GRAND RENEWABLE ENERGY PARK

CONSTRUCTION PLAN REPORT

DRAFT

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Prepared for:

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Executive Summary

Samsung C&T (Samsung), Korea Power Electric Corporation (KEPCO) and Pattern Energy (Pattern) are proposing to develop, construct, and operate the Grand Renewable Energy Park (the "Project") in response to the Government of Ontario's initiative to promote the development of renewable electricity in the Province. Together, these companies (referred to herein as "SPK") will be involved in the development of the first phase of the energy cluster development.

The Project is proposed within the County of Haldimand and is generally bounded by Townline Road to the north, Haldimand Road 20 to the west, the Grand River to the east and Lake Erie to the south. It consists of a 148.6 MW (nameplate capacity) wind project, a 100 MW (nameplate capacity) solar project located on privately owned and Ontario Realty Corporation (ORC) managed lands and a transmission line to convey electricity to the existing power grid.

The basic components of the Project include 67 wind turbines, approximately 425,000 photovoltaic (PV) solar panels installed on fixed ground-mounted racking structures organized into 100-1 MW solar modules, a collector sub-station, interconnect station and Operations and Maintenance building, temporary storage and staging areas, approximately 20 km of 230 kV transmission lines along Haldimand Road 20, approximately 82 km of new overhead and/or underground 34.5 kV collector lines along public roads, approximately 48 km of new underground collector lines along turbine access roads, approximately 45 km of turbine access roads and 40 km of solar panel maintenance roads.

SPK has retained Stantec Consulting Ltd. (Stantec) to prepare a Renewable Energy Approval (REA) application, as required under Ontario Regulation 359/09 - Renewable Energy Approvals under Part V.0.1 of the Act of the *Environmental Protection Act* (O. Reg. 359/09). According to subsection 6(3) of O. Reg. 359/09, the wind component of the Project is classified as a Class 4 Wind Facility and the solar component of the Project is classified as a Class 3 Solar Facility. This Draft Construction Plan Report is one component of the REA application for the Project, and has been prepared in accordance with O. Reg. 359/09, the Ontario Ministry of Natural Resources' (MNR's) *Approval and Permitting Requirements Document for Renewable Energy Projects* (September 2009), and MOE's Draft "*Technical Bulletin Three: Guidance for preparing the Construction Plan Report*" (March 2010).

The following table summarizes the requirements of this report as specified under O. Reg. 359/09:

Construction Plan Report Requirements (as per O. Reg. 359/09 – Table 1)		
Requirements	**Completed**	**Section Reference**
Set out a description of the following in respect of the renewable energy project:		
1. Details of any construction or installation activities.	✓	2.2
2. The location and timing of any construction or installation activities for the duration of the construction or installation.	✓	2.2
3. Any negative environmental effects that may result from construction or installation activities.	✓	3.0
4. Mitigation measures in respect of any negative environmental effects mentioned in paragraph 3.	✓	3.0

Provided the identified protective and mitigation measures are properly applied to the environmental features discussed, in conjunction with the monitoring plans and contingency measures, the construction phase of the Project is not likely to cause significant net environmental effects.

To ensure there are no significant effects, a Construction Environmental Management Plan and Construction Environmental Effects Monitoring Plan will be implemented in compliance with applicable municipal, provincial, and federal standards and guidelines. The Construction Environmental Management Plan will be comprised of a series of plans and procedures covering all critical construction and environmental management tasks including the mitigation measures identified within this Draft Construction Plan Report. In addition, a Construction Environmental Effects Monitoring Plan has been prepared and covers processes, effects monitoring and mitigation measures for bedrock excavations, terrestrial and aquatic habitats, groundwater, aquatic habitat, public roads, agricultural lands, air quality and environmental noise.

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1.0 Overview

Samsung C&T (Samsung), Korea Power Electric Corporation (KEPCO) and Pattern Energy (Pattern) are proposing to develop, construct, and operate the Grand Renewable Energy Park (the "Project") in response to the Government of Ontario's initiative to promote the development of renewable electricity in the Province. Together, these companies (referred to herein as "SPK") will be involved in the development of the first phase of the energy cluster development.

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The basic components of the Project include 67 wind turbines, approximately 425,000 photovoltaic (PV) solar panels installed on fixed ground-mounted racking structures organized into 100-1 MW solar modules, a collector sub-station, interconnect station and Operations and Maintenance building, temporary storage and staging areas, approximately 20 km of 230 kV transmission lines along Haldimand Road 20, approximately 82 km of new overhead and/or underground 34.5 kV collector lines along public roads, approximately 48 km of new underground collector lines along turbine access roads, approximately 45 km of turbine access roads and 40 km of solar panel maintenance roads. The Project site plan which depicts the Project Location during construction is provided in **Attachment A**.

The Project Location includes all land and buildings/structures associated with the Project and any air space in which the Project will occupy including temporary lands during construction ("constructible areas"). This includes structures such as turbines, solar panels, access roads and power lines that will be utilized during the construction of the Project. This also includes the corridors surrounding infrastructure such as access roads in which the final infrastructure may be located.

For the purposes of the identification of natural heritage features and the assessment of potential effects, a "Zone of Investigation" has been identified based on the requirements of Ontario Regulation 359/09 (O. Reg. 359/09) and the Ministry of Natural Resources' (MNR's) *Approval and Permitting Requirements Document for Renewable Energy Projects* (APRD) (September 2009). The zone of investigation encompasses the Project Location and an additional 120 m surrounding the Project Location. This ensures that negative environmental effects that may result from construction activities have been assessed within this report.

SPK has retained Stantec Consulting Ltd. (Stantec) to prepare a Renewable Energy Approval (REA) application, as required under O. Reg. 359/09. According to subsection 6(3) of O. Reg. 359/09, the wind component of the Project is classified as a Class 4 Wind Facility and the solar component of the Project is classified as a Class 3 Solar Facility. This Draft Construction Plan

Report is one component of the REA application for the Project, and has been prepared in accordance with O. Reg. 359/09, the MNR's APRD, and the Ministry of the Environments' (MOE) Draft "*Technical Bulletin Three: Guidance for preparing the Construction Plan Report* (March 2010)".

2.0 Construction and Installation Activities

2.1 FACILITY COMPONENTS OVERVIEW

2.1.1 Wind Components

2.1.1.1 Turbines

The Project will include 67 Siemens SWT-2.3 wind turbines with a total nameplate capacity of 148.6 MW. Sixty-five (65) of the turbines will have a nameplate capacity of 2.221 MW and two will have a nameplate capacity of 2.126 MW. Details of the turbine are provided below in Table 2.1. The nacelle for the turbine includes the electric generator, as well as blade and turbine control equipment, wind speed and direction sensing equipment, and auxiliary equipment. These components are located at the top of the 100 m supporting tower, and are connected to the blades via a main shaft. The tower will require the construction of a concrete foundation to a depth of up to approximately 2.4 m and approximately 16.7 m wide depending upon subsurface conditions (land base is 0.07 hectares per turbine foundation).

Table 2.1 : Turbine Description – Siemens SWT-2.3

Operating Data	Specification
General	
Rated capacity (kW)	2221 and 2126
Cut-in wind speed (m/s)	3-5
Cut-out wind speed (m/s)	25
Rotor	
Number of rotor blades	3 (49 m long each)
Rotor diameter (m)	101
Swept area (m^2)	8000
Rotor speed (rpm)	6-16
Tower	
Hub height (m)	100
Tip height (m)	149

Detailed information about the turbine model is provided in the **Draft Wind Turbine Specifications Report**.

2.1.1.2 Turbine Access Roads and Crane Pads

Access roads are required to access each turbine site from existing roads during both the construction and operation phases of the Project. Access roads are approximately 5 m wide (see drawings in **Attachment A**). Access roads will be constructed of native materials or engineered fill and generally consist of approximately 750 mm of granular material. Alternatively, a woven geotextile could also be utilized with a reduced granular material depth or a cement/soil stabilizing agent. Turbine laydown (prior to turbine erection) will take place adjacent to the access roads and has been incorporated into the Project Location design by

designating a 50 m wide "constructible area" for the access roads (see **Attachment A**). A total of approximately 45 km of access roads will be required.

Crane pads will be constructed at the same time as the access roads and will be adjacent to turbine locations (within the "constructible area" around each turbine as shown in **Attachment A)**. The general crane pad area will be approximately 20 m x 40 m, and will typically consist of the same make up as the access road, whereas the crane platform (where the crane sits) may consist of a heavier granular make up depending on site conditions. The excavated soil will be stockpiled and used for site rehabilitation. After construction, the crane pads will be removed and the native topsoil replaced.

2.1.1.3 Step-up Transformers and Collector Circuits (Lines)

A generator step-up transformer (GSU), located immediately adjacent to each turbine, is required to transform the electricity generated in the nacelle of each turbine to a common collection system line voltage (i.e. 690 V to 34.5 kV). From each GSU, 34.5 kV underground and overhead collector circuits carry the electricity to the Project's substation located near Haldimand Road 20 and Wilson Road. The collector lines will be buried underground (where feasible) on private property from the turbines to the municipal road rights-of-way at which time the lines may be switched to overhead lines or remain underground. The overhead lines will be constructed on single wooden pole structures, similar to existing distribution lines located throughout the area. In most cases, the underground lines will be built within the proposed access roads to minimize the amount of land disturbed during construction of the Project. Typically the collector lines will be buried at a minimum depth of 1.2 m so that agricultural production can continue on the lands above the collector lines. A total of approximately 130 km of collector lines will be required (48 km underground and 82 km aboveground and/or underground).

2.1.2 Solar Components

2.1.2.1 Solar Panels

The solar power generation part of the Project will include the installation of approximately 425,000 solar photovoltaic (PV) panels on land designated for this purpose bounded by Mt. Olivet Rd on the west, Meadows Rd on the north, Sutor Rd on the east and Haldimand Rd 20 on the south (see **Attachment A**). Some additional solar PV panels will be located south of Haldimand Rd 20 on land facing the solar farm to the north. Each solar PV panel is fabricated using multicrystalline manufacturing techniques and is mounted on structural aluminum or galvanized steel racks in rows. Each rack is fixed position, facing south and angled 28 - 35 degrees to the horizon. The rows of racks are supported by vertical structural steel posts that are founded in the ground to a depth below the frost line, nominally 1.2 m.

The basic building block of the solar farm is a 1 MW rated solar units. There are 100 solar units forming the entire solar farm. A 1 MW solar unit consists of rows of 60 solar PV panels mounted on racks in straight rows. Approximately 72 rows of solar PV panels constitute a solar

unit of 1 MW. Physical arrangements may vary slightly from unit to unit to accommodate physical, environmental and archaeological constraints within the designated solar farm area and may also slightly vary based on the manufacturer's panel specifications. Each solar PV panel in a row generates Direct Current (DC) power and the power is collected through a low voltage wiring system along a row and interconnected to the adjacent rows within the typical unit.

A 2.4 m high chain link fence will be installed around the entire perimeter of the solar farm to prevent unauthorized access to the solar panel area. In addition, a 6 m wide berm will be constructed to provide a landscaping barrier for landowners of adjacent residences where close proximity occurs to the solar PV panels.

2.1.2.2 Solar Land Stormwater Management System

The solar land stormwater management system will be a passive system comprised of local vegetated ditches/swales alongside the access roads constructed through the area. Because the solar cells are mounted above the ground, infiltration, filtration through vegetation and other natural hydrologic process will continue similar to existing conditions. Drainage will generally be directed to existing receiving systems (drainage paths, roadside ditches, etc.) as under current conditions. Therefore, a general area-wide stormwater treatment and/or detention systems are not required. The small increase in runoff from the gravel access roads will be attenuated and filtered through local ditches and no formal basins or other management techniques are required.

2.1.2.3 Solar Farm Access Roads

Solar access roads (laneways) are required to access each row of solar PV panels during construction of the Project. The minimum road width between solar panel rows will be 3 m; however these access roads will not be gravelled. Instead, the roads will be seeded with native grassland species following construction and used sparingly during maintenance activities. Solar panel support structures including racks will take place adjacent to the access roads at selected areas within the solar farm land area.

Around the outside of each 1 MW solar unit, a 4 m wide gravel road will be constructed for construction and operational purposes. Approximately 40 km of gravelled access road will be required.

2.1.2.4 Step Up Transformers and Collector Circuits

The power from each solar PV panel row is collected by a wiring system and this wiring system is connected to one of two 500 Kilowatt (kW) DC to Alternating Current (AC) power inverter panels located at each of the 100 solar units. Each power inverter panel is mounted on a precast concrete base foundation at a central point of each solar unit. The AC output from the inverter panels is connected to an adjacent solar step up (SSU) pad-mounted transformer rated

at 1 MW. Each SSU is mounted on a precast concrete vault to facilitate cable entry/exit. Each SSU is positioned in close proximity to the solar inverter panels to minimize power loss. The output voltage of the SSU is 34,500 Volts. The power output from each of the 1 MW SSUs (100 MW in total) is connected via 5 underground 34.5 kV power cable circuits to the collector substation located within the solar farm land area.

2.1.3 Electrical Transmission Components

2.1.3.1 Collector Substation

A Collector substation will be built to accumulate the power circuits from the wind and solar generation equipment outlined above. The accumulated power of approximately 248MW at 34.5 kV will arrive via both underground cable collector circuits and overhead pole line conductor circuits. The power will be transformed from a 34.5 kV collection voltage to a 230 kV transmission voltage. The substation will be located near Haldimand Road 20 and Mt. Olivet Road (see **Attachment A**) within the solar lands of the Project.

The Collector substation will consist of a prepared area of approximately 85 m by 85 m in size. It will be built on a prepared base of engineered fill and crushed stone to a depth of approximately 600 mm. A grounding grid will be built within the crushed stone and extend to 1 m beyond the 2.4 m high perimeter chain link fence for the substation.

The substation will include a prefabricated modular electrical building (EHouse) wherein all the incoming underground 34.5 kV collector circuits will terminate on interior switchgear. The EHouse will be founded on concrete foundations that are constructed below grade to below frost depth. Cable vaults will be installed beneath the EHouse to facilitate cable entry.

Reactive Power Capacitors and control will be located within the Collector Substation. Either one of D-VAR or S-VAR will be installed as approved by local authority(s). The capacitors will be 34.5 kV rated and there will be up to 6 capacitor banks installed in separate concrete containment foundations, founded below grade to below the frost line. The containment will be large enough to hold any insulating fluid that may leak from the capacitors. The dynamic controller will be a Statcom (or similar) controller located adjacent to the capacitors within the substation and on its own concrete foundation founded below grade to below the frost line.

There are two power transformers within the collector substation that will be used to step up the power to 230 kV. The wind power transformer is rated 100/133/166 MVA while the solar power transformer is rated 65/86/108 MVA. Each transformer is mounted on a concrete base foundation within an oil containment facility that would capture all of the oil insulating fluid within each transformer in the event of a leak. A sound attenuation wall will be constructed around the perimeter of the two power transformers to minimize the escape of transformer noise into the surrounding environment. The sound attenuation wall will be constructed with a minimum density of 20 kg/m^2 that will break the line of sight with any noise receptors.

Each of the 230 kV outputs of the two transformers are delivered via a 3 phase air bus (aluminum pipe) to a 1200 Amp 230 kV circuit breaker, isolation disconnect switch and Capacitive Voltage Transformers (CVT). The 230 kV outputs from the final isolation disconnect switches are coupled and connected to a 230 kV termination gantry complete with 230 kV lightning arrestors. The 230 kV termination gantry facilitates the connection of the collector substation to the overhead transmission tower adjacent to the substation. Each of the 230 kV devices located within the collector substation are founded on concrete foundations that extend below finished grade to below the frost line.

2.1.3.2 Collector Substation Stormwater Management System

Area drainage from the collector substation will be accomplished through a series of swales adjacent to the proposed access road that will collect and convey runoff from the substation area and associated access road west and south towards Haldimand Rd 20. The total drainage area associated with the substation and access road "hard" surfaces is less than 2 ha and therefore a "wet" water quality control pond (i.e. one containing a permanent pool) is inappropriate, as per the MOE *SWM Planning and Design Guidelines Manual (2003)*. In addition to the conveyance of runoff, the series of grassed swales will also provide water quality control, which is a suitable stormwater management practice for such an area according to the MOE guidelines. Water quantity control will be provided using a dry detention pond for the storage and slow release of runoff to the existing ditch and drainage system along Haldimand Road 20. Drainage from the solar lands will largely be conveyed around the substation facility, access road, and associated stormwater management measures through the use of diversion swales given that it does not require treatment or detention.

Within the substation footprint itself, the two transformers will be equipped with oil containment storage areas to capture oil in the event of a leak. Additionally, an oil/water separator will be incorporated into the design to treat any effluent before it enters the storm drainage swales.

2.1.3.3 Collector Substation Access Road

An access road for the collector substation and main access to the solar lands will be constructed from Haldimand Rd 20 (see **Attachment A**). The gravel surface of the access road is approximately 8 m wide with grassed swale drainage ditches of variable top width on either side, for stormwater runoff conveyance and treatment. The depth of the roadbed will generally consist of 750 mm of granular material. During construction it will be used to transport materials for construction of the substation including the two heavy power transformers and for maintenance purposes during operation.

2.1.3.4 Transmission Line

From the substation, a 20 km long overhead 230 kV transmission line, consisting of single, 3 conductor aluminum circuit will be constructed to connect the power generated by the wind and solar generation equipment to the Ontario electricity grid that is accessible at a location south of Hagersville, Ontario. The transmission line will be located along Haldimand Road 20 within the municipal road right-of-way (see **Attachment A**).

The transmission line will be constructed overhead using bare aluminum conductors. They are vertically isolated from ground via 230 kV insulators and monopole structures measuring 28 m in height. The monopole structures will be erected on concrete foundations located within the existing Haldimand Rd 20 right-of-way. The structures will be spaced approximately 200 m apart except where significant changes in line direction occur along the route. In these cases, the spacing will be closer to reduce the overhead line tension to a practical construction limit. There will also be closer spacing of the structures at the collector substation, the transition stations around Nelles Corners and the interconnect station near the transmission corridor east of Hagersville.

At a location just east of Nelles Corners (intersection of Haldimand Rd 20 and Highway 3), the overhead transmission line will make a transition to underground cable housed within a concrete encased ductbank. The underground cable is required as the overhead transmission line would violate safety clearances over the built infrastructure of Nelles Corners. The 230 kV ductbank would be constructed a minimum of 1.2 m below grade and be backfilled with thermal fill to dissipate heat of cable power losses through the ground.

The ductbank will be nominally 700 m long and will be constructed entirely within the Haldimand Rd 20 right-of-way beneath the village of Nelles Corners. To facilitate the transitioning of the overhead transmission line to underground cable east of Nelles Corners and to overhead line from underground cable west of Nelles Corners, two transitioning stations will be required to be constructed.

The transitioning stations will contain an A-frame galvanized steel lattice type structure complete with 230 kV lightning arrestors. The structure will be anchored to a concrete foundation that is founded to a depth of ground below the frost line. Each transitioning station will consist of a prepared area of 20 m by 20 m in size. It will be built on a prepared base of engineered fill and crushed stone to a depth of approximately 600 mm. A grounding grid will be built within the crushed stone and extend to 1 m beyond the 2.4 m high perimeter chain link fence for each station.

2.1.3.5 Transmission Line Interconnect Station

The 230 kV transmission line will terminate at an interconnect station located on the north side of Haldimand Rd 20, just east of the transmission corridor east of Hagersville. The transmission line overhead conductors will terminate on a termination gantry (structure) contained within the station area. The station will be enclosed by a chain link fence measuring 40 m wide x 40 m

long x 2.4 m high. The station will contain two termination gantries complete with 230 kV lightning arrestors. One will be used for the termination of the 230 kV transmission line and the other will be used to facilitate Hydro One's connection of the power collection circuit to the existing transmission circuit originating at the Nanticoke Power Generating Station. Each gantry will be anchored to a concrete foundation that is founded to a depth of ground below the frost line. The station will consist of a prepared area of 40 m by 40 m in size. It will be built on a prepared base of engineered fill and crushed stone to a depth of approximately 600 mm. A grounding grid will be built within the crushed stone and extend to 1 m beyond the 2.4 m high perimeter chain link fence.

In addition, a 230 kV isolation switch and 230 kV-1200 amp circuit breaker will be installed on a concrete foundations between the two termination gantry structures. The foundation will extend below grade to below the frost line. A small EHouse will be installed within the fenced enclosure for the station. The EHouse will be built on concrete foundations that are constructed below grade to below frost depth. Cable vaults will be installed beneath the EHouse to facilitate control cable entry.

2.1.3.6 Interconnect Station Stormwater Management System

The interconnect station has a small footprint (less than 0.3 ha of disturbed area) and therefore requires minimal stormwater management infrastructure and no water quantity controls. Water quality control will be provided through the use of grassed swales alongside the proposed access roads that convey drainage from the site to the existing ditches alongside Haldimand Road 20.

2.1.3.7 Operations and Maintenance Building

An operations and maintenance building will be constructed on land on the south side of Haldimand Rd 20 opposite the solar farm land area, just east of Mt. Olivet Rd (see **Attachment A**). The building will be a prefabricated engineered structure and will likely measure 24 m wide by 85 m long by 7 m high. It will be founded on concrete foundations that are extended below grade to below the frost line. The building will be used as an operations and maintenance facility and it will likely contain several offices, employee welfare facilities, control facilities, solar farm and wind farm spare parts storage space, a public greeting centre, common areas, maintenance work area and vehicle storage facilities.

The employee welfare facilities will be supported by an aboveground potable water tank, filled by tanker trucks, as well as a septic system for approximately 20 workers.

