DILLON CONSULTING

LOYALIST SOLAR LP

Construction Plan Report

Loyalist Solar Project

February 2017 – 16-3674

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1.0 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_{AC}), 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").

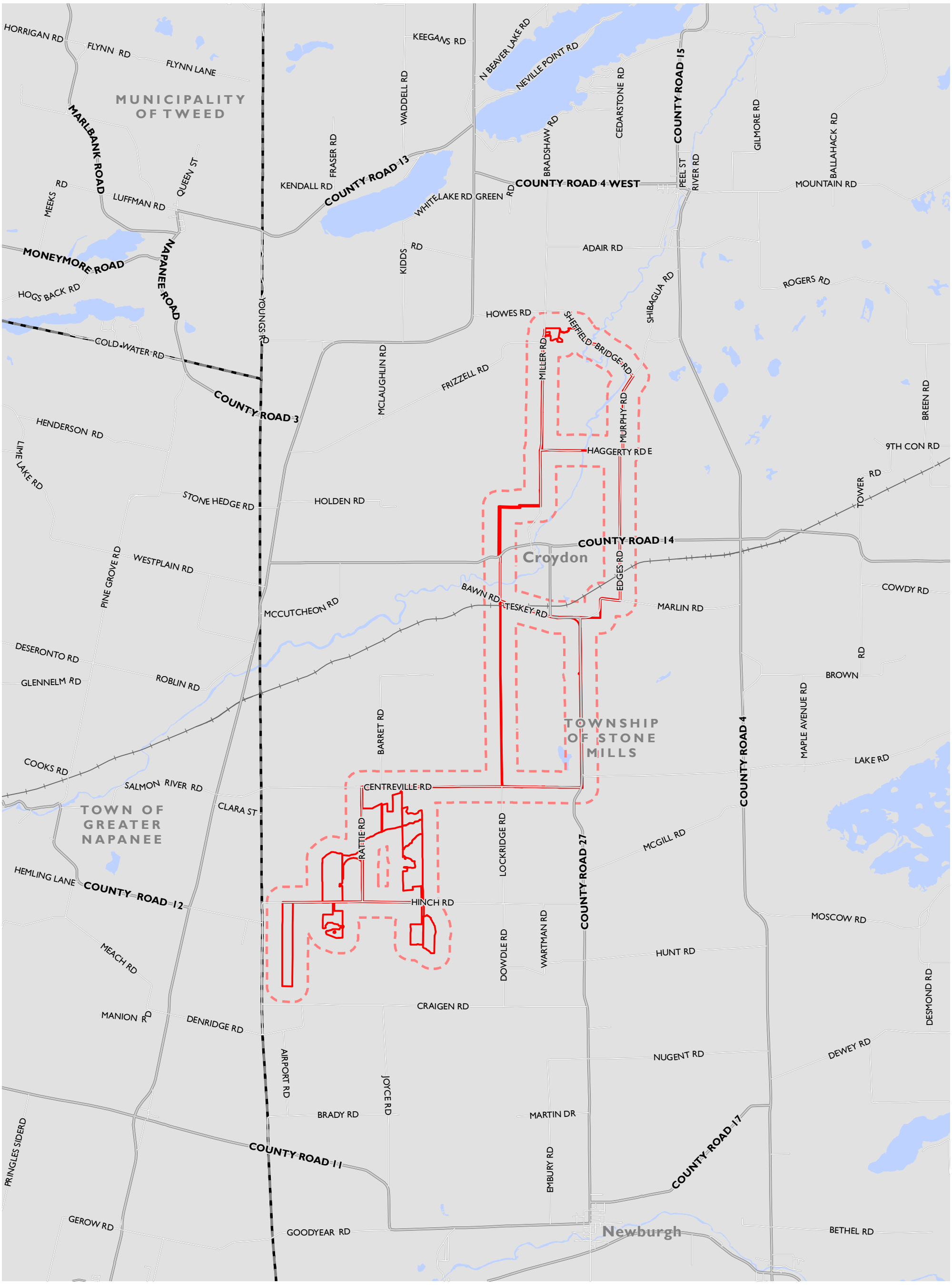
The Proponent submitted a proposal to the Independent Electricity System Operator ("IESO") under the Large Renewable Procurement I ("LRP") process and was subsequently awarded a LRP contract by the IESO to generate electricity. The Project will now be subject to a number of approvals including, among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

This *Construction Plan Report* ("CPR") provides detailed information on the installation of key Project components, potential environmental effects at and within 300 m of the Project Location (as they relate to construction activities and temporary facility components[1]), and mitigation and/or monitoring measures with respect to potential environmental effects as detailed in **Table 1**.

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

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

[1] Refer to the *Design and Operations Report* for technical specifications of permanent Project components (i.e., those present for the lifetime of the solar facility).



BluEarth Renewables Inc.
LOYALIST SOLAR LP

General Project Location
FIGURE 1

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

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MAP CREATED BY: GM
MAP CHECKED BY: JP
MAP PROJECTION: NAD 1983 UTM Zone 18N

1:70,000
0 0.5 1 2 km

N W E S

PROJECT: 163674 STATUS: DRAFT DATE: 2017-01-25

FILE LOCATION: I:\GIS\163674 - Loyalist Solar\mxd\PDR\Figure 1 General Project Location.mxd

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*

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*

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 (described as the "Project Location" on **Figure 1** and **2**). It has an approximate centroid at the following geographic coordinates:

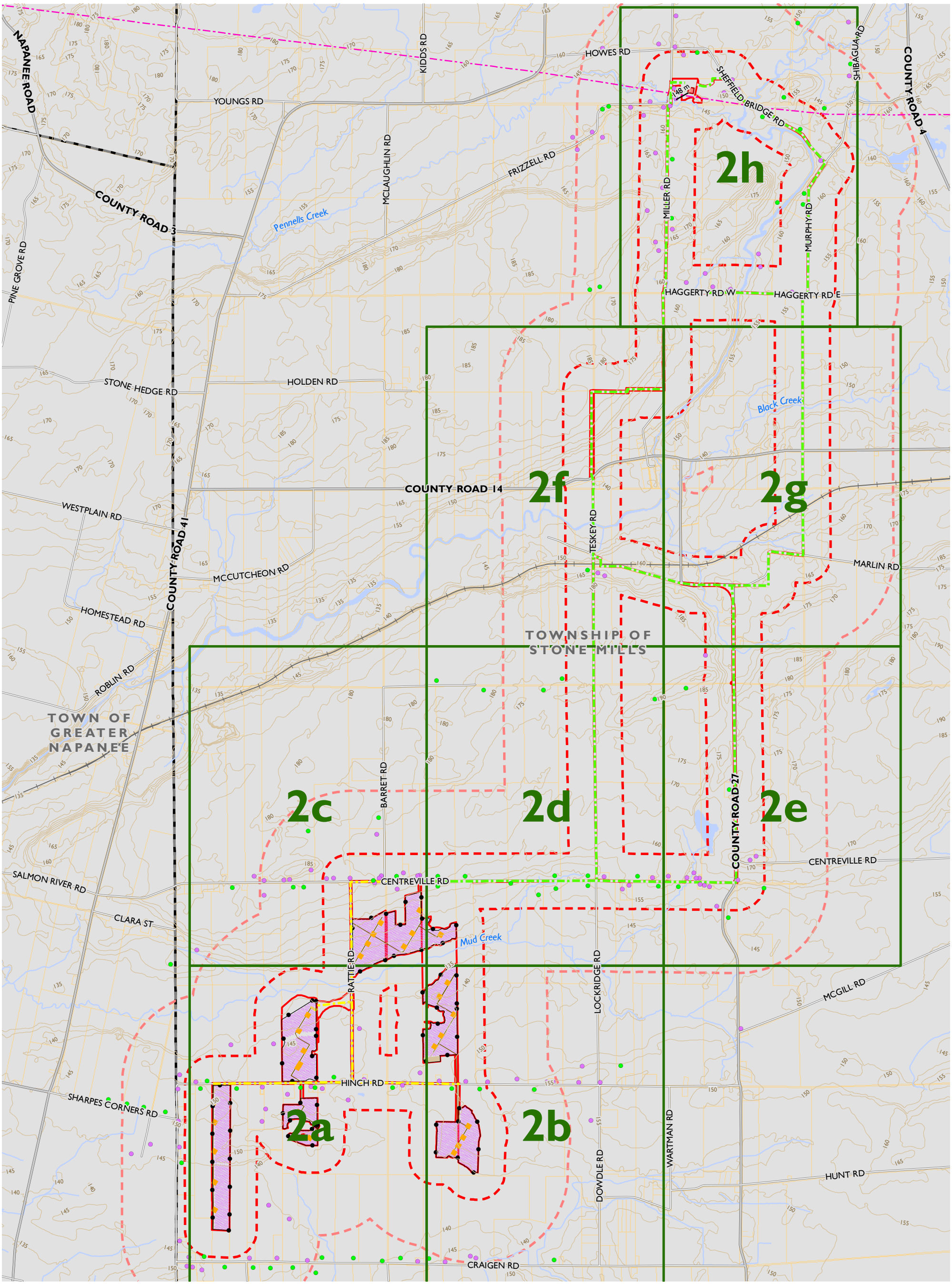
- Latitude: 44°22'3.382" N
- Longitude: 76°58'19.543" W

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

Figure 2 and ***Appendix A*** show the conceptual layout and location of key Project components. Further information on facility components making up the Project Location is provided in Sections 5 and 6 of the *Design and Operations Report*.

