Penn Energy – Hamilton_Port Hope-4
SOLAR ENERGY FACILITY

In the

Township of HAMILTON

Fit Contract No. F-000687-SPV-130-505
FIT Application No. FIT-FQWKQZF
COD: May 5, 2012

Environmental Impact Study Report

DRAFT

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1.0 INTRODUCTION

Penn Energy Trust (Penn) has executed a Feed-in-Tariff (FIT) contract with the Ontario Power Authority (OPA) for the construction of a 10 MW (peak AC) solar energy facility near the Town of Baltimore, northeast of Cobourg, Ontario. The subject lands are located in Lot 3 Concession 2 of the Township of Hamilton. The proposed Renewable Energy Generation Facility (REGF) would consist of a collection of solar photovoltaic (PV) modules (each approximately 1.00 m x 1.67 m in dimension) that are grouped into arrays tilted and facing south. These stationary arrays are strung together forming a series of rows oriented east to west. The Environmental Protection Act (EPA) administered by the Ministry of the Environment (MOE) regulates Renewable Energy Approvals (REA) under Part V.0.1 of the act, pursuant to Ontario Regulation 359/09. As part of this act, a Natural Heritage Assessment (NHA) is required in order to identify potential impacts to the natural area. Bowfin Environmental Consulting Inc. (Bowfin) has been retained by Penn to conduct the NHA.

A NHA study includes three activities: a review of records (background information), a site investigation and an evaluation of the significance of each natural feature identified. Each activity is summarized in a separate report. These activities identified and discussed the significance of natural features on or up to 120 m (depending on the feature) from the REGF project location. These features would include:

- Areas of natural and scientific interest (ANSI) (earth or life science);
- wetlands (coastal, northern, southern);
- valleylands;
- wildlife habitat;
- woodlands;
- Certain additional Natural features in the Oak Ridges Moraine Conservation Plan Area;
- Certain additional Natural features in the Greenbelt Plan's Protected Countryside;
- Provincial parks; and
- Conservation Reserves.

Should any significant natural features be found within the REGF project location or the appropriate adjacent lands to the feature, then an Environmental Impact Study (EIS) is required to identify and assess the potential environmental effects of the project on the natural feature, Provincial Park or conservation reserve.

The Evaluation of Significance Report determined that an Environmental Impact Study Report (EIS) was required to address the potential impacts to three significant features: woodlands, valleylands and wildlife habitat.