An access road to the operations and maintenance building will intersect with Haldimand Rd 20 and proceed south to the building parking area located directly south of the woodlot on the north end of the property. The outdoor vehicle and parts storage areas surrounding the operations and maintenance building will be gravelled. This area will also be fenced in by a 2.4 m high chain link fence.

Electrical power for the operations and maintenance facility will be provided from Haldimand County Hydro power circuits located on Haldimand Rd 20. The power will be delivered by overhead wires on overhead poles installed adjacent to the access road from Haldimand Rd 20. The overhead line will terminate on a transformer pole adjacent to the operations and maintenance building. The transformer will step down the power supply to a voltage that can be utilized within the building. The final connection of the power will be made through underground cable from the transformer pole to the building electrical service located within the building.

2.1.3.8 Operations and Maintenance Building Stormwater Management System

The operations and maintenance facility has a total area of about 3.2 ha including building storage and parking areas as well as the access road, plus a septic system and stormwater management facility. Total impervious coverage of the facility and access road footprints is expected to be about 90%. Drainage from this area is generally southerly towards the existing channel at the south property limit. Stormwater management (conveyance, treatment, and detention) will be achieved through a combination of grassed swale drainage ditches and an end-of-pipe constructed wetland stormwater management facility. While the developed drainage area is slightly less than that recommended by the MOE *Design Manual* for application of a 'wet' end-of-pipe facility, the relatively high degree of impervious coverage and 'tight' nature of on-site soils mean that the drainage area ought to generate sufficient flows to maintain a permanent pool. Drainage from the access road and operations and maintenance building/parking areas will be conveyed to the end-of-pipe facility through grassed swale drainage ditches which themselves provide water quality treatment benefits, in addition to moderate peak flow reduction. Swale runoff to the stormwater management facility will discharge into a small inlet micropool / forebay for energy dissipation and sediment retention prior to passing through the constructed wetland cell, which contains a permanent pool depth of approximately 0.3 m. The basin will provide both water quality treatment (sediment removal) and water quantity control (discharge rate restricted to existing conditions) and will be planted with vegetation species tolerant to a variety of moisture conditions. The basin will discharge in a non-erosive fashion to the existing channel at the southern site boundary.

2.2 MATERIALS BROUGHT ON SITE, CONSTRUCTION EQUIPMENT AND CONSTRUCTION ACTIVITIES

The specific materials brought on site for the construction and installation of the various Project components (e.g. access roads, foundations) are detailed below for each specific Project component. Additional materials brought on site include project infrastructure described above such as turbines, solar panels and transformers. Other construction related vehicles and machinery such as excavators, trucks used for the transport of Project components and cranes will also be brought on site during construction and installation activities. The assessment of potential environmental effects from the use of the construction equipment is provided throughout **Section 3**.

Based on the information below, it is anticipated that the following quantities of materials will be required for the construction of the Project:

- Granular A – 133,000 m^3
- Granular B – 580,000 m^3
- Rock/fill for wet areas – 3,000 m^3
- Geotextile for roadways – 58,900 m^2
- Geogrid for crane pads – 108,000 m^2
- Cement (provided by ready mix trucks) – 33,970 m^3

Hazardous materials to be used during the course of construction are related to fuels, lubricants and fluids that are required for use in construction equipment. These materials will be stored in appropriate storage units during the construction phase of the Project by the Construction Contractor. Designated storage unit areas and the type of storage units will be confirmed by the Construction Contractor prior to construction. Fueling of construction vehicles will take place within designated fueling areas such as the operations and maintenance building. The disposal of waste materials generated at the site or transported from the site is described in **Section 3.10**. Information related to groundwater withdrawal requirements during construction are detailed in **Section 3.1**.

It is envisioned that 100% of the peak labour force may be supplied through local and neighbouring communities. Consequently, no special housing, healthcare, or food facilities will be required as part of the Project's activities. On-site construction activities will be limited to daylight hours, unless approved by the County.

2.2.1 Turbine Access Road Construction

New/upgraded access roads will be constructed to support construction and transportation vehicles (including operating and maintenance phases) to each turbine site. Where possible, access has been planned in a manner that reduces the amount of land required to access the turbine sites or utilizes existing access roads, thus reducing potential impacts on the existing environment. For the wind component of the Project, the road scope of work includes approximately 45 km of access roads. Most roads will have an adjacent underground power line and fiber optic communication cable running their length. A 50 m wide constructible area from the municipal roads to the location of the wind turbine generators has been studied as part of the REA process, however the constructible area has been reduced in size in areas where constraints exist (e.g. natural features) and construction will be limited to a smaller area. Access

roads will incorporate “hammerhead” (or similar) truck turnaround areas near the turbine foundations.

During the construction of the access roads, surface material will be stripped, stockpiled and reused to the extent possible during site landscaping (note that only the land to be used by the access roads will be stripped, not the entire 50 m wide constructible area). The depth of the roadbed will be approximately 0.75 m. The construction will typically consist of 600 mm of granular ‘B’ base material topped with 150 mm of crushed gravel (Granular A). Alternatively, a woven geotextile or cement stabilized soil could also be utilized with a reduced granular material depth. The permanent road width will be approximately 5 m in straight sections with an additional 1 m compacted shoulders on each side for a total of 7 m. The roads will be wider where turning of large construction vehicles (e.g. transport trucks delivering blades, towers, and nacelles) is required.

The road construction for each turbine will utilize excavators, dozers, dump trucks and compaction equipment. The access road to each turbine will typically take two (2) to three (3) days of construction time depending on length of the road. Noise and dust will be emitted from the construction equipment used to construct the access roads. The assessment of potential environmental effects and mitigation measures from the construction of the Project including access roads are discussed below in Section 3 (including an assessment related to vegetation removal for access road construction). All wood related waste from vegetation removal will be provided to the participating landowner or disposed of at an approved off-site facility.

Culverts required for any water crossings are described within **Section 3.1** and the **Draft Water Assessment and Water Body Report** and within **Section 6** and **Appendix J** of the **Draft Natural Heritage Assessment and Environmental Impact Study**. Permits for the water crossings will be obtained from the Grand River Conservation Authority (GRCA) and Long Point Region Conservation Authority (LPRCA) prior to Project construction.

2.2.2 Turbine Foundation Construction and Crane Pads

The foundations for the turbines are made of poured in place reinforced concrete. The final foundation design will be determined based upon the site-specific detailed geotechnical assessment to be carried out in the next phase of the Project. However, the foundation will likely be an inverted “T” configuration, octagonal in shape with a diameter of approximately 16.7 m. The excavated area will be approximately 23 m x 23 m. The foundation is anticipated to be about 2.4 m deep in the centre and about 1 m at the edges. Inspections will be required by qualified geotechnical engineering personnel during excavations to confirm that conditions are safe and consistent with the requirements of the *Occupational Health and Safety Act*.

Grounding for the wind turbine will be provided by ground wire installed within the concrete foundation connected to the reinforcing steel of the foundation. A perimeter ground wire will be installed approximately 450 mm below grade around the perimeter of the foundation with periodic connections to the foundation and to 3 m long buried copper clad steel ground rods.

Connections will be made from the turbine ground wire to the internal tower and to the external wind turbine GSU transformer.

The turbine steel tower base is anchored to the concrete foundation using steel foundation mounting piece and bolts. An excavator, dozer and truck will perform the excavation for the foundation including rock excavation by mechanical means with excavating equipment (e.g. 40 T class excavators equipped with ripper bucket). Based on site specific conditions, blasting may also be utilized to assist in the excavations. The foundation itself is then back filled and compacted with select fill and native subsoil. Ready-mix trucks are used to transport the concrete to the Project Location. Approximately 45 truck trips (for concrete) to the Project Location are required per foundation. The excavation takes approximately two (2) to three (3) days per foundation. Construction of each foundation (formwork, rebar placement and concrete pour) is completed within a week. The foundation then needs to cure for up to 28 days prior to erection of the turbine.

The concrete required for the foundation construction will be provided via Ready-mix trucks. They will be used to transport the concrete to the Project Location and the contractor would be responsible for ensuring that wash water from the cleaning of concrete truck drums is disposed of in a sewage works designed for that purpose and approved under Section 53 (1) of the *Ontario Water Resources Act*, or under Part 8 of the *Building Code Act* (contractor will be responsible for determining the location of truck cleaning areas).

Crane pads will be constructed at the same time as the access roads and will be adjacent to turbine locations (within the constructability areas as shown in **Attachment A**). The general crane pad and/or mat area will be approximately 20 m x 40 m, and will typically consist of the same make up as the access road, whereas the crane platform (where the crane sits) may consist of a heavier granular make up depending on site conditions. The excavated soil will be re-used on site as feasible. If not feasible, the soil will be disposed of at an approved off-site facility. Once the turbine erection is complete, the crane pads will removed and the native topsoil replaced.

2.2.3 Turbine Assembly

The towers are delivered to each turbine site in five main sections and are assembled using a 600t - 800t crane. The nacelle arrives on-site assembled and is lifted into place by the heavy-lift crane. The rotor consists of the hub and three blades and is hoisted into place by two cranes: a large crane does the heavy lifting, while a smaller crane stabilizes the components as they are being lifted.

The components are delivered on individual oversized vehicles sufficient to carry the respective sections. The expected traffic per turbine is 14-16 heavy haul trucks with turbine components consisting of the following:

- One (1) – two (2) for the nacelle;
- Three (3) for the blades;
- Five (5) for the tower sections;
- One (1) – two (2) for the hub;
- Three (3) for the power module (at base of turbine); and
- One (1) for miscellaneous parts.

The assembly and erection of the turbine takes 3 to 5 days depending on wind conditions, since the cranes cannot operate in high winds. In addition to the cranes, there is an assortment of trailers, flatbed trucks and specialty trucks to deliver both the smaller cranes and the remaining turbine components (e.g. transformer and cabling).

The movement of these cranes between turbine sites will take place strictly along the access and municipal roads. No cross field crossings will be utilized so as to minimize potential soil impacts.

As described above, turbine laydown (prior to turbine erection) will take place adjacent to the access roads to each turbine location and has been incorporated into the Project Location design by designating a 50 m wide constructible area for the access roads (see **Attachment A** for the locations of the constructible areas). Turbine components will be temporarily placed in these locations prior to erection. No site preparation is required within these laydown areas (provided they are in safe working condition), however in locations where turbine components are temporarily stored, these areas will be restored following turbine erection to pre-existing conditions.

With the exception of one plantation, no woodland removal is anticipated for the installation of the turbines (possible hedgerow removal). Laydown areas will be outside of all wetland boundaries and constructible areas have been reduced in size and realigned in areas containing constraints to avoid woodlands, wetlands or other wildlife habitat.

2.2.4 Turbine Generator Step-Up (GSU) Transformer Construction

The wind turbine generator step-up transformers are located at the base of each wind turbine generator mast and foundation. A separate precast concrete vault is installed to receive the GSU. Typical sizes of the vault are 2.4m x 2.4m x 1.5m. A base consisting of approximately 450 mm granular B material is used to support the vault after it is lifted into place.

The GSUs are delivered by flatbed truck and trailer. A small crane is used to lift the GSU from the truck and place it directly onto the top of the precast concrete vault. No site preparation is required except for the excavating of the void for the precast concrete vault.

Grounding is required for each GSU. This consists of 4 – 19 mm diameter by 3 m long ground rods which are driven vertically into the ground, forming a square pattern around the GSU. They are inter-connected by bare copper wire and two connections of this ground grid are made to the GSU. The grounding of the GSU is interconnected to the overall wind turbine ground grid. Mechanical protection for the GSU in the form of bollards may be installed around the entire GSU assembly.

During the construction of the GSU vault, surface material will be excavated, stockpiled and reused to the extent possible during site landscaping (note that only the land to be used by the GSU areas will be stripped). The depth of the SSU utility vault will be approximately 2 m. The construction will typically consist of 450 mm of engineered fill/onsite crushed materials to form a base slab on which the vault will be positioned.

The area construction utilizes one (1) excavator, two (2) dump trucks and compaction equipment. The GSU vaults will take twelve (12) to sixteen (16) weeks of construction time.

2.2.5 Wind Power Collector Line Construction

The collection of power generated by wind turbine generators will be collected via the use of underground cables on private land and via overhead pole line and/or buried line within public right-of-ways.

The underground 34.5 kV power cables from the GSUs will be laid in a trench approximately 1.2 m deep. A total of approximately 48 km of trenching will be required for the underground lines. The trench will be backfilled with fine native soil around the power cables. A fibre optic communication cable will be laid on top of the fine native soil and then clear excavated material will be backfilled and compacted on top of the power and fibre optic bedding. It will be compacted to 95% standard proctor density. Rock or large boulders will be transported off-site.

The trenching will utilize 4 crews, each consisting of one (1) excavator, two (2) dump trucks and compaction equipment. The trenching and backfilling will take five (5) to seven (7) months of construction time.

If overhead poles are used, the power trenches will terminate at an underground to overhead transition pole within the public right-of-way or on the private property directly adjacent to the wind turbine access road. The location of the transition pole will be dependent on which side of the municipal road the overhead pole line is located on and the width of the public right-of-way at the specific location. The pole is constructed of pressure-treated wood and is installed direct buried. The power cable rises up the pole and terminates on an electrical isolation/protection device. Power from the device is connected to the wind power collector circuit for the area

which consists of bare aluminum conductors. The conductors are strung from pole to pole in a similar manner to utility distribution circuits. The poles are nominally spaced 60 m apart. Where changes in line direction occur, a guy and anchor is used to offset the tension in the line. The anchor is augured into the ground at a distance of approximately 4-5 m from the base of the pole. Where easements on private property are not possible, the overhead line is located on the opposite side of the right-of-way to accommodate the line direction change. The poles arranged along the public roads of Haldimand County will all meet at the common point of collection, the collector substation located on the solar farm land. Approximately 82 km of overhead pole and/or underground line is required to be constructed.

The installation of the overhead line poles and conductors are accomplished using at least six (6) crews of power linemen each consisting of two (2) utility bucket trucks, one (1) auguring truck, one pole trailer, two reel stand vehicles, one conductor puller vehicle, and one tensioner vehicle. An excavator may also be required in instances where an auger in not feasible. The pole installation will take approximately 24 weeks to complete. Tension stringing of the conductor will take approximately 24 weeks to complete. Final electrical connections and commissioning lasts approximately eight weeks. Augured material from each pole is usually spread around at the base of the pole. The material excavated represents no more than 0.7 cu m of soil per pole.

2.2.6 Solar Farm Land Area Preparation

The solar farm land area is used to locate the individual solar PV panels and associated power collection infrastructure. The solar farm land area will be graded by earth moving equipment to the elevations determined by the grading plans. Minimal change from the existing grades is anticipated but some grading will be performed to accommodate the construction of internal solar unit access roads. Existing catchment boundaries will be maintained.

The solar land stormwater management system will be a passive system comprised of local ditches/swales alongside the access roads constructed through the area. Because the solar cells are mounted above the ground, infiltration, filtration through vegetation and other natural hydrologic process will continue similar to existing conditions. Drainage will generally be directed to existing receiving systems (drainage paths, roadside ditches, etc.) as under current conditions. Therefore, a general area-wide stormwater system is not required. The small increase in runoff from the gravel access roads will be attenuated and filtered through local ditches and no formal basins or other management techniques are required.

The grading operation will utilize earth movers and is anticipated to take several months of construction time.

2.2.7 Solar Farm Main Access and Collector Substation Road Construction

A new main access and collector substation road will be constructed to support construction and transportation vehicles (including operating and maintenance phases) travelling to the internal solar unit access roads (laneways) and the collector substation site.

A 35 m wide workable area from Haldimand Rd 20 to the location of the collector substation has been allowed in the layout of the solar farm for purposes of access to the solar farm and collector substation and to act as a transmission corridor. During the construction of the access road, surface material will be stripped, stockpiled and reused to the extent possible during site landscaping (note that only the land to be used by the access road will be stripped, not the entire constructible area). The depth of the roadbed will be approximately 600 mm. The construction will typically consist of 450 mm of granular 'B' material, topped with 150 mm of crushed gravel (Granular A). The road width will be approximately 6 m with an additional 1 m of compacted shoulders on each side for a total width of 8 m.

The road construction will utilize excavators, dump trucks and compaction equipment. In addition, the unopened road allowance called Wilson Rd will be stopped and upgraded to also serve as an internal collector road.

2.2.8 Solar Farm Access Road Construction

New access roads will be constructed to support construction and transportation vehicles (including operating and maintenance phases) from the solar farm main access and collector substation access road to each solar unit inverter and SSU site.

For the 4 m wide access roads surrounding each solar unit component of the Project, the scope of work includes approximately 40 km of access roads. Most roads will have an adjacent underground power line and fiber optic communication cable running their length. A 10 m wide workable area has been allowed in the layout of the solar farm. During the construction of the access roads, surface material will be stripped, stockpiled and reused to the extent possible during site landscaping (note that only the land to be used by the access roads will be stripped, not the entire 10 m wide constructible area). The depth of the roadbed will be approximately 0.3 m. The construction will typically consist of 150 mm of engineered fill/onsite crushed materials, topped with 150 mm of crushed gravel (Granular A). The road construction utilizes one to two excavators, two (2) to three (3) dump trucks and compaction equipment. The solar unit access roads will take one (1) to three (3) months of construction time.

The 3 m wide access roads (laneways) between each row of solar panels (within each solar unit) will be unimproved and will not require construction preparation other than general site grading. These access roads will be seeded with native grassland species following construction for the operations phase of the Project. Snowmobiles and ATV's will be used to access the laneways during operation.

2.2.9 Solar PV Panel Installation

The individual solar PV panels measure approximately 2 m x 1 m. Each is mounted on a rack that is positioned approximately 2 m above finished grade at an angle of 28 - 35 degrees. Each rack is supported by screwed pile frame supports that are located beneath the rack approximately every 4 m. The supports are screwed into the undisturbed ground to a depth of approximately 2 m or below the frost line.

The racks and solar PV panels are delivered by truck to a construction staging at the operations and maintenance facility for temporary storage. An inventory of approximately two weeks will be stored to act as a buffer between manufacturing and installation on site. The construction staging area requirements are described below.

The racks are delivered to the specific solar unit worksite on a small truck. They are ultimately delivered by hand to the location of mounting onto the screwed pile frame supports. In a similar manner, the solar PV panels, manufactured from glass, are delivered by small truck to the location of the rack and positioned onto the rack and held securely.

There is a significant amount of DC power wiring required to interconnect the solar PV panels and deliver power generated by the solar PV panels to the solar unit inverters and SSU. DC cabling will be installed along the frame to a termination box mounted at the end of the each solar PV panel row. From there, a conduit/duct system is installed within a trench that collects the DC power of several rows into one Combiner box. The Combiner box will be mounted above grade on one of the rows support structure. DC power wiring from the combiner boxes will be routed through underground conduits/ducts to the inverter and SSU location for that unit. All wiring will be in accordance with the applicable CSA / Ontario Electrical Safety codes.

Waste materials associated with packaging and transporting the solar PV panels, racks, frames, screwed pile frame supports, and all DC wiring materials will be delivered to a refuse container at the solar unit inverter and SSU station, where it will be collected on a regular basis.

2.2.10 Solar Unit Inverter and SSU Transformer Locations

There are 100 areas adjacent to the solar units that will be required for the installation of solar unit DC to AC power invertors and step up transformers (SSU). At each location, two solar unit inverters and one SSU will be positioned on a concrete slab and concrete utility vault. They will be interconnected by plastic ducts below finished grade. The slab for the inverters will measure 6.1 m long by 2.8 m wide. The SSU utility vault will measure 2.4 m long by 2.4 m wide x 1.5 m deep. The duct will be approximately 940 mm wide by 610 mm deep by 3 m long. Where possible, these areas will be in back-to-back arrangements for two solar units and along solar unit access roads. This reduces the amount of land required for roads, thus reducing potential impacts on the existing environment. The solar unit inverters and SSU areas utilize approximately 0.6 hectares of solar farm land.

The invertors, SSUs, and precast concrete products are delivered by flatbed truck and trailer. A small crane is used to lift the products from the truck and place it directly onto the prepared surfaces/slab/vault. No site preparation is required except for the excavating of the void for the precast concrete vault and placement of granular base material.

Grounding is required for each SSU. This consists of 4 – 19 mm diameter by 3 m long ground rods which are driven vertically into the ground, forming a square pattern around the SSU. They are inter-connected by bare copper wire and two connections of this ground grid are made to the SSU. Mechanical protection for the SSU in the form of bollards may be installed around the entire SSU assembly.

During the construction of the inverter and SSU areas, surface material (topsoil) will be stripped, stockpiled and reused to the extent possible during site landscaping (note that only the land to be used by the inverter and SSU areas will be stripped). The depth of the inverter slabs will be approximately 600 mm. The construction will typically consist of 400 mm of engineered fill/onsite crushed materials, topped with 200 mm of crushed gravel (Granular A) and 50 mm of Styrofoam insulation. The depth of the SSU utility vault will be approximately 2 m. The construction will typically consist of 450 mm of engineered fill/onsite crushed materials to form a base slab on which the vault will be positioned.

The area construction utilizes one (1) excavator, two (2) dump trucks and compaction equipment. The graveled areas will take twelve (12) to sixteen (16) weeks of construction time.

2.2.11 Solar Unit Trenching Requirements

Trenching to lay DC and AC power wiring beneath grade in a concealed manner will be used to connect power throughout the solar farm area. Trenches will be required from each row of solar PV panels to the solar unit inverters and SSU locations. Trenches will be used from each solar unit inverter and SSU location to convey AC power at 34.5 kV to the collector substation. These will be installed along the edge of the graveled road network.

Typically, trenching will be excavated to a depth of 1.2 m below finished grade. The excavated material will be removed and stored on-site. Only selected excavated material will be used for filling in the trench after the conduit/cables/duct is installed. The balance of the backfilling will be accomplished using sand.

