completed as part of the REA process under O. Reg. 359/09. See the Water Assessment and Water Body Report for details.



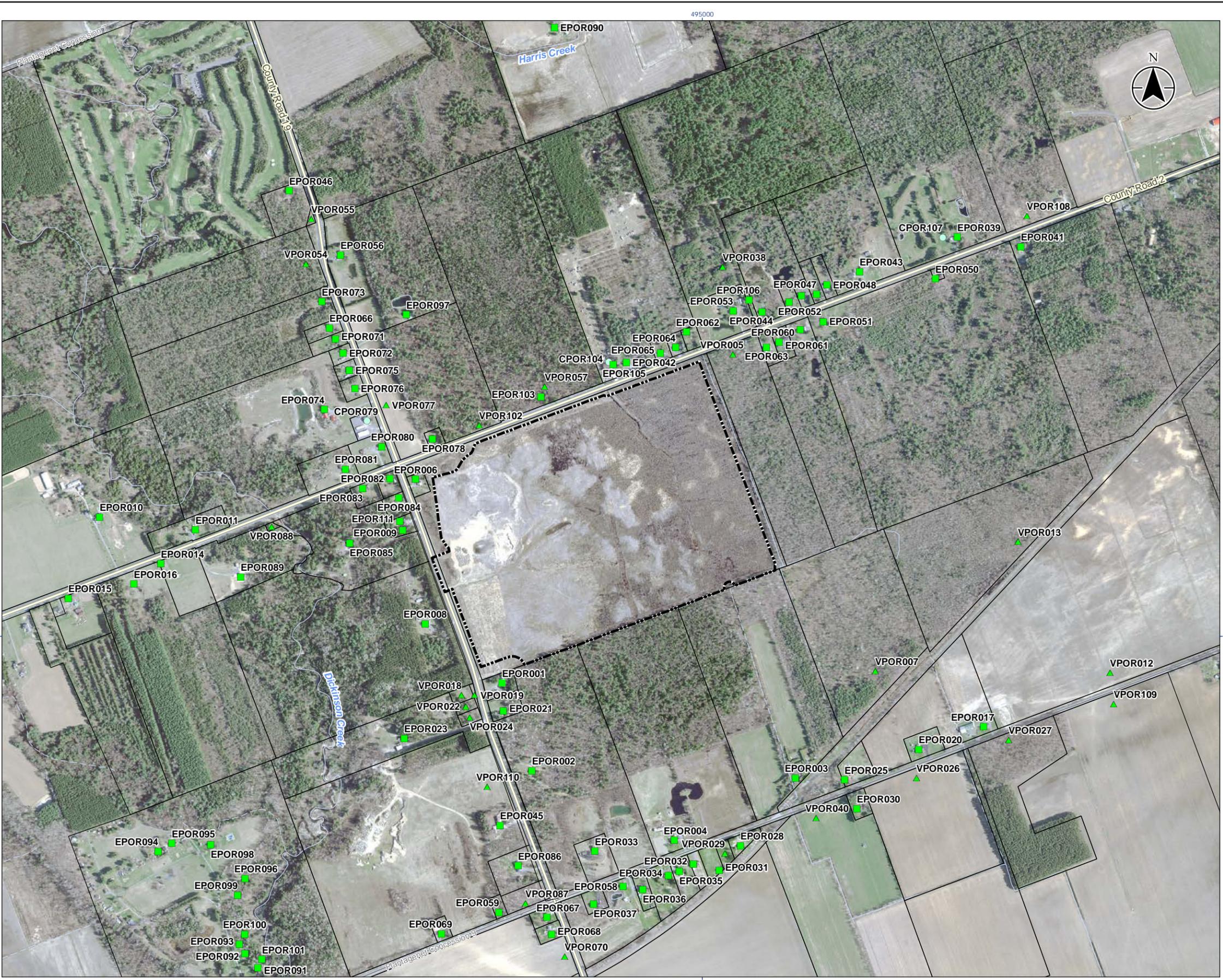
Project Location: Prescott and Russell
 Prepared by AMW on 2017-01-23
 Technical Review by NK on 2016-11-30
 Independent Review by NK on 2016-11-30

Client/Project:
 PENDLETON ENERGY CENTRE LP
 PENDLETON SOLAR ENERGY CENTRE

Figure No.
 4

Title
 Natural Features and Water Bodies

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- Legend**
- Project Location
 - Property Boundary
 - Major Road
 - Minor Road
 - Watercourse (Intermittent)
 - Watercourse (Permanent)
 - Waterbody
- Receptor**
- Non-Participating Residence
 - Non-Participating Vacant
 - Commercial



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 18N
 2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2016.
 3. Imagery Source: Ontario Ministry of Natural Resources and Forestry, Digital Raster Acquisition Project East 2014 (DRAPE2014)
 4. Waterbody and watercourse mapping within 120 m of the Project Location has been updated based on field studies completed as part of the REA process under O. Reg. 359/09. See the Water Assessment and Water Body Report for details.



Project Location: Prescott and Russell
 Client/Project: PENDLETON ENERGY CENTRE LP
 PENDLETON SOLAR ENERGY CENTRE

Figure No.: 5
 Title: Points of Reception

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