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CONSULTING

LOYALIST SOLAR PROJECT

# Executive Summary Report

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# Introduction

Loyalist Solar LP, a limited partnership between Mohawks of the Bay of Quinte and BluEarth Renewables Inc. (together the "Proponent"), proposes to develop a non-rooftop solar facility with a maximum nameplate capacity of 54 megawatts alternating current ("MW<sub>AC</sub>"), located in the Township of Stone Mills, County of Lennox & Addington, Ontario (**Figure 1**). The renewable energy facility will be known as the Loyalist Solar Project (the "Project").

The Proponent submitted a proposal to the Independent Electricity System Operator ("IESO") under the Large Renewable Procurement I ("LRP") process and was subsequently awarded a LRP contract by the IESO to generate electricity. The Project will now be subject to a number of approvals including, among others, *Ontario Regulation 359/09* (O. Reg. 359/09) – Renewable Energy Approval ("REA") under Part V.0.1 of the Ontario *Environmental Protection Act* and is considered to be a Class 3 Solar Facility under the regulation.

The REA process requires that Proponents undertake detailed studies to determine the potential effects of their proposed projects. These studies include those related to archaeology, cultural heritage, noise, the natural environment, and outline potential effects related to all phases of the project, including construction, operations and decommissioning.

This *Executive Summary Report* provides a brief description of each REA report prepared as part of the draft REA release. The following reports are summarized in this document:

- Project Description Report
- Construction Plan Report
- Design and Operations Report
- Decommissioning Plan Report
- Noise Study Report
- Water Assessment and Water Body Report
- Natural Heritage Assessment (4 reports)
- Archaeological Assessment (Stage 1 and 2)
- Cultural Heritage Report

In accordance with Sections 16, 17 and 18 of *Ontario Regulation 359/09*, these draft documents must be made available for Indigenous, municipal and public review. The local municipalities (Township of Stone Mills and County of Lennox & Addington) are provided with draft reports at least 90 days prior to the second public meeting. Indigenous Communities are provided with the draft reports between 90 and 60 days prior to the second public meeting, but prior to release of the documents to the public (at least 60 days prior to the second public meeting). These reports will also be made available on the Proponent's website at the time of release of the documents to the public:

[www.bluearth.ca/loyalist](http://www.bluearth.ca/loyalist)

The second public meeting is scheduled to be held in late January 2017 at the Newburgh Community Hall, in Newburgh, Ontario. Further notification was provided that includes final public meeting details. All consultation activities will be documented in the *Consultation Report*, which will be submitted to the Ministry of Environment and Climate Change (“MOECC”) as part of the final REA application package.

After the REA application package is submitted, the MOECC will undertake a “completeness review” to ensure all application components are present. The completeness review will include a 30 day public comment period. After that, the application will go through a detailed technical review for approximately six months prior to a decision on the approval.

More information about the REA process can be found on the MOECC’s website:

<https://www.ontario.ca/page/renewable-energy-approvals>.

## 2.0 The Proponent

The Proponent is coordinating and managing the approvals process for the Project. The contact is:

**Full Name of Company:** *Loyalist Solar LP, c/o BluEarth Renewables Inc.*

**Prime Contact:** *Tom Bird, Director, Regulatory*

**Address:** *34 Harvard Road, Guelph, ON, N1G 4V8*

**Telephone:** *1-844-214-2578*

**Email:** *[projects@bluearth.ca](mailto:projects@bluearth.ca)*

Dillon Consulting Limited (“Dillon”) has been retained by the Proponent to prepare the REA application for the Project. The contact at Dillon is:

**Full Name of Company:** *Dillon Consulting Limited*

**Prime Contact:** *Megan Bellamy, Project Manager*

**Address:** *235 Yorkland Boulevard, Suite 800, Toronto, ON, M2J 4Y8*

**Telephone:** *(416) 229-4646 ext. 2423*

**Fax:** *(416) 229-4692*

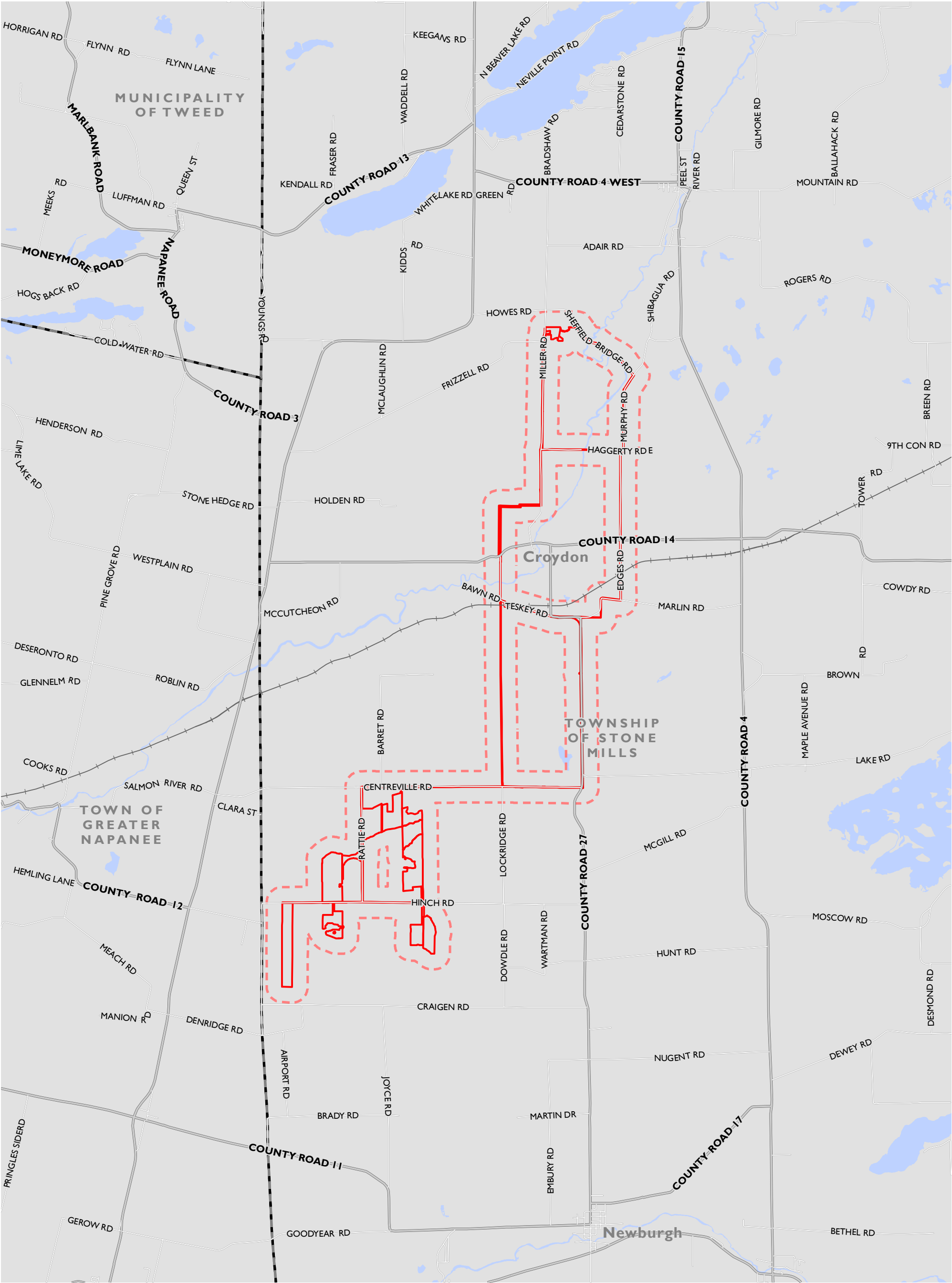
**Email:** *[MBellamy@dillon.ca](mailto:MBellamy@dillon.ca)*

## 3.0 Project Location

This Class 3 Solar Facility is to be located within the Township of Stone Mills, in the County of Lennox & Addington, approximately nine kilometres north of Napanee, Ontario. The Project Location, situated on multiple privately owned parcels, consists of approximately 200 hectares (494 acres) and is contained within an area generally bounded on the north by Howes Road, Craigen Road to the south, County Road 27 and Murphy Road to the east, and County Road 41 to the west. It has an approximate centroid at the following geographic coordinates:

- Latitude: 44°22'3.382" N
- Longitude: 76°58'19.543" W

**Figure 1** shows the general location of the Project in Southwestern Ontario. The Project Location is defined in *Ontario Regulation 359/09* to be “a part of land and all or part of any building or structure in, on or over which a person is engaging in or proposes to engage in the project”. The Project Location as shown on **Figure 2** may be further refined around the project components in the final reports. Additional site plans are provided in the *Design and Operations Report*. **Figure 3** identifies proposed project component locations. These are subject to change within the Project Location and as described within the operational flexibility described in **Section 4**. **Figure 3** also identifies natural features based on the *Natural Heritage Assessment* (“NHA”) Site Investigation that are within 300 m of the Project Location, and also identifies setbacks around these features for the purpose of assessing potential environmental effects.