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

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



BluEarth Renewables Inc.
LOYALIST SOLAR LP

Site Plan - Conceptual Component Layout
FIGURE 2

- Existing Noise Receptor
- Vacant Lot Noise Receptor
- CA - Connection Line Route
- Railway
- Electrical Transmission Line
- 5 m Elevation Contour
- Fence
- Inverter Station
- Solar Panel
- Electrical Collection Line
- Access Road
- Operation and Maintenance Area
- Substation
- Project Location Boundary
- Project Location 300 m Area of Investigation
- Project Location 1000 m Area of Investigation
- Municipal Boundary
- Parcel
- Water Body

See appendices for Figures 2a - 2h.

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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MAP CREATED BY: GM
MAP CHECKED BY: JP
MAP PROJECTION: NAD 1983 UTM Zone 18N

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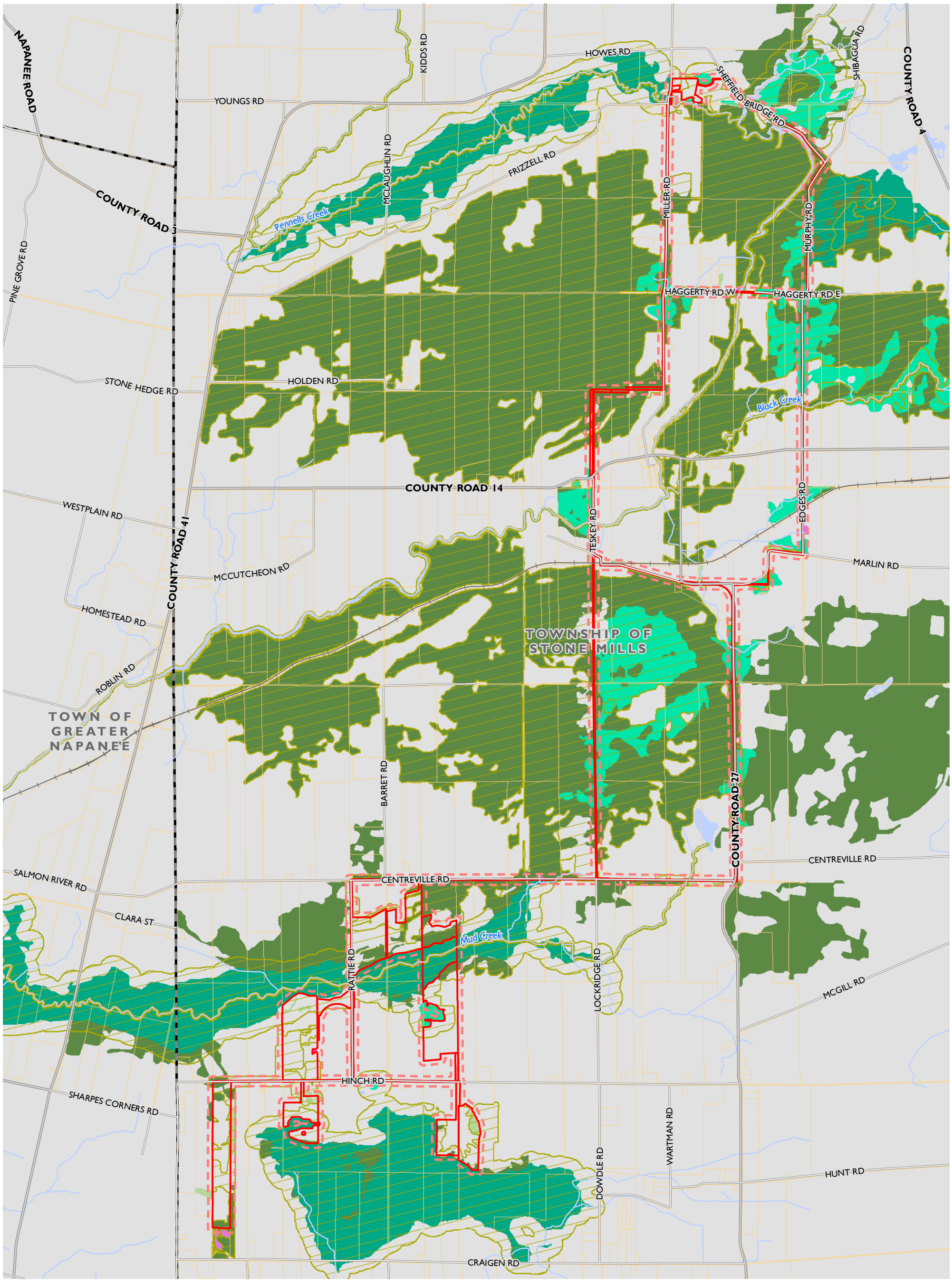
PROJECT: 163674 STATUS: DRAFT DATE: 2017-01-27

FILE LOCATION: I:\GIS\163674 - Loyalist Solar\mxd\CPR\Figure 2 Site Plan Conceptual Component Layout key.mxd



BluEarth Renewables Inc.
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Site Plan -
Natural Heritage Features
FIGURE 3

- Railway
- Watercourse
- Project Location Boundary
- Project Location 50 m Area of Investigation
- Municipal Boundary
- Parcel
- Significant/Treated as Significant Wildlife Habitat
- Water Body
- Significant Wetland
- Assumed Provincially Significant Wetland
- Non Significant Wetland
- Significant Woodland
- Non Significant Woodland

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.

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MAP CREATED BY: GM
MAP CHECKED BY: MB
MAP PROJECTION: NAD 1983 UTM Zone 18N

PROJECT: 163674 STATUS: DRAFT DATE: 2017-01-25

FILE LOCATION: I:\GIS\163674 - Loyalist Solar\mxd\CPR\Figure 3 Natural Heritage Features.mxd