Figure 1 Location of the Subject Lands

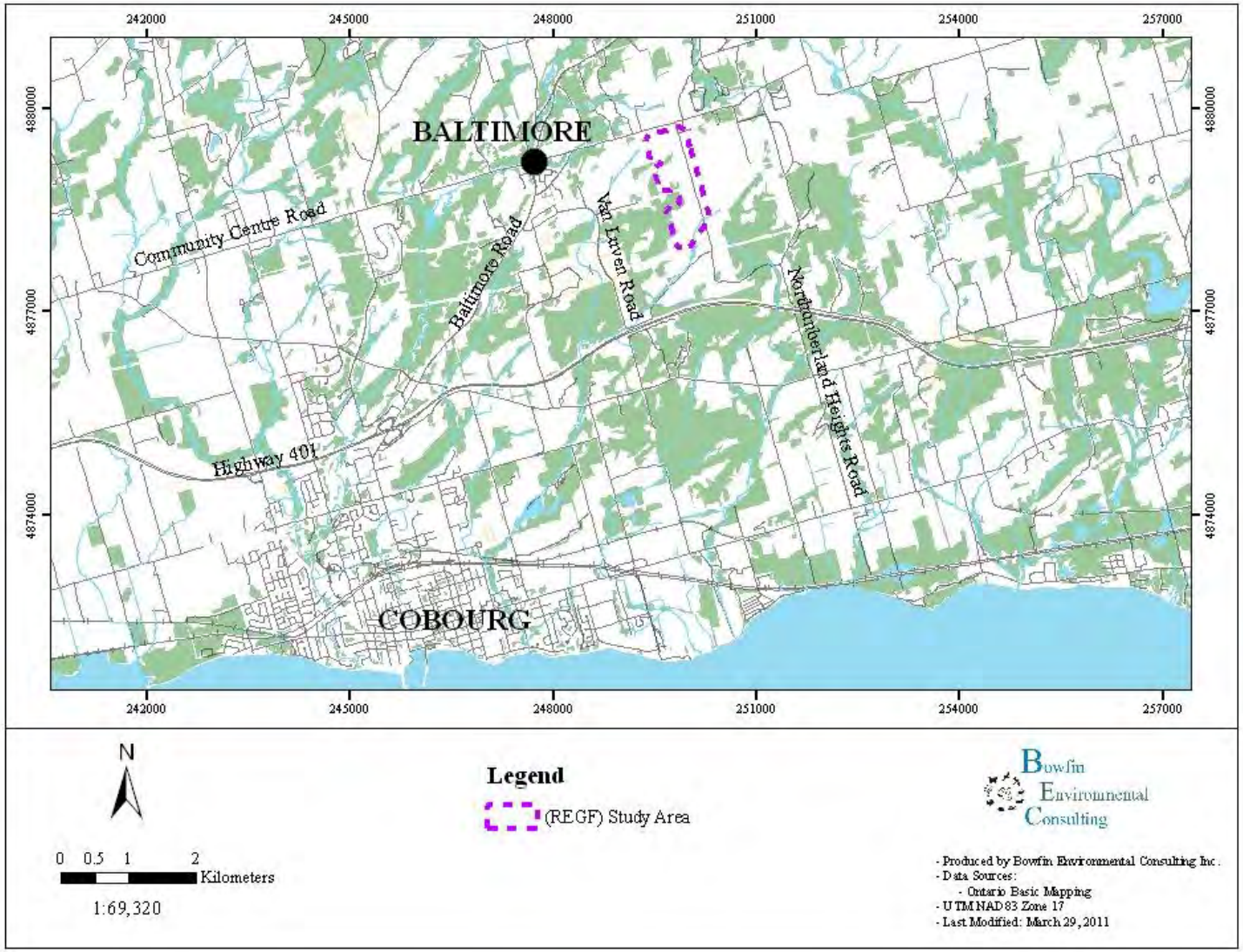
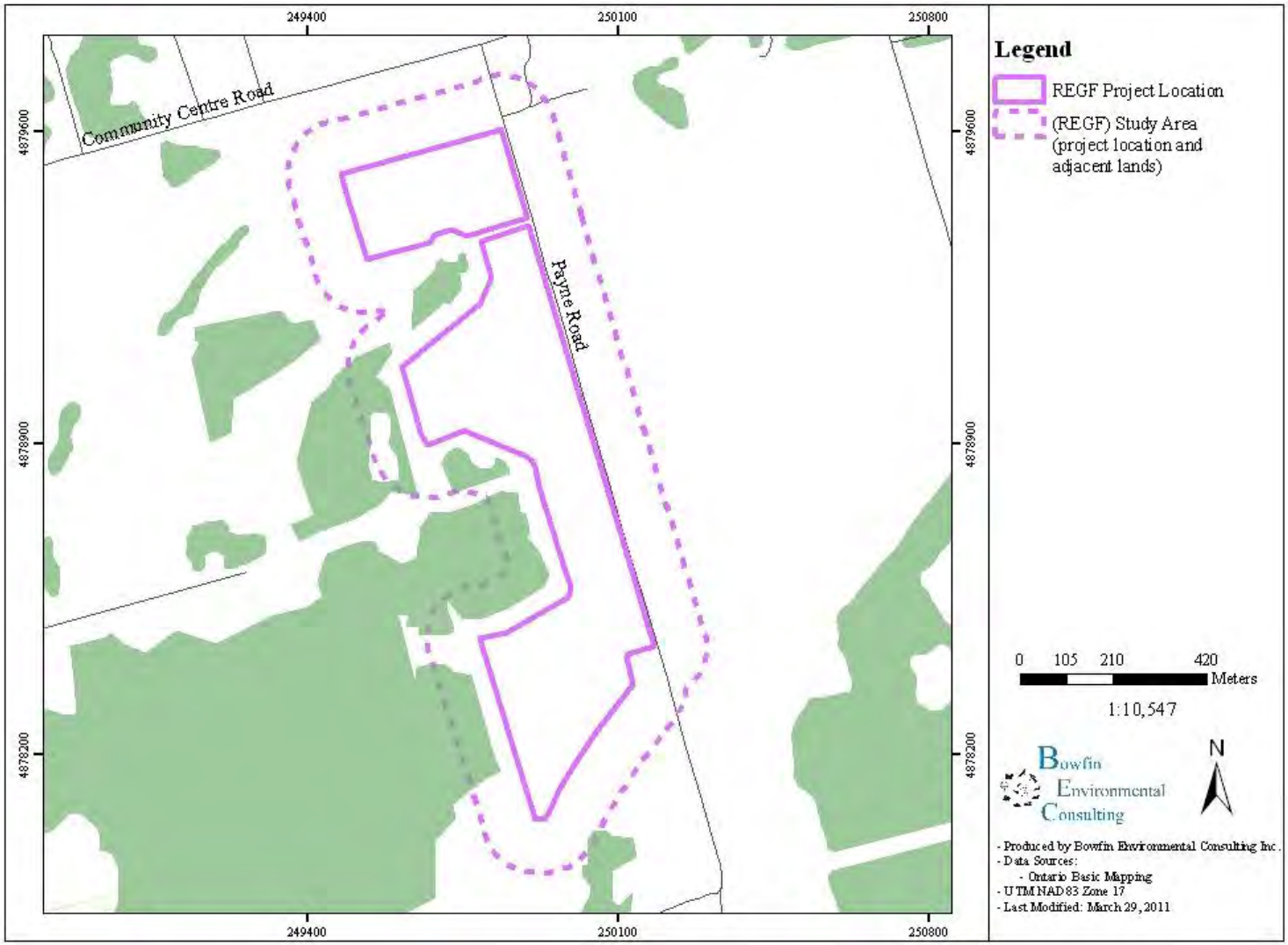