The trenching will utilize six crews, each consisting of one (1) excavator, two (2) dump trucks and compaction equipment.

2.2.12 Operations and Maintenance Building Construction Staging Area

A temporary construction staging area for the construction of the Project will be located on the land south of Haldimand Rd 20 at Mt Olivet Rd where the operations and maintenance building will be located. The staging area will be located adjacent to the operations and maintenance building completely within the outer boundary of the proposed solar unit that is to be adjacent to the operations and maintenance building. The staging area will be graveled with compacted surface material suitable for vehicular truck traffic. Prior to installation of the solar unit at this staging area location, the gravel material will be removed and the site will be prepared in the same manner as the other solar unit sites (e.g. gravel road around the solar unit and grassed laneways between each row). The staging area will be approximately 2 hectares in size and it will support the following construction operations:

- Portable construction and Owner's offices and lunch rooms;
- Parking areas for Contractor, Subcontractors and Other Contractors;
- Portable generators;
- Maintenance and tool sheds;
- Water and rinsing facilities (water to be brought in by tanker);
- Equipment storage and maintenance area;
- Approved temporary fuel tanks, in properly sized spill containment structures;
- Disposal facilities for various solid wastes;
- Temporary toilet facilities – self-contained with no on-site disposal (additional facilities will be located throughout the Project Location);
- Waste disposal containers;
- Laydown areas for small scale solar and wind farm materials, equipment; and,
- Laydown areas for electrical power collection materials.

During the construction of the graveled surface areas forming the construction staging area, surface material will be stripped and stockpiled for reuse (note that only the land to be used by the graveled areas will be stripped). The depth of the graveled areas will vary and will be dependent upon site conditions/requirements at the time of construction. Once the majority of Project construction is complete and the staging area is required for solar unit installation, as described above, all facilities will be removed including the graveled areas and the area will be used for the installation of a solar unit. The stockpiled soil stripped at the beginning of

construction operations will be placed back to its original position on the land. The staging area construction will require excavators, dozers, dump trucks and compaction equipment. The graveled areas will take four (4) to six (6) weeks of construction time.

An additional temporary staging area within the solar farm area will be constructed and removed in the same manner as described. This additional staging area will also be located in an area to be ultimately used for the installation of a solar unit.

2.2.13 Collector Substation Construction

The collector substation is built on the solar farm land as shown in **Attachment A**. The area of 85 m x 85 m must be prepared with a clear stone cover on grade for the reduction of step and touch potentials. The transformers, switchgear, VAR Capacitors, EHouse, termination gantries and other materials are delivered to the site by flat bed trucks at the appropriate times in the construction process. They are lifted off the truck by cranes and positioned onto the concrete foundations prepared for these purposes.

Grounding is required for the substation. This consists of a grid of bare copper cable laid below grade and interconnected to all equipment, EHouse and perimeter fence for the substation. The grid is installed before placement of the final layer of clear stone.

During the construction of the substation, surface material will be stripped, stockpiled and reused to the extent possible during site landscaping (note that only the land to be used by the substation will be stripped). The depth of the concrete foundations varies but will be approximately 1200 mm. The substation will typically consist of 450 mm of engineered fill/onsite crushed materials, topped with 200 mm of crushed stone (Granular A). The large concrete oil containment structures required for the transformers will be a concrete facility constructed on-site as opposed to a precast facility. A base foundation for the transformer will be surrounded by a concrete vault with sufficient air space to contain all the oil. A drain for the containment facility for each transformer will be connected to the stormwater drainage system through an oil water separator tank buried below grade. The substation stormwater management strategy is outlined in Section 2.1.3.2.

The area construction utilizes excavators, dozers, dump trucks and compaction equipment. The civil part of the substation will take 3 months of construction time. The electrical construction will take approximately 12 months.

Waste materials from the construction of the station will be delivered to the temporary construction staging area at the operations and maintenance facility for proper disposal.

2.2.14 Operations and Maintenance Building Construction

A permanent operations and maintenance building for the Project will be located on the land south of Haldimand Rd 20 at Mt Olivet Rd. The building will be prefabricated and will be founded on concrete foundations that are extended below grade to below the frost line. The building will take two to three weeks to excavate. A graveled outdoor vehicle and parts storage area will be located around the perimeter of the operations and maintenance building and will be contained by a 2.4 m high chain link fence.

A stormwater management system will be installed to the southeast of the operations and maintenance building as described in section 2.1.3.8.

2.2.15 Transmission Line Construction

The transmission line structures along Haldimand Rd 20 will be founded on individual concrete footings, located approximately every 150-200 m. The foundations will likely consist of monolithic concrete caissons. For the tangent poles the size of each footing will be approximately 1.5 m in diameter and excavated to a depth of approximately 6 m. For the angle poles the size of each footing will be approximately 2 m in diameter and excavated to a depth of approximately 9 m. Reinforcing steel will be used to reinforce the concrete for each of the monopole structure foundations. Approximately 11 cubic metres of concrete for each tangent structure and 29 cubic metres of concrete for each angle structure will be poured from Ready Mix concrete delivery trucks. Excavated material will be removed from each foundation site by excavators and dump trucks and taken to offsite storage and/or disposal.

The monopole structures will be 28 m long and will likely be shipped to the foundation site in three sections on flatbed delivery trucks. A crane will be used to erect the sections of each tower from the roadway area so that crane pads are not required.

To facilitate the tension stringing of the overhead transmission line conductors, there will be a need to establish approximately eight temporary tensioning and conductor let off sites along the right-of-way directly beneath the transmission line. Each tension stringing and conductor let off site must be equipped with a temporary ground grid consisting of 4 – 19 mm diameter by 3 m long ground rods which are driven vertically into the ground, forming a square pattern around the site. They are inter-connected by bare copper wire and two connections of this ground grid are made to all of the tensioning and conductor let off equipment.

The installation of the three transmission conductors is accomplished using six (6) crews of power lineman each typically consisting of two (2) utility bucket trucks, two reel stand vehicles, one conductor let off vehicle, and one tensioner vehicle. The structure installation will take approximately 24 weeks to complete. Tension stringing of the conductor will take approximately 24 weeks to complete.

Packaging materials for all electrical materials will be disposed of at the waste disposal containers stored at the transmission construction staging area.

Construction of the transmission line along the Haldimand Rd 20 right-of-way will require traffic control with flag persons at each end of the area of construction for the day (lane closures will be required). This affects the monopole structures, transitioning stations, and the underground ductbank at Nelles Corners.

2.2.16 Overhead/Underground Transition Stations Construction

The transitioning stations are required on the east and west sides of Nelles Corners to facilitate underground construction of the transmission line beneath Nelles Corners. An area of 20 m x 20 m must be prepared as a substation with a clear stone cover on grade for the reduction of step and touch potentials. The termination gantries and other materials are delivered to the transitioning stations by flat bed trucks at the appropriate times in the construction process. They are lifted off the truck by cranes and positioned onto the concrete foundations prepared for these purposes.

Grounding is required for the transitioning stations. This consists of a grid of bare copper cable laid below grade and interconnected to all structures and perimeter fence for the substation. The grid is installed before placement of the final layer of clear stone.

During the construction of the transitioning stations, surface material will be stripped, stockpiled and reused to the extent possible during site landscaping (note that only the land to be used by the substation will be stripped). The depth of the concrete foundations varies but will be approximately 1200 mm. The substation will typically consist of 450 mm of engineered fill/onsite crushed materials, topped with 200 mm of crushed stone (Granular A). A base foundation for the termination gantry will be constructed. It is 10 m long x 2 m wide x 1.2 m deep.

The area construction utilizes one (1) excavator, two (2) dump trucks and compaction equipment. The civil part of the substation will take 2 months of construction time. The electrical construction will take approximately 6 months. Waste materials from the construction of the transitioning stations will be disposed of at the waste disposal containers stored at the transmission construction staging area.

2.2.17 Underground Transmission Conductors

A concrete encased ductbank will be constructed along the Haldimand Rd 20 right-of-way at a minimum depth of 1.2 m. The ductbank will be approximately 700 m and be located beneath Nelles Corners. The ductbank will house individual PVC ducts for each of the 230 kV power cables, the ground cable and the fiber optic cable. All will be encased in concrete delivered by Ready-Mix trucks.

The excavated material will be removed and stored off-site. Only selected excavated material will be used for filling in the trench after the ducts are installed. At each end of the ductbank will be a utility pulling vault measuring 5 m long x 3 m wide x 3 m deep. During the construction of the ductbank, an excavation will be made for the utility pulling vaults. The depth of the utility vault will be approximately 3.5 m. The construction will typically consist of 450 mm of engineered fill/onsite crushed materials to form a base slab on which the vault will be positioned. A crane is used to lift the vault into place from a flatbed delivery truck.

The trenching will typically utilize 1 crew, each consisting of excavators, dump trucks and compaction equipment. The trenching will take six (6) to eight (8) weeks of construction time.

Space within the right-of-way will be required to facilitate the pulling of the 230 kV conductors into the ducts within the ductbank. Pulling equipment will be located at the utility vaults.

2.2.18 Interconnect Station Construction

The 230 kV transmission line will terminate at an interconnect station located on the north side of Haldimand Rd 20, just east of the transmission corridor east of Hagersville on the Dufferin Aggregates land as shown in **Attachment A**. The transmission line overhead conductors will terminate on a termination gantry (structure) contained within the station area. The station will also contain a 230 kV switchgear circuit breaker, motorized isolation switch, and a small EHouse for protection control and SCADA equipment. The station will be enclosed by a chain link fence measuring 40 m wide x 40 m long x 2.4 m high. The area must be prepared as a substation with a clear stone cover on grade for the reduction of step and touch potentials. The termination gantries, switchgear, EHouse and other materials are delivered to the site by flat bed trucks at the appropriate times in the construction process. They are lifted off the truck by cranes and positioned onto the concrete foundations prepared for these purposes.

Grounding is required for the substation. This consists of a grid of bare copper cable laid below grade and interconnected to all equipment, EHouse and perimeter fence for the substation. The grid is installed before placement of the final layer of clear stone.

During the construction of the substation, surface material will be stripped, stockpiled and reused to the extent possible during site landscaping (note that only the land to be used by the interconnect station will be stripped). The depth of the concrete foundations varies but will be approximately 1200 mm. The substation will typically consist of 450 mm of engineered fill/onsite crushed materials, topped with 200 mm of crushed stone (Granular A). A base foundation for the termination gantry will be constructed. It is 10 m long x 2 m wide x 1.2 m deep.

The stormwater management strategy for the interconnect station was described in Section 2.1.3.6. Drainage will be accommodated in swales alongside the access road and no further stormwater infrastructure is required.

The area construction utilizes one (1) excavator, two (2) dump trucks and compaction equipment. The civil part of the substation will take 3 months of construction time. Noise and dust will be emitted from the construction equipment used to construct the substation and the assessment of potential environmental effects from the construction of the Project including these areas is discussed below in **Section 3**. The electrical construction will take approximately 12 months.

2.2.19 Transmission Construction Staging and Laydown Area

A temporary construction staging area for the construction of the transmission line will be located on the Dufferin Aggregates land on the north side of Haldimand Rd 20, adjacent to the east side of the transmission corridor, just east of Hagersville. The temporary construction staging and laydown area will be adjacent to the interconnect station. It will be a graveled compacted surface suitable for vehicular truck traffic.

The staging laydown area will be approximately 0.8 hectares in size and it will support the following construction operations:

- Portable construction staff lunch rooms;
- Parking areas for Contractor, Subcontractors and Other Contractors;
- Portable generators;
- Maintenance and tool storage;
- Water and rinsing facilities (water to be brought in by tanker);
- Equipment storage and maintenance area;
- Approved temporary fuel tanks, in properly contained spill containment structures;
- Disposal facilities for various solid wastes;
- Temporary toilet facilities – self-contained with no on-site disposal;
- Waste disposal containers;
- Laydown areas electrical power collection materials.

During the construction of the graveled surface areas forming the transmission construction staging area, surface material will be stripped, stockpiled for reuse when the Project is completed (note that only the land to be used by the graveled areas will be stripped). The depth of the graveled areas will vary and will be dependent upon site conditions/requirements at the

time of construction. Once construction is complete, all facilities and the storage area will be removed including the graveled areas. The stockpiled soil stripped at the beginning of construction operations will be placed back to its original position on the land.

The area construction will utilize excavators, dump trucks and compaction equipment. The graveled areas will take two (2) to four (4) weeks of construction time.

2.2.20 Component Transportation to the General Area

Siemens (the turbine manufacturer) will be responsible for the transportation of all wind turbine components and related construction equipment to the project site and the solar PV panel manufacturer will be responsible for the solar panels.

Both the turbine and solar manufacturers will be completing a transportation study to determine the route of Project materials to the general area. This information will be provided to Haldimand County prior to component transportation to the area. Along the component transportation route, intersections may require road widening to accommodate the turning radius of the transport vehicles (to be determined as part of the transportation study). As appropriate, the turbine and/or solar manufacturer will be responsible for acquiring permits (where appropriate) for any road upgrades or other uses required for component transportation. SPK will pay for any temporary or permanent road widening activities and structural upgrades. Once the full road requirements have been finalized, detailed plans including maintenance of the municipal roads will be developed with Haldimand County as appropriate.

2.2.21 Land Surveying and Geotechnical Surveys

Preliminary geotechnical work was completed across the wind farm, solar farm and transmission line components of the Project to confirm site-specific conditions within the Study Area. This information was used to determine the suitability of the area in general. It was found that the soil and bedrock conditions are conducive for the design and construction of the Project. Additional detailed geotechnical work will be required prior to Project construction.

Prior to construction, a registered Ontario Land Surveyor (or equivalent) will survey all access road, collector line, transmission line, turbine locations, and solar lands as appropriate. Any temporary work locations may also be surveyed to ensure construction vehicles and personnel stay within the demarcated areas.

2.2.22 Timing and Construction Plans

A description of the key construction activities are provided below in **Table 2.2**. Construction activities leading up to Project operations are anticipated to take approximately 15-20 months. Additional timing requirements with respect to natural heritage features such as wildlife and wildlife habitat are provided within the **Draft NHA/EIS**.

Table 2.2: Construction Activities – Projection and Schedule

Phase Details	Schedule
Surveying	August 2011 – November 2011
Delivery of construction materials, storage materials, site preparation, construction of access roads and crane pads	March 2012 – January 2013
Installation of tower foundations	March 2012 – September 2012
Tower/turbine delivery and erection	May 2012 – November 2012
Solar panel delivery and installation	March 2012 – December 2012
Installation of collector lines and transmission line	March 2012 – January 2013
Installation of collector substation	March 2012 – January 2013
Installation of operations and maintenance building	March 2012 – September 2012
Installation of interconnect facility and transition stations	March 2012 – January 2013
Reclamation of temporary work areas, final grading, topsoil replacement	July 2012 – January 2013
Project Testing	January 2013 – February 2013
Commercial Operation	March 2013

Note: Construction activities will take place during normal business hours. When construction is anticipated to be required outside of normal business hours, the timing will be discussed in advance with the County.
In the event changes are required to the proposed construction schedule, updated construction schedules will be provided to the public through postings on the Project website (www.SamsungRenewableEnergy.com).

2.2.23 Temporary Uses of Land

As identified above, the lands to be temporarily used during the construction of the Project include the temporary laydown areas paralleling the access roads and turbine locations, the turbine crane pads, the transmission construction staging and laydown area at the interconnect station, the operations and maintenance building construction staging area, and the solar land staging area. The requirements for these temporary areas including upgrades and restoration are described above.

2.2.24 Materials Generated at, or Transported from, the Project Location

Waste materials brought to the site that will require removal include equipment packaging, scraps, fuels and other lubricants and will require reuse, recycling, and/or disposal at an appropriate MOE-approved off-site facility.

Waste that is generated at or transported from the Project Location is described below. Sanitary waste generated during the construction phase will be collected via portable toilets and wash stations supplied by a licensed third party who will be retained prior to the start of major construction activities. The excavated area for the foundations and other infrastructure will consist of surface and subsurface materials. These materials excluding excavated soil will require removal from the site and disposal at an approved off-site facility. This will require the use of large dump trucks that are capable of transporting heavy loads of excavated material.

The exact type of truck and number of truck trips required for the removal of gravel, fill, and excavated material will be determined and confirmed by the Construction Contractor prior to construction of the Project. The excavated soil removed for installation of infrastructure such as access roads, crane pads, substation, foundations, etc., will be re-used on site as feasible. If not feasible, the soil will be disposed of at an MOE-approved off-site facility to be determined by the Construction Contractor and discussed with the County. Should contaminated soil be encountered during the course of excavations, the contaminated material will be disposed of in accordance with the current appropriate provincial legislation, such as Ontario Regulation 347, the General – Waste Management Regulation. Additional information related to waste materials generated during construction including disposal techniques and mitigation measures are detailed in **Section 3.10**.

There will be no long-term on-site storage of waste during the construction of the Project and final disposal of waste will be conducted by a third-party contractor at an MOE-approved facility.

3.0 Potential Effects and Mitigation Measures

The following construction-specific potential effects and mitigation measures have been identified and analyzed for any negative environmental effects that may result from construction/installation activities within the zone of investigation (120 m from the boundary of the Project Location). A description of the existing natural environment can be found within the **Draft NHA/EIS**, **Draft Heritage and Archaeological Report**, and **Draft Water Assessment and Water Body Report**. Where a significant natural feature is located within the zone of investigation, a detailed analysis of the potential effects is provided in the **Draft NHA/EIS**, **Draft Heritage and Archaeological Report** and **Draft Water Assessment and Water Body Report** and has been summarized below. The construction site plan (**Attachment A**) clearly identifies all natural features within the zone of investigation and the Project Location in relation to the natural feature. The Construction Environmental Management Plan (CEMP) and Construction Environmental Effects Monitoring Plan details additional mitigation measures and are discussed in Sections 4 and 5.

3.1 WATERBODIES AND AQUATIC RESOURCES

3.1.1 GROUNDWATER

Groundwater levels were measured during the preliminary geotechnical investigations via boreholes and depth to groundwater levels ranged from 0.4 m to 12.5 m. It was noted that the groundwater levels were subject to seasonal fluctuations and changes due to major weather events.

3.1.1.1 Wind Component

Potential Effects

There is potential for groundwater to be encountered during the installation of the turbine foundations, access roads, and underground collector lines. Based on this, groundwater seepage would have to be controlled during grubbing and stripping and during subsequent excavation and fill placement. As such, it is possible that some dewatering activities may be required when installing the tower foundations, access roads, and/or underground collector lines. Due to the dominance of clay soils within the Project Location, seepage is anticipated to be nominal and controllable with standard sump pumps and is anticipated to be below the threshold of 50,000 L/day (the required level for a Permit to Take Water).

Some materials, such as fuel, lubricating oils and other fluids associated with turbine construction, have the potential for discharge to the on-site environment through accidental spills and thus infiltrate groundwater supplies.

Mitigation Measures

It is possible that near-surface groundwater may be encountered in the course of excavations; however, it is extremely unlikely that quantities withdrawn will exceed the threshold for the MOE's requirement for a Temporary Permit To Take Water (i.e. >50,000 L per day) and will not negatively affect groundwater quality, quantity, or movement. Any water pumped from excavated areas will be directed away from natural features and not directly into wetlands.

Given the amount of water that is anticipated to be encountered (below the threshold for a permit), it is anticipated that private wells (if present) will not be affected by construction activities. If well water quality or quantity is disturbed as a result of construction, SPK will provide a temporary potable water supply until corrective measures are taken and will comply with MOE Guideline B-9: Resolution of Groundwater Interference Problems.

The Construction Emergency Response and Communications Plan will contain procedures for spill contingency and response plans, spill response training, notification procedures, and necessary cleanup materials and equipment. As per s.13 of the *Environmental Protection Act*, all spills that could potentially have an adverse environmental effect, are outside the normal course of events, or are in excess of prescribed regulatory levels should be reported to the MOE's Spills Action Centre.

Net Effects

Some temporary disturbance may be possible during the excavation of the turbine foundations and/or installation of the access roads and underground collector lines. However, with the implementation of good construction practices (e.g. minimizing the length of time that the excavation is open and monitoring seepage into the excavation should it occur), it is anticipated any potential effects would be short term in nature and have little to no effect on groundwater quality and adjacent private water wells.

3.1.1.2 Solar Component

Potential Effects

There is potential for groundwater to be encountered during the installation of the solar panel foundations and access roads. Based on this, groundwater seepage would have to be controlled during grubbing and stripping and during subsequent excavation and fill placement. As such, it is possible that some dewatering activities may be required when installing the panels and access roads. Due to the dominance of clay soils within the Project Location, seepage is anticipated to be nominal and controllable with standard sump pumps and be below the threshold of 50,000 L/day.

Some materials, such as fuel and other fluids associated with construction equipment have the potential for discharge to the on-site environment through accidental spills and thus infiltrate groundwater supplies.

Mitigation Measures

It is possible that near-surface groundwater may be encountered in the course of excavations; however, it is extremely unlikely that quantities withdrawn will exceed the threshold for the MOE's requirement for a Temporary Permit To Take Water (i.e. >50,000 L per day) and will not negatively affect groundwater quality, quantity, or movement. Any water pumped from excavated areas will be directed to away from natural features and not directly into wetlands.

Given the amount of water that is anticipated to be encountered (below the threshold for a permit), it is anticipated that private wells (if present) will not be affected by construction activities. If well water quality or quantity is disturbed as a result of construction, SPK will provide a temporary potable water supply until corrective measures are taken and will comply with MOE Guideline B-9: Resolution of Groundwater Interference Problems.

The Construction Emergency Response and Communications Plan will contain procedures for spill contingency and response plans, spill response training, notification procedures, and necessary cleanup materials and equipment. As per s.13 of the *Environmental Protection Act*, all spills that could potentially have an adverse environmental effect, are outside the normal course of events, or are in excess of prescribed regulatory levels should be reported to the MOE's Spills Action Centre.