Ecological Land Classification

- 2. Cultural Alvar
- 3. CVC_4: Extraction
- 4. CVI_1:Transportation (Rail)
- 5. CVR_4: Rural Residential Property
- 6. FOC: Coniferous Forest
- 7. FOCM2-1: Dry-fresh Red Cedar Coniferous Forest Type
- 8. FOCM2-2: Dry-Fresh White Cedar Coniferous Forest Ecosite
- 9. FOCM4-1: Fresh-Moist White Cedar Coniferous Forest Type
- 10. FOCM4: Fresh-moist White Cedar Coniferous Forest Ecosite
- 11. FOCS3-1: Dry-Fresh White Cedar Calcareous Bedrock Coniferous Forest Type
- 12. FODM3-1: Dry-Fresh Poplar Deciduous Forest Type
- 13. FODM4-2: Dry-Fresh White Ash-Hardwood Deciduous Forest Type
- 14. FODM4-4: Dry-Fresh Ironwood Deciduous Forest Type
- 15. FODM5-2: Dry-Fresh Sugar Maple-Beech Deciduous Forest Type
- 16. FODM5-4: Dry-Fresh Sugar Maple-Ironwood Deciduous Forest Type
- 17. FODM5-7: Dry-fresh Sugar Maple-Black Cherry Deciduous Forest Type
- 19. FODM5: Dry-Fresh Sugar Maple Deciduous Forest Ecosite
- 20. FODM7-2: Fresh-moist Green Ash-Hardwood Lowland Deciduous Forest
- 21. FODM7: Fresh - Moist Lowland Deciduous Forest
- 22. FODM8-1: Fresh-moist Poplar Deciduous Forest
- 23. FODM9: Fresh-moist Oak-Maple-Hickory Deciduous Forest
- 25. FOMM2-3: Dry-Fresh White Pine-Hardwood Mixed Forest Type
- 26. FOMM4-3: Dry-Fresh White Cedar-Hardwood Mixed Forest Type
- 27. FOMM5-2: Dry-Fresh Poplar Mixed Forest Type
- 30. MAMM1-2: Cattail Graminoid Mineral Meadow Marsh Type
- 31. MAMM1-3: Reed Canary Grass Mineral Meadow Marsh
- 32. MAMM1-9: Narrow-leaved Sedge Graminoid Mineral Meadow Marsh
- 33. MAMM3: Mixed Mineral Meadow Marsh
- 34. MAMO1-2: Cattail Graminoid Organic Meadow Marsh
- 35. MAMO1-3: Reed Canary Grass Graminoid Organic Meadow Marsh
- 36. MAMR3: Bedrock Meadow Marsh
- 37. MASO1-1: Cattail Organic Shallow Marsh
- 38. MEFM4: Fresh-moist Forb Meadow
- 39. MEGM4: Fresh-moist Graminoid Meadow
- 40. MEMM3: Dry-Fresh Mixed Meadow Ecosite
- 41. MEMM4: Fresh-moist Mixed Meadow Ecosite
- 42. MEMR2: Dry-fresh Non-calcareous Bedrock Mixed Meadow Ecosite
- 43. OAGM1: Annual Cover Crop
- 44. OAGM2: Perennial Cover Crop
- 45. OAGM4: Open Pasture
- 46. OAO: Open Aquatic Area
- 47. RBOA1-1: Dry Lichen-Moss Open Alvar Pavement Type
- 48. RBOA1: Open Alvar Rock Barren Ecosite
- 49. RBSA1-1: Common Juniper Shrub Alvar Type
- 50. RBSA1: Alvar Shrub Rock Barren Ecosite
- 51. RBTA1-7: Red Cedar Alvar Woodland Type
- 52. RBTB1-1: Red Cedar Calcareous Treed Alvar Type
- 53. SWCO1-1:White Cedar Organic Coniferous Swamp
- 55. SWDM2-1: Black Ash Mineral Deciduous Swamp
- 56. SWDM2-2: Green Ash Mineral Deciduous Swamp
- 57. SWDM3-3: Swamp Maple Mineral Deciduous Swamp
- 58. SWDM4-5: Poplar Mineral Deciduous Swamp
- 59. SWDM4: Mineral Deciduous Swamp Ecosite
- 60. SWDO2-3: Swamp Maple Organic Deciduous Swamp
- 61. SWTM3:Willow Mineral Deciduous Thicket Swamp
- 62. SWTO2:Willow Organic Deciduous Thicket Swamp
- 63. SWTO5: Organic Deciduous Thicket Swamp
- 65. TAGM4:Treed Pasture
- 66. TAGM5: Hedgerow
- 67. THCM1-1: Dry - Fresh Red Cedar Coniferous Thicket
- 68. THDM2-7: Prickly Ash Deciduous Shrub Thicket Type
- 69. THDM2: Dry-fresh Deciduous Shrub Thicket Ecosite
- 70. THDM5-1: Gray Dogwood Deciduous Thicket
- 71. WOCM1-1: Dry-Fresh Red Cedar Coniferous Woodland

ADAIR RD
ROGERS RD
SHIBAGUA RD
HOWES RD
ZZELL RD
COUNTY ROAD 4
HOLDEN RD
Black Creek
COUNTY ROAD 14
MARLIN RD
MCCUTCHEON RD
HOMESTEAD RD
ROBLIN RD
TOWN OF GREATER NAPANEE
TOWNSHIP OF STONE MILLS
BARRET RD
CENTREVILLE RD
SALMON RIVER RD
CLARA ST
Mud Creek
LOCKRIDGE RD
MCGILL RD
SHARPES CORNERS RD
HINCH RD
WARTMAN RD
DOWDLE RD
HUNT RD
MEACH RD
DENRIDGE RD
CRAIGEN RD
JOYCE RD
CLANCY RD
NUGENT RD

- Existing Noise Receptor
- Vacant Lot Noise Receptor
- Railway
- Mapped Watercourse
- Project Location Boundary
- Project Location 50 m Area of Investigation
- Project Location 1000 m Area of Investigation
- Municipal Boundary
- Parcel

Zoning (Township of Stone Mills)*

- Environmental Protection
- Extractive Industrial Pits and Quarries
- Waste Management
- Water Body

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

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

Note: Heritage Features to be added.

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Site Plan - Land Use
FIGURE 4

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MAP CREATED BY: GM
MAP CHECKED BY: MB
MAP PROJECTION: NAD 1983 UTM Zone 18N

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PROJECT: 163674 STATUS: DRAFT DATE: 2017-01-25

FILE LOCATION: I:\GIS\163674 - Loyalist Solar\mxd\CPR\Figure 4 Land Use.mxd

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, photovoltaic ("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 in ***Appendix A***, and commitments made in the various technical reports adhered to. This includes observing the minimum areas to be assessed between Project components and the nearest significant natural feature, waterbody, 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. These are shown in 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_{AC}) of the Project are not subject to change.

5.0 Project Overview

The Project is designed to generate 54 MW_{AC} of electricity. PV panels will be the technology used to convert solar energy into electricity. With exposure to sunlight, the solar modules convert solar radiation into direct current ("DC") electricity through a PV process. The PV process occurs when the energy from the sunlight is transferred to semiconductors contained in the modules. DC electricity generated from the PV panels will be collected and converted to AC electricity through inverters, which will be contained in multiple inverter stations throughout the site. An inverter station houses multiple components, including, among others, inverters and a medium voltage ("MV") transformer.

The AC electrical energy output from the inverter stations will be collected via above ground and underground cables (collector lines) within the Project Location and moved via above ground and/or underground lines in municipal road rights-of-way ("ROW"). The energy output from the collector lines will feed into the connection line, which will carry the energy output to the Project's substation. At the substation, the voltage will be stepped up to 230 kV and connected to the IESO transmission grid at the existing H23B transmission circuit. A control building will also be present at the substation, containing communications and SCADA equipment.

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

As part of the construction program, good site practices and procedures will be implemented. These practices will include policies regarding the management of any excavated material, erosion, sediment, sound, dust control, the handling of wastes, on-site safety management, and emergency response procedures. These are discussed in **Section 7** as part of the mitigation measures and monitoring activities. They are expanded upon in the Emergency Response and Communications Plans ("ERCP") discussed in the *Design and Operations Report*. The Proponent's staff and contractors will be made aware of the environmental management commitments contained in these reports to ensure they are implemented (see **Section 8**).

All on-site construction activities will be conducted within the Project Location as identified in **Figure 2**. It is anticipated that the majority of construction materials will be staged outside of the Project Location at an existing facility(ies) as appropriate. Construction materials and equipment not staged at an existing facility(ies) will be stored in temporary construction laydown areas within the Project Location boundary and depicted on **Figure 2**.

5.1 General Timing

It is anticipated that construction will last approximately 10 to 12 months. Pending receipt of all necessary approvals and permits, construction is tentatively scheduled to begin in fall 2017. **Table 2** outlines the anticipated duration of each key construction activity. It is expected that the Project will remain operational for a period of at least 20 years. However, it is possible that the Project would remain operational for longer period of time due to the lifecycle of facility components along with repowering of the generating equipment and/or receiving a subsequent form of power purchase agreement. Construction activities will be staged such that seasonal activity restriction timing windows related to natural heritage features are avoided.

Table 2: Anticipated Duration of Construction Activities

Construction Activity	Estimated Timing	Approximate Duration
Site Preparation	Q4/2017-Q2/2018	9 months
Installation of solar components (structural supports, racking, modules, collection system)	Q1/2018-Q3/2018	9 months
Installation of substation and Operations & Maintenance building	Q1/2018-Q4/2018	12 months
Commissioning, site clean-up and restoration	Q4/2018	3 months

5.2 Overview of Materials and Equipment

In general, the materials to be used for construction will include standard building materials such as concrete, wood, aggregate, aluminum, steel, and metal. To the extent practicable, these materials will be procured from local and/or regional sources where they are available in sufficient quality and quantity and at competitive prices.

Hazardous materials used during construction are limited to fuels, lubricants, fluids, and coolants that are associated with machinery, vehicles and equipment. These materials will be managed according to the activities set out in the Environmental Effects Monitoring Plan ("EEMP") and through practices developed by the contractor that are consistent with the EEMP provided in the *Design and Operations Report*. Given the implementation of a Spills Prevention and Contingency Plan, the likelihood of a spill is very low and the types of materials used on site are not expected to cause any adverse effects in the unlikely event that a spill occurs. Any residual impact will be promptly addressed. The contractor's plan will be outlined in the ERCPs and any spills will be managed per the procedures outlined in a Spills Prevention and Contingency Plan to be prepared prior to construction. Decisions on waste disposal or recycling during, and immediately after construction, will be made by the on-site contractor (who will abide by the requirements of the *Environmental Protection Act*).

Table 3 summarizes the construction activities, their anticipated duration, and the likely equipment and materials needed during this phase. Construction equipment and vehicles, including those that transport materials, will access the site via the entrances off Hinch Road, Centreville Road, Rattie Road, and Miller Road (**Figure 2**). It is expected that dump trucks, half-ton trucks, semi-trailer trucks, and other transports will bring materials and equipment to and from the site. The transportation of materials will occur throughout the construction phase; however, the majority of trips will occur in months 1 to 9 (with the transport of materials for access roads, PV panels, electrical equipment and associated racking/support structures). A Traffic Management Plan that details the transportation route of construction materials will be developed prior to the start of construction.