**BluEarth Renewables Inc.**  
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**General Project Location**  
FIGURE 1

- Railway
- Project Location Boundary
- Project Location 300 m Area of Investigation
- Municipal Boundary

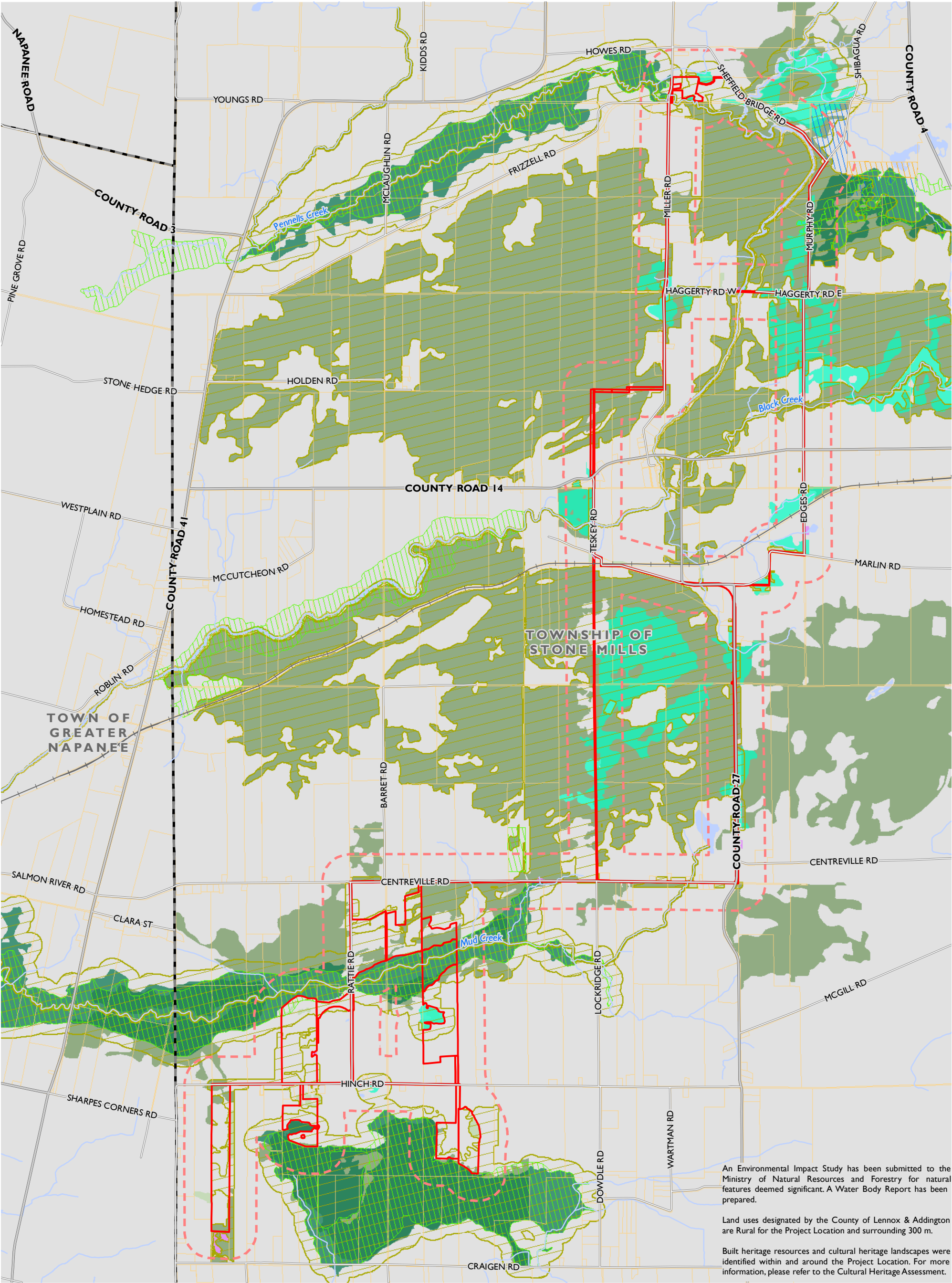


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An Environmental Impact Study has been submitted to the Ministry of Natural Resources and Forestry for natural features deemed significant. A Water Body Report has been prepared.

Land uses designated by the County of Lennox & Addington are Rural for the Project Location and surrounding 300 m.

Built heritage resources and cultural heritage landscapes were identified within and around the Project Location. For more information, please refer to the Cultural Heritage Assessment.

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Project Location and Natural Features

FIGURE 2

- Railway

Mapped Watercourse

Project Location Boundary

Project Location 300 m Area of Investigation

Municipal Boundary

Parcel

Environmental Protection

Extractive Industrial Pits and Quarries

Waste Management

Significant/Treated as Significant Wildlife Habitat

Water Body

Significant Wetland

Assumed Provincially Significant Wetland

Non Significant Wetland

Significant Woodland

Non Significant Woodland

\*All other lands within the 300 m Setback are zoned Rural.

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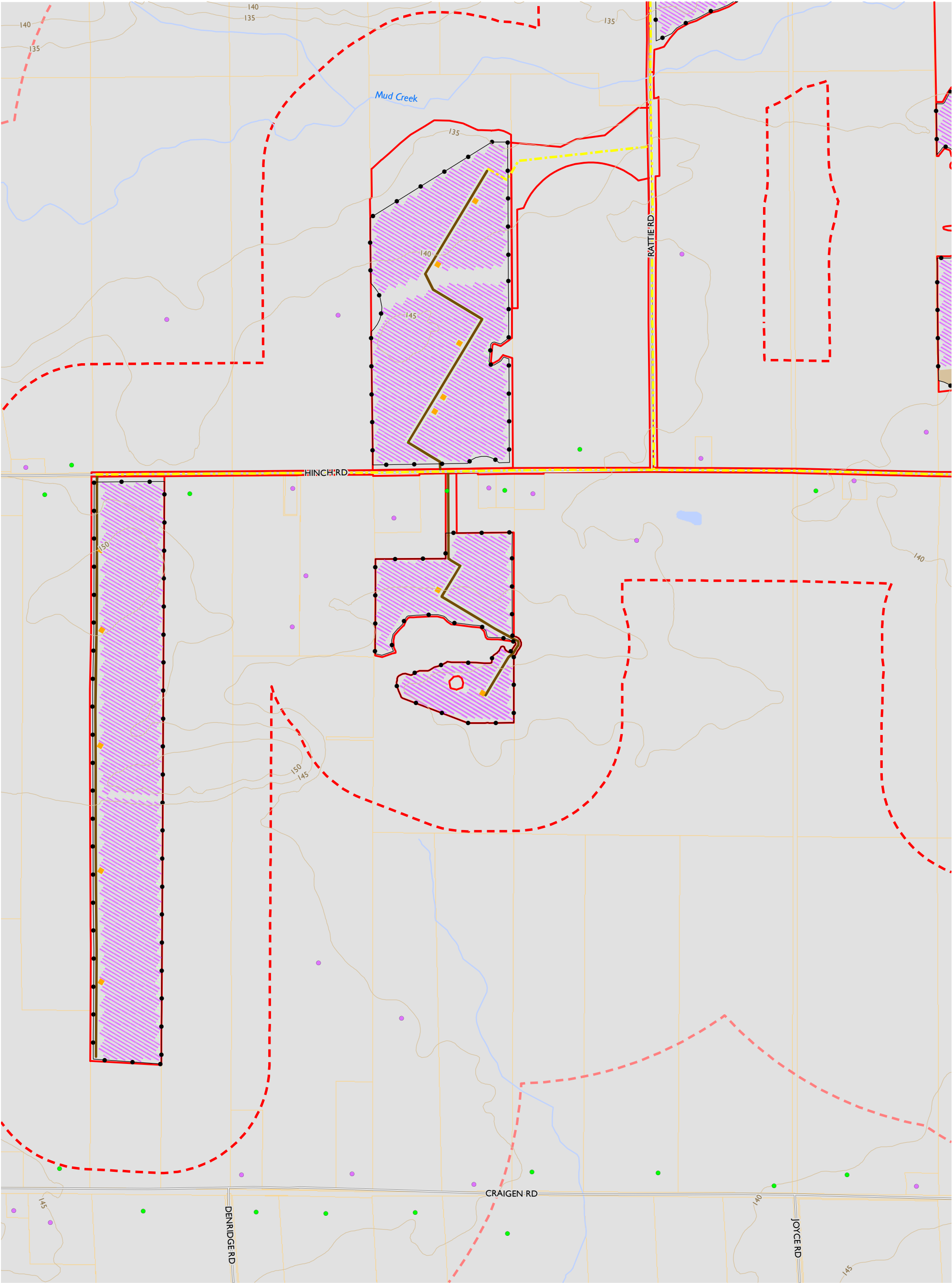
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DATE: 2017-01-25

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**Site Plan -  
Conceptual  
Component Layout**  
FIGURE 3a

- |                                   |                              |                                               |
|-----------------------------------|------------------------------|-----------------------------------------------|
| Existing Noise Receptor           | Electrical Transmission Line | Operation and Maintenance Area                |
| Vacant Lot Noise Receptor         | 5 m Elevation Contour        | Substation                                    |
| Connection Line (Preferred Route) | Fence                        | Project Location Boundary                     |
| Connection Line (Bid Route)       | Inverter Station             | Project Location 300 m Area of Investigation  |
| Connection Line (Alternate 1)     | Solar Panel                  | Project Location 1000 m Area of Investigation |
| Connection Line (Alternate 2)     | Electrical Collection Line   | Parcel                                        |
| Railway                           | Access Road                  | Water Body                                    |