Net Effects

Some temporary disturbance may be possible during the excavation of the solar panel foundations. However, with the implementation of good construction practices (e.g. minimizing the length of time that the excavation is open and monitoring seepage into the excavation should it occur), it is anticipated any potential effects would be short term in nature and have little to no effect on groundwater quality and adjacent private water wells.

3.1.1.3 Electrical Transmission Component

Potential Effects

There is potential for groundwater to be encountered during the installation of the transmission line tower foundations, substation, and operations and maintenance building. Based on this, groundwater seepage would have to be controlled during grubbing and stripping and during subsequent excavation and fill placement. As such, it is possible that some dewatering activities may be required.

Some materials, such as fuel and other fluids associated with construction equipment and transformers have the potential for discharge to the on-site environment through accidental spills and thus infiltrate groundwater supplies.

Mitigation Measures

It is possible that near-surface groundwater may be encountered in the course of excavations; however, it is extremely unlikely that quantities withdrawn will exceed the threshold for the MOE's requirement for a Temporary Permit To Take Water (i.e. >50,000 L per day) and will not negatively affect groundwater quality, quantity, or movement. Any water pumped from excavated areas will be directed to away from natural features and not directly into wetlands.

Given the amount of water that is anticipated to be encountered (below the threshold for a permit), it is anticipated that private wells (if present) will not be affected by construction activities. If well water quality or quantity is disturbed as a result of construction, SPK will provide a temporary potable water supply until corrective measures are taken and will comply with MOE Guideline B-9: Resolution of Groundwater Interference Problems.

The Construction Emergency Response and Communications Plan will contain procedures for spill contingency and response plans, spill response training, notification procedures, and necessary cleanup materials and equipment. As per s.13 of the *Environmental Protection Act*, all spills that could potentially have an adverse environmental effect, are outside the normal course of events, or are in excess of prescribed regulatory levels should be reported to the MOE's Spills Action Centre.

Net Effects

Some temporary disturbance may be possible during the excavation of the solar panel foundations. However, with the implementation of good construction practices (e.g. minimizing the length of time that the excavation is open and monitoring seepage into the excavation should it occur), it is anticipated any potential effects would be short term in nature and have little to no effect on groundwater quality and adjacent private water wells.

3.1.2 SURFACE WATER, STORMWATER, AND FISH AND FISH HABITAT

Surface water bodies (e.g. lakes, watercourses) within 120 m of the Project Location are described in the **Draft Water Assessment and Water Body Report** (extended to 300 m in a review of Lake Trout lakes). This includes information obtained during the records review and site investigations.

A fish habitat assessment was conducted to determine the quality of fish habitat within 120 m of the Project Location. The assessment of fish habitat followed the criteria established by the MNR (1994), which has been developed based on levels of protection required for proposed developments in and around lakes and watercourses. This assessment was also used to characterize watercourses according to Fisheries and Oceans Canada (DFO) fish habitat types. Information related to the site investigations is provided in the **Draft Water Assessment and Water Body Report**.

The Project Location encompasses eight subwatersheds located between the south bank of the Grand River and the north shore of Lake Erie. The eight subwatersheds fall within the jurisdiction of two Conservation Authorities, as presented below:

Long Point Region Conservation Authority (LPRCA)

- Stoney Creek
- Hemlock Creek
- Wardells Creek
- Evans Creek

Grand River Conservation Authority (GRCA)

- Unnamed Grand River Tributaries
- Holmes Creek and Sulphur Creek
- Unnamed Lake Erie Tributaries
- Mazi Drain

Potential effects and recommended mitigation measures vary by Project Component, and are discussed in the following sections. Project infrastructure and/or construction activities may require the crossing of navigable waters. Confirmation of the presence of these waters will be obtained from Transport Canada and permits (if required) will be obtained prior to construction.

In addition, any of the various construction activities outlined in this report for the various Project components will result in the disturbance of at-surface soils to various extents, ranging from construction traffic to topsoil stripping and/or grading activities involving cutting or filling, all of which expose the underlying earth to potential erosion and sediment transport to off-site locations. An evaluation of the site's erosion potential yields a general conclusion of 'low', owing primarily to the flat character of the areas and the low erodibility of in-situ Haldimand / Lincoln clay soils. In all instances where the potential for erosion is identified a series of control measures will be implemented including, but not limited to:

- Erect silt fence before grading begins on the downstream side of the area to be graded to protect the downstream lands from potential sediment transport that may be entrained in overland flows.
- Direct runoff via swales and erosion control berms (where necessary) to sediment control measures to ensure that no untreated runoff is discharged from the site.
- Utilize the proposed end-of-pipe SWM facilities as temporary sediment control measures.
- Install temporary rock check dams in swales where appropriate to help attenuate flows, reduce erosive velocities, and encourage sediment deposition.
- Immediately stabilize all disturbed areas not subject to construction activities within 30 days, according to OPSS 804.

Silt barriers (e.g., fencing) will be erected along wetland and woodland edges located within 30 m of construction work areas (access roads, laydown areas) to minimize potential sediment transport to the natural features. In order to ensure the effectiveness of the various erosion and sediment control measures, an appropriate inspection and maintenance program is necessary. The inspection activities will include:

- Inspection of the erosion and sediment controls after each significant rainfall event or weekly, whichever is more frequent.
- Inspections should include all silt fence installations, rock-check dams, the sediment control facility, outlets and vegetation.
- Submission of regular monitoring results to the conservation authorities during active construction periods.

3.1.2.1 Wind Component

Potential Effects

The wind component of the Project overlaps with the following subwatersheds:

- Hemlock Creek
- Wardells Creek
- Evans Creek
- Holmes Creek and Sulphur Creek
- Unnamed Lake Erie Tributaries
- Mazi Drain

The Project is not anticipated to require significant alteration to surface water runoff, or to involve the storage of surface water. The access roads will not impact stormwater flow as culverts will be installed where required.

No wind turbines have been located within 30 m of the average annual high water mark of a lake or a permanent or intermittent watercourse (measured from blade tip).

Potential effects to water bodies and fish habitat resulting from the wind component relate to four general activities, as follows (see Section 4.0 in the **Draft Water Assessment and Water Body Report** for additional information):

- Turbine Construction:
    - Increase in watercourse turbidity.
- Culvert and Access Road Construction:
    - Disturbance to aquatic biota and habitat during installation;

- Permanent enclosure of portions of a watercourse;
- Loss of bed material within the culvert structure; and
- Disturbance or loss of riparian vegetation within road allowance.

- Overhead Collector Line Installation:
  - Disturbance or loss of riparian vegetation; and
  - Increase in watercourse turbidity.
- Underground Collector Line Installation:
  - Collapse of punch and bore hole under watercourse;
  - Disturbance or loss of riparian vegetation; and
  - Introduction of deleterious substances to watercourse during machinery fording.

Some materials, such as fuel, lubricating oils and other fluids associated with turbine construction and fuelling of equipment, have the potential for discharge to the on-site environment through accidental spills.

Mitigation Measures

The Construction Emergency Response and Communications Plan will contain procedures for spill contingency and response plans, spill response training, notification procedures, and necessary cleanup materials and equipment. As per s.13 of the *Environmental Protection Act*, all spills that could potentially have an adverse environmental effect, are outside the normal course of events, or are in excess of prescribed regulatory levels should be reported to the MOE's Spills Action Centre.

Where applicable, DFO Operational Statements should be followed to protect fish and fish habitat. There are DFO Operational Statements for the following:

- High-pressure directional drilling;
- Isolated or Dry Open-cut Watercourse Crossings (less than 5 m wide between high water marks);
- Punch and Bore Crossings;
- Overhead Line Construction; and

- Temporary Watercourse Crossings.

DFO Operations Statements can be found in Appendix F of the **Draft Water Body and Water Assessment Report**.

All in-water work should have regard for in-water construction timing windows, which should be determined through additional consultation with the MNR prior to construction.

To address the potential effects, erosion and sediment control measures will be implemented during all construction activities. The Construction Contractor should obtain adequate quantities of materials in order to control erosion and sediment deposition. Additional supplies should be maintained on-site in a readily accessible location for maintenance and contingency purposes. Required supplies may include:

- Silt fencing;
- Straw/hay bales;
- Wooden stakes;
- Sand bags;
- Water energy dissipater;
- Filter cloth;
- Water pumps (including stand-by pumps and sufficient lengths of hose); and
- Snow fencing with sufficient quantities of t-bars.

Erosion and sediment control measures will be installed and additional measures may be installed, at the discretion of the Construction Contractor. Barriers should be inspected regularly to ensure proper functioning and maintenance. Vegetation removal on the slopes of watercourses should be minimized to the extent possible, to minimize the risk of slope failure and siltation. Watercourse banks and the associated water feature (i.e. the area between erosion control fences) should not be disturbed until necessary for construction activities. Materials removed or stockpiled (e.g. excavated soil, backfill material, etc.) should be deposited and contained in a manner to ensure sediment does not enter a watercourse, at least 30 m from a watercourse.

As soon as possible following completion of the construction activity at a watercourse, watercourse banks should be restored to their original grade. Seeding should be completed during favourable climatic conditions. Once sown, seed should be protected with a layer of erosion control matting that would assist in stabilizing the slope and propagation of the seed mixture. In the event that broadcast seeding is not feasible due to seasonal restrictions, hydroseeding should be considered. Erosion and sediment control measures should remain securely installed until permanent vegetation measures are successful and areas are stabilized, as determined by the Construction Contractor.

Even with properly installed erosion and siltation control measures, extreme runoff events could result in collapse of silt fencing, slope or trench failures and other problems which could lead to siltation of water bodies. If siltation to a watercourse occurs, related construction activities should cease immediately until the situation is rectified.

For specific mitigation measures associated with the construction and installation of any new culvert crossings including where temporary isolation of the work area is required, see the **Draft Water Assessment and Water Body Report**. As appropriate, the Construction Contractor (or certified/qualified designate) should be on-site during installation of watercourse crossings to ensure compliance with specifications and site plans. In particular, the Construction Contractor should ensure that pre-construction preparation is completed prior to commencement of in-water work and that bank, bed, and floodplains are restored to pre-existing conditions, as possible, following completion of the construction activities.

Net Effects

With the implementation of the protection measures, any associated effects to surface water and water bodies would be both spatially and temporally limited and, therefore, no significant negative construction effects are anticipated to surface water, water bodies and fish and fish habitat. It is anticipated that there will be no net effects to seepage areas or to Lake Trout lakes that are at or above development capacity.

3.1.2.2 Solar Component

Potential Effects

The solar component of the Project overlaps with the following subwatersheds:

- Unnamed Grand River Tributaries
- Wardells Creek

Potential effects to water bodies and fish habitat resulting from the solar component relate to three general activities as follows (see the **Draft Assessment Water and Water Body Report**):

- Solar Panel installation
    - An increase in watercourse turbidity.
- Culvert and Access Road Construction:
    - Disturbance to aquatic biota and habitat during installation;
    - Permanent enclosure of portions of a watercourse;

  - Loss of bed material within the culvert structure; and
  - Disturbance or loss of riparian vegetation within road allowance.

- Underground Collector Line Installation:
  - Collapse of punch and bore hole under watercourse;
  - Disturbance or loss of riparian vegetation; and
  - Introduction of deleterious substances to watercourse during machinery fording.

Some materials, such as fuel, lubricating oils and other fluids associated with turbine construction, have the potential for discharge to the on-site environment through accidental spills.

No solar panels or transformers have been located within 30 m of the average annual high water mark of a lake or within 30 m of a permanent or intermittent watercourse. No construction for the solar component will occur within 300 m of the average annual high water mark of a Lake Trout lake that is at or above development capacity.

A solar land stormwater management system will be installed which will be a passive system comprised of local vegetated ditches/swales alongside the access roads constructed through the area. Because the solar cells are mounted above the ground, infiltration, filtration through vegetation and other natural hydrologic process will continue similar to existing conditions. Drainage will generally be directed to existing receiving systems (drainage paths, roadside ditches, etc.) as under current conditions. Therefore, a general area-wide stormwater treatment and/or detention systems are not required. The small increase in runoff from the gravel access roads will be attenuated and filtered through local ditches and no formal basins or other management techniques are required.

Mitigation Measures

The Construction Emergency Response and Communications Plan will contain procedures for spill contingency and response plans, spill response training, notification procedures, and necessary cleanup materials and equipment. As per s.13 of the *Environmental Protection Act*, all spills that could potentially have an adverse environmental effect, are outside the normal course of events, or are in excess of prescribed regulatory levels should be reported to the MOE's Spills Action Centre.

Where applicable, DFO Operational Statements should be followed to protect fish and fish habitat. There are DFO Operational Statements for the following:

- High-pressure directional drilling;

- Isolated or Dry Open-cut Watercourse Crossings (less than 5m wide between high water marks);
- Punch and Bore Crossings;
- Overhead Line Construction; and
- Temporary Watercourse Crossings.

DFO Operations Statements can be found in Appendix F of the **Draft Water Assessment and Water Body Report**.

All in-water work should have regard for in-water construction timing windows, which should be determined through consultation with the MNR. Erosion and sediment control measures will be implemented during all construction activities. The contractor should obtain adequate quantities of materials in order to control erosion and sediment deposition. Additional supplies should be maintained on-site in a readily accessible location for maintenance and contingency purposes. Required supplies may include:

- Silt fencing;
- Straw/hay bales;
- Wooden stakes;
- Sand bags;
- Water energy dissipater;
- Filter cloth;
- Water pumps (including stand-by pumps and sufficient lengths of hose); and
- Snow fencing with sufficient quantities of t-bars.

Erosion and sediment control measures will be installed and additional measures may be installed, at the discretion of the Construction Contractor. Barriers should be inspected regularly to ensure proper functioning and maintenance. Vegetation removal on the slopes of watercourses should be minimized to the extent possible, to minimize the risk of slope failure and siltation. Watercourse banks and the associated water feature (i.e. the area between erosion control fences) should not be disturbed until necessary for construction activities. Materials removed or stockpiled (e.g. excavated soil, backfill material, etc.) should be deposited and contained in a manner to ensure sediment does not enter a watercourse.

As soon as possible following completion of the construction activity, watercourse banks should be restored to their original grade. Seeding should be completed during favourable climatic conditions. Once sown, seed should be protected with a layer of erosion control matting that would assist in stabilizing the slope and propagation of the seed mixture. In the event that broadcast seeding is not feasible due to seasonal restrictions, hydroseeding should be considered. Erosion and sediment control measures should remain securely installed until

permanent vegetation measures are successful and areas are stabilized, as determined by the Construction Contractor.

Even with properly installed erosion and siltation control measures, extreme runoff events could result in collapse of silt fencing, slope or trench failures and other problems which could lead to siltation of water bodies. If siltation to a watercourse occurs, related construction activities should cease immediately until the situation is rectified.

As appropriate, the Construction Contractor (or certified/qualified designate) should be on-site during installation of watercourse crossings to ensure compliance with specifications and site plans. In particular, the Construction Contractor should ensure that pre-construction preparation is completed prior to commencement of in-water work and that bank, bed, and floodplains are restored to pre-existing conditions, as possible, following completion of the construction activities.

Net Effects

With the implementation of the protection measures, any associated effects to surface water and water bodies would be both spatially and temporally limited, therefore no significant negative construction effects are anticipated to surface water and water bodies. It is anticipated that there will be no net effects to seepage areas located within 120 m of solar panels.

3.1.2.3 Electrical Transmission Component

Potential Effects

The electrical transmission component of the Project overlaps with the following subwatersheds:

- Stoney Creek
- Hemlock Creek
- Wardells Creek

Potential effects to water bodies and fish habitat resulting from the electrical transmission component relate to three general activities as follows (see the **Draft Water Assessment and Water Body Report**):

- Culvert and Access Road Construction:
    - Disturbance to aquatic biota and habitat during installation;
    - Permanent enclosure of portions of a watercourse;
    - Loss of bed material within the culvert structure; and

  - Disturbance or loss of riparian vegetation within road allowance.

- Overhead Collector Line Installation:
  - Disturbance or loss of riparian vegetation; and
  - Increase in watercourse turbidity.
- Underground Collector Line Installation:
  - Collapse of punch and bore hole under watercourse;
  - Disturbance or loss of riparian vegetation; and
  - Introduction of deleterious substances to watercourse during machinery fording.

Some materials, such as fuel, lubricating oils and other fluids associated with transformer and building construction have the potential for discharge to the on-site environment through accidental spills. Within the substation footprint itself, the two transformers will be equipped with oil containment storage areas to capture oil in the event of a leak. Additionally, an oil/water separator will be incorporated into the design to treat any effluent before it enters the storm drainage swales.

Area drainage from the collector substation will be accomplished through a series of swales adjacent to the proposed access road that will collect and convey runoff from the substation area and associated access road west and south towards Haldimand Rd 20. The total drainage area associated with the substation and access road "hard" surfaces is less than 2 ha and therefore a "wet" water quality control pond (i.e. one containing a permanent pool) is inappropriate, as per the MOE *SWM Planning and Design Guidelines Manual (2003)*. In addition to the conveyance of runoff, the series of grassed swales will also provide water quality control, which is a suitable stormwater management practice for such an area according to the MOE guidelines. Water quantity control will be provided using a dry detention pond for the storage and slow release of runoff to the existing ditch and drainage system along Haldimand Road 20. Drainage from the solar lands will largely be conveyed around the substation facility, access road, and associated stormwater management measures through the use of diversion swales given that it does not require treatment or detention.

Stormwater management for the operations and maintenance building (conveyance, treatment, and detention) will be achieved through a combination of grassed swale drainage ditches and an end-of-pipe constructed wetland stormwater management facility. While the developed drainage area is slightly less than that recommended by the MOE *Design Manual* for application of a 'wet' end-of-pipe facility, the relatively high degree of impervious coverage and 'tight' nature of on-site soils mean that the drainage area ought to generate sufficient flows to maintain a

permanent pool. Drainage from the access road and operations and maintenance building/parking areas will be conveyed to the end-of-pipe facility through grassed swale drainage ditches which themselves provide water quality treatment benefits, in addition to moderate peak flow reduction. Swale runoff to the stormwater management facility will discharge into a small inlet micropool / forebay for energy dissipation and sediment retention prior to passing through the constructed wetland cell, which contains a permanent pool depth of approximately 0.3 m. The basin will provide both water quality treatment (sediment removal) and water quantity control (discharge rate restricted to existing conditions) and will be planted with vegetation species tolerant to a variety of moisture conditions. The basin will discharge in a non-erosive fashion to the existing channel at the southern site boundary.

The transformer substation will not be located within 30 m of the average annual high water mark of a lake and a permanent or intermittent watercourse. No construction for the transmission line or transformer substation will occur within 300 m of the average annual high water mark of a Lake Trout lake that is at or above development capacity or is anticipated to have an effect on a seepage area within 120 m of the Project Location.

Mitigation Measures

The Construction Emergency Response and Communications Plan will contain procedures for spill contingency and response plans, spill response training, notification procedures, and necessary cleanup materials and equipment. As per s.13 of the *Environmental Protection Act*, all spills that could potentially have an adverse environmental effect, are outside the normal course of events, or are in excess of prescribed regulatory levels should be reported to the MOE's Spills Action Centre.

Where applicable, DFO Operational Statements should be followed to protect fish and fish habitat. There are DFO Operational Statements for the following:

- High-pressure directional drilling;
- Isolated or Dry Open-cut Watercourse Crossings (less than 5m wide between high water marks);
- Punch and Bore Crossings;
- Overhead Line Construction; and
- Temporary Watercourse Crossings.

DFO Operations Statements can be found in Appendix F of the **Draft Water Assessment and Water Body Report**. Timing windows for any in-water work should be determined through consultation with the MNR.

Erosion and sediment control measures will be implemented during all construction activities. The contractor should obtain adequate quantities of materials in order to control erosion and sediment deposition. Additional supplies should be maintained on-site in a readily accessible location for maintenance and contingency purposes. Required supplies may include:

- Silt fencing;
- Straw bales;
- Wooden stakes;
- Sand bags;
- Water energy dissipater;
- Filter cloth;
- Water pumps (including stand-by pumps and sufficient lengths of hose); and
- Snow fencing with sufficient quantities of t-bars.

Erosion and sediment control measures will be installed and additional measures may be installed, at the discretion of the Construction Contractor. Barriers should be inspected regularly to ensure proper functioning and maintenance. Vegetation removal on the slopes of watercourses should be minimized to the extent possible, to minimize the risk of slope failure and siltation. Watercourse banks and the associated water feature (i.e. the area between erosion control fences) should not be disturbed until necessary for construction activities. Materials removed or stockpiled (e.g. excavated soil, backfill material, etc.) should be deposited and contained in a manner to ensure sediment does not enter a watercourse.

As soon as possible following completion of the construction activity, watercourse banks should be restored to their original grade. Seeding should be completed during favourable climatic conditions. Once sown, seed should be protected with a layer of erosion control matting that would assist in stabilizing the slope and propagation of the seed mixture. In the event that broadcast seeding is not feasible due to seasonal restrictions, hydroseeding should be considered. Erosion and sediment control measures should remain securely installed until permanent vegetation measures are successful and areas are stabilized, as determined by the Construction Contractor.

Even with properly installed erosion and siltation control measures, extreme runoff events could result in collapse of silt fencing, slope or trench failures and other problems which could lead to siltation of water bodies. If siltation to a watercourse occurs at a higher rate than normally experienced, related construction activities should cease immediately until the situation is rectified.

As appropriate, the Construction Contractor (or designate) should be on-site during installation of watercourse crossings to ensure compliance with specifications and site plans. In particular, the Construction Contractor should ensure that pre-construction preparation is completed prior

to commencement of in-water work and that bank, bed, and floodplains are restored to pre-existing conditions, as possible, following completion of the construction activities.