It should be noted that while an attempt has been made to identify all solar facility and construction equipment, the exact size, weight and technical specifications of the materials and equipment will not be known until suppliers and contractors have been selected. It is anticipated that the types and sizes of equipment used will be similar, regardless of which suppliers and -site contractors are selected for the Project.

Table 3: Anticipated Construction Materials and Equipment

Construction Activity	Material and Equipment Brought On-site[2]					Material Generated and Taken Off-site			
	Type of Material (Estimate Quantity)	Estimated Number of Truck Loads	Vehicle Used to Transport Material	Equipment Used During Activity	Weight (Tonnes)	Type (Estimated Quantity)	Stored On-site	Number of Truck Loads	Vehicle Used to Transport Material Off-site
Survey and staking of Project Location	Survey stakes, flagging tape, markers (TBD)	3	Pickup / light Truck	Pickup Truck	3	None	N/A	N/A	N/A
Equipment used to transport, unload and move materials and equipment.	Transportation of bulldozers, excavators, lifts and other large equipment.	50-60	Flatbed Semi-Trailer Trucks	Semi-Trailer Track-Type Tractors (Bulldozer) Rough Terrain Cranes Telescopic Handlers Scrapers Excavators Wheel Loaders Backhoes Motor Graders Soil Compactors Pile Driving/Drilling Equipment	Empty: 7-16 Loaded: 40-70 44 23 10 25 26 20 9 20 13 20	None	Equipment temporarily stored on-site	N/A	N/A
Clearing, ground levelling, compacting and grading.	N/A	N/A	On-Site	Track-Type Tractors (Bulldozer) Scrapers Motor Graders Soil Compactors Dump Trucks Wheel Loaders	44 25 20 25 20 20	Topsoil and sub-soil management, Removed vegetation	Yes* Yes**	TBD TBD	Dump Truck
Installation of perimeter fence and security lighting.	Fence posts and chain-link fence (2500 metres est.), concrete	5	Semi-Trailer	Backhoes w/ Auger (TBD) Skid Steers Telescopic Handlers Pickup Trucks	9 9 10 3	None	No	N/A	N/A
Construction of access roads, temporary storage and construction areas and base for the substation and O&M building.	Granular A and B Miscellaneous Access Road and Base Materials (TBD) Culverts, geotextile	2500 5	Dump Truck Semi-Trailer	Bulldozers Scrapers Motor Graders Soil Compactors Dump Trucks Wheel Loaders	44 25 20 25 20 20	Topsoil	Yes*	TBD	N/A

[2] Estimates based on typical construction standards/techniques for a typical 54 MW solar project. As appropriate, all construction materials and equipment (when not in use) will be temporarily stored in construction laydown areas.

Construction Activity	Material and Equipment Brought On-site[2]					Material Generated and Taken Off-site			
	Type of Material (Estimate Quantity)	Estimated Number of Truck Loads	Vehicle Used to Transport Material	Equipment Used During Activity	Weight (Tonnes)	Type (Estimated Quantity)	Stored On-site	Number of Truck Loads	Vehicle Used to Transport Material Off-site
Construction of foundations for inverter stations, substation components, and O&M building.	Concrete (TBD) Rebar and sonotubes for footing construction (TBD)	50	Semi-Trailer Concrete Mixer	Excavators Wheel Loaders Backhoes Rough Terrain Cranes Dump Trucks Concrete Mixers	26 20 9 23 20 30	N/A	N/A	N/A	N/A
Installation of support, racking and PV modules.	Racking support (TBD) Steel and aluminum racking (TBD) Solar PV panels (TBD)	30-60 100-200 180-550	Semi-Trailer Semi-Trailer Semi-Trailer	Pile Driving/Drilling Equipment Rock Drilling Equipment Rough Terrain Crane Telescopic Handler Excavator Backhoe	20 20 23 10 26 9	None	N/A	N/A	N/A
Construction of O&M building	Lumber or Brick (TBD) Glass, aluminum or steel (TBD) or a pre-fabricated structure	2-5	Pick-up Truck Scissor Lift	Pick-up Truck Scissor Lift	3 2	None	N/A	N/A	N/A
Installation of wiring, inverter stations, substation, connection to IESO grid, and O&M building.	Inverter stations (34) Inverters (TBD), & substation, AC & DC electrical cabling, conduit, connectors, ground wire, etc. (TBD)	55 150	Semi-Trailer Semi-Trailer	Rough Terrain Crane Telescopic Handler Excavator Backhoe Dump Truck Pickup Truck Backhoe w/ Auger (TBD) Radial Boom (Digger) Derrick (RBD) Rock Drilling Equipment	23 10 26 9 20 3 9 1 1 20	None	N/A	N/A	N/A
Installation of connection line and electrical collection system	Electrical poles (TBD) Electrical insulators, guy wires, anchors, junction boxes, electrical cabling, conduit, connectors, ground wire, etc. (TBD)	10 150	Semi-Trailer Semi-Trailer	Excavator Backhoe Pickup Truck Backhoe w/ Auger (TBD) Radial Boom Derrick (Digger) Hy Hoe Hydraulic Ram Rock Drilling Equipment Aerial Bucket Truck Pole Trailer Cable Trailer Tension Machines	26 9 3/4 9 22 26 12 20 15 12 2	None	N/A	N/A	N/A

Construction Activity	Material and Equipment Brought On-site[2]					Material Generated and Taken Off-site			
	Type of Material (Estimate Quantity)	Estimated Number of Truck Loads	Vehicle Used to Transport Material	Equipment Used During Activity	Weight (Tonnes)	Type (Estimated Quantity)	Stored On-site	Number of Truck Loads	Vehicle Used to Transport Material Off-site
Remediation and clean-up of work areas.	None	N/A	N/A	Pickup Truck Service vehicles (TBD) Excavator Backhoe Dump Truck	3 -- 26 9 20	Construction waste and miscellaneous materials	No***	TBD	Semi-Trailer Dump Truck Pickup Truck
Site landscaping and vegetation.	Vegetative seed (to cover 173 hectares approx.) Imported Topsoil (TBD)	15	Pickup Truck	Pickup Truck Hydroseeding Device (TBD) Excavator Backhoe Dump Truck	4 -- 26 9 20	None	N/A	N/A	N/A
Testing and commissioning.	None	N/A	N/A	Pickup Trick Service vehicles (TBD)	3 --	None	N/A	N/A	N/A

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

** *Waste vegetation from site preparation will be temporarily stored on site until it can be removed.*

*** As applicable, *construction waste will be removed from the Project Location by a licensed contractor who will recycle and reuse materials where possible. Material that cannot be recycled or reused will be transported to an appropriate disposal facility.*

5.3 Temporary Uses of Land

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

Construction laydown areas will be used during Project construction, and are anticipated to be located at existing facilities (i.e. warehouse and storage yard) in Napanee and located within the Project Location boundary shown on **Figure 2**. Pending the final design, any part of the Project Location may be used as temporary storage, which will be dependent on how construction will be staged. These areas are where construction equipment such as excavators, bulldozers and graders, and materials for construction (including PV panels) will be temporarily stored. Laydown areas within the Project Location boundary will be surrounded by either permanent or temporary construction fencing which will be removed at the end of the construction phase.

Site trailers, washrooms, and the first aid station to be used during operation of the facility will be located in an Operations & Maintenance building (see the *Design and Operations Report*). In the case where the use of the construction laydown areas may remain during the operations phase of the Project (e.g., to be used for parking or other uses), they would then be considered as permanent Project components.

During construction, temporary storage of hazardous materials may occur, including fuels, oils, fluids, etc. These materials will be stored in sealed containers. Storage of these materials will be temporary and as required. Spill prevention measures and spill response measures will be prescribed in the Spills Prevention and Contingency Plan. This plan will be in place prior to the start of construction.

Temporary and disturbed areas may be rehabilitated after the construction of the solar facility is complete. Temporary fencing, trailers and construction equipment will be removed from the Project Location. Temporary sediment structures will also be removed. Areas of compacted soil due to the presence of heavy machinery may be rehabilitated by tilling and the spreading of existing topsoil to restore soil density and drainage. These areas may also be planted with vegetation to control erosion, as necessary.

5.4 Temporary Water Takings

During the construction phase, the installation of racking support poles and underground cables may require temporary water taking if groundwater starts to collect in the trenches and holes dug for these components. As planned, water takings are anticipated to be less than 50,000L/day. Should water takings need to be greater (i.e. 50,000 – 400,000 L/day), the Proponent will register the water taking as an activity on the Environmental Activity and Sector Registry ("EASR"). This would require the Proponent and their contractors to prepare a water taking plan, discharge plan, and provide notification to the Township and County prior to dewatering taking place.