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

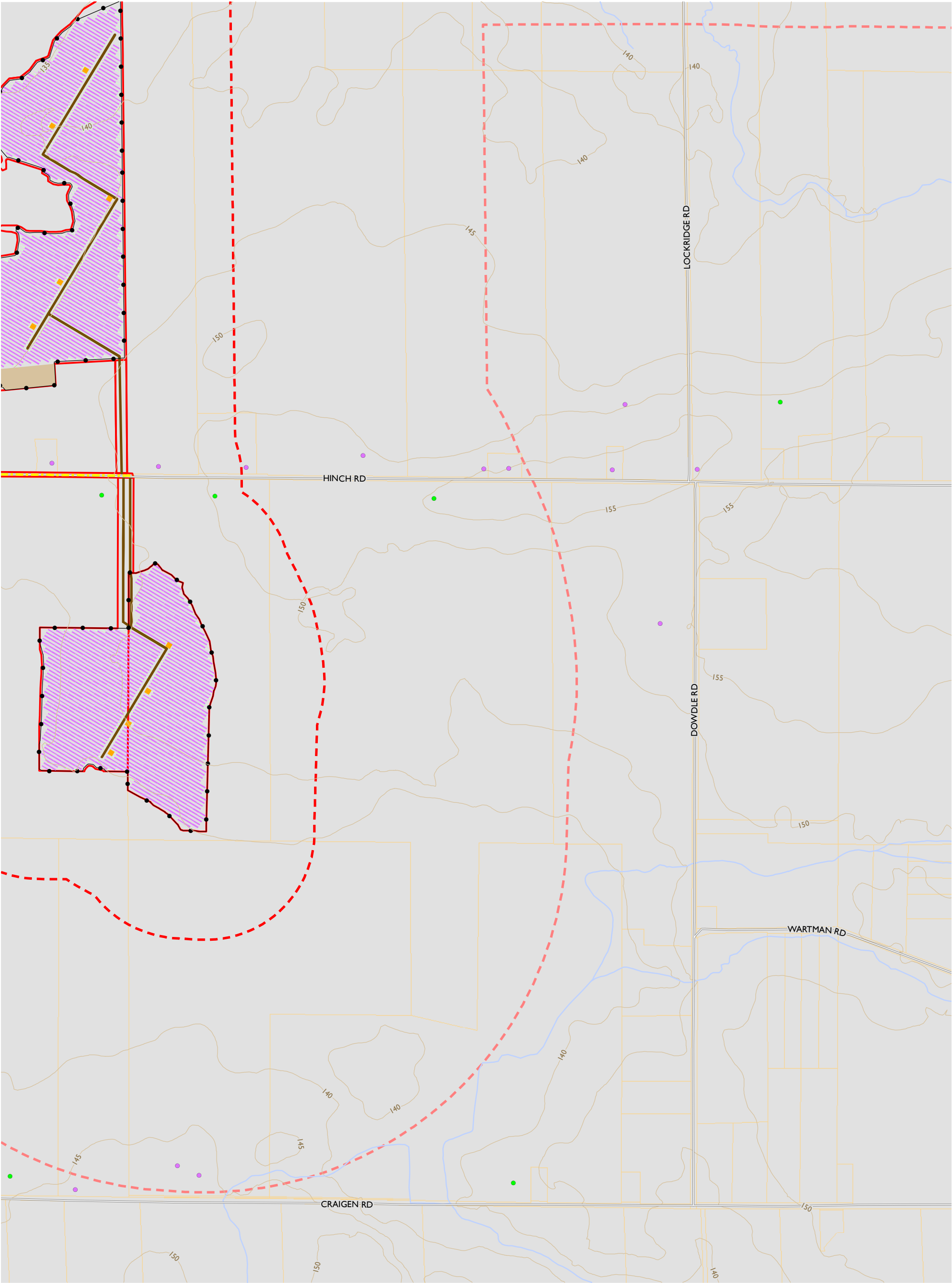
The proponent will prepare a Stormwater Management Plan based on the final detailed design of the facility prior to construction.



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**BluEarth Renewables Inc.**  
LOYALIST SOLAR LP

**Site Plan -  
Conceptual  
Component Layout**  
FIGURE 3b

- |                                   |                              |                                               |
|-----------------------------------|------------------------------|-----------------------------------------------|
| Existing Noise Receptor           | Electrical Transmission Line | Operation and Maintenance Area                |
| Vacant Lot Noise Receptor         | 5 m Elevation Contour        | Substation                                    |
| Connection Line (Preferred Route) | Fence                        | Project Location Boundary                     |
| Connection Line (Bid Route)       | Inverter Station             | Project Location 300 m Area of Investigation  |
| Connection Line (Alternate 1)     | Solar Panel                  | Project Location 1000 m Area of Investigation |
| Connection Line (Alternate 2)     | Electrical Collection Line   | Parcel                                        |
| Railway                           | Access Road                  | Water Body                                    |

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

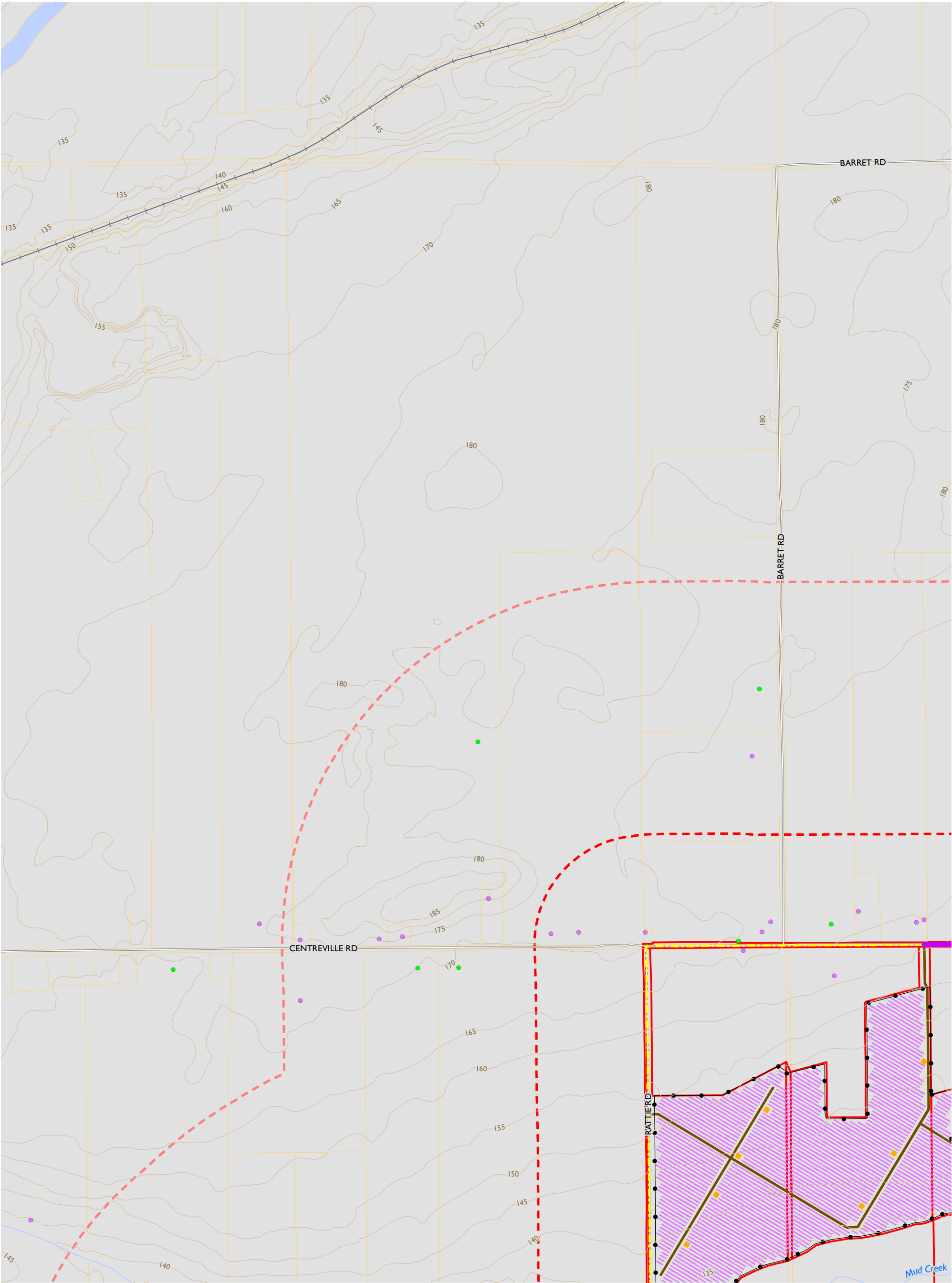
The proponent will prepare a Stormwater Management Plan based on the final detailed design of the facility prior to construction.