Figure 2 REGF Study Area (including the Project Location and adjacent lands within 120 m)



2.0 METHODOLOGY

The study area for this proposed solar facility includes the portion of subject lands where any construction activities, including support facilities and staging areas, would take place ("REGF Project Location") as well as all adjacent lands within 120 m (the "Study Area") (Figure 2).

2.1 Summary of the Evaluation of Significance

Based on the accepted methods for determining significance of natural features (i.e. NHAG, SWTHG, NHRM, OWES), the NHF that were being brought forward as significant NHF are: woodlands, valleylands and wildlife habitat (Table 1, Figure 3). These features are discussed in this Environmental Impact Study.

Table 1 Summary of Significance of Natural Heritage Features Identified within the Study area

Natural Heritage Feature	Present in or within 120 m of Project Location?	Significant? (yes/no)	EIS Required (yes/no)
Wetlands	Yes	No	No
Woodlands	Yes	Yes	Yes
Valleylands	Yes	Yes	Yes
ANSIs	No	No	No
Wildlife Habitat -foraging areas with abundant mast -seeps/springs -deer movement corridor	Yes	Yes	Yes

Figure 3 Location of Significant Natural Heritage Features

3.0 ENVIRONMENTAL IMPACT STUDY (EIS) REPORT

The evaluation of these natural heritage features was completed by Michelle Lavictoire. Pursuant to O.Reg 359/09 section 38, the applicant must prepare an Environmental Impact Study report if they wish to construct, install or expand a renewable energy generation facility in or within 120 m of any of the following locations (among others that not applicable to this project):

- A significant woodland or within 120 m of a significant woodland;
- A significant valleyland or within 120 m of a significant valleyland; or
- A significant wildlife habitat or within 120 m of a significant wildlife habitat.

The records review report indicated that there was insufficient information to determine the significance of three natural features an unevaluated woodland, valleylands, and wildlife habitat. During the site investigation particular attention was paid at gathering additional information in order to comment on these natural features. The site investigations confirmed that there were no sand barrens, savannah, tallgrass prairie, alvars or valleylands within or adjacent to the subject lands. The study area is also located outside of the Oak Ridges Moraine, the Greenbelt Protected Countryside and the Niagara Escarpment. The site investigations found that the REGF project location consisted primarily of row crops with some windrows. Rock piles were found within the windrows present between fields. Outside of the REGF project location but within the study area other habitat types included thickets, forests, valleylands, small man-made wetland pond, and meadows. The evaluation of significance report found that there was a significant woodland, valleylands and wildlife habitat but no significant wetlands. The boundaries of the significant features are identified in Figure 3. The site concept plan of the proposed REGF which shows the location of the solar modules, perimeter fence, landscaped setback and maintained grass areas is provided in Appendix A.

The following section provides a description of the proposed solar facility and its construction methods, operation and decommissioning phases. This is followed by an evaluation of the three significant natural heritage features (woodland, valleylands and wildlife habitat). The features are discussed in terms of their significance, the proposed solar facility's potential to impact the feature, any re-design which was implemented as part of the site plan development process, recommended mitigation measures and residual impacts (following re-design and mitigation measures).