These documents would include such details as an analysis of proposed soil settlement that would occur, whether a monitoring program would be needed, the maximum quantity of water to be discharged each day and the method of transfer or water discharge. Water takings under 50,000L/day are not anticipated to have negative environmental effects. Mitigation measures associated with water takings are included in **Table 4**.

5.5 Construction Workforce

The workforce will include construction supervisors and specialists, general and skilled labour, equipment operators, technicians for electrical systems and commissioning, plant installation and operation staff, security and general maintenance staff. The construction workforce is estimated to require 150-200 workers on average over the 12 month construction period. Construction hours will occur in accordance with local municipal By-laws (see **Section 7.7**).

6.0 Construction Activities

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

6.1 Surveying of Project Location

Prior to the construction phase, the site will be surveyed and staked to delineate the Project Location boundary. The survey will identify the location of underground utilities and/or infrastructure as well as the location of Project infrastructure.

Significant or provincially significant environmental features and their applicable setbacks (e.g., water bodies, significant wildlife habitat, etc.) will also be clearly demarcated by the Proponent or their construction contractor. Areas to be avoided will be fenced and/or flagged, as appropriate.

6.2 Clearing, Levelling, Compacting and Grading

Clearing activities will take place prior to the start of other major construction works and will consist of vegetation removal, grubbing and large surface rock removal. Following any clearing activities, and as necessary, the Project Location will be graded to facilitate construction activities. As noted in **Table 3**, graders, bulldozers, scrapers, soil compactors, dump trucks, wheel loaders and backhoes, among other equipment, will be used to generally prepare the site. Appropriate grading techniques will be used to prevent increased runoff potential and maintain desired drainage patterns.

Major excavation works or fill placement are not expected for the Project. The primary excavation work is likely to be limited to grading and soil removal and/or replacement for various foundations, access roads, and trenches for underground electrical cables. Topsoil removed construction of permanent access roads will be distributed across the Project Location in appropriate areas. Any temporarily stockpiled topsoil will be covered to minimize erosion from wind and precipitation. Topsoil removal and distribution will be conducted in accordance with mitigation measures for rare vegetative communities (such as alvars), detailed in **Table 4** and in the NHA EIS.

6.3 Drainage and Erosion Control

Construction activities associated with the Project are not anticipated to significantly increase the peak-flow of drainage from and within the Project Location. To minimize the potential for impairment of the quality of any adjacent waters during construction, an Erosion and Sediment Control ("ESC") plan will be developed and implemented during construction.

While a detailed ESC plan cannot be completed until the final site grading plan, the phasing of construction, and construction methodology have all been confirmed, the following measures will be considered when developing the ESC plan and linked to the Stormwater Management Plan as appropriate:

- Identifying and protecting all trees and plants not shown for removal that are contained within the construction area
- Installing silt fences and other necessary erosion control measures prior to commencing construction activities
- Phasing construction, where possible, to limit areas with exposed soils, and limit duration of soil exposure
- Implementing proper dewatering techniques to ensure the water within the site is properly managed
- Using appropriate grading techniques to prevent increased run-off potential and maintain pre-construction drainage patterns
- Using sedimentation basins or sediment traps to treat relatively large drainage areas
- Re-vegetation of disturbed areas after construction has been completed (either through natural re-growth or planting, as necessary, where appropriate)
- Protecting stockpiled soil areas with silt fencing and locating the areas a safe distance from sensitive natural features.

The ESC and Stormwater Management Plans will incorporate mitigation measures from the *Natural Heritage Assessment* and *Water Body Report*, as applicable.

6.4 Installation of Perimeter Fence and Security Lighting

For the safety of the public and wildlife, and for security purposes, a perimeter fence will be installed. This will be a chain link fence of standard height (approximately 1.8 m) that will be installed around those areas of the Project Location where PV panels, inverter station sand the substation are located. The fencing is a requirement of the Electrical Safety Authority ("ESA") and will be built to required specifications. Gated entrances will be installed at the site entrances off of Hinch Road, Centreville Road, Rattie Road, and Miller Road. Temporary entrances may be in place during construction.

The perimeter fencing is to have contact with the ground surface to prevent entry of wildlife. Where is not feasible for the fence to contact the ground, other measures will be installed to prevent wildlife access under the fence. During the construction phase, in areas appropriate to protect turtle hatchlings, the spacing in the chain link should be of sufficient size to prevent entry from the ground surface to a height of approximately 0.5 m.

During construction, the site will be monitored by the supervising construction staff. For security and maintenance purposes, lights will be installed near the substation and site entrances to the facility and task-specific lights will be installed where necessary.

6.5 Construction of Access Roads and Installation of Temporary Power

A series of internal gravel access roads will be needed for construction vehicles and equipment transport. They will also provide long-term access to the site for on-going maintenance and will allow a service vehicle to access each inverter station directly. The main entrances to the solar facility will be located off Hinch Road, Centreville Road, Rattie Road, and Miller Road.

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

During construction of the access roads, the topsoil will be stripped and stored. Some cut and fill may be required, however, it is expected that the subgrade material will be comprised of existing native granular deposits where suitable. The subgrade will be cut as cleanly as possible to minimize disturbance. Should weak areas be detected, further excavation may be required.

The depth of the roadbed will be constructed as required to transport loads associated with the construction and on-going operation and maintenance needs of the Project. Geo-grid and geotextile fabric may be used, as needed, to improve the structural integrity of the road base.

During the construction period, it is anticipated that on-site electricity to power site trailers and communications will be obtained from the local distribution utility from nearby suitable distribution lines; failing this, temporary generators would be utilized. More localized electrical needs will be supplied by portable generators to power small equipment in various locations within the Project Location.

Where roads are deemed necessary only for construction, the area(s) will be rehabilitated as per instructions below prior to solar facility operation:

- The aggregate materials will be excavated by a backhoe/front-end loader, along with any underlying geotextile fabric.
- All compacted areas will be tilled in a manner adequate to restore the sub-grade material to the proper density and depth, consistent with the surrounding area. Clean, compatible sub-grade material, followed by topsoil will be applied as appropriate.

6.6 Installation of Water Crossings

It is not anticipated that the design of the Project will require the installation of new water crossings for access roads. Where the Project Location has been determined to occur “within” a water body, this relates to a crossing location where a collector line or connection line is proposed. Where these locations occur, the existing municipal road rights-of-way will be used. Upgrades to culvert crossings on municipal roads are not anticipated. Should new or upgraded water crossings be required, permitting or approvals that may be required for work within or adjacent to water bodies will be obtained.

6.7 Temporary Storage, Construction Areas and Installation of Temporary Facilities

Temporary laydown and construction staging areas will be located within the Project Location boundary as shown on **Figure 2** and in ***Appendix A*.** During the construction phase, any part of the Project Location may be used as temporary storage, which will be dependent upon how construction will be staged. Areas will be designated for the use of the construction office trailers, portable washrooms, first aid stations, vehicle parking, construction equipment parking, storage sheds, truck unloading/loading, waste disposal pick-up areas, and equipment and material laydown, among other uses.

After site grading is completed (discussed above), a layer of granular material will be installed to provide an adequate base for construction vehicles, heavy equipment, and material laydown. Temporary facilities will be removed when the construction period is finished, however, as discussed in **Section 5.3**, a portion of the construction laydown area(s) may be maintained after construction for operational and maintenance purposes.

6.8 Construction of Foundations

Engineered foundations will be constructed for the solar PV racking systems, inverter stations, substation components, and the Operations & Maintenance building (if located within the Project Location). The substation area and up to 34 inverter stations will be prepared and/or excavated as needed and foundations for the equipment will be installed. The soil conditions are such that several foundation types may be installed, including:

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

The final foundation selection(s) will occur during the Project's detailed design stage.

6.9 Installation of Supports, Racking and PV Modules

Approximately 190,000 to 290,000 PV panels of 340 (or higher) watts (DC) each will be installed for the Project. The PV panels are anticipated to be arranged in lines and strings in parallel. The PV panels will be mounted to a racking system that is aligned in rows approximately 5 to 12 m apart, and will use racking structures that are either fixed in place or track the movement of the sun. Each of the racking structures will be constructed on a support, and will undergo final assembly on site.

Racking foundation design will vary depending upon the depth of overburden (soil above bedrock). For areas with less than 1.2 m of overburden the foundation will likely consist of a rock socket type anchor which consists of a hole drilled through the overburden and at least 1 m into the bedrock. A steel post is then concreted into the bedrock.

For areas with more than 1.2 m and less than 2.2 m of overburden the proposed PV foundation will likely consist of spread footing type anchor. They would be comprised of a concrete footing placed in an excavated hole directly on bedrock or below the level of frost. A steel post would be set in the concrete and the excavation would be backfilled with compacted native material.