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**BluEarth Renewables Inc.**  
LOYALIST SOLAR LP

**Site Plan -  
Conceptual  
Component Layout**  
FIGURE 3c

- |                                   |                              |                                               |
|-----------------------------------|------------------------------|-----------------------------------------------|
| Existing Noise Receptor           | Electrical Transmission Line | Operation and Maintenance Area                |
| Vacant Lot Noise Receptor         | 5 m Elevation Contour        | Substation                                    |
| Connection Line (Preferred Route) | Fence                        | Project Location Boundary                     |
| Connection Line (Bid Route)       | Inverter Station             | Project Location 300 m Area of Investigation  |
| Connection Line (Alternate 1)     | Solar Panel                  | Project Location 1000 m Area of Investigation |
| Connection Line (Alternate 2)     | Electrical Collection Line   | Parcel                                        |
| Railway                           | Access Road                  | Water Body                                    |

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

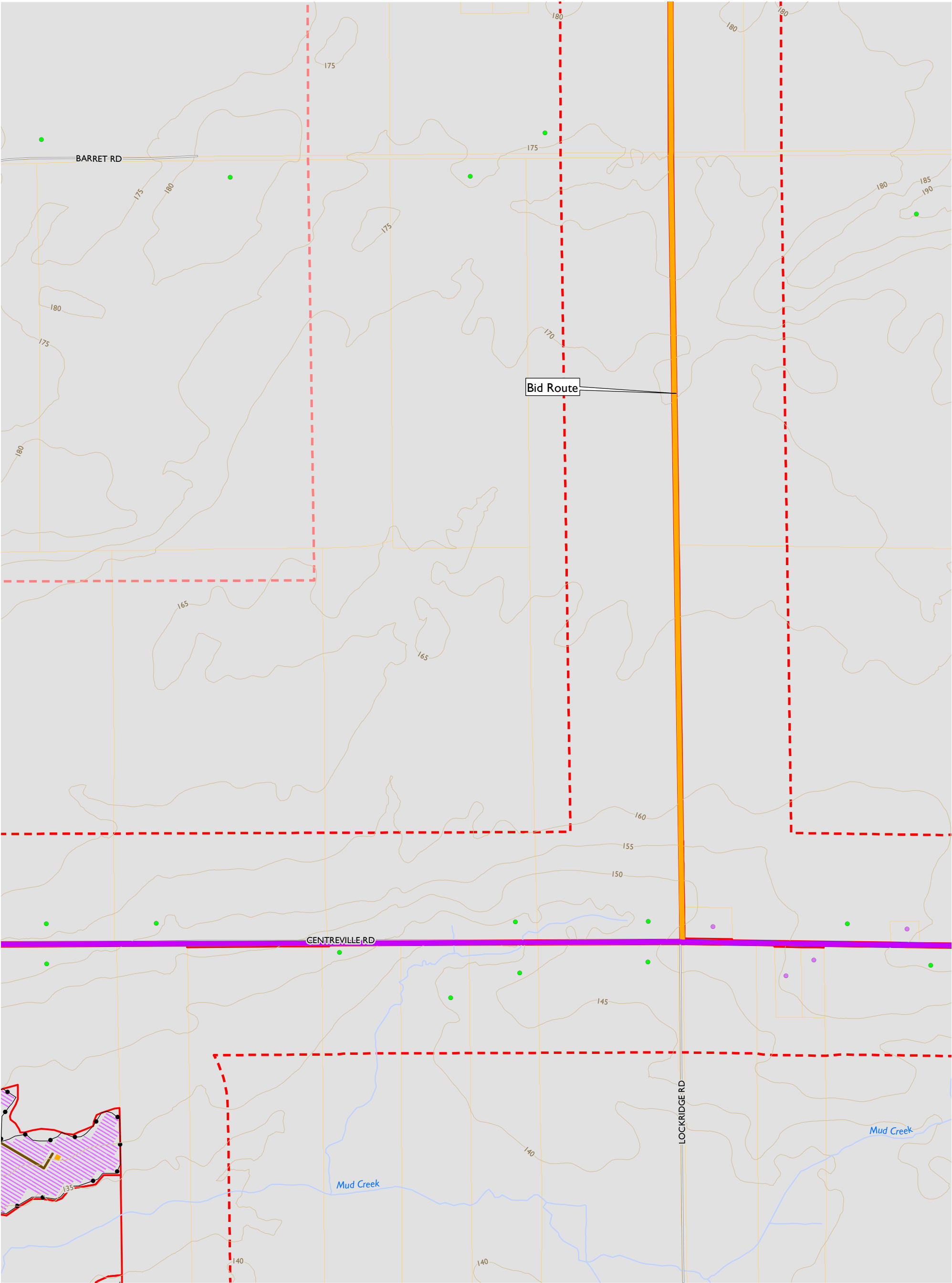
The proponent will prepare a Stormwater Management Plan based on the final detailed design of the facility prior to construction.



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**BluEarth Renewables Inc.**  
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**Site Plan -  
Conceptual  
Component Layout**  
FIGURE 3d

- |                                   |                              |                                               |
|-----------------------------------|------------------------------|-----------------------------------------------|
| Existing Noise Receptor           | Electrical Transmission Line | Operation and Maintenance Area                |
| Vacant Lot Noise Receptor         | 5 m Elevation Contour        | Substation                                    |
| Connection Line (Preferred Route) | Fence                        | Project Location Boundary                     |
| Connection Line (Bid Route)       | Inverter Station             | Project Location 300 m Area of Investigation  |
| Connection Line (Alternate 1)     | Solar Panel                  | Project Location 1000 m Area of Investigation |
| Connection Line (Alternate 2)     | Electrical Collection Line   | Parcel                                        |
| Railway                           | Access Road                  | Water Body                                    |

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

The proponent will prepare a Stormwater Management Plan based on the final detailed design of the facility prior to construction.

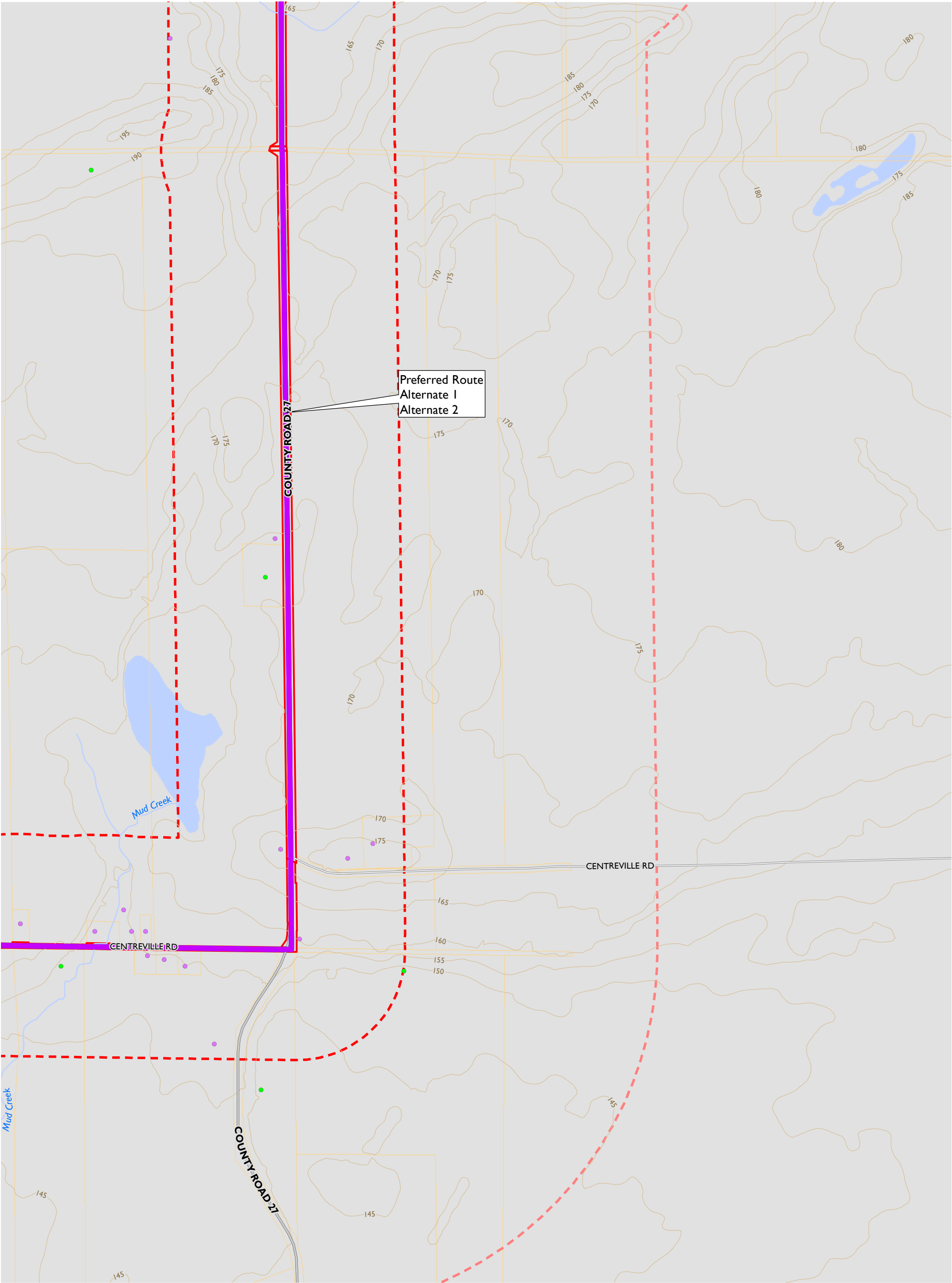


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Preferred Route  
Alternate 1  
Alternate 2

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**Site Plan -  
Conceptual  
Component Layout**  
FIGURE 3e

- |                                   |                              |                                               |
|-----------------------------------|------------------------------|-----------------------------------------------|
| Existing Noise Receptor           | Electrical Transmission Line | Operation and Maintenance Area                |
| Vacant Lot Noise Receptor         | 5 m Elevation Contour        | Substation                                    |
| Connection Line (Preferred Route) | Fence                        | Project Location Boundary                     |
| Connection Line (Bid Route)       | Inverter Station             | Project Location 300 m Area of Investigation  |
| Connection Line (Alternate 1)     | Solar Panel                  | Project Location 1000 m Area of Investigation |
| Connection Line (Alternate 2)     | Electrical Collection Line   | Parcel                                        |
| Railway                           | Access Road                  | Water Body                                    |