Similar to the information provided in this EIS, a Construction Plan Report will also be available to address the potential negative environmental effects that may result from construction or installation activities on the woodland and animal movement corridor. The Construction Plan Report also addresses the mitigation measures described in this EIS.

When negative environmental effects of a project on the significant natural features are identified, then the EIS report needs to describe how the Environmental Effects Monitoring Plan addresses them. A description of the potential impacts, re-design, mitigation measures and

residual impacts are provided in the sections below. For this project, the potential to impact natural features has been eliminated through re-design (i.e. moving the project away from significant features). No impacts to the significant woodlands, valleylands or wildlife habitat are anticipated. Furthermore, improvements to these habitats are expected following the establishment of a 30 m setback. An Environmental Effects Monitoring Plan (EEMP) will be created by Penn and will include the mitigation measures outlined in this EIS. This EEMP will include the montoring described in section 4.1. of this report.

3.1 Solar Facility Project Description and Anticipated Potential Impacts

The REGF's potential to impact the natural environment was evaluated for the construction, operation and decommissioning phases. The proposed REGF would consist of a collection of solar photovoltaic (PV) modules (each approximately 1.00 m x 1.67m in dimension) that are grouped into arrays. These stationary arrays are strung together forming a series of rows oriented east to west. Electricity collection and distribution lines would link the PV modules to a collection house with inverter and transformer equipment. For this size of operation 10-15 collection houses are anticipated. Laneways would provide access to each collection house. The entire operation (solar modules, collection houses and access lanes) would be fenced in order to provide for safety and security, in accordance with applicable requirements. The fence will be constructed as per applicable legislation (such as Ontario Energy Board requirements). A perimeter lane would be constructed inside of the fence. The access lanes (perimeter lane and lane ways to collection houses) would consist of a typical farm lane, they would not be paved. These activities would require clearing of vegetation and minor grading. The solar modules are placed above the ground and as such allow for low growing herbaceous vegetation to be planted underneath. The securing of the modules to the ground, primarily to prevent uplift from wind, would be completed by pile driving or core drilling pipes into the ground. The exact methods will be decided following geotechnical investigations. The construction period would take approximately 6 months to complete. The expected operational lifespan of the solar modules is 20-30 years.

It should be noted that as the project's design has evolved the REGF layout has been modified substantially. When natural features were identified, setbacks/buffers were established and the project footprint was pulled-back from those features in an effort to minimize or avoid any negative effects on woodlands, wetlands, valleylands, streams/tributaries, and seeps. The REGF utilizes no land that hasn't already been modified for long-term agricultural purposes. In almost every case the new setbacks/buffers are simply portions of the former croplands that will be left fallow during the lifespan of the REGF, allowing soil nutrients to replenish.

In order to ensure that no woody vegetation would become established where it could cause damage to the fence or shade the solar modules, routine maintenance would include regular mowing, as frequently as weekly, during the operation of the solar facility. This area located adjacent to the outside of the perimeter fence, but within any setbacks/buffers from significant NHFs, will be limited to a maximum of 5 m wide. Regular mowing, as needed, will also be conducted within the facility.