For areas with more than 2.2 m of overburden (and with limited cobbles) foundation will likely consist of a helical pile type anchor. This would be comprised of a single or double helix plate welded onto a 141 mm diameter steel post. The helical piles would be installed using an excavator-mounted rotary drive head.

The final racking and support selection will occur during the Project's detailed design stage, including the exact method of installation, and number of supports and racks required. Additional details regarding racking and PV panels are provided in the *Design and Operations Report*.

6.10 Installation of Collector Line System and Inverter Stations

Collector lines within the generation portion of the site will either be installed above ground on poles and/or placed in excavated trenches. It is anticipated that the majority of electrical collector lines installed in road rights-of-way will be located above ground on poles, anticipated to be between 60 and 70 feet tall. Poles will be equipped with mounting structures and electrical insulators and ancillary equipment such as grounding wire, communications cables, and others as necessary. Where cabling will be installed on private property, it will be installed underground (unless not technically feasible) and will generally follow access roads. Cabling on municipal roads will be installed on poles within the municipal right-of-way unless technical reasons require it to be buried.

The pole installation process requires the excavation of holes for poles and anchors (augered or drilled as necessary). Poles are then framed and set and then installed using guy wires and screw anchors or rock anchors, as needed. Overhead cabling will be installed using Tension Machines, and clamped as required. Trees and vegetation will be removed or trimmed as required to accommodate the overhead lines as per ESA standards.

Where lines are buried, the lines will be placed on a sand-bedding or similar material and capped with marking tape to serve as a warning for future excavators, as per ESA requirements.

Inverter stations will require support foundations. The type and depth of foundation will vary depending upon geotechnical characteristics of the subsurface area at each location. Typically, inverter station foundations are either pre-cast concrete pads which are transported on site or cast-in-place concrete pads.

6.11 Installation of Connection Line System

The connection line will be constructed to connect the Project to the project substation located adjacent to the existing Hydro One Networks Inc. ("HONI") 230 kV line, as shown in **Figure 2** and ***Appendix* A.** **Figure 2** and ***Appendix A*** depict four connection line options (Preferred Route, Bid Route, Alternate 1 and Alternate 2) to connect the Project to the substation. A final route will be selected based upon consultation with the public, HONI, the IESO, and other regulatory agencies. The connection line options have been routed to minimize or avoid impacts to sensitive environmental features.

Dependent on the preferred connection line route, it is anticipated that the connection line will be mostly installed on poles and be located within municipal road ROWs. Some sections of the ROWs may require clearing, while other sections may be installed to avoid impacts to sensitive natural features. The specifications (pole height, material, guy wires, anchor locations) and construction method will be finalized at the Project's detailed design stage.

Should poles need to be constructed for above-ground collector lines or the connection line system, they would likely be either grey fibreglass or wood and approximately 65-80 feet tall. Poles will be equipped with mounting structures and electrical insulators and ancillary equipment such as grounding wire, communications cables, and others as necessary. The type of pole and number of circuits needed would be dependent on HONI's requirements for existing infrastructure in the rights-of-way. A final decision will be made prior to construction during the detailed design stage of the project.

Should engineering constraints identify the need for underground installation of either electrical collector or connection line systems due to the potential to negatively affect sensitive environmental features, a directional boring (i.e., horizontal directional drilling (HDD)) construction method may be used. This is a trenchless method of installing piping or cabling that uses a drill rig to bore along a predetermined path below the surface. The creation of temporary jack and bore pits may be required for this operation. The detailed design phase of the Project will determine if this type of installation would be required.

6.12 Communications & SCADA

A communications tower and SCADA system including fibre-optic cable runs will be constructed to allow for remote communication and transfer of Project operational data. The SCADA system will be housed inside a Control building to be located in the substation area (as shown in **Figure 2** and ***Appendix* A**).

Both the communications tower and Control building will be constructed on an appropriate foundation to be determined during detailed design.

6.13 Substation

The Project substation will be located within leased lands on private property northeast of the intersection of Miller Road and Frizzell Road, adjacent to the HONI corridor. While the exact make and model of the substation is in the process of being determined, it will be sized appropriately for a 54 MW_{AC} facility. The foundation for the substation will be determined during detailed design and will be compliant with MOECC spill containment requirements.

6.14 Operations & Maintenance Building

An Operations & Maintenance ("O&M") building may be constructed within the Project Location. The exact location of this building, if required, will be determined during detailed design, but is anticipated to be east of Rattie Road and north of Hinch Road, as shown on Figure 2. The building is anticipated to be pre-fabricated, and will be placed on a concrete foundation. Further details regarding the O&M building can be found in the *Design and Operations Report*.

6.15 Remediation and Clean-up of Work Areas

After all major construction activities are completed, and the Project has been commissioned, work areas will be rehabilitated as needed. Construction-related waste and excess materials brought to the site will be removed and reused, recycled, or disposed of in accordance with provincial guidelines. Trucks and other like vehicles will be used to remove non-permanent equipment from the Project Location.

6.16 Site Landscaping and Vegetation

Site restoration and reclamation is planned for the Project Location where necessary, including along access roads. The restoration and reclamation strategy may include re-contouring of the land to suitable drainage patterns (in accordance with the Stormwater Management Plan), management and replacement of subsoil (if applicable), and topsoil and re-vegetation. Disturbed areas may be seeded or allowed to re-vegetate naturally as needed, to help stabilize soil conditions, enhance soil structure, and/or increase soil fertility. In some locations, vegetation will be retained or planted to provide visual screening from neighbouring properties.

6.17 Testing and Commissioning

The components will be tested to ensure safe and proper operation prior to start-up and connection to the IESO transmission grid. If unanticipated issues arise, remedial corrections will be made prior to commissioning of the Project.

7.0 Environmental Effects and Proposed Mitigation Measures and Monitoring Activities

The construction phase of the Project has the potential to affect the environment. For each environmental feature/concern, the following is described:

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

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

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

Staff and on-site contractors involved with the Project during the construction phase will be made aware of the environmental commitments contained in this report and their requirements for implementation. The on-site contractor will be responsible for implementing the EEMP discussed in the *Design and Operations Report*.

7.1 Archaeological Resources

7.1.1 Existing Conditions

Archaeological Research Associates Ltd. was retained by the Proponent to complete *Stage 1 and Stage 2 Archaeological Assessments* as required under *Ontario Regulation 359/09*.

The Stage 1 AA 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 AA identified potential for archaeological finds to occur. The Stage 2 AA was undertaken from June-September 2016. 16 sites containing archaeological materials were identified, including seven Pre-Contact findspots, eight Euro-Canadian findspots, and one multi-component findspot. Further investigation (i.e., a Stage 3 and/or Stage 4 Archaeological Assessment) was recommended for seven of the sites prior to development. MTCS provided their acceptance of the Stage 1 and 2 Archaeological Assessment on December 6, 2016.

7.1.2 Potential Effects

Construction activities at the Project Location have the potential to cause negative effects to archaeological resources by altering, disrupting and/or destroying items of cultural heritage value or interest.

7.1.3 Proposed Mitigation and/or Monitoring Plans

Based on the results of the *Stage 1 and 2 Archaeological Assessment*s, 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 Archaeological Assessment is recommended, the Stage 4 would recommend mitigation measures for the sites, which could include documentation and removal of artefacts.

No construction activities will take place in the vicinity of known archaeological finds until the assessments have been completed and clearance has been obtained from the MTCS. Should previously undocumented archaeological resource be discovered, alteration of the site will immediately cease, and additional fieldwork will be undertaken by a licensed archaeologist in accordance with Section 48(1) of the *Ontario Heritage Act.*

Should human remains be found, the police or regional coroner's office, the Registrar of Cemeteries and any applicable Aboriginal Communities will be contacted in accordance with the *Cemeteries Act.*

7.2 Cultural Heritage Resources

7.2.1 Existing Conditions

Archaeological Research Associates Ltd. was retained by the Proponent to complete a *Cultural Heritage Assessment* as required under *Ontario Regulation 359/09*.

The assessment included background research, consultation with appropriate agencies, and a windshield survey of potential cultural heritage resources within the study area. It is noted that the "Project Site Study Area" identified in the Cultural Heritage Assessment takes in a larger area than is associated with the Project Location. The assessment identified 87 Built Heritage Resources ("BHR"), and 5 Cultural Heritage Landscapes ("CHL"), and it was determined that they all have cultural heritage value or interest. The study did not identify any protected properties within the study area.

7.2.2 Potential Effects

Construction activities at the Project Location have the potential to cause negative effects on cultural heritage resources by altering, disrupting and/or destroying items of cultural heritage value or interest such as built features or cultural heritage landscapes, 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, or construction activities including pole and solar panel installation. Indirect impacts include, but are not limited to: alterations that are not compatible with the historic fabric and appearance of the area, the creation of shadows that alter the appearance of an identified heritage attribute, the isolation of a heritage attribute from its surrounding environment, the obstruction of significant views and vistas, and other less-tangible impacts (including changes in land use, and land disturbances).