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

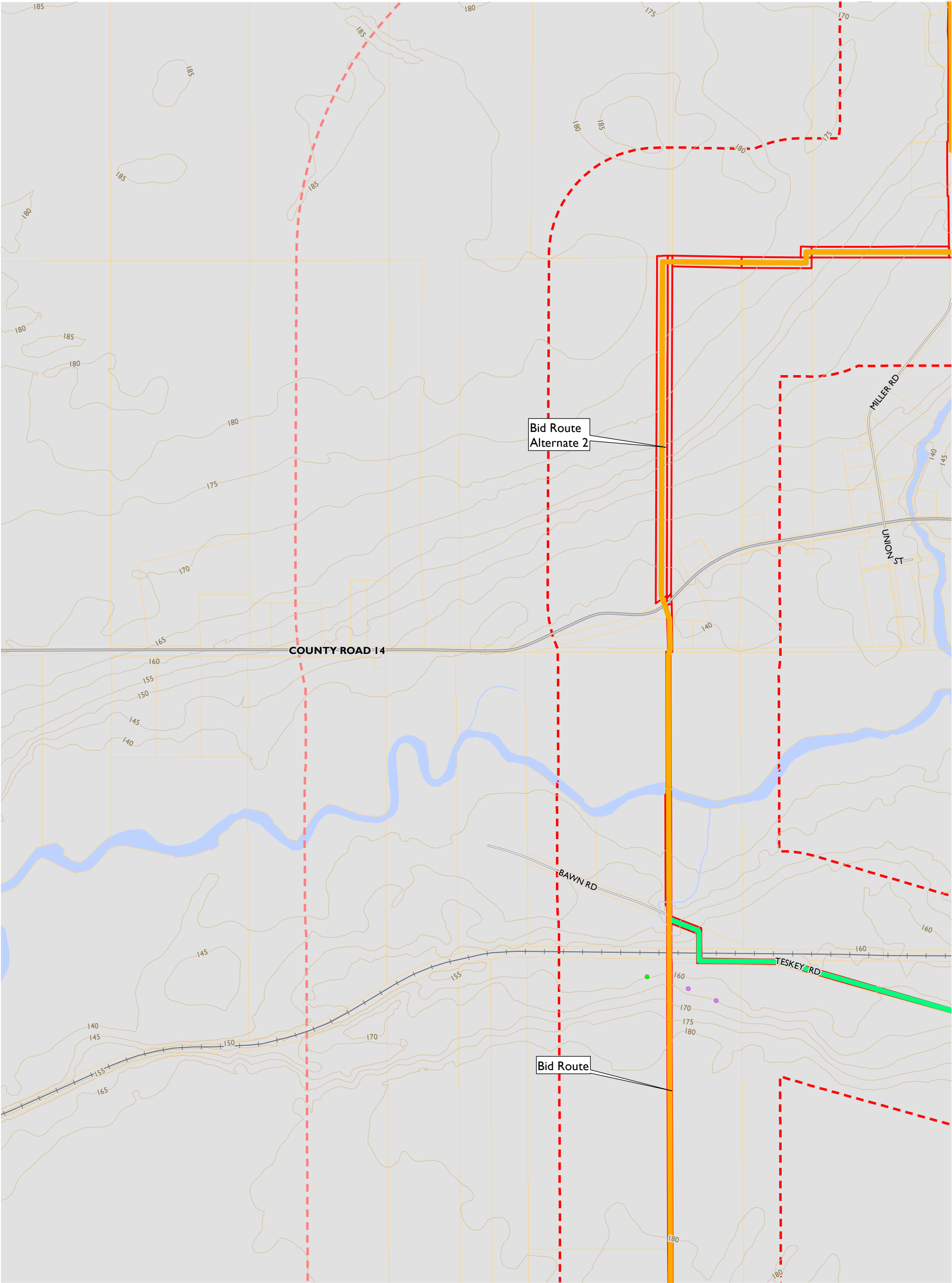
The proponent will prepare a Stormwater Management Plan based on the final detailed design of the facility prior to construction.



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**BluEarth Renewables Inc.**  
LOYALIST SOLAR LP

**Site Plan -  
Conceptual  
Component Layout**  
FIGURE 3f

- |                                   |                              |                                               |
|-----------------------------------|------------------------------|-----------------------------------------------|
| Existing Noise Receptor           | Electrical Transmission Line | Operation and Maintenance Area                |
| Vacant Lot Noise Receptor         | 5 m Elevation Contour        | Substation                                    |
| Connection Line (Preferred Route) | Fence                        | Project Location Boundary                     |
| Connection Line (Bid Route)       | Inverter Station             | Project Location 300 m Area of Investigation  |
| Connection Line (Alternate 1)     | Solar Panel                  | Project Location 1000 m Area of Investigation |
| Connection Line (Alternate 2)     | Electrical Collection Line   | Parcel                                        |
| Railway                           | Access Road                  | Water Body                                    |

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

The proponent will prepare a Stormwater Management Plan based on the final detailed design of the facility prior to construction.

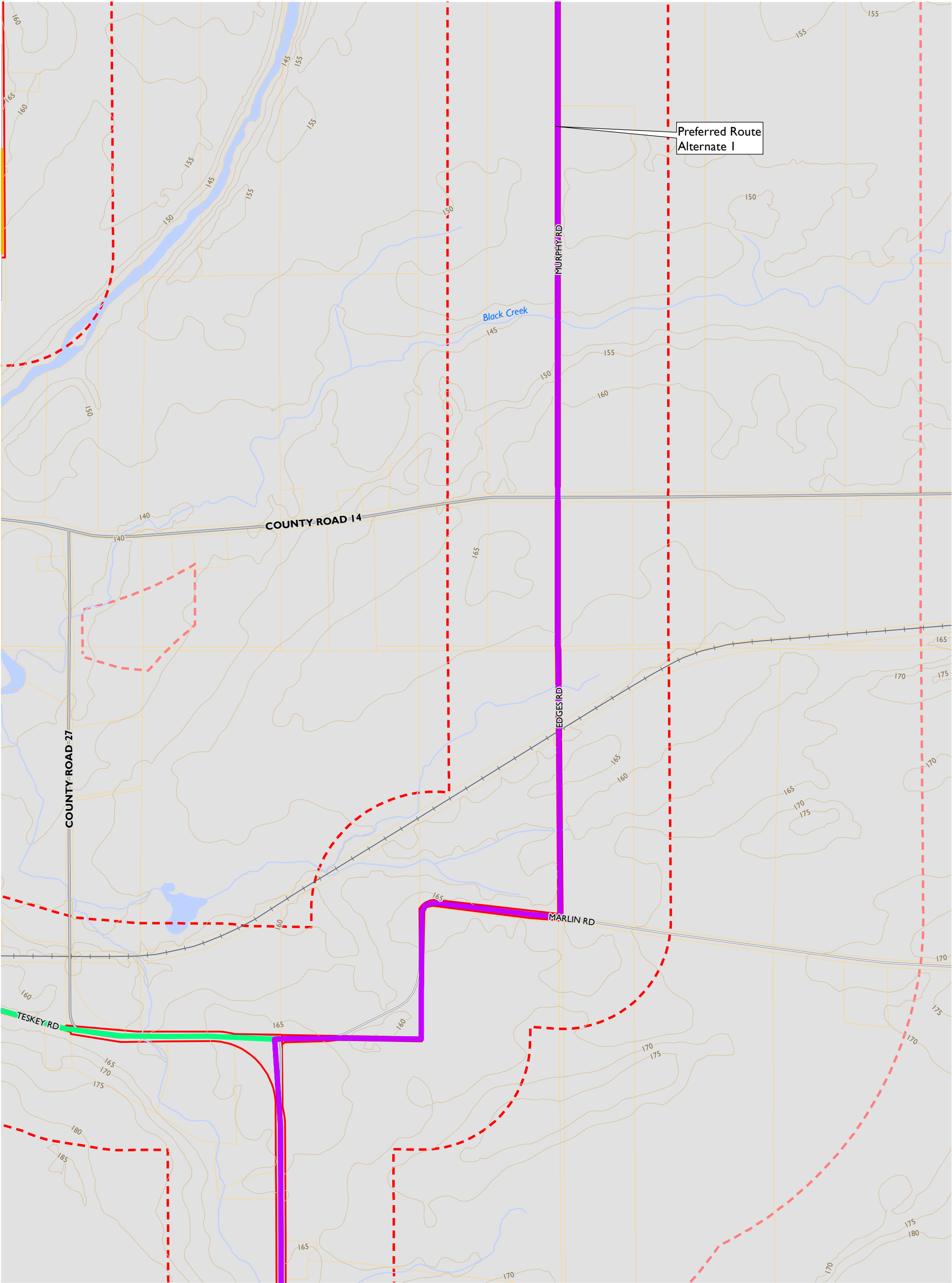


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**BluEarth Renewables Inc.**  
LOYALIST SOLAR LP

**Site Plan -  
Conceptual  
Component Layout**  
FIGURE 3g

<ul style="list-style-type: none"><li>Existing Noise Receptor</li><li>Vacant Lot Noise Receptor</li><li>Connection Line (Preferred Route)</li><li>Connection Line (Bid Route)</li><li>Connection Line (Alternate 1)</li><li>Connection Line (Alternate 2)</li><li>Railway</li></ul>	<ul style="list-style-type: none"><li>Electrical Transmission Line</li><li>5 m Elevation Contour</li><li>Fence</li><li>Inverter Station</li><li>Solar Panel</li><li>Electrical Collection Line</li><li>Access Road</li></ul>	<ul style="list-style-type: none"><li>Operation and Maintenance Area</li><li>Substation</li><li>Project Location Boundary</li><li>Project Location 300 m Area of Investigation</li><li>Project Location 1000 m Area of Investigation</li><li>Parcel</li><li>Water Body</li></ul>
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## 4.0 Operational Flexibility

A detailed Project design phase will be undertaken prior to the start of construction, which may result in some modifications to the information presented in the REA reports. These modifications include, but are not limited to, general adjustments to the site plan that result in a decrease in the Project's footprint (within the current boundary), and/or a decrease in the number of Project components or infrastructure (including transformers, inverter stations, PV panels, PV racking, etc.). Adjustments to the location of Project components may also occur within the Project Location boundary. Where specific equipment is proposed, alternate equipment may be utilized so long as it is equivalent in nature and does not result in any additional negative effects.