Net Effects

With the implementation of the protection measures, any associated effects to surface water and water bodies would be both spatially and temporally limited, therefore no significant negative effects are anticipated to surface water and water bodies.

3.2 WILDLIFE AND WILDLIFE HABITATS

The following provides a description of the potential construction related effects to wildlife and wildlife habitats. Potential effects and mitigation measures associated with endangered and threatened species are being addressed as part of a separate process in conjunction with the MNR. Where potential effects indicate that approvals or permits are required for endangered and threatened species, these will be addressed separately through the applicable statute and corresponding permit and approval process (additional information is also provided in the **Draft NHA/EIS**).

3.2.1 Wind Component

Five types of significant wildlife habitat were identified within 120 m of the Wind Project Location: seasonal concentration areas (deer yards, migratory landbird stopover areas, winter raptor feeding and roosting areas), specialized habitats (woodland amphibian breeding ponds, seeps, area-sensitive species), rare habitat (rare vegetation communities), habitat for species of conservation concern, (declining grassland and woodland species, species of special concern (Snapping Turtle) and animal corridors.

Potential Effects

Wildlife Habitat

The potential construction effects on the five types of significant wildlife habitat located within 120 m of the Project Location are detailed in the **Draft NHA/EIS** and include the following:

- Seasonal concentration areas
    - winter deer yards (habitat fragmentation, disturbance)
    - landbird migratory stopover (disturbance);
- Animal movement corridors (fragmentation, disturbance);
- Rare vegetation communities (changes to hydrology, dust, erosion and sedimentation);
- Specialized habitats

- area-sensitive species (disturbance)
- seeps and springs (disturbance)
- amphibian woodland breeding ponds (changes to hydrology)

- Habitat for species of conservation concern
  - Snapping Turtle (disturbance)
  - declining woodland species (habitat fragmentation and loss, disturbance)
  - grassland bird species (disturbance)

Birds

Installation of wind turbines and access roads in open, treed and grassland habitat will result in limited habitat removal. Current land uses will continue under the turbines. No significant grassland habitat will be lost during the construction of the access roads, collector lines or turbines

A grassland area-sensitive species, the Upland Sandpiper, was observed within 120 m of the wind Project Location. Fragmentation could result in increased rates of nest parasitism and predation. These effects are expected to be minimal due to the current fragmentation and disturbance present in the Study Area from the existing road system and agricultural activity. Disturbance during construction is not expected to decrease current populations in the Study Area below self-sustaining levels. Large contiguous areas of grassland habitat will remain intact in the Study Area.

Numerous area-sensitive forest species were identified within 120 m of the Wind Project Location. No clearing of woodlands supporting area sensitive species will occur as part of the Wind Project. Clearing of one plantation adjacent to areas sensitive breeding bird habitat will occur to accommodate a new access road and turbine, but will have limited potential impact on the area sensitive species. The constructible area for the access road through the plantation has been reduced from 50 m to 10 m to help minimize the potential effects associated with access road construction. Additional information related to clearing for Project construction is provided in the **Draft NHA/EIS**.

Significant stopover areas for migratory landbirds along the north shore of Lake Erie are located within 120 m of the Wind Project Location. No construction is proposed within these features, although several turbines and access roads will be constructed adjacent to these features. Disturbance to species using these areas during construction are expected to be minimal as no intrusion into such features is proposed.

Construction activity, such as increased traffic, noise, or dust, also has the potential to indirectly disturb birds, particularly breeding birds, and their habitats. Disturbance of birds may occur as a result of increased on-site human activities. The current level of human activity is low, and is generally restricted to agricultural uses and hunting. Additional information related to disturbance effects is provided in the **Draft NHA/EIS**.

Other Wildlife

During construction of the access roads and turbine foundations, and erection of the turbine towers, the access roads will experience some traffic, which will vary in intensity as the construction phase progresses. Equipment used during construction activities has the potential to injure slower moving wildlife such as snakes and turtles. Some limited mortality is possible, however, the potential long-term effects to wildlife populations from this mortality and from barrier effects is anticipated to be minimal because of the temporary (i.e., one breeding season or less) nature of the increased traffic activity.

Sensory disturbance of wildlife may occur during construction of the Project as a result of increased on-site human activities and construction related noise. Large mammals may be displaced from the site due to increased traffic and construction noise (Arnett *et al.*, 2007). However, a certain level of sensory disturbance to wildlife in the Study Area already exists from ongoing agricultural activities and hunting.

Mitigation Measures

Overall, the total vegetation clearing will represent a very small proportion of the habitat in the area, and any wildlife displacement will be temporary and adequate habitat alternatives exist. Disturbance effects are expected to be short-term in duration and spatially limited to the work areas and their immediate vicinity. Standard measures such as proper muffling of construction machinery and lighting design will minimize sound and lighting effects. Mortality of wildlife along access roads and effects to animal movement within animal corridors can be minimized through the limitation of vehicle traffic to daylight hours (unless approved otherwise by the County) and the implementation of a speed limit of 30 km/h on access roads.

To the extent practical, tree and/or brush clearing would be completed prior to or after the breeding season for migratory birds (May 1 to July 31). Currently, construction is planned for fall 2011. However, should clearing be required during the breeding bird season, prior to construction, surveys will be undertaken to identify the presence/absence of nesting birds or breeding habitat. If a nest is located, a designated buffer will be marked off within which no construction activity will be allowed while the nest is active. The radius of the buffer width ranges from 5- 60 m depending on the species. Buffer widths are based on the species sensitivity and on buffer width recommendations that have been reviewed and approved by Environment Canada.

Where a proposed access road crosses between two natural features (i.e. between wetland and upland habitat, or across a hedgerow), culverts will be installed beneath the access road to

allow for animal movement. Some culverts will double as equalization culverts allowing flows to be conveyed beneath the access road, however, where animal movement is to be accommodated, additional design measures (countersunk, low stature opening, fencing to direct species) will be incorporated.

Potential disturbance effects to birds would be minimized by minimizing construction activities during sensitive periods (i.e. the breeding season) where immediately adjacent to significant bird habitat. When the turbines are operational, mortality and disturbance monitoring studies will be conducted to determine if the turbine operation results in collision with significant bird species or disturbance/avoidance effects.

Should construction activities occur adjacent to wetland / watercourse features during the turtle breeding season, additional barriers (i.e. silt fencing) will be erected around areas of disturbed soils to discourage turtles from nesting / laying eggs in these areas. Should a turtle nest be encountered, a buffer will be established and the nest will be protected from construction activities (such as with a wire cage) and monitored until the nest is no longer active.

Where the construction of an access road is proposed within 10 m of a natural feature, the area between the access road and the feature will be naturalized (seeded with native species) to establish a natural vegetated buffer along the edge of the community. This buffer area will help minimize impacts and mitigate disturbance resulting during construction and operation of the Wind Project.

A more detailed assessment of the impacts and discussion of mitigation are provided in Tables 6.1 and 6.2 of the **Draft NHA/EIS**.

Net Effects

There is some potential for disturbance to wildlife during construction of the Project as a result of the limited amount of vegetation removal and increased human activity, particularly increased traffic. Some limited mortality is possible, however potential long-term effects to wildlife populations from this mortality and from barrier effects is anticipated to be minimal because of the temporary nature of the increased traffic activity. Mitigation measures, construction timing and buffer restoration proposed in the **Draft NHA/EIS** will minimize effects on wildlife and wildlife habitat.

3.2.2 Solar Component

Four types of significant wildlife habitat were identified within 120 m of the Solar Project Location: seasonal concentration areas (deer yards, raptor feeding and wintering areas), specialized habitats (woodland amphibian breeding ponds, area-sensitive species), habitat for species of conservation concern (declining woodland species, species of special concern (Short-eared Owl), and animal corridors.

Potential Effects

Wildlife Habitat

No removal of natural vegetation is proposed with the exception of hedgerows. The panels will be suspended above grade within existing agricultural fields. Areas beneath and surrounding the solar panels will be vegetated with native grassland species. The installation of fence may disrupt animal movement, however small rodents, amphibians, mammals and adult deer will be able to cross the site.

The potential construction effects on the four types of significant wildlife habitat are detailed in the **Draft NHA/EIS** and include the following:

- Seasonal concentration areas
    - winter deer yards (habitat fragmentation, disturbance)
    - landbird migratory stopover (disturbance);
- Animal movement corridors (fragmentation, disturbance);
- Specialized habitats
    - area-sensitive forest species (disturbance)
    - amphibian woodland breeding ponds (changes to hydrology)
- Habitat for species of conservation concern
    - Short-eared Owl (disturbance)
    - declining woodland species (disturbance)

Birds

Construction activity, such as increased traffic, noise, or dust, has the potential to indirectly disturb birds, particularly breeding birds, and their habitats. Disturbance of birds may occur as a result of increased on-site human activities. The current level of human activity is low, and is generally restricted to agricultural and recreational uses and hunting.

A species of special concern (Short-eared Owl) was observed feeding and roosting during the winter months within the hay fields, pasture lands and hedgerows north of the Solar Project Location. In total, 4 raptor species and 25 individuals were observed in this area. No direct impacts to grassland habitat or winter raptor roosting and feeding areas are anticipated.

Other Wildlife

No removal of natural vegetation within the Natural Features is proposed. The woodlands and wetlands that provide habitat for area sensitive birds, deer wintering, declining bird species and vernal pools for amphibian breeding will not be directly impacted by the Project.

During construction of the solar project, solar access roads are required to access each row of solar PV panels. These access roads will experience some traffic, which will vary in intensity as the construction phases progress. Equipment used during construction activities has the potential to injure slower moving wildlife such as snakes and turtles. Some limited mortality is possible, however, the potential long-term effects to wildlife populations from this mortality and from barrier effects is anticipated to be minimal because of the temporary (i.e., one breeding season or less) nature of the increased traffic activity.

Sensory disturbance of wildlife may occur during construction of the Project as a result of increased on-site human activities. Large mammals may be displaced from the site due to increased traffic and construction noise (Arnett *et al.*, 2007). However, a certain level of sensory disturbance to game and wildlife resources in the area already exists from ongoing agricultural and recreational activities, and hunting.

Mitigation Measures

All solar panels and associated access roads and electrical equipments have maintained a minimum 30 m setback from the dripline of the adjacent wetland, woodland and wildlife habitat features, which ensures no direct loss of these habitats. These setback areas will be planted with native grassland species to provide a buffer surrounding natural features.

Disturbance effects are expected to be short-term in duration and spatially limited to the work areas and their immediate vicinity. Standard measures such as proper muffling of construction machinery and lighting design will minimize sound and lighting effects. Mortality of wildlife along access roads, and effects to animal movement within animal corridors can be minimized through the restriction of vehicle traffic to daylight hours and the implementation of a speed limit of 30 km/h.

To the extent practical, tree and/or brush clearing would be completed prior to or after the breeding season for migratory birds (May 1 to July 31). Currently, construction is planned for fall 2011. However, should clearing be required during the breeding bird season, prior to construction, surveys will be undertaken to identify the presence/absence of nesting birds or breeding habitat. If a nest is located, a designated buffer will be marked off within which no construction activity will be allowed while the nest is active. The radius of the buffer width ranges from 5- 60 m depending on the species. Buffer widths are based on the species sensitivity and on buffer width recommendations that have been reviewed and approved by Environment Canada.

To maintain connectivity between natural features, a minimum 280 m wide corridor has been proposed through the centre of the Solar Lands to connect natural features to the east. No fences will be in this area that would obstruct east-west wildlife movement. To maintain a connection to the west, specifically for deer, a gap in the security fencing will be maintained along the north side of the access road and transmission line that will be fenced off to maintain a secure perimeter around the solar modules, but will maintain a 10 to 15 m wide corridor to allow for the free movement of deer in an east-west direction.

Since the panels will be suspended above grade, the property will remain porous to allow for the movement of small rodents, amphibians and reptiles across the site. Areas beneath and surrounding the solar panels will be vegetated with native grassland species.

A detailed assessment of the impacts and discussion of mitigation are provided in Tables 6.1 and 6.2 of the **Draft NHA/EIS**.

Net Effects

Overall, the Solar Project, including the solar modules, access roads, fencing and berming is not anticipated to result in adverse environmental impacts.

There is some potential for disturbance to wildlife during construction of the Project as a result of the increased human activity, particularly increased traffic. Some limited mortality is possible, however potential long-term effects to wildlife populations from this mortality and from barrier effects is anticipated to be minimal because of the temporary nature of the increased traffic activity.

The buffer areas between the development setback and the natural features will be naturalized with native plant species intended to be maintained as a vegetated buffer zone. The lands immediately adjacent to the woodlands and wetlands have been disturbed by agricultural activities in the past (annually) and provide little benefit in terms of ecological function, habitat or natural vegetation. Enhancing these areas through the establishment of naturalized buffers will benefit and enhance the adjacent natural features and associated habitat. Over time, these areas will become an extension of the natural features they are intended to protect.

3.2.3 Electrical Transmission Component

Two types of significant wildlife habitat were identified within 120 m of the Transmission Project Location: specialized habitats (woodland amphibian breeding ponds, area-sensitive species) and habitat for species of conservation concern (declining grassland and woodland species).

Potential Effects

Wildlife Habitat

No grading or removal of natural vegetation is proposed to install the transmission line. The only areas where vegetation removal is proposed are within the local areas surrounding the proposed monopoles structures that will be cleared for the construction of the monopole foundations. Any vegetation impacted during construction is located within the municipal right-of-way and subject to current maintenance operations. Clearing and grubbing of these areas will be required, however, the extent of this disturbance will be limited to the existing right of way.

Construction activities during the installation of the monopoles and installation of the transmission line are anticipated to be low impact and short duration. Any disturbance to local wildlife that may occur will be temporary in nature and very minor in comparison to the existing permanent disturbance resulting from traffic along Haldimand Road 20. Wildlife species inhabiting the adjacent habitats have likely adapted to such impacts.

The potential construction effects on the two types of significant wildlife habitat are detailed in the **Draft NHA/EIS** and include the following:

- Specialized habitats
    - area-sensitive forest species (disturbance)
    - amphibian woodland breeding ponds (changes to hydrology)
- Habitat for species of conservation concern
    - declining grassland and woodland species (disturbance)

Birds

Construction activity, such as increased traffic, noise, or dust, has the potential to indirectly disturb birds, particularly breeding birds, and their habitats. Disturbance of birds may occur as a result of increased on-site human activities. The current level of human activity is low, and is generally restricted to agricultural and recreational uses and hunting.

Numerous area-sensitive forest species were identified within 120 m of the Transmission Project Location. No clearing of woodlands supporting area sensitive species will occur as part of the Transmission Project and all work will occur within the municipal right-of-way. Additional information related to clearing for Project construction is provided in the **Draft NHA/EIS**.

Other Wildlife

No removal of natural vegetation is proposed within the majority of the natural features along Haldimand Road 20, with the exception of localized areas of Natural Features 2, 6, 11 and 19 that may be directly impacted during the clearing and site preparation to install the monopoles, as required, within the right of way along Haldimand Road 20.

Two significant grassland habitats occur adjacent to the proposed Transmission Line, although these features occur beyond the maintained road shoulders, ditches and other areas maintained within the right of way. As a result, no direct impacts to these features are anticipated.

Equipment used during construction activities has the potential to injure slower moving wildlife such as snakes and turtles. Some limited mortality is possible, however, the potential long-term effects to wildlife populations from this mortality is anticipated to be minimal because of the temporary nature of the increased traffic activity.

Mitigation Measures

To the extent practical, tree and/or brush clearing would be completed prior to or after the breeding season for migratory birds (May 1 to July 31). Currently, construction is planned for fall 2011. However, should clearing be required during the breeding bird season, prior to construction, surveys will be undertaken to identify the presence/absence of nesting birds or breeding habitat. If a nest is located, a designated buffer will be marked off within which no construction activity will be allowed while the nest is active. The radius of the buffer width ranges from 5- 60 m depending on the species. Buffer widths are based on the species sensitivity and on buffer width recommendations that have been reviewed and approved by Environment Canada.

Potential disturbance effects and direct mortality are expected to be very small relative to the existing disturbance associated with traffic along Haldimand Road 20. As a result, no mitigation is proposed.

Net Effects

No net effects are anticipated as a result of the proposed Transmission Project components. There is some potential for disturbance to wildlife during construction of the Project as a result of the limited amount of vegetation removal and increased human activity. Some limited mortality is possible, however potential long-term effects to wildlife populations from this mortality and from barrier effects is anticipated to be minimal because of the temporary nature of the increased traffic activity, particularly in the context of the existing disturbance from Haldimand Road 20.

3.3 WETLANDS AND WOODLANDS

3.3.1 Wind Component

Potential Effects

Significant natural areas found within 120 m of the Project Location include provincially significant wetlands and significant woodlands. A detailed analysis of the functions of these features and the potential effects from the Project is provided in the **Draft NHA/EIS** document.

The site layout has minimized disturbance to the most important habitat features within the area and has minimized the length of new access roads, which typically are responsible for the largest amount of disturbed footprint during construction (Arnett *et al.*, 2007). Efforts were made to incorporate the current road network at the site to the greatest extent possible.

All components of the Project are located outside of wetland boundaries. Therefore, direct wetland habitat loss is not anticipated from the Project. Portions of the Project infrastructure (i.e. turbines, access roads, and collector lines) are found within 120 m of wetlands and as a result, potential impacts to hydrology and ecological function are detailed in the **Draft NHA/EIS** as per the requirements of O. Reg. 359/09.

The area contains woodland areas, evaluated as significant using criteria established through the Haldimand County Official Plan. While the majority of the Project infrastructure has been sited outside of significant woodlands, there is one new access road and turbine within a plantation, one access road along an existing farm laneway through a deciduous forest and three buried collector lines proposed along existing farm laneways through significant woodlands. Additional Project components (e.g. turbines, access roads and corresponding buried collector lines) are found within 120 m of significant woodlands and as a result, potential impacts and mitigation measures are detailed in the **Draft NHA/EIS**. Proposed clearing will result in the removal of approximately 1.72 ha of plantation in areas identified as significant woodland (please see **Draft NHA/EIS**).

Clearing activities during construction will be limited but will result in the removal of vascular plants and portions of plant communities. A botanical survey of the area found that most plant species were common in Ontario. No rare species of vegetation are to be removed as part of the Project. Alteration or removal of vegetation for access roads and turbine could have the potential to affect both flora and fauna through loss of species diversity, fragmenting available habitat (especially for species with low mobility), introduction or spread invasive species, and temporary disruption to wildlife.

Potential impacts to natural features in the area during construction include disturbance due to increased traffic, noise, or dust. These impacts are anticipated to be temporary in duration and relatively minor in scale. The Project Location is not within a provincial park or a conservation

reserve, although a collector line is proposed within 120 m of James N. Allen Provincial Park. The collector line will be constructed within the municipal right-of-way on the opposite side of the Kings Row from the Park. No impacts on the natural features or ecological functions within the vegetation communities that occur within 120 m of the collector line are anticipated.

Mitigation Measures

The primary mitigation measures employed was to avoid the most sensitive habitats found in the area and minimize land required for the Project layout by minimizing the length of new access roads and using existing access roads where possible. Based on the approach taken to site turbines, access roads and collector lines outside of the significant natural features, impacts to existing natural vegetation communities has been avoided for the most part.

Limited clearing of natural vegetation will be required, including portions (1.72 ha) of a cultural plantation and trimming of existing vegetation along the existing farm laneways (where required for access). Overall, the total vegetation to be cleared represents a very small proportion of the habitat available in the local area.

Where vegetation clearing is proposed, mitigation measures include staking and monitoring the limits of vegetation clearing to prevent encroachment, scheduling clearing to avoid sensitive wildlife periods, delineating wetlands to assist with demarcating construction area limits, implementing erosion and sediment controls and restoring cleared areas with native species following construction. Further details are provided in the **Draft NHA/EIS**.

No wetland habitats will be removed. No construction is proposed within 5 m of any wetland feature and no excavation is proposed within 30 m of any wetland feature. Culverts will be installed to maintain hydrologic conditions within adjacent woodland and wetland features. All power cable trenches within 30 m of wetlands will be backfilled with sand, with a clay plug every 30 m to ensure that groundwater entering the trenches is not drawn along the sand-filled conduit. Natural buffer areas will be established where project components are proposed with 10 m of a wetland or woodland. Additional measures will be employed to mitigate against ecological and hydrological impacts of any physical infrastructure within 30 m of wetlands and woodlands, as outlined in the **Draft NHA/EIS**.

As appropriate and prior to construction, the limits of vegetation clearing will be staked in the field. The Construction Contractor will ensure that no construction disturbance occurs beyond the staked limits and that edges of sensitive areas adjacent to the work areas are not disturbed. Where necessary, standard construction mitigation measures will be implemented to minimize dust, soil erosion and sedimentation.

All equipment refueling will occur well away from natural features and in designated areas such as the operation and maintenance building area. In the event of an accidental spill, the MOE Spills Action Centre should be contacted and emergency spill procedures implemented immediately. Any fuel storage (within certified storage tanks) and activities with the potential for

contamination should occur in properly protected and sealed areas well removed from natural features.

Monitoring of the limits of clearing and the installation and maintenance of erosion and sediment control measures will be implemented on a regular basis throughout the construction period. Additional detailed mitigation measures and monitoring recommendations are described within Tables 6.1 and 6.2 of the **Draft NHA/EIS**.

Net Effects

Though the effects are anticipated to be minimal, there is some potential for disturbance of natural features during construction of the Project as a result of the limited removal of vegetation and increased human activity. However, these effects are expected to be short-term in duration and spatially limited to the work areas and their immediate vicinity. The relatively small amount of woodland to be removed represents a very small proportion of the available habitat in the local area and is not anticipated to have a significant effect on the ecological functions these features support.