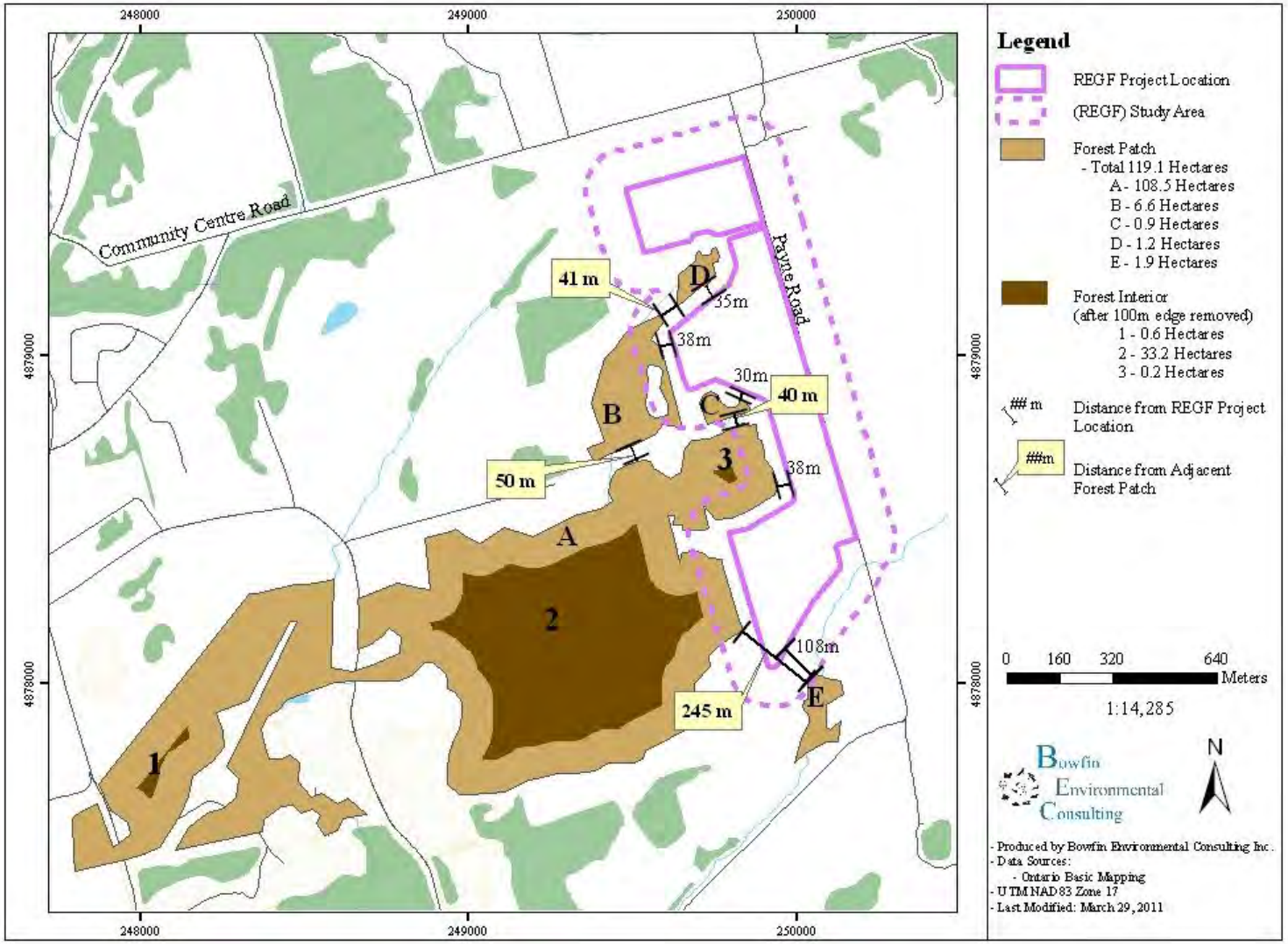
The decommissioning of the site would include the removal of the modules, collection house and the pipes used to secure the modules in place. The site could then be reverted back into agricultural use, grazing lands or natural features.

The potential impacts are discussed in the sections below (sections 3.2, 3.3 and 3.4). The significance of the potential impacts is measured using three different criteria: area affected, duration of impacts and magnitude. The area affected may be local in extent signifying that they will only be impacted within the study area or regional signifying that they may impact an area outside the immediate study area. The duration of the impact may be rated as short term (1-2 years), medium term (2-4 years) or long term (>4 years). The magnitude of the impact may be negligible signifying that the impact is not noticeable, minor signifying that the project's impacts are perceivable and suggests minor mitigations, moderate signifying that the project's impacts are perceivable and require mitigations as well as monitoring and/or compensations and major signifying that the project's impacts would destroy the environmental component within the study area.

3.2 Woodlands

The evaluation of significance found that there were two significant woodlands located within the project subject lands (polygons A and B) (Figure 4). The remaining woodlands (C-E) were much smaller (0.9, 1.2 and 1.9 ha, respectively). The proposed project does not include the removal of any of the forest patches. In fact, a buffer from all woodland areas (both significant and insignificant) of at least 30m is proposed. The only removal of woody vegetation would occur within the windrows, but loss of the windrows will not affect the woodlands in terms of the size, interior habitat, or ecological functions and no species of conservation value were located within the windrows. The windrows located along Payne Road will be removed and replaced with new landscaping (e.g. grass and hedges). The removal of those trees is being completed in order to address aesthetic screening requests of the neighbours and to minimize shading of the solar panels. Any potential impacts to the forest polygons would be indirect and could occur during the construction, operation and decommission phases of the project. These activities could result in the indirect impact of the loss or harm of surrounding trees, not designated to be removed.