Regarding sound emitting components, provisions for operational flexibility are incorporated by constraining such equipment within an area of placement (polygon) rather than at a fixed point. The *Noise Study Report* demonstrates that the sound emitting equipment can be located anywhere within these polygons and still achieve the required predicted sound level limits at nearby receptors. Please see the *Noise Study Report* for additional details.

In all cases where an operational or technical change is necessary, the Project will remain within the Project Location boundary as shown on **Figure 2**, and commitments made in the various technical reports adhered to. This includes observing the minimum setback distances between Project components and the nearest significant natural feature, water body, and/or other feature where described and ensuring any proposed mitigation measures remain effective at avoiding or minimizing impacts. During operations, routine modifications to the solar facility may be implemented (e.g., resurfacing of ingress/egress points and/or access roads, repairs to fencing, electrical maintenance, etc.) provided their effects are environmentally insignificant and do not exceed the boundaries of the constructed Project.

Four Connection Line route options have been assessed and presented in the REA reports (Preferred Route, Bid Route, Alternate 1 and Alternate 2). These are shown in Figure 3 of the *Design and Operations Report*. All four potential routes have been assessed as per REA requirements. Ultimately, only one route will be constructed and it will be chosen based on input from stakeholders and regulatory agencies as well as from findings from engineering studies. Residents will be notified once the final route has been selected.

The classification (Class 3 Solar Facility) and nameplate capacity (54 MW<sub>AC</sub>) of the Project are not subject to change.

## 5.0 Project Description Report

---

The draft *Project Description Report* (“PDR”) is a project summary document that provides an overview of the proposed Project. It discusses the Project Location, components, activities, potential negative environmental effects and mitigation measures. It is a summary of the other documents prepared in support of the REA application. This *Executive Summary Report* re-iterates the content of the PDR, but separates out the information based on each of the draft reports. Therefore, a summary of the PDR here would be redundant.

## 6.0 Construction Plan Report

The draft *Construction Plan Report* (“CPR”) provides detailed information on the construction activities for the installation of all project components, location and timing of the construction, related potential negative environmental effects within 300 metres of the Project Location (as they relate to construction activities and temporary facility components) and mitigation and/or monitoring measures with respect to those negative environmental effects.

Construction activities are anticipated to take approximately 10-12 months and are targeted to begin in fall 2017. During the construction phase, there will be several temporary uses of land, including sediment and erosion control structures, construction laydown areas, temporary fencing, site trailers, washrooms, first aid station, parking, and temporary access roads. Major activities during the construction phase include:

- Surveying of Project Location
- Clearing, Levelling, Compacting and Grading
- Drainage and Erosion Control
- Installation of Perimeter Fence and Security Lighting
- Installation of Water Crossings
- Construction of Access Roads and Installation of Temporary Power
- Installation of Water Crossings
- Temporary Storage, Construction Areas and Installation of Temporary Facilities
- Construction of Foundations
- Installation of Supports, Racking and PV Modules
- Installation of Collector Line System and Inverter Stations
- Installation of Connection Line System
- Installation of Communications & SCADA
- Installation of Substation
- Installation of Operations & Maintenance Building
- Remediation and Clean-up of Work Areas
- Site Landscaping and Vegetation
- Testing and Commissioning

The existing conditions at the Project Location as well as potential negative effects from construction activities and proposed mitigation and monitoring plans are described in the CPR. As part of the construction program, good management practices and procedures regarding the management of any excavated material, stormwater runoff, sediment, dust, noise, soil compaction, natural and cultural heritage resources, agricultural resources, hazardous materials, local traffic, on-site safety management and emergency response procedures will be followed.

To minimize the potential for environmental effects during the construction phase, the contractor will be made aware of the environmental management commitments made for the Project. Mitigation for potential effects during the construction phase are described in Table 4 of the *Construction Plan Report*, and in the Environmental Effects Monitoring Plan (“EEMP”), presented as Appendix A in the *Design and Operations Report*.

After all major construction activities are completed; work areas will be cleaned up and, with the exception of permanent structures, the land will be rehabilitated to a state similar to its former condition.

All construction-related waste and excess materials brought to the site will be removed and reused, recycled, or disposed of as applicable by a licensed contractor in accordance with Provincial guidelines.



## 7.0 Design and Operations Report

The draft *Design and Operations Report* (“DOR”) provides a description of the project components, operations and maintenance activities, and provides detailed site plans identifying the layout of the project components and their relation to natural features, land uses and cultural heritage resources. The report also discusses the potential for environmental effects as they relate to permanent facility components and their operations within 300 m of the Project Location. An EEMP is appended to the report and outlines potential negative effects throughout the life of the Project as well as mitigation and monitoring requirements.

PV panels will be the technology used to convert solar energy into electricity. With exposure to sunlight, the solar modules convert solar radiation into direct current (“DC”) electricity through a PV process. The PV process occurs when the energy from the sunlight is transferred to semiconductors contained in the modules. DC electricity generated from the PV panels will be collected and converted into AC electricity by inverters, which will be contained in multiple inverter stations. An inverter station is comprised of multiple components, including inverters and a medium-voltage (“MV”) transformer. The AC energy output from the inverter stations will be transmitted via underground/overhead cables and connected to the substation. At the substation, the voltage will be stepped up to 230 kV and connected to existing H23B transmission circuit.

Major facility components include:

- Approximately 190,000 to 290,000 solar PV panels of 340 (or higher) watts (DC) each, installed on either a fixed rack or single axis tracking system
- Up to 34 inverter stations will be required for the Project. Inverter stations house multiple components, including inverters, MV transformer and Supervisory Control and Data Acquisition (“SCADA”) monitoring equipment. The AC voltage created by the inverters will be “stepped-up” to 34.5 kV through the multiple inverter stations.
- The AC electrical energy output from the inverter stations will be collected via underground and/or above ground collector lines.
- A connection line, likely consisting of three 3-phase circuits mounted either on poles or below ground (where necessary) which will transmit the generated energy from the PV panels, inverter stations and collection system to the substation. The preferred connection line route has not yet been determined; however, it will be one of the four options shown on Figure 3.
- A substation to step up the AC electrical energy to 230 kV and connect to the existing 230 kV H23B transmission line.
- Permanent gravel access roads (approximately 6 m wide), which may be constructed using a bonding substance, geotextile fabric, and culverts as needed where conveyance of surface water drainage is required.

- Perimeter fencing in accordance with Electrical Safety Authority (“ESA”) specifications, of standard height (approximately 1.8 m), built and posted with signs to required specifications. Gates will be installed where the fence intersects access roads. The perimeter fencing is to have contact with the ground surface to prevent entry of wildlife.
- Lighting may be installed, including near the entrances and task-specific lighting, as necessary. Motion-sensors may be installed to address potential lighting concerns. Motion-sensored security cameras will be installed to secure the Project location.
- A control building and communication tower will be located within the substation yard at the northeast corner of the Project Location.
- An Operations and Maintenance building which will contain equipment to monitor the operation of the facility, staff offices, a washroom, lunch room, warehouse and parking area. The Operations and Maintenance building is planned to be in an existing structure in Napanee or another nearby location outside of the Project Location. If no suitable structure is found, the building will be constructed onsite.

Stormwater management measures to be in place during the operation of the Loyalist Solar Project will be determined prior to the start of construction. Existing drainage patterns will be maintained to the extent possible to ensure minimal impact to off-site drainage conditions.

The Project will operate year-round. The facility will be continuously monitored and managed remotely using a SCADA system which monitors the status of the facility in real time. Minimal on-site activity is required for daily operations; however, there will be some employees working out of the operations and maintenance building.

Maintenance activities may include:

- Scheduled site visits to inspect equipment
- Minor repairs as necessary
- Cleaning of PV panels
- Landscape maintenance
- Third party inspections and testing

Additional maintenance or service may be required for issues such as major maintenance or repairs; however, this is not anticipated to be a common occurrence. Site inspections for all project components will occur on an as-needed basis.

Emergency Response and Communications Plans will be developed for the Project prior to construction and will provide key contact information for relevant responders, regulators, landowners and other stakeholders. They will contain a description of the chain of communications between the Proponent and relevant responders under emergency scenarios applicable to the Project.

The DOR contains the EEMP and equipment technical specifications as appendices.

## 8.0 Noise Study Report

The *Noise Study Report* (“NSR”) provides a description noise sources for the Project and summarizes the results of the noise modeling to demonstrate that the renewable energy facility will be compliant with MOECC specified noise levels.

The report considers dwellings to be noise receptors. Dwellings are defined in the MOECC’s Technical Guide to Renewable Energy Approvals as permanent or seasonal residences and also includes places of worship, community centres and education and health care facilities. Noise receptors were identified within 1,000 m of the Project Location. Noise receptors were assessed to ensure the Project was designed so the noise levels are predicted to be below the required levels.

All modelling and predictions for the *Noise Study Report* were done using the software package CadnaA, in accordance with ISO 9613-2. All noise sources were modelled as point sources with no directivity. Inverter stations (also called “inverter-transformer clusters”) were modelled as a single point source.