Setbacks from wetlands and mitigation measures for infrastructure within 30 m of wetlands will ensure that there is no disruption of wetland function and no net loss of wetland area.

3.3.2 Solar Component

Potential Effects

Significant natural areas found within 120 m of the Project Location include wetlands and significant woodland. A detailed analysis of the functions of these features and the potential effects from the Project is provided in the **Draft NHA/EIS** document.

The site layout has minimized disturbance to the most important habitat features within the area. All components of the Project (solar panels and associated access roads and electrical equipment) are located at least 30 m outside of wetland boundaries. Therefore, direct wetland habitat loss is not anticipated from the Project. Portions of the Project infrastructure (e.g. solar panels and associated access roads and electrical equipments) are found within 120 m of wetlands and as a result, potential hydrological and ecological impacts are detailed in the **Draft NHA/EIS** as per the requirements of O. Reg. 359/09.

No significant grading is proposed on the solar lands and existing drainage patterns will be maintained, ensuring any surface water flows currently draining to the various wetlands will be maintained.

The area contains woodland areas evaluated as significant using criteria established through the Haldimand County Official Plan. All components of the Project (solar panels and associated

access roads and electrical equipment) are located at least 30 m outside of significant woodland boundaries. Portions of the Project infrastructure are found within 120 m of significant woodland and as a result, potential hydrological and ecological impacts are detailed in the **Draft NHA/EIS**. No grading within the root zone or pruning of retained trees within these significant woodlands is proposed.

Potential impacts to woodlands and wetlands in the area during construction include disturbance due to increased traffic, noise, erosion or dust. These impacts are anticipated to be temporary in duration and relatively minor in scale. The Project Location is not within a provincial park or a conservation reserve.

Mitigation Measures

The primary mitigation measure employed was to avoid the most sensitive habitats found in the area. All solar panels and associated access roads and electrical equipment have been set back a minimum of 30 m from the dripline of the woodland and wetland features.

The majority of the proposed solar land development will be located within existing agricultural fields. No removal of natural vegetation is proposed, with the exception of hedgerows.

As appropriate and prior to construction the limits of grading will be staked in the field. The Construction Contractor will ensure that no construction disturbance occurs beyond the staked limits and that edges of sensitive areas adjacent to the work areas are not disturbed. Where necessary, standard construction mitigation measures will be implemented to minimize dust, soil erosion and sedimentation.

All equipment refueling will occur well away from natural features. In the event of an accidental spill, the MOE Spills Action Centre should be contacted and emergency spill procedures implemented immediately. Any fuel storage and activities with the potential for contamination should occur in properly protected and sealed areas well removed from natural features.

Monitoring of the limits of grading and the installation and maintenance of erosion and sediment control measures will be implemented on a regular basis throughout the construction period. Additional detailed mitigation measures and monitoring recommendations are described within Tables 6.1 and 6.2 of the **Draft NHA/EIS**.

Net Effects

Though the effects are anticipated to be minimal, there is some potential for disturbance of natural features during construction of the Project as a result of increased human activity. However, these effects are expected to be short-term in duration and spatially limited to the work areas and their immediate vicinity.

The setback from wetlands will ensure that there is no disruption of wetland function and no net loss of wetland area. No impacts to significant woodland areas are anticipated as a result of the construction of the solar lands.

3.3.3 Electrical Transmission Component

Potential Effects

Significant natural areas found within 120 m of the Project Location include wetlands and significant woodland. A detailed analysis of the functions of these features and the potential effects from the Project is provided in the **Draft NHA/EIS** document. The wetlands and woodlands along Haldimand Road 20 currently experience higher impact from daily vehicle traffic and maintenance of the roadway than natural features located elsewhere in the area.

With one exception, the transmission line has been sited along the opposite side of the road from all wetlands to avoid potential interference or encroachment during construction or future maintenance activities. In only one instance, where wetlands are located on both sides of Haldimand Road 20 (Natural Feature 18 and 19), the transmission line passes immediately adjacent to, but not over, the wetland in Natural Feature 18 (see the **Draft NHA/EIS**). The transmission line will pass over the maintained portion of the existing right-of-way.

Direct impacts may result through the installation of the monopole structures within portions of the natural features that encroach within the right-of-way. Tree removal and site preparation to construct the foundations and install the pole structures will result in localized disturbance. Any vegetation impacted during construction is located within the municipal right-of-way and subject to current maintenance operations. Construction activities during the installation of the monopoles and installation of the transmission line are anticipated to be low impact and short in duration. Any disturbance to local wildlife that may occur will be temporary in nature.

Mitigation Measures

The monopole structures have been located outside of all wetlands. Poles will be located within the municipal right-of-way a minimum of 6 m and a maximum of 9.5 m to 11.5 m (depending on width of right-of-way) from the existing edge of the roadway. The transmission lines may be located less than 6 m from the edge of pavement, where required to avoid crossing any wetland features, as they will be suspended approximately 1 to 2 m out from each pole structure. The transmission lines have been sited such that no transmission lines overhang a wetland, which required 4 crossings of Haldimand Road 20 to avoid the wetland areas.

Limited clearing of natural vegetation will be required, including small portions of woodland. Overall, the total vegetation to be cleared represents a very small proportion of the habitat available in the local area.

As appropriate and prior to construction the limits of vegetation clearing will be staked in the field. The Construction Contractor will ensure that no construction disturbance occurs beyond the staked limits and that edges of sensitive areas adjacent to the work areas are not disturbed. Where necessary, standard construction mitigation measures will be implemented to minimize dust, soil erosion and sedimentation.

Erosion and sediment controls will be employed during construction activities to avoid any offsite sedimentation in adjacent natural features, although the footprint of disturbance will be minimal. Such measures are more important where dewatering during the construction of concrete footings for the monopoles is required.

All equipment refueling will occur well away from natural features within designated areas such as the operations and maintenance building area. In the event of an accidental spill, the MOE Spills Action Centre should be contacted and emergency spill procedures implemented immediately. Any fuel storage and activities with the potential for contamination should occur in properly protected and sealed areas well removed from natural features.

Monitoring of the limits of clearing and the installation and maintenance of erosion and sediment control measures will be implemented on a regular basis throughout the construction period. Additional detailed mitigation measures and monitoring recommendations are described within Tables 6.1 and 6.2 of the **Draft NHA/EIS**.

Net Effects

No net effects are anticipated as a result of the proposed Transmission Project components. The transmission line has been located to avoid encroachment or overhang of wetlands along Haldimand Road 20, with the majority of the transmission line occurring on the opposite side of the road. Only small encroachments into significant woodlands may occur where these features encroach into the right of way, although impacts will be localized and minimized through construction best management practices, erosion and sediment control measures and timing. No impacts on significant wildlife habitat are anticipated.

Though the effects are anticipated to be minimal, there is some potential for disturbance of natural features during construction of the Project as a result of the limited removal of vegetation and increased human activity. However, these effects are expected to be short-term in duration and spatially limited to the work areas and their immediate vicinity, and are minor in comparison to the existing disturbance along Haldimand Road 20.

3.4 AIR QUALITY

3.4.1 All Project Components

Potential Effects

During construction, minor localized air emissions will occur from operating heavy equipment and temporary operation of portable generators. Additionally, construction related traffic and various construction activities (e.g. excavation, grading, and exposed areas) have the potential to create short-term nuisance dust effects in the immediate vicinity of the Project.

Construction activities rely on the utilization of a wide range of mobile equipment, such as bulldozers, dump trucks, and cranes. The engine exhaust from these vehicles, especially from those operating on diesel fuel, represent a source of particulate and other emissions (e.g. SO_2, NO_X, VOCs , PAHs, and CO_2) from the construction site. Traffic delays also result in increased emissions from vehicles traveling slowly through construction zones. The delivery of materials to construction sites can also generate significant amounts of emissions, especially for sites that are relatively far from material manufacturers.

Mitigation Measures

To protect adjacent receptors from potential off-site dust concerns, the Construction Contractor will implement good site practices during construction which may include:

- maintaining equipment in good running condition and in compliance with regulatory requirements;
- protecting stockpiles of friable material with a barrier or windscreen and in the event of dry conditions and excessive dust;
- dust suppression (e.g. water) of source areas (water will be obtained via tanker trucks); and
- covering loads of friable materials during transport.

In terms of emissions from combustion engines, all construction equipment will meet the emissions requirements of the MOE and/or Ministry of Transportation (MTO). This will assist in minimizing the Project's short-term contributions of greenhouse gases, odour, and other airborne pollutants.

Net Effects

The application of the recommended protection and mitigation measures during construction should limit fugitive dust and odour emissions to the work areas and limit combustion emissions. As a result, any net effects are expected to be short-term in duration and highly localized.

3.5 ENVIRONMENTAL NOISE

3.5.1 All Project Components

Potential Effects

During the construction period, noise will be generated by the operation of heavy construction equipment at each of the work areas including excavation equipment and potential blasting, and associated vehicular traffic on-site. The audible noise at receptors beyond the construction areas is expected to be a minor, short-term disruption consistent with noise generated by any construction project.

Mitigation Measures

It is generally accepted that construction activities will result in short term environmental noise effects. To minimize inconvenience brought on by noise during the construction phase of the Project, all engines associated with construction equipment will be equipped with mufflers and/or silencers in accordance with MOE and/or MTO guidelines and regulations. Noise levels arising from equipment will also be compliant with sound levels established by the MOE and County guidelines (if applicable).

To the greatest extent possible, construction activities that could create excessive noise will be restricted to daylight hours (unless approved by the County) and adhere to any local noise by-laws. If construction activities that cause excessive noise must be carried out outside of these time frames, adjacent residents will be notified in advance and by-law conformity will occur, as required. Sources of continuous noise, such as portable generator sets will be located in a manner so as to minimize disturbance to off-site receptors.

Net Effects

Application of the recommended mitigation measures during construction should limit noise emissions to the general vicinity of the work areas. Any net effects are expected to be limited to short-term, intermittent noise increases during daylight hours at the work areas and/or along the haul routes.

3.6 LAND USE, RESOURCES AND INFRASTRUCTURE

3.6.1 Wind Component

Potential Effects

Agricultural Lands and Soils

The existing land use within 120 m of the Project Location for the wind farm components includes primarily agricultural lands (both private and Ontario Realty Corporation (ORC) managed). In addition, five turbines are proposed on lands previously used by the Dunnville Airport. The agricultural land used for the turbines, access roads and collector lines are

primarily Class 3 agricultural lands and potential effects are related to the temporary change in use from agricultural to renewable energy development on lands used during construction. However, where lands are being used during construction, landowners are being financially compensated for the lease of the private lands and thus offset the effect of removing the land from agricultural production. Longer term impacts to agricultural lands and soils are discussed in the **Draft Design and Operations Report**.

Construction could result in adverse effects to artificial drainage, including tiles being crushed or cut by machinery. Temporary or permanent disruption to water flow could result in soil erosion or crop loss on adjacent lands due to flooding.

While its presence has not been confirmed in agricultural lands anticipated to be affected by Project, the soybean cyst nematode (SCN) has been identified in Haldimand County (OMAFRA, 2002). Once a field has been infested, there is significant potential for soybean crop loss, and there is no effective method of eradicating SCN. During construction requiring soil disturbance, equipment would be transported from field to field, and thus there is potential for transportation of SCN-contaminated soil to non-infested fields.

It is not anticipated that contaminated soils will be encountered during construction, however if contaminated soil is encountered during the course of excavations the contaminated material will be disposed of in accordance with the current appropriate provincial legislation, such as Ontario Regulation 347, the General – Waste Management Regulation.

Provincial Plans, Policies and Recreational Uses

There are no areas protected under provincial plans and policies within 120 m of the Project Location. Much of the land within the area including lands within 120 m of the Project Location is used for recreational purposes such as hunting and off-roading. Hunting and other recreational uses will not be permitted on lands required during the construction phase of the Project (unless permitted by SPK and/or the construction contractor) as it would be unsafe for recreational users due to the large construction equipment on-site. No fisheries resources will be impacted during the construction of the wind component of the Project. The construction of the Project will not result in the creation of access to previously inaccessible areas as the Project is located in areas already cleared for agricultural uses.

Minerals, Aggregates and Petroleum Resources

While lands designated for mineral and aggregate resource extraction may be present within proximity to the Project Location, construction of the Project is not anticipated to have any potential effects on these resources as the lands required for the Project have been granted for renewable energy development instead of mineral and aggregate extraction by each participating landowner. The Project will not require the creation of a new pit or quarry to provide the required aggregate materials and as such a licence of permit under the *Aggregate Resources Act* will not be sought for the Project. A final location of the source of the required

aggregate will be determined prior to construction, however it is planned that local sources will be used to the greatest extent possible.

Numerous petroleum resources operations (pipelines, abandoned wells, capped wells, active wells, suspended wells, and unknown wells) are located within 75 m of the Project Location (shown in **Attachment A**). Given this, on-site surveying will take place prior to construction and an Engineer's Report will be prepared for all petroleum resources operations within 75 m of the Project Location. The purpose of the Engineer's Report will be to demonstrate that there are no effects to the petroleum resources operations as a result of the construction of the Project. If a potential effect to the petroleum resources operations is identified, construction methods may be altered (staying within the Project Location) to minimize or eliminate any potential effects.

Telecommunications and Radar

There are no anticipated significant effects to telecommunication/radar systems during the construction of the Project. Potential effects to these systems following erection of the turbines is detailed in the **Draft Design and Operations Report**.

Provincial and Local Infrastructure

Provincial and local infrastructure which may be impacted during construction includes provincial and local roads and municipal drains. There is potential for an increase of traffic during construction on Provincial Highways due to commuting workforce, the transport of Project components, equipment and supplies, and to remove excess materials and waste from the area (transportation routes to the Project Location are to be determined prior to construction). In addition, transport of Project equipment and supplies would include carrying excess loads and large tower components (e.g. turbine components). Permits from the Ministry of Transportation (MTO) may be required to facilitate the component transportation on provincial highways. It is not anticipated that the additional traffic on the provincial highways would cause any significant traffic congestion. Truck trips on local roads will be noticeably reduced after the access roads and foundations have been installed and the turbine components are on-site. The increase in traffic, including excess load traffic, may result in short-term, localized disturbance to traffic, create potential traffic safety hazards, and/or produce abnormal wear on the roads (additional discussion is provided in Section 3.7). Municipal road allowances would be used for the siting of the collector lines and thus there may be short term impacts to local roads during the installation of the collector lines.

Municipal drains have been identified within the Project Location and potential effects to these surface water features are discussed in Section 3.1.2. The abandoned railway easement will not be impacted during Project construction.

The Dunnville Airport is to be utilized for the wind component of the Project and thus will no longer be in service. As a result, there are no potential concerns related to local air traffic from the airport.

Local Economy and Viewscape

During construction, the actual number employed and the make-up of those employed would vary over time as the Project goes through the various construction phases. On average, it is expected that up to 178 persons may be directly employed during the construction period specifically for the construction of the wind component of the Project (peak of 240). The construction of the Project would also result in indirect and induced employment, the majority of which is anticipated to be filled by local businesses. Indirect employment is jobs and income in other businesses/industries in the community that supply inputs to the Project and Project employees. Induced employment includes jobs and income changes occurring in other businesses/industries in the community from spending activities of directly and indirectly employed individuals. To the extent possible, local hiring would be maximized during the construction period providing work for existing qualified tradespersons and labourers. Trades that could be provided locally may include pipefitters, electricians, ironworkers, millwrights and carpenters. Since it is likely that the labour force would be supplied through local and neighbouring communities no special housing, healthcare or food facilities would be required as part of the Project construction activities.

As the construction of the Project is primarily located away from the lakeshore area which is associated with cottagers and tourism of the area, impacts to these features during construction is anticipated to be minimal and short term (e.g. traffic related).

The viewscape from areas surrounding the Project Location will be temporarily altered due to the presence of construction equipment and personnel along with changes to the physical landscape (e.g. removal of agricultural land for Project infrastructure).

Mitigation Measures

Agricultural Lands and Soils

Given that agricultural land will be required during the construction of the turbines, access roads and collector lines, landowners are being financially compensated for the lease of the private lands and thus offset the effect of removing the land from agricultural production. To the greatest extent possible, efforts have been made to site the turbines, access roads and collector lines in such a way as to minimize disturbances to existing agricultural lands and operations. In particular, siting of turbines and access roads are completed with the approval of the participating landowner. Construction activities would be restricted to the delineated construction areas. Following the completion of construction, as appropriate, temporary workspaces would be graded and de-compacted (if required), the topsoil replaced, and the area left as close to pre-existing condition as possible.

The location of artificial tile drainage and associated drains would be confirmed with each landowner on a site-specific basis prior to construction activities. Avoidance of all tile drains may not be possible. Some artificial tile drains may be severed or may require re-alignment due to

the installation of the underground collector lines, underground met tower cabling, and/or wind turbine tower and met tower foundation excavations. Should tile drains be severed or crushed during construction activities, locations should be recorded and flagged. If a main drain, header tile, or large diameter tile is severed, a temporary repair should be made to maintain field drainage and prevent flooding of the work area and adjacent lands. Severed tile drains that are not immediately repaired should be capped to prevent the entry of soil, debris, or rodents. After the repair of each severed tile, and prior to backfilling, the landowner should be invited to inspect and approve the repair. Where necessary, a qualified drainage specialist would be retained to identify reasonable drainage solutions. An agricultural tile drainage contractor would carry out any re-alignment works as well as repair tiles and/or drains that may experience construction related damage. To ensure the success of measures recommended by the drainage specialist all persistent drainage problem sites would be monitored quarterly for a one year period after repair.

A pre-construction soil sampling program may be implemented to identify potential SCN infestation. The pre-construction program would typically include soil analysis for each agricultural row crop field to determine the extent of SCN infestation. Any field identified to contain SCN would be recorded and the location provided to the Construction Contractor. Additionally, any imported topsoil would have a composite sample analyzed for SCN before it is used during construction. If SCN fields are identified, appropriate mitigation measures should be developed. Examples of mitigation measures may include washing stations for equipment, and/or restricted access to fields.

If contaminated soil is encountered during the course of excavations the contaminated material will be disposed of in accordance with the current appropriate provincial legislation, such as Ontario Regulation 347, the General – Waste Management Regulation.

Provincial Plans, Policies and Recreational Uses

Hunting and other recreational uses will not be permitted on lands required during the construction phase of the Project as it would be unsafe for recreational users due to the large construction equipment on-site. As such, there are no mitigation measures available for recreational users of Project lands during the construction of the Project.

Mineral, Aggregate and Petroleum Resources

As no potential effects are anticipated to existing mineral or aggregate resources, no mitigation measures are necessary.

Final wind turbine component alignments will be confirmed prior to construction based on consultation with the MNR's Petroleum Resources Branch and based on technical constraints that may be identified during detailed design and engineering (including the Engineer's Report). However, all wind turbine component alignments will remain within the existing Project Location boundary shown in **Attachment A**). No additional mitigation measures are anticipated after the

final alignments are confirmed. Underground locates would be conducted prior to construction given the known potential for unrecorded, improperly decommissioned wells.

Provincial and Local Infrastructure

SPK will undertake consultation with the MTO regarding any necessary agreements related to wear on roads from transportation of Project materials in addition to obtaining the required permits for use of provincial highways.

In the event that any unidentified utilities within municipal road allowances are damaged during the construction of the Project, SPK would pay for repairs. Haldimand County has stated that agreements would be developed for use of the municipal road allowance for routing of the collector lines. Where there are existing distribution lines within the municipal road allowance, SPK will work with Haldimand Hydro and Hydro One to develop shared pole user agreements (if reasonable to do so).

Detailed plans or agreements regarding maintenance and/or repairs of the local roads damaged during construction would be developed with the County. Pre and post construction road surveys will be conducted. The Construction Contractor would implement a Traffic Management Plan to identify and deal with specific traffic planning issues including the management of traffic and the delivery of materials (see Section 3.7).

Mitigation measures related to municipal drains are discussed in Section 3.1.2. While no permits are required for work within municipal drains, drains superintendents from the County will be permitted to attend site visits and be part of the discussions with the Conservation Authorities during the *Fisheries Act* permitting process for the Project.

Local Economy and Viewscape

To the extent possible, SPK and/or the Construction Contractor will source required goods and services from local qualified suppliers where these items are available in sufficient quantity and at competitive prices. Disruptions in the vicinity of local businesses would be largely due to an increase in traffic, and would be short term and are not expected to affect use of these businesses.

Minimal mitigation measures are available to address concerns related to visual changes to the area during the construction of the Project.

Net Effects

There are no anticipated significant effects related to land use, resources and infrastructure as a result of construction of the Project. The Project's effect on the rural community during construction, including the suspension of recreational uses, traffic, and some disturbance to adjacent land uses, these effects will be temporary and will be minimized through the implementation of good site practices, transport planning, and good communication with the

community. Road safety is not expected to be an issue during the construction phase; however, the potential for accidents along the haul routes and on-site cannot be totally avoided.

A positive net effect is anticipated on the local economy during construction of the Project. The Project provides positive income, employment, and fiscal benefits to the local area, including the County and participating landowners. The County would receive ongoing property tax income and participating landowners would receive land lease payments. A nominal increase in municipal services is possible. Existing businesses within local communities could benefit from the demands of the Project workforce during construction.

3.6.2 Solar Component

Potential Effects

Agricultural Lands and Soils

The existing land use within 120 m of the Project Location for the solar components includes primarily agricultural lands that are Class 3 agricultural lands. Potential effects are related to the temporary change in use from agricultural to renewable energy development on lands used during construction. However, where lands are being used during construction, landowners are being financially compensated and thus offset the effect of removing the land from agricultural production. Longer term impacts to agricultural lands and soils are discussed in the **Draft Design and Operations Report**.

Given that minor site grading will be required, construction could result in adverse effects to artificial drainage, including tiles being crushed or cut by machinery and limited top soil removal.