7.2.3 Proposed Mitigation and/or Monitoring Plans

Based on the results of the *Cultural Heritage Assessment*, potential effects could be mitigated using the following measures:

- During demolition of a cultural heritage resource, it is recommended that the building be documented and material(s) be salvaged for reuse. Wood (i.e., siding, window frames, flooring) from the house and outbuildings that can be reused, should be offered to a local museum, municipality and/or to a salvage company. The materials in question require careful removal.
- Avoid construction of utility poles and/or other connection line infrastructure on either side or beneath identified built heritage resources.
- Consideration of connection line routing that proposes the least impacts on cultural heritage resources.
- Conducting construction activities outside of the zones of influence, as determined for specific resources within the *Construction Vibration Zone of Influence Study* to reduce impacts from construction-related vibrations, or conduct more detailed vibration analysis where the setback is not feasible.

- Buffer zones, site plan control, and other planning mechanisms can be discussed at the site plan stage to ensure any proposed development includes is refined to minimize risk. Where construction is proposed to take place within the zone of influence for vibration effects, construction engineers will determine if any mitigation measures should be implemented.
- Alterations to the resource or landscape should be reversible, and should have the ability to be returned to its original condition.
- During the installation of the connection lines and/or collection lines either above or below ground, any wood fencing (split rail, snake, boulder, etc.) should be avoided where possible. If fencing is damaged it should be rebuilt with the use of local knowledge/labour/materials.

Any changes in the project design should avoid identified BHRs and CHLs. Any such changes should be reviewed by a qualified heritage professional to determine if an addendum to the *Cultural Heritage Assessment* is required.

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

7.3 Natural Heritage Resources

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

7.3.1 Existing Conditions

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

- 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 (4 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[3] and located either within the Project Location or within 50 m of the Project Location:

- In addition to the four Provincially Significant Wetlands in the Project Location or surrounding 50 m, 32 unevaluated southern wetlands within 50 m of the Project Location were assumed to be provincially significant using the MNRF's Rapid Assessment to determine wetland characteristics and ecological functions.
- Eighteen woodland units were determined to be significant based on factors like size, interior habitat, and proximity to significant habitats.

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

- 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 Habitat(25 units)

For the purposes of the Project, these habitats will be treated as significant and the mitigation measures outlined in the *NHA Environmental Impact Study Report* will be implemented to minimize/avoid negative environmental effects.

[3] Significant refers to provincially significant, significant or assumed provincially significant for the purposes of the REA reporting.

The remaining candidate wildlife habitat was evaluated as not significant or no longer was located within the Project Location or surrounding 50 m once the Project Location was refined following the site investigation field work.

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

7.3.2 Potential Effects

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

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

- Soil mobilization resulting in sedimentation of adjacent habitat
- Change in surface water runoff volumes/ patterns
- Potential changes to water quality
- Potential changes to the local hydrological regime (groundwater)
- Reduction in habitat
- Damage to woodland/ wetland edge species through soil compaction and trenching where tree roots may occur
- Obstacle to wildlife movement after construction of perimeter security fence
- Disturbance/ incidental mortality to wildlife species from Project activities

A summary of the potential negative environmental effects is provided in **Table 4**.

7.3.3 Proposed Mitigation and/or Monitoring Plans

In consideration of the above potential environmental effects, mitigation measures have been proposed to address these effects and maintain the ecological integrity and functionality of significant natural features. For a complete review of the mitigation measures proposed for significant natural features, please refer to the *NHA Environmental Impact Study.* The following is a summary of the key mitigation and/ or monitoring measures:

- Installation of temporary or permanent fencing to direct wildlife away from construction areas
- Erosion and sediment control measures prior to site clearing and regularly maintained until the Project is operational and vegetative ground cover is re-established
- Develop a stormwater management plan which maintains pre-construction surface water flows to adjacent lands (quantity, quality, infiltrations, conveyance patterns and seasonality of water flow)
- Avoid construction (including clearing) activities during the breeding bird season to minimize impacts on breeding birds. Should clearing be required during the breeding bird season, nest searches conducted by a qualified person are to be completed 48 hours in advance of clearing. If nests are found, then work cannot occur within the timing window

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

The Project has been developed to retain the value of significant natural features identified and to mitigate any negative effects that will occur. The mitigation measures proposed will minimize or avoid impacts to natural features. For the natural features deemed significance, the layout of the Project will allow for the persistence of all these natural features in the general local landscape after this Project is constructed and operational. The MNRF provided a confirmation letter for the NHA on January 27, 2017.

7.4 Water Bodies

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

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

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

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

7.4.1 Existing Conditions

As outlined in Sections 30 and 31 of *Ontario Regulation 359/09*, a records review and site investigation were undertaken to fulfill the requirements of the *Water Assessment Report*. The records review identified seventeen potential water bodies mapped within the Project Location and the surrounding 120 m, including three potential lakes and 14 potential permanent or intermittent streams. The purpose of the site investigation was to confirm the presence of these water bodies. This resulted in confirmation of one lake, 13 permanent and/or intermittent streams, and five seepage areas that meet the definition of a water body under as per *Ontario Regulation 359/09*.

These water bodies and the results of the site investigation are 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/or Intermittent Streams***
  - Mud Creek was found to intersect the Project Location and also occurs within the 120 m area of assessment. The watercourse was found to be a permanent natural stream within an associated wetland complex.
  - Tributary 2 to Mud Creek was found to intersect the Project Location. The watercourse was found to be a natural intermittent stream.
  - Tributary 2.1 to Mud Creek was found to intersect the Project Location. The watercourse was observed to be a natural permanent stream.
  - Salmon River was found to intersect 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 is defined as a natural permanent stream.
  - Tributary 1 to the Salmon River was found to intersect the Project Location at a culvert location along a proposed connection line route along Teskey Road, approximately 45 m north of Bawn Road. The watercourse was found to be an intermittent stream.
  - Tributary 2 to the Salmon River was found to intersect the Project Location along a proposed connection line route on Edges Road, approximately 70 m north of Marlin Road. The watercourse was found to be a natural permanent stream.
  - Tributary 2.1 to the Salmon River was found to intersect the Project Location where there are proposed connection line routes in two locations, including where it crosses County Road 27 through a culvert approximately 670 m south of Marlin Road, and where it intersects the Project Location at County Road 27, approximately 210 m east of Teskey Road. The watercourse was found to have reaches that were dry and is therefore classified as an intermittent natural stream.
  - Tributary 2.2 to the Salmon River was found to intersect the Project Location where there is a proposed connection line route on Edges Road approximately 630 m north of Marlin Road, and occur within the 120 m area of assessment. The watercourse was found to be an intermittent stream.
  - Tributary 2.4 to the Salmon River falls within the 120 m area of assessment from a proposed connection line route northwest of the intersection of Edges Road and Marlin Road. The watercourse was found to be an intermittent stream.
  - Tributary 3 to the Salmon River was found to intersect the Project Location where there is a proposed connection line route on Haggerty Road, approximately 17 m east of Miller Road. The watercourse was found to be a natural intermittent stream associated with a nearby wetland.

- Tributary 3.1 to the Salmon River was found to intersect the Project Location approximately 30 m northeast of the intersection of Miller Road and Haggerty Road West. The watercourse was found to be a permanent natural stream associated with a wetland community.
- Black Creek was found to intersect 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. The Creek was found to be a natural permanent stream.
- Pennell's Creek was found to intersect the Project Location where there is a proposed connection line route on Miller Road, south of Howes Road. The Creek was found to be a natural permanent stream.

- ***Seepage Areas***
  - Seep 1 was estimated to occur within the 120 m area of assessment 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 area of assessment 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 area of assessment located 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.

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

7.4.2 Potential Effects

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

- changes in natural surface drainage;
- soil erosion and mobilization resulting in increased sedimentation, turbidity, and inputs of nutrients and/or contaminants in adjacent water bodies;
- changes to local hydrological regime;
- increased surface water runoff from overland dispersal of water resulting from soil compaction and/or dewatering activities (if required);
- isolated crossing of water bodies may create barrier to species movement;
- disturbance to seepage area pathway to surface;
- decrease in water quality; and,
- contamination of soil from accidental spills or from equipment and machinery.