In accordance with the proposed amendments to the *Technical Guide for Renewable Energy Approvals* that came into effect on May 1, 2016 (EBR Proposal Notice 012-4493), a polygon approach was used for this analysis. The location of each sound emitting component has been defined in the *Noise Study Report* with a polygon. In this approach, the inverter stations can be located anywhere within the polygon, and compliance would still be achieved at all receptors. Compliance was assessed by grouping project receptors into “zones”. Noise sources within a 1.5 km radius of all receptors in a given zone were taken into consideration, and a worst-case conceptual project layout was determined. The *Noise Study Report* concludes that the Project will be in compliance with the Ministry of the Environment and Climate Change (“MOECC”) noise limit of 40 dBA at all receptors without the need for mitigation.

Based on the results of the noise modelling, no mitigation measures are required to achieve compliance with MOECC noise standards at either the inverter stations or substation.

## 9.0 Decommissioning Plan Report

The draft *Decommissioning Plan Report* (“DPR”) provides an overview of all activities that will occur during the decommissioning phase of the Project, as well as all activities related to the restoration of land and water, and the management of excess materials and waste.

Decommissioning of the facility will include disconnection of the facility from the electrical grid and the removal of all facility components, including:

- PV arrays
- Inverter stations and substation
- Access roads
- Underground cables
- Equipment foundations

Decommissioning activities, particularly the removal of project components and grading, could cause negative environmental effects similar to those of the construction phase. Potential negative environmental effects will be mitigated through measures similar to those outlined for construction.

Recyclable materials will be transported off-site by truck and managed at appropriate facilities in accordance with provincial waste management regulations. Residual waste materials for disposal will be removed by a licensed contractor and transported to an MOECC-approved facility. It is not anticipated that any waste materials will be left on-site with the possible exception of foundations or steel piles that may break off below grade during removal and/or disconnected underground electrical wires buried at 1 metre in depth. The final decision on waste disposal or recycling will be made by the on-site contractor who will refer to the standards of the day for waste generated at the facility. Given that methods of managing wastes and recyclables may change in the future, information in this report will be updated approximately six months prior to the start of decommissioning to conform to future local and provincial requirements.

The Project Location has been primarily used for agricultural purposes. Through the decommissioning phase, the Project Location could be restored to a state similar to its former condition or to the condition of the future intended land use (anticipated to be agricultural).

In accordance with MOECC requirements, six months prior to decommissioning, the Proponent will update their list of stakeholders and notify them, as appropriate, of decommissioning activities. Federal, provincial and local authorities will also be notified as needed to discuss the potential approvals required to engage in decommissioning activities.

## 10.0 Natural Heritage Assessment

The *Natural Heritage Assessment* (“NHA”) includes a description of the natural features in the Project Location and lands within 50 m. Under *Ontario Regulation 359/09*, the term “natural feature” refers to areas of natural and scientific interest (earth science and life science), wetlands, woodlands and wildlife habitat. The NHA consists of a series of four reports:

- The NHA Records Review Report identifies previously known or potential natural features present at or within 50 m of the Project Location
- The NHA Site Investigation Report verifies the presence of those identified features and identifies if any additional natural features occur
- The NHA Evaluation of Significance Report documents the data collected to determine if the natural features identified are significant or provincially significant. Development prohibitions generally apply to solar Projects located in or within 50 m of a significant or provincially significant natural feature unless an environmental impact study is completed
- The NHA Environmental Impact Study Report is prepared in order to seek an exception to the established prohibitions and develop within the natural features and/or setback

It is under the jurisdiction of Ministry of Natural Resources and Forestry (MNRF) to confirm that the NHA has been prepared according to the guidelines and procedures established for renewable energy projects.

For the Loyalist Solar Project, through a thorough background review of applicable data and records, consultation and field studies, various natural features were identified during the records review and site investigation work. These include:

- Provincially Significant wetlands (4 units)
- Non-provincially significant wetland (1 unit)
- Unevaluated wetlands (53 units)
- Unevaluated woodlands (46 units)
- Candidate Significant Wildlife Habitat, including:
  - Waterfowl Stopover and Staging Areas (14 units)
  - Turtle Wintering Areas (1 unit)
  - Reptile Hibernaculum (16 units)
  - Colonially- Nesting Bird Breeding Habitat (Tree/ Shrub) (28 units)
  - Colonially- Nesting Bird Breeding Habitat (Ground) (16 units)
  - Alvar (21 units)
  - Old Growth Forest (7 units)
  - Waterfowl Nesting Area (7 units)
  - Bald Eagle & Osprey Nesting, Foraging and Perching Habitat (9 units)
  - Woodland Raptor Nesting Area (3 units)

- Turtle Nesting Area (1 unit)
- Amphibian Breeding Habitat (Wetlands) (1 unit)
- Amphibian Breeding Habitats (Woodlands) (11 units)
- Woodland Area- sensitive Bird Breeding Habitat (5 units)
- Marsh Breeding Bird Habitat General (5 units)
- Marsh Breeding Bird Habitat Green Heron (12 units)
- Terrestrial Crayfish (1 unit)
- Common Nighthawk Habitat (13 units)
- Redheaded Woodpecker Habitat (7 units)
- Eastern Wood-Pewee Habitat (7 units)
- Wood Thrush Habitat (5 units)
- Large Yellow Pond Lily Habitat
- Juniper Hairstreak (28 units)
- Amphibian Movement Corridors (1 unit)
- Generalized Candidate Significant Wildlife Habitat, including:
  - Waterfowl Stopover and Staging Areas (Terrestrial and Aquatic)
  - Shorebird Migratory Stopover Areas
  - Turtle Wintering Areas
  - Waterfowl Nesting Area
  - Bald Eagle & Osprey Nesting, Foraging and Perching Habitat
  - Woodland Raptor Nesting
  - Seeps & Springs
  - Amphibian Breeding Habitats (Wetlands)
  - Amphibian Breeding Habitats (Woodlands)
  - Woodland Area- sensitive Bird Breeding Habitat
  - Marsh Breeding Bird Habitat (General)
  - Marsh Breeding Bird Habitat (Green Heron)
  - Common Nighthawk Habitat
  - Redheaded Woodpecker Habitat
  - Eastern Wood-Pewee Habitat

Following the site investigation work, the Project Location was refined to avoid sensitive natural features, where possible. Additional surveys were then completed to evaluate natural features for significance. Wildlife (birds, amphibians and reptiles) and vegetation surveys occurred over a period of 5.5 months in the spring, summer and fall of 2016. In total, over 475 hours were spent surveying the natural features associated with the Project. As a result, the following natural features were evaluated to be significant<sup>1</sup> and located either within the Project Location or within 50 m of the Project Location:

<sup>1</sup> Significant refers to provincially significant, significant or assumed provincially significant for the purposes of the REA reporting.



- Provincially Significant Wetlands (4 units)
- Assumed Provincially Significant Wetlands (32 units)
- Woodlands (18 units)
- Significant Rare Vegetation Communities (2 units; previously categorized under Alvars)
- Turtle Nesting Area (1 unit)
- Amphibian Breeding Habitats (Woodlands) (4 units)
- Woodland Area- sensitive Bird Breeding Habitat (3 units)
- Common Nighthawk Habitat (3 units)
- Redheaded Woodpecker Habitat (1 unit)
- Eastern Wood-Pewee Habitat (4 units)
- Wood Thrush Habitat (2 units)
- Large Yellow Pond Lily Habitat

In addition, the following natural features have been treated as significant. With the exception of the waterfowl stopover and staging areas, the following wildlife habitat is not able to be further surveyed due to access limitations (permission and/or health and safety concerns):

- Waterfowl Stopover and Staging Areas (Terrestrial; 10 units)
- Waterfowl Stopover and Staging Areas (Aquatic; 3 units)
- Turtle Wintering Area (1 unit)
- Reptile Hibernaculum (15 units)
- Colonially- Nesting Bird Breeding Habitat (Tree/ Shrub; 10 units)
- Amphibian Breeding Habitats (Woodlands; 2 units)
- Terrestrial Crayfish (1 unit)
- Carolina Whitlow Grass Habitat (1 unit)
- Juniper Hairstreak (25 units)

In consideration of the identified potential environmental effects, mitigation measures have been proposed to address these effects and maintain the ecological integrity and functionality of significant natural features. Details regarding proposed mitigation measures can be found in the NHA Environmental Impact Study Report.

The Project has been developed to retain the value of significant natural features identified and to mitigate negative effects that will occur. For the natural features deemed to be significant, the layout of the Project will allow for the persistence of natural features in the local landscape after this Project is constructed and operational. MNR provided a confirmation letter for the *Natural Heritage Assessment* on January 27, 2017.

## 11.0 Water Reports

A *Water Assessment Report* (consisting of a Records Review and Site Investigation) and *Water Body Report* were completed to fulfill the requirements of *Ontario Regulation 359/09*. These reports provide a description of the water bodies in the Project Location and demonstrate that the required REA setbacks from water features have been met or that appropriate mitigation and monitoring is recommended.

The records review identified 17 potential water bodies mapped within the Project Location and surrounding 120 m. These included 3 potential lakes, and 14 potential permanent and/or intermittent streams. The site investigation confirmed the presence of 12 of these waterbodies, and identified seven additional water bodies. These included one lake, 13 permanent and/or intermittent streams, and five seepage areas. The location and classification of the water bodies found is discussed below:

- **Lakes**

- Water Body 1 was found during the site investigation to occur within the 120 m area of assessment from the Project Location. The water body was determined to be a small pond on a residential property at 894 Hinch Road, approximately 105 m south of the Project Location on Hinch Road. This feature was sufficiently naturalized and had little disturbance resulting from cattle pasturing, and will be treated as an applicable water body.