While its presence has not been confirmed in agricultural lands anticipated to be affected by Project, the soybean cyst nematode (SCN) has been identified in Haldimand County (OMAFRA, 2002) Once a field has been infested, there is significant potential for soybean crop loss, and there is no effective method of eradicating SCN. During construction requiring soil disturbance, equipment would be transported from field to field, and thus there is potential for transportation of SCN-contaminated soil to non-infested fields.

It is not anticipated that contaminated soils will be encountered during construction, however if contaminated soil is encountered during the course of excavations the contaminated material will be disposed of in accordance with the current appropriate provincial legislation, such as Ontario Regulation 347, the General – Waste Management Regulation.

Provincial Plans, Policies and Recreational Uses

There are no areas protected under provincial plans and policies within 120 m of the solar Project Location. Much of the land within the area including lands within 120 m of the Project Location is used for recreational purposes such as hunting and off-roading. Hunting and other recreational uses will not be permitted on lands required during the construction phase of the

Project as it would be unsafe for recreational users due to the large construction equipment on-site. No fisheries resources will be impacted during the construction of the solar component of the Project. The construction of the Project will not result in the creation of access to previously inaccessible areas as the Project is located in areas already cleared for agricultural uses.

Mineral, Aggregate and Petroleum Resources

As the lands for the solar component of the Project are in agricultural production, the construction of the solar component of the Project is not anticipated to have any potential effects on mineral or aggregate resources as these lands have not been earmarked for mineral or aggregate extraction. The Project will not require the creation of a new pit or quarry to provide the required aggregate materials and as such a license of permit under the *Aggregate Resources Act* will not be sought. A final location of the source of the required aggregate will be determined prior to construction, however it is planned that local sources will be used to the greatest extent possible.

Numerous petroleum resources operations (abandoned and unknown wells and one active well) are located within 75 m of the Project Location (shown in **Attachment A**). Given this, on-site surveying will take place prior to construction and an Engineer's Report will be prepared for all petroleum resources operations within 75 m of the Project Location. The purpose of the Engineer's Report will be to demonstrate that there are no effects to the petroleum resources operations as a result of the construction of the Project. If a potential effect to the petroleum resources operations is identified, construction methods may be altered (staying within the Project Location) to minimize or eliminate any potential effects.

Telecommunications and Radar

There are no anticipated potential effects to telecommunication/radar systems during the construction of the Project.

Provincial and Local Infrastructure

Provincial and local infrastructure which may be impacted during solar construction includes provincial and local roads. There is potential for an increase of traffic during construction on Provincial Highways due to commuting workforce, the transport of Project components, equipment and supplies, and to remove excess materials and waste from the area (transportation routes to the Project Location are to be determined prior to construction). In addition, transport of Project equipment and supplies may include carrying excess loads. Permits from the MTO may be required to facilitate component transportation on provincial highways. It is not anticipated that the additional traffic on the provincial highways would cause any significant traffic congestion. The increase in traffic, including excess load traffic, may result in short-term, localized disturbance to traffic, create potential traffic safety hazards, and/or produce abnormal wear on the roads (additional discussion is provided in Section 3.7).

Given that the collector lines for the solar panels will remain completely within the solar lands and will not be within municipal road allowances, no effects to infrastructure within the road allowances is anticipated.

Local Economy and Viewscape

During construction, the actual number employed and the make-up of those employed would vary over time as the Project goes through the various construction phases. On average, it is expected that up to 92 persons may be directly employed during the construction period specifically for the construction of the solar component of the Project. The construction of the Project would also result in indirect and induced employment, the majority of which is anticipated to be filled by local businesses. To the extent possible, local hiring would be maximized during the construction period providing work for existing qualified tradespersons and labourers. Since it is likely that the labour force would be supplied through local and neighbouring communities no special housing, healthcare or food facilities would be required as part of the Project construction activities.

As the construction of the solar component of the Project is located a significant distance from the lakeshore area which is associated with cottagers and tourism of the area, impacts to these features during construction is not anticipated.

Concerns have been raised from local residents regarding the visual impact the solar Project may have on local roads and adjacent private residences given the change in land use from agricultural to solar farm development. The Project will alter the existing viewscape of the solar farm lands given the large scale development of the Project, however the significance of the change/impact is subjective based on the persons opinion of the Project and the use of agricultural land for renewable energy development.

Mitigation Measures

Agricultural Lands and Soils

Given that agricultural land will be required during the construction of the solar components, landowners are being financially compensated for the lease of the private lands and thus offset the effect of removing the land from agricultural production. Construction activities will be restricted to the delineated construction areas and following the completion of construction, as appropriate, temporary workspaces would be graded and de-compacted (if required), the topsoil replaced, and the area left as close to pre-existing condition as possible.

The location of artificial tile drainage and associated drains would be confirmed on a site-specific basis prior to construction activities. Avoidance of all tile drains may not be possible. Some artificial tile drains may be severed or may require re-alignment. Should tile drains be severed or crushed during construction activities, locations should be recorded and flagged. If a main drain, header tile, or large diameter tile is severed, a temporary repair should be made to maintain field drainage and prevent flooding of the work area and adjacent lands. Severed tile

drains that are not immediately repaired should be capped to prevent the entry of soil, debris, or rodents. After the repair of each severed tile, and prior to backfilling, the landowner should be invited to inspect and approve the repair. Where necessary, a qualified drainage specialist would be retained to identify reasonable drainage solutions. An agricultural tile drainage contractor would carry out any re-alignment works as well as repair tiles and/or drains that may experience construction related damage. To ensure the success of measures recommended by the drainage specialist all persistent drainage problem sites would be monitored quarterly for a one year period after repair.

A pre-construction soil sampling program may be implemented to identify potential SCN infestation. The pre-construction program would typically include soil analysis for each agricultural row crop field to determine the extent of SCN infestation. Any field identified to contain SCN would be recorded and the location provided to the Construction Contractor. Additionally, any imported topsoil would have a composite sample analyzed for SCN before it is used during construction. If SCN fields are identified, appropriate mitigation measures should be developed. Examples of mitigation measures may include washing stations for equipment, and/or restricted access to fields.

If contaminated soil is encountered during the course of excavations the contaminated material will be disposed of in accordance with the current appropriate provincial legislation, such as Ontario Regulation 347, the General – Waste Management Regulation.

In order to prevent soil erosion immediately following construction, provide dust control and to maintain an annual grassland type appearance under the solar panels, SPK may plant a vegetated understory of native grassland species that will mimic annual grassland vegetation. This type of vegetation should require only minimal maintenance and irrigation and would assist in preventing the invasion of non-native grassland species.

Provincial Plans, Policies and Recreational Uses

Hunting and other recreational uses will not be permitted on lands required during the construction phase as it would be unsafe for recreational users due to the large construction equipment on-site. As such, there are no mitigation measures available for recreational users of Project lands during the construction of the Project.

Mineral, Aggregate and Petroleum Resources

As no potential effects are anticipated to existing mineral or aggregate resources, no mitigation measures are necessary.

Final solar component alignments will be determined prior to construction based on consultation with the MNR's Petroleum Resources Branch and based on technical constraints that may be identified during detailed design and engineering (including the Engineer's Report). However, all solar components will remain within the Project Location boundary shown in **Attachment A**).

No additional mitigation measures are anticipated after the final alignments are determined. Underground locates would be conducted prior to construction given the known potential for unrecorded, improperly decommissioned wells.

Provincial and Local Infrastructure

SPK will undertake consultation with the MTO regarding any necessary agreements related to wear on roads from transportation of Project materials in addition to obtaining the required permits for use of provincial highways.

Detailed plans or agreements regarding maintenance and/or repairs of the local roads damaged during construction would be developed with the County. Pre and post construction road surveys will be conducted. The Construction Contractor would implement a Traffic Management Plan to identify and deal with specific traffic planning issues including the management of traffic and the delivery of materials (see Section 3.7).

Local Economy and Viewscape

To the extent possible, SPK and/or the Construction Contractor will source required goods and services from local qualified suppliers where these items are available in sufficient quantity and at competitive prices. Disruptions in the vicinity of local businesses would be largely due to an increase in traffic, and would be short term and are not expected to affect use of these businesses.

To minimize any potential visual obtrusiveness of the Project on public roads and adjacent private lands, a minimum 9 m wide buffer area will be used between the solar farm and perimeter property lines. In addition, excavated material from the access roads will be bermed (approximately 6 m wide) along the outer edge of the solar farm lands to provide a landscaping barrier for landowners of adjacent residences where close proximity occurs to the solar PV panels. The berm in addition to the buffer areas will help minimize any potential visual obtrusiveness of the Project.

Net Effects

There are no anticipated significant effects related to land use, resources and infrastructure as a result of construction of the solar component of the Project. The Project's effect on the rural community during construction, including the suspension of recreational uses, traffic, and some disturbance to adjacent land uses, these effects will be temporary and will be minimized through the implementation of good site practices, transport planning, and good communication with the community. Road safety is not expected to be an issue during the construction phase; however, the potential for accidents along the haul routes and on-site cannot be totally avoided.

A positive net effect is anticipated on the local economy during construction of the Project. The Project provides positive income, employment, and fiscal benefits to the local area, including the County and participating landowners. The County would receive ongoing property tax income and participating landowners would receive land lease payments. A nominal increase in

municipal services is possible. Existing businesses within local communities could benefit from the demands of the Project workforce during construction.

3.6.3 Electrical Transmission Component

Potential Effects

Agricultural Lands and Soils

The Project's substation and operations and maintenance building are proposed to be located on Class 3 agricultural lands while the transmission line is proposed directly within municipal road allowances and thus will not impact agricultural lands and soils during construction. The approximate total amount of agricultural land required for the substation (0.7 hectares) and operations and maintenance building (3.2 hectares) is approximately 3.9 hectares.

Potential effects are related to the temporary change in use from agricultural to renewable energy development on the land used during construction. However, where lands are being used during construction, landowners are being financially compensated and thus offset the effect of removing the land from agricultural production. Longer term impacts to agricultural lands and soils are discussed in the **Draft Design and Operations Report**.

Construction could result in adverse effects to artificial drainage, including tiles being crushed or cut by machinery.

While its presence has not been confirmed in agricultural lands anticipated to be affected by Project, the soybean cyst nematode (SCN) has been identified in Haldimand County (OMAFRA, 2002) Once a field has been infested, there is significant potential for soybean crop loss, and there is no effective method of eradicating SCN. During construction requiring soil disturbance, equipment may be transported from field to field, and thus there is potential for transportation of SCN-contaminated soil to non-infested fields.

It is not anticipated that contaminated soils will be encountered during construction, however if contaminated soil is encountered during the course of excavations the contaminated material will be disposed of in accordance with the current appropriate provincial legislation, such as Ontario Regulation 347, the General – Waste Management Regulation.

Provincial Plans, Policies and Recreational Uses

There are no areas protected under provincial plans and policies within 120 m of the substation, O&M building and transmission line Project Location boundary. Some of the land within 120 m of the substation and O&M building may be used for recreational purposes such as hunting. Hunting and other recreational uses will not be permitted on lands required during the construction phase of the Project as it would be unsafe for recreational users due to the large construction equipment on-site. No fisheries resources will be impacted during the construction

of the electrical transmission component of the Project. The construction of the Project will not result in the creation of access to previously inaccessible areas as the Project is located in areas already cleared for agricultural uses and as part of the municipal road right-of-way.

Mineral, Aggregate and Petroleum Resources

As the lands for the electrical transmission component of the Project are in agricultural production or within the municipal road right-of-way, the construction of the solar component of the Project is not anticipated to have any potential effects on mineral or aggregate resources. The Project will not require the creation of a new pit or quarry to provide the required aggregate materials and as such a license or permit under the *Aggregate Resources Act* will not be sought.

Numerous petroleum resources operations are located within 75 m of the Project Location (shown in **Attachment A**). Given this, on-site surveying will take place prior to construction and an Engineer's Report will be prepared for all petroleum resources operations within 75 m of the Project Location. The purpose of the Engineer's Report will be to demonstrate that there are no effects to the petroleum resources operations as a result of the construction of the Project. If a potential effect to the petroleum resources operations is identified, construction methods may be altered (staying within the Project Location) to minimize or eliminate any potential effects.

Telecommunications and Radar

There are no anticipated potential effects to telecommunication/radar systems during the construction of the Project.

Provincial and Local Infrastructure

Provincial and local infrastructure which may be impacted during construction includes local roads and a Hydro One Corridor from the Ontario Power Generation's coal fuelled Nanticoke Generating Station. There are also additional systems such as electrical, cable, and water that are located within the municipal road right-of-way along the transmission line route.

Construction works within the municipal road right-of-way and increase in traffic, including excess load traffic, may result in short-term, localized disturbance to traffic, create potential traffic safety hazards, and/or produce abnormal wear on the roads (additional discussion is provided in Section 3.7).

Existing electrical distribution infrastructure within the municipal right of way along Regional Road 20 will be affected by the new 230 kV transmission line. Selected portions of the existing Haldimand County Power Inc. electrical distribution system along Regional Road 20 will have to be relocated (within the right of way) to facilitate the installation of the new transmission line. Detailed plans and agreements will be developed with Haldimand County Power Inc. for the relocation and restoration work. It would be anticipated that some minor service interruptions to the existing Haldimand County Power Inc. customers would occur during the relocation work; however this will be minimized to the greatest extent possible.

Selected portions of the existing communications infrastructure along Regional Road 20 may also require relocation (within the right of way) due to the new transmission line. Detailed plans and agreements for the relocation of the existing communications wiring along Regional Road 20 will be developed with communications provider for the relocation work in the same manner as the existing electrical services relocations. The relocation of any existing electrical and communication services along Regional Road 20 would be well planned in advance of construction in order to minimize the duration of any service interruptions.

Local Economy and Viewscape

During construction, the actual number employed and the make-up of those employed would vary over time as the construction of the substation, O&M Building, and transmission line goes through the various construction phases. On average, it is expected that approximately 35 persons may be directly employed during the construction period for the construction of the electrical components. To the extent possible, local hiring would be maximized during the construction period providing work for existing qualified tradespersons and labourers. Since it is likely that the labour force would be supplied through local and neighbouring communities no special housing, healthcare or food facilities would be required as part of the Project construction activities.

As the construction of the electrical transmission component of the Project is located a significant distance from the lakeshore area which is associated with cottagers and tourism of the area, impacts to these features during construction is not anticipated.

Mitigation Measures

Agricultural Lands and Soils

Given that agricultural land will be required during the construction of the substation and O&M Building, landowners are being financially compensated for the lease of the private lands and thus offset the effect of removing the land from agricultural production. Construction activities will be restricted to the delineated construction areas and following the completion of construction, as appropriate, temporary workspaces would be graded and de-compacted (if required), the topsoil replaced, and the area left as close to pre-existing condition as possible.

The location of artificial tile drainage and associated drains would be confirmed on a site-specific basis prior to construction activities. Avoidance of all tile drains may not be possible. Some artificial tile drains may be severed or may require re-alignment. Should tile drains be severed or crushed during construction activities, locations should be recorded and flagged. If a main drain, header tile, or large diameter tile is severed, a temporary repair should be made to maintain field drainage and prevent flooding of the work area and adjacent lands. Severed tile drains that are not immediately repaired should be capped to prevent the entry of soil, debris, or rodents. After the repair of each severed tile, and prior to backfilling, the landowner should be

invited to inspect and approve the repair. If flooding of adjacent agricultural land occurs as a result of a severed tile and subsequent soils are damaged or crops are lost, the impacted area would be rehabilitated as soon as possible. Where necessary, a qualified drainage specialist would be retained to identify reasonable drainage solutions. An agricultural tile drainage contractor would carry out any re-alignment works as well as repair tiles and/or drains that may experience construction related damage. To ensure the success of measures recommended by the drainage specialist all persistent drainage problem sites would be monitored quarterly for a one year period after repair.

A pre-construction soil sampling program may be implemented to identify potential SCN infestation. The pre-construction program would typically include soil analysis for each agricultural row crop field to determine the extent of SCN infestation. Any field identified to contain SCN would be recorded and the location provided to the Construction Contractor. Additionally, any imported topsoil would have a composite sample analyzed for SCN before it is used during construction. If SCN fields are identified, appropriate mitigation measures should be developed. Examples of mitigation measures may include washing stations for equipment, and/or restricted access to fields.

If contaminated soil is encountered during the course of excavations the contaminated material will be disposed of in accordance with the current appropriate provincial legislation, such as Ontario Regulation 347, the General – Waste Management Regulation.

Provincial Plans, Policies and Recreational Uses

Hunting and other recreational uses will not be permitted on lands required during the construction phase as it would be unsafe for recreational users due to the large construction equipment on-site. As such, there are no mitigation measures available for recreational users of Project lands during the construction of the Project.

Mineral, Aggregate and Petroleum Resources

As no potential effects are anticipated to existing mineral or aggregate resources, no mitigation measures are necessary.

Final transmission line alignments will be determined prior to construction based on consultation with the MNR's Petroleum Resources Branch and based on technical constraints that may be identified during detailed design and engineering (including the Engineer's Report). However, the transmission line alignment will remain within the Project Location boundary shown in **Attachment A**). No additional mitigation measures are anticipated after the final alignment is determined. Underground locates would be conducted prior to construction given the known potential for unrecorded, improperly decommissioned wells.

Provincial and Local Infrastructure

SPK will undertake consultation with the MTO regarding any necessary agreements related to wear on roads from transportation of Project materials in addition to obtaining the required permits for works within road rights-of-way for the transmission line route.

Detailed plans or agreements regarding maintenance and/or repairs of the local roads damaged during construction would also be developed with the County in addition to obtaining the required permits for works within road rights-of-way for the transmission line route. Pre and post construction road surveys will be conducted. The Construction Contractor would implement a Traffic Management Plan to identify and deal with specific traffic planning issues including the management of traffic and the delivery of materials (see Section 3.7).

The relocation of any existing electrical and communication services along Regional Road 20 would be well planned in advance of construction in order to minimize the duration of any service interruptions.

Local Economy and Viewscape

To the extent possible, SPK and/or the Construction Contractor will source required goods and services from local qualified suppliers where these items are available in sufficient quantity and at competitive prices. Disruptions in the vicinity of local businesses would be largely due to an increase in traffic and possible lane closures, and would be short term and are not expected to affect use of these businesses.

Net Effects

There are no anticipated significant effects related to land use, resources and infrastructure as a result of construction of the electrical transmission component of the Project. The Project's effect on the rural community during construction, including the suspension of recreational uses, traffic, and some disturbance to adjacent land uses, these effects will be temporary and will be minimized through the implementation of good site practices, transport planning, and good communication with the community. Road safety is not expected to be an issue during the construction phase; however, the potential for accidents along the haul routes and on-site cannot be totally avoided.

A positive net effect is anticipated on the local economy during construction of the Project. The Project provides positive income, employment, and fiscal benefits to the local area, including the County and participating landowners. The County would receive ongoing property tax income and participating landowners would receive land lease payments. A nominal increase in municipal services is possible. Existing businesses within local communities could benefit from the demands of the Project workforce during construction.

3.7 TRAFFIC AND ROAD USAGE

3.7.1 All Project Components

Potential Effects

There will be an increase in traffic during construction on municipal roads due to the commuting workforce, the transport of Project components, construction machinery, equipment and supplies, and to remove excess materials and waste from the Project Location. In addition, transport of Project equipment and supplies would include carrying excess loads and large components such as turbines, blades, solar panels, and electrical poles. Truck trips would be noticeably reduced after the various access roads and turbine foundations have been installed and other Project components such as towers and solar panels are on-site. The increase in traffic, including excess load traffic, may result in short-term, localized disturbance to traffic patterns, increase in traffic volume, and create potential traffic safety hazards. Temporary road/lane closures may also be required for component transportation and for the installation of the collector lines and transmission line within the municipal road right-of-way.

Transportation of excess loads and large Project components may also produce abnormal wear on the County roads or may require road upgrades (structural, widening of turning radii, etc.) to handle the load requirements. As appropriate, permits will be obtained from the County and/or MTO to implement these activities once final transportation routes and requirements have been finalized.

Potential effects and mitigation measures related to construction traffic noise and air pollution is addressed in Sections 3.4 and 3.5.

Mitigation Measures

Detailed plans or agreements regarding maintenance and/or repairs of the local roads and road rights-of-way damaged during construction will be developed with the County. Pre and post construction road surveys will also be conducted and SPK will be responsible for any required upgrades/repairs directly associated with Project construction. The Construction Contractor will implement a Traffic Management Plan to identify and deal with specific traffic planning issues including the management of traffic and the delivery of materials. Aspects of the Traffic Management Plan will likely include strategies governing movement of materials and personnel to, from, and within the workspace areas; management of connection points between Project access roads and public roads; transport of abnormal loads; control of any upgrading/modification roadworks, road/lane closures; and/or dust and vehicle emission controls.

SPK is committed to working with the County to obtain all necessary permits, approvals, and agreements related to the Project.

Net Effects

Abnormal wear (e.g. rutting) on municipal roads may be unavoidable. However, the effect of constructing the various Project components is anticipated to have a limited, short term effect on local roads given SPK's commitment to developing maintenance and/or repair plans or agreements with the County. Truck traffic would increase on some roads during Project component deliveries, but would be restricted to predetermined routes and times to the greatest extent possible. Road safety is not expected to be an issue during the construction phase due to the implementation of a Traffic Management Plan; however, the potential for accidents along the haul routes and on-site cannot be totally avoided.

The effect of constructing the various Project components is anticipated to have a limited, short term effect on traffic during construction and will also be managed through the implementation of a Traffic Management Plan.

3.8 PUBLIC HEALTH AND SAFETY

3.8.1 All Project Components

Potential Effects

Potential effects to public health and safety are largely in the form of increased construction related traffic (Section 3.7) and unauthorized access of the public to the Project's construction sites. Accidents and malfunctions such as fires also pose a risk to public health and safety.