Figure 4 Location of Woodland Forest Patches



Indirect Impacts - Construction, Operation and Decommissioning Phases

The potential indirect impacts to the woodland associated with this project include harm to trees not intended for removal. Harm could occur during any of the three stages of the project. During construction the activities which could inadvertently harm additional trees include clearing, grubbing, grading, installation of fencing and the perimeter lane. During operation the potential to cause impacts to the woodland would be limited to maintenance activities such as repairs to the fence or lane as well the regular mowing of the narrow area outside (within 5 m) of the perimeter fence. This mowing is required to ensure that no woody growth damages the fence and to provide accessibility for inspection and maintenance of the fence. During the decommissioning phase, the fence will be removed; the machinery used for this activity has the potential to harm the woodland. It is noted that the current agricultural land-use practices include clearing and working the soil immediately adjacent to the woodlands. By providing a 30m buffer from the woodland areas, this project will provide an overall improvement to this natural feature when compared to current land-use practices.

Initial Impact Analysis

Prior to mitigation, the potential impacts from construction and decommissioning are considered to be local, short-term and negligible. Those impacts associated with operation (the maintenance activities) are local, repetitive and negligible.

Mitigation Measures

The potential impacts identified above may be minimized and/or eliminated through the use of the following mitigation measures and monitoring:

During Construction

- Establish a 30 m buffer between the woodland and the perimeter fence in order to protect the root structure and to minimize hazards from falling edge trees;
- Clearly delineate the limits/perimeter of the area to be cleared to prevent the loss of woody vegetation not intended for removal;
- No removal of woody vegetation (trees or shrubs) between April 15th and July 31st, inclusive, unless a biologist has walked the site no earlier than five days prior to the planned clearing and has indicated that no nesting activity is occurring within the area to be cleared;
- Utilize small machinery (such as a small backhoe) within 25 m of woodlands for the removal of woody vegetation to minimize harm to the root system of trees not intended for removal;
- All stockpiling or infilling activities will be confined to within the fenced in area and will not extend more than 5 m of the outside of the fence in order to minimize potential to damage root systems of trees not intended for removal and to prevent sedimentation from entering the valleylands;

- All topsoil removal will be confined to within the fenced area and will not extend more than 5 m outside of the fence to minimize potential to damage root systems of trees not intended for removal and to prevent sedimentation from entering the valleylands;
- The perimeter lane should be left as a farm lane (i.e. unpaved, gravel or dirt road) to allow rainwater to infiltrate the soil;

During Operation and Maintenance

- Initial mowing should commence before April 15th or after July 31st, unless a biologist has walked the site no earlier than five days prior to the planned clearing and has indicated that no nesting activity is occurring within the area to be cleared;
- Clearly indicate limits/perimeter of area to be mowed around the perimeter fence to prevent impacts to the woodland feature; and
- While mowing, operator will visually scan the area for wildlife to minimize harm; and
- Utilize small machinery (such as a small tractor) within 25 m of woodlands/valleylands to repair any damage to the fence or perimeter lane to minimize potential damage to root systems of trees not intended for removal.

During Decommissioning

- Utilize small machinery (i.e. small backhoe) within 25 m of woodlands to remove the fencing in order to minimize potential damage to root systems of trees not intended for removal and to reduce soil compaction;
- All stockpiling or infilling activities will occur outside of the drip lines in order to minimize potential to damage root systems of trees not intended for removal and to prevent sedimentation from entering the valleyland; and
- Depending on the proposed land-use following decommissioning, the site could be reverted back into agricultural uses or naturalized with native trees, shrubs or grasses or allowed to naturalize on its own. Depending on the selected use, appropriate ministries will be consulted as necessary.

Residual Impact

No direct negative impacts to the woodland would be anticipated as a result of this project. The establishment of a 30 m buffer (the first 5 m adjacent to the fence regularly mowed and the balance of existing cropland/meadow areas left fallow to naturalize as a meadow) would result in a net gain in terms of protection of the woodland. Provided that the mitigation measures are implemented and that best practices are utilized during construction, the potential impacts to the woodland during all phases are considered to be negligible.