- **Permanent and Intermittent Streams**

- Mud Creek was found to be a permanent natural stream within an associated wetland complex that intersects the Project Location and falls within the 120 m setback in multiple locations. Mud Creek originates from Perry's Lake and flows in a south and west direction where it crosses under Centreville Road, Lockridge Road and is associated with the Mud Creek Provincially Significant Wetland.
- Tributary 2 to Mud Creek was found to be a natural intermittent stream that intersects the Project Location where there is an existing culvert under Centreville Road approximately 440 m west of Lockridge Road. Immediately upstream of Centreville Road, an in-line open water area was observed from the road right-of-way and can be viewed via aerial imagery. From the open water area, the stream flows in a westerly direction and then south through an equalization culvert under Centreville Road. This open water area and the stream channel was surrounded by white cedar coniferous forest to the north and south of Centreville Road before becoming associated with a willow mineral deciduous thicket swamp.
- Tributary 2.1 to Mud Creek intersects the Project Location at a culvert on Centreville Road, approximately 680 m west of Lockridge Road. The watercourse was observed to be a natural permanent stream (with a defined channel) connecting two willow mineral deciduous thicket swamp units bisected by Centreville Road.

- The Salmon River was observed to be a natural permanent stream watercourse that intersects the Project Location in three locations where connection line routes are proposed and flows within 120 m of the Project Location at a fourth location. The Salmon River originates to the north of the Project Location and generally flows in a southwest direction towards Napanee and the Bay of Quinte. The Salmon River was assessed at each of the various points where it intersects with the Project Location (Sheffield Bridge Road, east of Miller Road; Sheffield Bridge Road, 740 m west of Murphy Road; Haggerty Road, 690 m west of Murphy Road; and, Teskey Road, 345 m north of Bawn Road). Given the size and length of the Salmon River, it flows through a variety of habitats and community types.
- Tributary 1 to the Salmon River is a natural intermittent stream that intersects the Project Location at a culvert location along a proposed connection line route on Teskey Road, approximately 45 m north of Bawn Road. The dominant riparian vegetation community upstream of Teskey Road was residential and mixed meadow. Downstream of Teskey Road, the riparian vegetation communities consisted of mixed meadow and some deciduous shrub thicket. This stream was associated with Seepage Area 1.
- Tributary 2 to the Salmon River was observed to be a natural permanent stream that intersects the Project Location along a proposed connection line route on Edges Road, approximately 70 m north of Marlin Road. The watercourse appears to run in a westward direction, draining the adjacent cattail graminoid mineral meadow marsh east of Edges Road, through a culvert under the road toward a confluence with other tributaries to the Salmon River west of this location. Downstream of Edges Road the tributary is bordered by a residential property and an agricultural field. This stream was associated with Seepage Area 3.
- Tributary 2.1 to the Salmon River was found to be an intermittent stream that intersects the Project Location where there are proposed connection line routes in two locations (both crossings under County Road 27, 670 m south of Marlin Road and 210 m east of Teskey Road). Based on an interpretation of aerial photography the watercourse appears to originate from a wetland complex east of County Road 27 and flows northwest until it converges with Tributary 2 to the Salmon River. This stream was associated with Seepage Area 2.
- Tributary 2.2 to the Salmon River was observed to be an intermittent stream that intersects the Project Location where there is a proposed connection line route on Edges Road, approximately 630 m north of Marlin Road. The watercourse appears to flow between two willow mineral deciduous thicket swamp areas bisected by Edges Road.
- Tributary 2.4 to the Salmon River falls within the 120 m setback of a proposed connection line route northwest of the intersection of Edges Road and Marlin Road. The stream appears to drain the surrounding cattail graminoid mineral meadow marsh at the streams origin and travels through a lowland deciduous forest community closer to the confluence with Tributary 2 to the Salmon River.
- Tributary 3 to the Salmon River was observed to be a natural intermittent stream that intersects the Project Location where there is a proposed connection line route on Haggerty Road, approximately 17 m east of Miller Road. The stream originates from a willow mineral deciduous thicket swamp and discharges into the Salmon River.

- Tributary 3.1 to the Salmon River was observed to be a natural permanent stream that intersects Project Location approximately 30 m northeast of the intersection of Miller Road and Haggerty Road West (see **Figure 3h**). The watercourse originates in a willow mineral deciduous thicket swamp complex west of Miller Road and flows eastward through a culvert under Miller Road before converging with Tributary 3 to the Salmon River.
- Black Creek was found to be a natural permanent stream that intersects the Project Location at a box culvert where there is a proposed connection line route on Murphy Road, approximately 477 m north of County Road 14. Where Black Creek crosses Murphy Road, the north and south riparian areas along the stream consisted of green ash-hardwood lowland deciduous forest, with open pasture areas adjacent to that community.
- Pennell's Creek was found to be a natural permanent stream that intersects the Project Location where there is a proposed connection line route on Miller Road, south of Howes Road. The watercourse flows through deciduous swamp and forest communities, a residential property and a meadow marsh as it flows eastward and converges with the Salmon River.
- **Seepage Areas**
  - Seep 1 was estimated to occur within the 120 m setback near the intersection of Tributary 1 to the Salmon River with the Project Location on Teskey.
  - Seep 2 was estimated to occur within the 120 m setback near the intersection of Tributary 2.1 to the Salmon River with the Project Location on County Road 27.
  - Seep 3 was estimated to occur within the eastern 120 m setback south of the intersection of Tributary 2 to the Salmon River with the Project Location on Edges Road.
  - Seep 4 was estimated to occur within 120 m of the Project at the edge of a fresh-moist mixed meadow community.
  - Seep 5 was estimated to occur within 120 m of the Project at the edge of a red cedar calcareous treed rock barren community.

As required by Section 39 of *Ontario Regulation 359/09*, PV panels and the substation transformer are prohibited from being constructed, installed or expanded in a Project Location within 30 m of the average annual high water mark of a water body. Other activities, such as perimeter fence construction and installation of collector and connection lines, are permitted if potential negative environmental effects are identified and appropriate mitigation measures are implemented (see Section 40 of *Ontario Regulation 359/09*). None of the Project activities are expected to have any physical or functional effect on a water body provided the appropriate mitigation measures are implemented and maintained. Mitigation measures proposed to minimize and/or eliminate negative environmental effects to water bodies within 120 m of the Project Location, and will be implemented during each Project phase. Details regarding mitigation measures can be found in the *Water Body Report*, *Construction Plan Report*, *Design and Operations Report* and the EEMP.

## 12.0 Archaeological Assessment

Archaeological Research Associates Ltd. was retained to complete the Archaeological Assessment for the area to be impacted by the Project. The assessment was conducted in accordance with the Ontario Heritage Act and using the Ministry of Culture and Sport's ("MTCS") Draft Standards and Guidelines for Consultant Archaeologists.

The Stage 1 Archaeological Assessment included a desktop study and was conducted in April 2016 in accordance with the MTCS 2011 *Standards and Guidelines for Consultant Archaeologists*. The Stage 1 Archaeological Assessment identified potential for archaeological finds to occur. The Stage 2 Archaeological Assessment was undertaken from June-September 2016. 16 sites containing archaeological materials were identified, including seven identified as Pre-Contact findspots, eight identified as Euro-Canadian findspots, and one identified as a multi-component findspot.

Based on the results of the *Stage 1 and 2 Archaeological Assessment*, additional field work is required at seven of the find locations prior to development. The *Stage 3 Archaeological Assessment* will expand on the information gathered during the Stage 2 assessment. If a Stage 4 assessment is recommended, the Stage 4 would recommend mitigation measures for the sites, which could include documentation and removal of artefacts.

## 13.0 Cultural Heritage Assessment Report

Archaeological Research Associates Ltd. (“ARA”) was retained to complete the *Cultural Heritage Assessment* for the area to be impacted by the Project. As per *Ontario Regulation 359/09*, the Project Location and all abutting properties were examined. The “Potential Project Sites” include eight property parcels identified for the construction of solar arrays, three alternative property parcels and the property on which the substation transformer and connection point is to be located.

The *Cultural Heritage Assessment* was undertaken to document properties and landscapes with known or potential cultural heritage value or interest, as per *Ontario Heritage Act*, *Ontario Regulation 9/06*, identify potential impacts of the project, and propose mitigation options. The assessment included background research, consultation with appropriate agencies, and a windshield survey of potential cultural heritage resources within the study area.

The assessment identified 87 Built Heritage Resources and 5 Cultural Heritage Landscapes, and it was determined that they all had cultural heritage value or interest. The study did not identify any protected properties within the study area.

The identified heritage resources have the potential to be impacted by construction activities, by altering, disrupting and/or destroying items of cultural heritage value or interest, both directly and indirectly. Direct impacts include, but are not limited to, those that physically affect cultural heritage resources themselves (including destruction and alteration). Direct impacts can be caused by initial project staging, excavation/levelling operations, construction of access roads and renovations or repairs to existing structures. Evaluation of impacts included a *Construction Vibration Zone of Influence Study* to assess the impacts of construction vibration on the resources.

Mitigation measures were recommended to address any applicable direct or indirect impacts to the Project. Measures include implementation of visual screening, avoidance of wood fencing, implementation of setbacks from construction activities to sensitive buildings, and implementation of BHR-specific mitigation measures (which may include salvaging demolished resources, and investigation of the risk of vibration-related impacts on the resource where construction is occurring close to cultural heritage resources).

The *Cultural Heritage Assessment* was approved by MTCS in February 2017.