In addition, recreational uses of the land in proximity to the Project Location during construction pose a safety risk due to the large construction equipment on-site.

Potential effects and mitigation measures related to construction related noise and air quality is addressed in Sections 3.4 and 3.5.

Mitigation Measures

Implementing transportation planning and safety measures during construction would minimize the potential for traffic related safety concerns. A detailed Traffic Management Plan and a detailed Health and Safety/Emergency Response Plan will also be prepared and implemented by the Construction Contractor.

Land access to the construction-sites will be controlled through signage and restricted to authorized personnel only. The Construction Contractor would also employ good site safety practices during the construction phase. The detailed Health and Safety/Emergency Response Plan referenced above should consider both public and occupational health and safety issues. This may include protecting the public from equipment and construction areas by posting warning signs, use of personal protective equipment, accident reporting, equipment operation, and confined space entry. Discussions with local emergency services personnel shall take

place prior to construction to address concerns of local emergency services personnel. If required, SPK would participate in a training session for these workers.

Net Effects

With proper protection and mitigation measures, and adherence to safety policies and procedures, there is minimal increased or new risk to public health and safety from construction of the Project.

3.9 HERITAGE AND ARCHAEOLOGICAL RESOURCES

A Stage I and II Archaeological Assessment has been completed for the Project and is provided in the **Draft Archaeological and Heritage Report**. In addition, a Built Heritage and Cultural Landscape Inventory **Draft** Report and a Protected Properties Assessment **Draft** Report have also been completed for the Project and are provided in the **Draft Archaeological and Heritage Report**.

The results of the Stage 1 Archaeological Assessment indicated that most of the proposed project area demonstrated the potential for the presence of significant and intact archaeological resources. During the completion of the Stage II Archaeological Assessment, a total of 128 archaeological sites were located within or adjacent to the Project Location.

A total of 609 potential built heritage resources and 36 cultural heritage landscapes were identified within or adjacent to the general Project area (not specifically within the Project Location). Ten (10) designated properties were also found in the general Project area.

3.9.1 All Project Components

Potential Effects

Archaeological resources located during the course of on-site archaeological assessments will be documented and/or removed (as appropriate) from the Project Location prior to construction in accordance with Ministry of Tourism and Culture guidelines. As such, there are no anticipated significant effects to known archaeological resources during the construction of the Project.

Potential impacts to built and cultural heritage resources and protected properties are related to destruction, alteration, shadowing which alters the appearance of the resource, isolation of the resource, direct or indirect obstruction of views of or from within the resource, change in land use of the resource, and land disturbances which may impact the resource. Identified potential impacts to each of the various built and cultural heritage resources and protected properties are fully described within the **Draft Archaeological and Heritage Report**.

Mitigation Measures

Given that there are no anticipated effects to known archaeological resources during the construction of the Project, mitigation measures are not required. However, should other archaeological or historical materials or features be found during construction, all work within the vicinity of the find would be suspended and a Ministry of Tourism and Culture archaeologist and aboriginal communities would be contacted. In the event that human remains are encountered or suspected of being encountered before or during construction, all work would stop immediately. Notification would then be made to the Ontario Provincial Police or local police.

The primary mitigation measure to avoid potential impacts to built and cultural heritage resources and protected properties is to avoid the use of the properties and resources during the construction of the Project.

Net Effects

By following the procedures recommended above, no significant adverse effects on archaeological resources are anticipated during construction of the Project. In addition, no potential negative impacts of significant magnitude have been identified to heritage resources or protected properties.

3.10 WASTE MATERIAL DISPOSAL

3.10.1 All Project Components

Potential Effects

The location and classification of landfills sites in the area was determined through a review of the MOE Waste Disposal Inventory (1991), and review of Haldimand County's Official Plan (2009). Only one site was noted as occurring within 500 m of a turbine or the solar farm (approximately 371 m from T25), although none of the sites are within the Project Location. The site opened in 1973 and closed in 1979 and is referenced as the South Cayuga Landfill (CofA #: A110307). The site is classified as A6 meaning it contains rural, municipal/domestic waste and had been closed for 10 to 20 years at the time of preparation of the MOE Waste Disposal Inventory (MOE, 1991). The MOE indicated that further information about the landfill would only be provided via a Freedom of Information Act request (Kozak pers. comm., 2011). Given the distance separation between the sites, no effects from the landfill are anticipated.

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

contained and allowed to blow off the construction site. There will be no on-site disposal of waste during the construction or operation of the Project.

Sanitary waste generated during the construction phase will be collected via portable toilets and wash stations supplied by a licensed third party who will be retained prior to the start of major construction activities.

Mitigation Measures

During construction, the Construction Contractor would implement a site-specific waste collection and disposal management plan, which may include site practices such as:

- systematic collection and separation of waste materials within on-site storage areas (not waste disposal areas) in weather-protected areas located at either central construction areas or the O&M building;
- all waste materials and recycling would be transported off-site by private waste material collection contractors licensed with a Certificate of Approval – Waste Management System;
- contractors would be required to remove their excess materials from the site (e.g. extra cable, formwork, scrap metals, pallets, etc.);
- excess materials generated during the course of construction excavations of soil would be handled in accordance with the MOE's Protocol for the Management of Excess Materials in Road Construction and Maintenance;
- excess excavated soils may be reused elsewhere on the property with landowner permission;
- labelling and proper storage of hazardous and liquid wastes (e.g. used oil, drained hydraulic fluid, and used solvents) in a secure area that would ensure containment of the material in the event of a spill. As per s.13 of the *Environmental Protect Act*, all spills that could potentially have an adverse environmental effect, are outside the normal course of events, or are in excess of the prescribed regulatory levels would be reported to the MOE's Spills Action Centre;
- dumping or burying wastes within the Project sites would be prohibited;
- should contaminated soil be encountered during the course of excavations the contaminated material would be disposed of in accordance with the current appropriate provincial legislation, such as Ontario Regulation 347, the General – Waste Management Regulation;
- disposal of non-hazardous waste at a registered waste disposal site(s);

- if waste is classified as waste other than solid non-hazardous, a Generator Registration Number is required from the MOE and the generator would have obligations regarding manifesting of waste. Compliance with Schedule 4 of Regulation 347 is mandatory when determining waste category;

- implementation of an on-going waste management program consisting of reduction, reuse, and recycling of materials; and

- disposal of sanitary wastes would be the responsibility of the contracted third party and they would ensure disposal in accordance with appropriate legislation, standards and policies.

The cement provider would be responsible for ensuring that wash water from the cleaning of cement truck drums is disposed of in a sewage works designed for that purpose and approved under Section 53.(1) of the *Ontario Water Resources Act*, or under Part 8 of the *Building Code Act*.

In terms of accidental spills or releases to the environment, standard containment facilities and emergency response materials would be maintained on-site as required. Refuelling, equipment maintenance, and other potentially contaminating activities would occur in designated areas, and as appropriate spills should be reported immediately to the MOE Spills Action Centre.

It is recommended that Construction Waste Management Plans be developed by the Construction Contractor and should include protocols for the reuse, recycling and/or disposal of solid, hazardous and sanitary waste.

Net Effects

During construction, the temporary on-site storage of waste should not create any significant adverse effect provided mitigation measures are implemented. In addition, there will be no on-site disposal of waste generated by the Project. It is assumed that licensed waste disposal sites are compliant with Provincial and County regulations.

4.0 Construction Environmental Management Plan

Although not a requirement of O. Reg. 359/09, SPK, in consultation with the Construction Contractor, would prepare a Construction Environmental Management Plan (CEMP) prior to the initiation of any substantive on-site works. The CEMP would be the controlling plan for all construction activities, and would be designed to minimize potential adverse environmental effects, while enhancing the Project's benefits. The CEMP would be based on the environmental effects and mitigation measures identified in this report, and related reports to be submitted as part of the REA application. As part of the construction program, site practices and procedures would be implemented to further reduce the environmental effects identified in this report and supporting studies. These practices may include specifications regarding disposal of excavated material, sediment control, dust control, and soil compaction control. In addition, SPK staff and contractors would be made aware of the environmental commitments contained in this report and supporting studies to ensure the commitments are implemented.

The Project CEMP would include procedures and plans based on regulatory requirements and accepted site practices and as appropriate would include the following plans:

- *Traffic Management Plan*: the Construction Contractor and/or the major component manufacturers would assist in the development and implementation of this plan, which would contain strategies governing movement of materials and personnel to, from, and within the workspace areas; management of connection points between access roads and public roads; transport of abnormal loads; road/lane closure strategies, control of any upgrading/modification roadworks; and/or dust suppression and vehicle emission controls;

- *Hazardous Waste Management Plan:* to outline the procedures for proper identification, storage, handling, transport, and disposal of hazardous waste. In addition, the procedures would outline specific requirements for personnel training, emergency response, product review and approval, and record keeping;

- *Non-Hazardous Waste Management Plan:* to establish alternative procedures for the management and disposal of non-hazardous waste such as used lubricants, used drums, and general waste with specific provisions for reuse and recycling of waste materials;

- *Health and Safety Plan*: the Construction Contractor would prepare this plan considering both public and occupational health and safety issues. This may include protecting the public from equipment and construction areas by posting warning signs, use of personal protective equipment, accident reporting, equipment operation, and confined space entry;

- *Construction Plan*: SPK would develop construction specifications that would form part of the construction contract. These specifications would detail the specific techniques and procedures to be followed to implement the mitigation recommendations contained in this report and supporting reports and studies;

- *Emergency Response and Communications Plan*: the Construction Contractor and/or SPK would include a plan for the proper handling of material spills and associated procedures to be undertaken during a spill event. The plan would also specify containment and clean-up materials and their storage locations. The plan would include general procedures for personnel training. As appropriate, the plan may cover response actions to high winds, fire preparedness, evacuation procedures, and medical emergencies. This plan would be developed in consultation with local emergency services personnel to determine the extent of emergency response resources and response actions of those involved. The plan would include key contact information for emergency service providers, address information for turbine and other Project infrastructure locations, a description of the chain of communications and how information would be disseminated between SPK and/or the Construction Contractor and the relevant responders;

- *Wildfire Prevention and Preparedness Plan*: the Construction Contractor and/or SPK may develop a plan for forest fire prevention and preparedness in accordance with MNR and County requirements (if required). This plan may be developed with input from the County to determine the extent of emergency response resources and response actions of those involved. If required, the plan would be finalized and provided to the MNR and County prior to construction and would include information on the following:
    - Fire hazard assessment – identification of fuel sources at the Project site including gasoline, oils/lubricant, and debris from clearing activities;
    - Risk assessment of ignition;
    - Ignition prevention measures – dependent on the results of the risk assessment;
    - Fire preparedness plan – including a suppression plan which would require input from the County to determine the extent of emergency response resources and response actions (the fire preparedness plan would also be incorporated in the Emergency Response Plan for evacuation purposes); and,
    - Fire protection – maintenance and other measures to protect the Project and public from wildfire threats.
- *Training Plan*: as appropriate, this would involve the training/informing of construction personnel on the unique features of the above plans prior to construction; and

- *Complaint Response Protocol*: SPK would continue its pre-construction contact with Project stakeholders during construction and through the initial period of operation as long as this seems an effective two-way channel for communication. SPK and/or the Construction Contractor may consider developing and implementing a Complaint

Response Protocol for the construction phase to address any reasonable concern from the public. This protocol would likely provide a telephone number for contact at SPK. Any telephone number provided to the public for reporting of complaints should be equipped with a voice message system. SPK would endeavour to respond to messages within 48 hours. All reasonable commercial efforts should be made to take appropriate action as a result of actual concerns as soon as practicable. Should such a protocol be developed, SPK would consider posting it on the Project website (www.SamsungRenewableEnergy.com) and/or providing it directly to the County and the MOE.

SPK would provide overall direction for the development and implementation of these plans.

5.0 Construction Environmental Effects Monitoring Plan

The Construction Contractor would be the primary party responsible for the implementation of Construction Environmental Effects Monitoring Plan measures. Implementation of these measures would be undertaken in compliance with applicable municipal, provincial, and federal standards and guidelines. The following subsections outline the key monitoring activities to be implemented based on the potential effects and mitigation measures identified in the previous sections.

Additional environmental effects monitoring will take place during the operation of the Project and may consist of similar monitoring activities as described below. The Environmental Effects Monitoring Plan for the operation of the Project is provided in the **Draft Design and Operations Report** and should be reference for a complete description of the monitoring efforts and contingency measures that will be implemented.

5.1.1 BEDROCK EXCAVATIONS

Methodologies/Sampling Protocols

Given that larger scale bedrock excavations will be required for the installation of the turbine foundations, regular inspections will be required by qualified geotechnical engineering personnel during bedrock excavations to confirm that conditions are safe and consistent with the requirements of the *Occupational Health and Safety Act*. Excavations will cease if it is deemed that conditions are not safe and consistent with the requirements of the *Occupational Health and Safety Act*.

Performance Objectives/Additional Actions

Provided that regular inspections/monitoring are conducted and safety procedures implemented as outlined above, it is anticipated that potential effects have been mitigated and that no additional monitoring actions would be required.

5.1.2 TERRESTRIAL HABITATS

Methodologies/Sampling Protocols

The majority of monitoring for terrestrial habitat impacts will take place post-construction, during operations of the Project. Construction activities that have the potential to affect terrestrial flora and fauna include vegetation clearing, disturbance, accidental spills and/or leaks, and waste disposal. Monitoring of construction activities is necessary to ensure terrestrial flora and fauna are protected.

Vegetation clearing activities would be conducted under constant observation and monitoring of the Construction Contractor to ensure that vegetation is cleared only from designated areas (within the areas identified as constructible areas). Areas outside the designated construction-

sites shall not be disturbed. Erosion and sediment control measures will be monitored on a regular basis (weekly), maintained throughout construction and any discrepancies rectified immediately. Additional monitoring of construction fences to prevent encroachment into adjacent natural features and monitoring of drainage ditches, culverts and general flow patterns to ensure proper site drainage will also occur.

Additional monitoring during construction to confirm whether the proposed mitigation measures are protecting the natural features, as proposed includes:

- monitoring of winter wildlife movement within and adjacent to the Solar Project Location (i.e. proposed corridors) to determine the barrier effect of the project on local animal movement corridors and general circulation; and

- monitoring of vegetated areas to ensure that native grassland species are propagating within the proposed buffer areas and beneath the proposed solar modules and to minimize the introduction of non-native or invasive species to the area.

Elements of the post-construction monitoring program to determine impacts and disturbance to wildlife species during construction and operation of the Project include:

- Mortality monitoring of breeding birds, migratory land birds, migratory raptors and bats in accordance with the MNR bird and bat guidelines;

- A point count-based study to assess disturbance effects to declining forest breeding birds (Feature 42);

- A transect-based study to assess disturbance effects to migratory land birds resulting from wind turbine operation during migration; and

- Visual monitoring for changes to hydrological conditions in wetlands and significant woodlands, weekly during construction and seasonally for one year following construction.

Details regarding the mortality and disturbance monitoring, reporting, adaptive management programs and contingency measures are provided within the **Draft NHA/EIS** and the **Draft Environmental Effects Monitoring Plan**. Monitoring will be required following the unlikely event of contamination from an accidental spill or leak. Contaminated soils will be removed and replaced as appropriate. All such activities will follow procedures outlined in the Emergency Response Plan for the CEMP (see Section 4.0).

As appropriate, records of waste generation and hauling should be maintained. Where a third party's activities are identified as non-compliant or insufficient, the Construction Contractor would seek out an alternative recycling or disposal solution.

Performance Objectives/Additional Actions

Provided mitigation measures outlined in Section 3 are implemented, and monitoring as outlined above occurs, it is anticipated that environmental disturbance would have been contained and that no additional monitoring actions would be required.

An adaptive management program that outlines performance objectives, and contingency measures will be implemented should the performance objectives established in the **Draft EEMP** not be met. Contingency measures may include an adaptive management approach that allows mitigation measures to be implemented in the event that unanticipated potentially significant adverse environmental effects are observed, as assessed through a review of annual monitoring reports. The post-construction monitoring program will be reassessed by MNR and SPK at the end of each monitoring year.

5.1.3 GROUNDWATER

Methodologies/Sampling Protocols

The presence of recently drilled or non-documented water wells would be investigated with participating landowners. In the event that turbines are located within 100 m of private residential wells of participating landowners, the Construction Contractor may, at the landowner's request, hire a hydrogeologist to undertake monitoring of the quality and quantity of these wells over the course of construction. The hydrogeologist would develop a well monitoring program to address potentially affected wells.

Performance Objectives/Additional Actions

In the event that well water quality or quantity is disturbed as a result of construction, as determined by the hydrogeologist, SPK would provide a temporary potable water supply until corrective measures are taken and would comply with MOE's *Guideline B-9: Resolution of Groundwater Interference Problems*. All corrective measures, including determination of when corrective measures are no longer required, would be outlined in the well monitoring program to be developed by the hydrogeologist.

5.1.4 AQUATIC HABITATS

Methodologies/Sampling Protocols

As appropriate, a Construction Contractor representative would be on-site during installation of Project components that could potentially affect aquatic habitats to ensure compliance with specifications, site plans and permits. In particular, the Construction Contractor would ensure that pre-construction preparation is completed prior to commencement of in-stream work (if required). Where required and if applicable, the Construction Contractor would ensure that detailed pre-construction profiles of the slopes, banks, and bed are determined prior to the

commencement of the construction works. The Construction Contractor would monitor weather forecasts prior to construction works, particularly prior to work near aquatic habitats.

Performance Objectives/Additional Actions

The Construction Contractor would ensure that bank, bed, and floodplain conditions are restored to pre-construction conditions, as possible, following completion of the construction activities.

Environmental inspection following spring run-off the year after construction (first year of operations) may also be considered to review the effectiveness of the bank and slope re-vegetation (if required), to check bank and slope stability, and to ensure surface drainage has been maintained. In the event that adverse effects are noted, appropriate remedial measures would be completed as necessary (i.e. such as site rehabilitation and revegetation) and additional follow-up monitoring conducted as appropriate, under the direction of an environmental advisor.

Additionally, compensation strategies and/or permits from Fisheries and Oceans Canada and/or the conservation authorities, as applicable, would likely include conditions of approval such as construction and post-construction monitoring. All such strategies and/or permits would be obtained prior to construction, and all such conditions and requirements would be implemented.

5.1.5 AGRICULTURAL LANDS

Methodologies/Sampling Protocols

For a period of one year after restoration of temporary work areas on agricultural lands, potential soil problem areas including subsidence, soil erosion and/or stoniness may be visually monitored by a soil specialist (such as a professional agrologist), or as per agreements with the landowner. Monitoring of the above mentioned soil issues is usually conducted during the spring, the year after construction, so that the area has had a chance to over-winter. These issues are usually identified during a site visit once the soil is dry enough to traverse by foot, but before the land owner has been on the fields to cultivate and seed for next year's crop.

Performance Objectives/Additional Actions

If adverse impacts are noted during the above post-construction monitoring, appropriate remediation measures would be developed by the soil specialist, or as per agreements with the landowner. These mitigation measures may include, but are not limited to, soil re-grading or importation to correct the effects of subsidence, re-grade or import soil from an off-site source to mitigate soil erosion issues, and surface pick excess stones as required. SPK would be responsible for the implementation of all necessary mitigation measures. Additional follow-up monitoring would be conducted, under supervision of the soils specialist. Additional monitoring in representative locations may include measurement of soil physical and chemical properties (soil compaction, soil fertility and soil organic matter levels).

5.1.6 PUBLIC ROADS

Methodologies/Sampling Protocols

County roads would be restored to their pre-construction conditions to the satisfaction of local authorities as applicable to the agreements with Haldimand County. Some municipal roads requiring structural enhancement/upgrades may be left in their upgraded form if requested by the County. For a period of one year after construction (first year of operations), roads would be monitored following a heavy rain event and following spring runoff, as defined by applicable agreements, to ensure no erosion, bank slumpage, road subsidence or major rutting has occurred as a result of construction activities. As appropriate, affected roadside ditches and drains would be repaired if required and monitored to ensure that they are functioning properly.

Performance Objectives/Additional Actions

If adverse impacts are noted during the above post-construction monitoring, appropriate remediation measures would be developed as per applicable agreements. As appropriate, affected road substrate would be repaired and roadside ditches and drains would be revegetated. Additional follow-up monitoring would be conducted, as per applicable agreements, until adverse impacts are no longer evident.

5.1.7 AIR QUALITY & ENVIRONMENTAL NOISE

Methodologies/Sampling Protocols

As appropriate, records of vehicle maintenance would be retained and made available for periodic review by the Construction Contractor. Monitoring and maintenance of noise abatement devices on construction and support equipments will also take place to keep noise levels within acceptable construction noise standards.

The Construction Contractor would monitor to ensure that temporary topsoil storage piles are stabilized with appropriate means.

Performance Objectives/Additional Actions

All vehicles identified through the monitoring program that fail to meet the minimum emission and noise standards would be repaired immediately or replaced as soon as practicable from the construction area. Provided mitigation measures outlined in Section 3 are implemented, and monitoring as outlined above occurs, it is anticipated that environmental disturbance would have been contained and that no additional monitoring actions would be required.

6.0 Closure

This Draft Construction Plan Report for the Grand Renewable Energy Project has been prepared by Stantec for SPK in accordance with Item 1, Table 1 of Ontario Regulation 359/09, and the Draft guidance document "*Technical Bulletin Three – Guidance for Preparing the Construction Plan Report*".

This report has been prepared by Stantec for the sole benefit of SPK, and may not be used by any third party without the express written consent of SPK. The data presented in this report are in accordance with Stantec's understanding of the Project as it was presented at the time of reporting.

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