3.3 Significant Wildlife Habitat

During the Evaluation of Significance it was determined that significant wildlife habitat was located within 120 m of the REGF project location. The habitats that were deemed to be significant were the foraging areas with abundant mast, seeps and springs, deer movement corridors. There were no significant wildlife habitats located within the REGF project location. None of these habitats will be directly impacted by the proposed project. It is noted that the forest with the abundant mast was located 115 m, the seeps and springs 40-115 m and the deer

wildlife corridor a minimum of 30 m from the REGF project location (Figure 3). No impacts (direct or indirect) are anticipated for the forest with abundant mast due to its distance from the REGF project location. The deer wildlife corridor located within the study area represents the start of the corridor and links a stratum 2 yard (Stratum 2 yards are considered not significant by OMNR) to agricultural land-uses. The construction of the facility includes the installation of a fence around the REGF project location. This fence is located at least 30m outside of the valleys. Following the construction of the fence, the deer corridor will continue to be able to function as it currently does, since there will continue to be abundant uninfringed habitats within the immediate area. As such no direct impacts are anticipated for the deer movement corridor. The construction of laneways and the perimeter lane as well as the use of machinery during construction and decommissioning could result in soil compaction. There is the potential that this compaction could indirectly affect the seeps and springs. It is noted that the existing land use encroaches much closer, up to immediately adjacent, to all of these features than does the REGF project location. Therefore, the construction of the solar facility will result in an increased setback for each of these features. No direct impacts are anticipated to the significant wildlife habitat during any phase of the project.

The construction and decommissioning of the facility may result in indirect impacts due to the generation of noise and dust as well as the potential for soil compaction. No indirect impacts are anticipated during the operation of the facility.

Initial Impact Analysis
Prior to mitigation, the potential for indirect impacts from construction and decommissioning are considered to be local, short-term and minor. Those impacts associated with operation (the maintenance activities) are local, repetitive and negligible.

Mitigation Measures
The potential indirect impacts identified above may be minimized and/or eliminated through the use of the following mitigation measures and monitoring:

During Construction

- Ensure that properly operating mufflers (i.e. standard OEM or similar) are used on all project machinery and vehicles to minimize noise impacts;
- Conduct construction activities during daylight hours whenever possible to minimize light impacts to wildlife;
- Water will be used sparingly as a dust surpressant during periods when visible, airborne dust is being generated and broadcast; and
- Watering will only be implemented to the extent necessary for dust control and will not result in the excessive formation of puddles, rutting by equipment or vehicles or siltation of watercourses.

Residual Impact
While it is considered highly unlikely, there remains the potential for changes to seeps and springs to occur as a result of soil compaction during the construction phase. As such, the

existing seeps and springs will be monitored once during the summer of the year following the construction.

3.4 Significant Valleylands

The evaluation of significance found that there were three significant valleylands located within the project subject lands that required analysis of potential impact. These areas consisted of forest banks and bottomlands along the headwaters of tributaries to Brook Creek. Groundwater discharge was present within each of the valleylands. The proposed project will not include any tree removal along the slopes of the valleys. All activities associated with the construction, operation and decommissioning of the REGF will occur within the land that is currently used as croplands. A 30 m buffer from the top of the steep slopes to the perimeter fence will be established. No activities would occur within the buffer with the exception of the regular mowing immediately adjacent to the fence (5 m wide for maintenance). The creation of a larger buffer around the valleylands will result in a local, long term positive impact. The increase in the buffer from the current conditions is considered a benefit to this feature.

4.0 CONCLUSIONS AND RECOMMENDATIONS

The proposed REGF project is located within an area that is currently being used for row cropping. Site investigations found that the habitats consisted of row crops, windrows, plantations, deciduous thickets, woodlands and forests. Three confirmed significant features were found within the study area but outside of the REGF project location: significant woodlands, valleylands and wildlife habitat (foraging areas with abundant masts, seeps and springs and deer movement corridor). While the significant woodland is located within the project study area, following re-design of the site plan and the use of properly implemented mitigation measures there are no anticipated measurable negative impacts to these features.

4.1 Monitoring Plan

Since the construction of the project could result in soil compaction which in turn could impact the presence of seeps and springs within the study area, monitoring of the seeps and springs are required. This monitoring would consist of a survey of the seeps and springs once, during the summer following construction. A summary report of the findings would be created and circulated to the OMNR Peterborough district office. Should any impacts be documented, they would be discussed with OMNR.

5.0 ADDITIONAL MEASURES AND BEST MANAGEMENT PRACTICES

The following section provides suggestions that are above and beyond the requirements of the EIS.

Table 2 Summary of Additional Enhancement and Mitigation Measures to be Implemented during Construction and Decommissioning and Residual Effect

Natural Feature	Potential Project – Environmental Interactions	Mitigation Measures	Residual Effect
Ponds, and seeps (polygons 1, 2, 3, 4 and 6)	The construction activities will remain 30 m from the top of slope of the valleys and 115 m from the isolated seep located in Polygon 6 and 80 m from the small wetland feature. As such no direct impacts will occur as the result of any of the activities. Potential indirect impacts would be: • Introduction of sediment from the construction activities into these habitats, intended for removal.	Sediment control strategies will be implemented. These will include the use of keyed in sediment fencing (i.e. geotextile fabric held up with stakes) when working within 30 m of the pond, valley or seeps. The bottom of the fabric will be buried into the ground in order to prevent water from going under the fabric). Sediment fencing will need to be installed around any fill as well as on the down slope side of any area to be cleared of vegetation or excavated within 30 m of the pond, valley or seeps. Sediment fencing will also need to be maintained (i.e. tears repaired) throughout construction. Minimize the removal of vegetation (only clear vegetation within REGF project location). Clearly delineate the boundaries of areas not intended for clearing and/or grading on the construction plans and in the field.	Net Gain, as the current row cropping is located within 30 m of these features, provided that the mitigation measures are properly installed and maintained until there is no exposed soil.

Natural Feature	Potential Project – Environmental Interactions	Mitigation Measures	Residual Effect
		Re-seed any exposed soil and allow the vegetation to grow BEFORE removing the sediment fence.	
Wildlife and Wildlife Habitat (all polygons)	Construction activities will include the removal of woody vegetation and rock piles located within the fencerows, and minor grading. • Loss of vegetation • Disruption of potential nesting activities • Disruption to species as a result of noise or light from project activities	Clearly delineated the area where vegetation will be removed on the construction plans and in the field. Use small machinery (i.e. small backhoe) outside of perimeter fence within 30 m of outer edge of work area. Where possible, do not disturb rock walls or rock piles. Removal of rock walls will occur outside of the hibernation period, preferably between late May and September. No clearing of vegetation between April 15th and July 31st, inclusive, unless a biologist has walked the site no earlier than five days prior to the planned clearing and has indicated that no nesting activity is occurring within the area to be cleared.	Negligible
Accidents or Malfunctions	• Spills from project machinery	All machinery will remain a minimum distance of 30 m from the valleylands (with exception of small machinery (i.e. lawn tractor) for the mowing of the perimeter land).	Considered unlikely to occur

Natural Feature	Potential Project – Environmental Interactions	Mitigation Measures	Residual Effect
		Fueling and maintenance activities will occur within an area where sediment erosion control measures and all precautions have been made to prevent oil, grease, antifreeze or other materials from inadvertently entering the ground or the surface water flow. This area will be at a minimum 30 m away from the valleylands. Monitor area for leakage, in the unlikely event of spillage halt all construction activities and corrective measures must be implemented. Any spills must be immediately reported to the MOE Spills Action Centre (1.800. 268.6060)	

Table 3 Summary of Additional Mitigation Measures to be Implemented during Operation and Residual Effect

Natural Feature	Potential Project – Environmental Interactions	Mitigation Measures	Residual Effect
Pond and seeps (polygons 1,2, 3, 4 &6) Wildlife and Wildlife Habitat (all areas outside of perimeter land)	During operation regular maintenance of the vegetation adjacent to the perimeter lane and within the REGF project location will be required. • Loss of vegetation	Ensure that mowing activities only occur in designated areas (i.e. inside REGF project location and within the 5 m perimeter apron located outside of the fencing). Use small machinery (i.e. lawn tractor) outside of the fenced area. Initial mowing should commence before April 15th or after July 31st, inclusive, unless a biologist has walked the site no earlier than five days prior to the planned clearing and has indicated that no nesting activity is occurring within the area to be cleared. Ensure that properly operating mufflers (i.e. standard OEM or similar) are used on all project machinery and vehicles to minimize noise impacts. Conduct construction activities during daylight hours whenever possible to minimize light impacts to wildlife.	Negligible
Accidents or Malfunctions	• Spills from project machinery	All machinery should remain at a minimum distance of 30 m from all valleylands (with exception of small machinery for the mowing of the perimeter land).	Considered unlikely to occur

Natural Feature	Potential Project – Environmental Interactions	Mitigation Measures	Residual Effect
		Fueling and maintenance activities should occur within an area where sediment erosion control measures and all precautions have been made to prevent oil, grease, antifreeze or other materials from inadvertently entering the ground or the surface water flow. This area should be at a minimum 30 m away from the wetland. Monitor area for leakage, in the unlikely event of spillage halt all construction activities and corrective measures must be implemented. Any spills must be immediately reported to the MOE Spills Action Centre (1.800. 268.6060)	

6.0 REFERENCES

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Appendix A – Site Concept Plan