7.4.3 Proposed Mitigation and/or Monitoring Plans

No PV panels and no transformers will be constructed, installed or expanded within 30 m of the average annual high water mark of a water body. Therefore, potential negative environmental effects to water bodies from the Project (outlined in **Table 4**) are considered to be indirect effects. None of the Project activities are expected to result in residual effects provided the appropriate mitigation measures are implemented. Mitigation measures proposed to minimize and/or eliminate negative environmental effects to water bodies within 120 m of the Project Location will be implemented during each phase of the Project, as required. Details regarding mitigation measures can be found in **Table 4** and the *Water Bodies Report*, and generally include:

- Appropriate grading techniques will be used to prevent increased run-off potential, and to maintain drainage.
- An Erosion and Sediment Control (ESC) plan will be developed for the site and appropriate ESC measures will be used as needed to prevent erosion and soil mobilization. Key ESC measures likely to be used to mitigate the potential negative effects include (but are not limited to):
  - Identifying and protecting vegetation not shown for removal within the construction area.
  - Maintaining existing riparian vegetation buffers around water bodies where possible. Where collector and/or collection line installation requires the removal of vegetation, efforts to maintain a vegetated buffer between the Project activities and the water body should be provided.
  - Installing silt fences (placed at the downslope side of proposed grading activities, proposed stockpile areas, and the site limits) and necessary erosion control measures prior to commencing construction activities.
- Maintaining existing riparian vegetation buffers around water bodies.
- The rate and timing of water pumping will be controlled. If possible, water takings will be restricted to less than 50,000 litres per day. Should water takings in excess of 50,000 L/day be required (i.e., 50,000 – 400,000 L/day), the Proponent will file the water taking on the Environmental Activity and Sector Registry ("EASR") in accordance with EASR requirements. Dewatering will not occur until the EASR application has been filed.
- Proper geotechnical assessment practices, drilling planning and execution to be followed.
- Equipment should not be operated within the limits of the water body/wetland area.
- Where possible for intermittent streams, conduct activities when the water body is dry.
- The construction area adjacent to sensitive features should be clearly delineated by sediment or erosion control fencing, or other similar boundary, to avoid impacting the adjacent feature(s).
- Avoid placing poles on meander belts, active floodplains or other unstable areas that may result in erosion or scouring of the stream bed.
- A Spill Prevention and Contingency Plan will be developed and spill response kits will be kept on site during installation.
- Operate machinery in locations that maximize distance from the water body, and that minimize disturbance to riparian areas.

- Construction equipment and materials will be primarily stored in temporary construction laydown area(s). No equipment or materials should be stored within 30 m of a water body.
- Following the construction phase and prior to vegetation establishment, areas of soil compaction will be rectified by methods such as scarification, etc.
- Utilize good management practices to reduce the transport of materials (e.g. soil, vegetation, etc.) off site. This may include installing construction entrance features such as mud mats at vehicle access points adjacent to paved roads or as otherwise agreed to with the municipality.
- Re-vegetate disturbed areas in the Project Location following the construction phase, as necessary.

7.5 Stormwater Management

7.5.1 Existing Conditions

The Project Location is primarily used for agricultural purposes with some areas being natural land cover types, including small forested areas and wetland areas. The topography of the land is generally flat with some rolling hills. Large formal stormwater management controls are not present at the Project Location.

7.5.2 Potential Effects

The construction phase of the Project has the potential for significant changes to stormwater runoff quality and quantity. Construction activities such as clearing and grading the site and installing of electrical equipment have the potential for the greatest impact, and typically include:

- Increased sediment levels in stormwater runoff due to increased weathering and erosion of exposed soils.
- Increased pollutant levels in stormwater runoff from construction materials and equipment.
- Increase in stormwater discharge (i.e., volume and flow rate) due to changes in grading and/or ground cover.

The effects of these impacts during construction of the Loyalist Solar Project include:

- Impairment of water quality and on natural environment habitat of receiving waters due to discharge of sediment or pollutant laden runoff from the Project Location.
- Potential damage to downstream properties or sensitive natural features due to increased volumes of stormwater discharging from the Project Location.

7.5.3 Proposed Mitigation and/or Monitoring Plans

The following mitigation and/or monitoring measures represent good practices to address the potential effects to stormwater during construction. These mitigation measures will be formalized in the detailed design Stormwater Management Plan and erosion and sediment control plan to be completed prior to construction.

They will include recommended mitigation from the NHA and *Water Body Report*, as applicable.

- Construction phasing will occur, where possible, to limit areas with exposed soils and duration of exposure.
- Appropriate grading techniques will be used to prevent increased runoff potential and maintain desired drainage patterns.
- Where appropriate, grasses will be planted on disturbed areas after construction activities have ceased (e.g. construction laydown area).
- Silt fencing will be installed around areas with stockpiled soils and these areas will be located a safe distance from sensitive natural features, as determined by the *Natural Heritage Assessment* (see NHA Reports).
- Temporary stormwater management measures will be maintained and monitored on a regular basis during construction to ensure they are functioning properly.
- Erosion and sediment control measures (e.g., silt fences, hay bales, etc.) will be monitored regularly and after rain events of 10 mm or greater, and maintained until a vigorous growth is established in the vegetated areas.

The Proponent will complete a stormwater management ("SWM") and ESC plan and report to outline the appropriate measures to be put in place during construction. The SWM and ESC plan will be completed once the final design, site layout, construction phasing and construction methodology have been developed. It is anticipated that this Stormwater Management Plan will be a condition of the REA to be issued by the MOECC. The Stormwater Management Plan will include an analysis of pre-development and post-development flows and will identify the appropriate mitigation measures to manage stormwater runoff during construction.

7.6 Groundwater

7.6.1 Existing Conditions

The Project is located in the Napanee Plain physiographic unit characterized by a flat to slightly undulating plain, reflecting the underlying limestone bedrock. The area consists of extensive limestone plain with little to no overburden. Hydrogeological investigations indicate a relatively impermeable underlying bedrock layer. Groundwater movement through the limestone bedrock is slow resulting in a high water table in the study area. More rapid movement of water is interpreted to occur in the network of shallow fractures observed at the bedrock surface. This movement likely occurs in the upper metre of the bedrock.

7.6.2 Potential Effects

During construction, impacts may occur as a result of accidental fuel spillage/releases from equipment, stormwater run-off, sedimentation, minor waste generation, and foundation supports for PV panels.

7.6.3 Proposed mitigation and/or Monitoring Plans

Through the implementation of mitigation measures, the risk of impact will be minimized. Mitigation measures include:

- Spill containment around the substation area
- A Spill Prevention and Contingency Plan to be in place prior to the start of construction
- Erosion and sediment control measures (e.g., silt fencing)

7.7 Air, Odour and Dust

7.7.1 Existing Conditions

Based on site investigation, the majority of the Project Location for the Project is zoned as rural. Farming equipment such as tillage and harvesting equipment have the potential to create odour and dust during the planting and harvesting seasons. There is a municipally-owned aggregate pit adjacent to the Project Location (west of Lockridge Road and north of Centreville Road). Operation activities at this facility may have the potential to create odour and dust.

7.7.2 Potential Effects

During construction, increases in particulate matter (dust) may be experienced in the adjacent areas. Activities that could produce higher levels of dust include, but are not limited to: construction of access roads; travel of construction vehicles and equipment over gravel roads; clearing and grubbing; grading and levelling; and drilling and rock cutting.

Additionally, there will be emissions from the diesel engines of construction machinery and equipment which may adversely impact local air quality and odour. The impacts may be localized and temporary and will not have a significant impact on regional air quality or climate change.

7.7.3 Proposed Mitigation and/or Monitoring Plans

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

- Vehicle idling will be prohibited where possible in order to minimize particulate matter from vehicles and equipment.
- Equipment will be maintained in good working order.
- Vehicular traffic will be minimized on exposed soils and high traffic areas will be stabilized with fresh gravel.
- Dust mitigation measures (e.g., light watering) will be implemented on gravel roads during construction.

7.8 Noise

7.8.1 Existing Conditions

Noise levels within the Township of Stone Mills are governed by Bylaw 98-56. The bylaw stipulates that noise as a result of operation of any equipment in connection with construction will not be permitted within the hours of 8PM and 7AM, and 24 hours on Sundays.

7.8.2 Potential Effects

During the construction period, activities may lead to elevated levels of noise in the area. Activities that could produce higher levels of noise include, but are not limited to: clearing and grubbing of trees; compacting and grading; rock drilling and cutting, installation of foundation piles, and operation of construction vehicles. These activities are expected to occur in a staggered manner throughout the construction period.

7.8.3 Proposed Mitigation and/or Monitoring Plans

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

- Vehicle and equipment idling will be limited where possible.
- Construction activities resulting in noise emissions will take place in accordance with local municipal By-laws unless an exemption has been authorized.
- Where work may need to be conducted after the normal hours or on weekends, this will be done in accordance with local municipal requirements in order to minimize any impacts to the surrounding community.
- All equipment will be maintained in good working order with required muffling devices.

7.9 Land Use and Resources

7.9.1 Existing Conditions

The proposed solar facility will be located on lands zoned by the Township of Stone Mills as Rural. The Official Plan for the Township of Stone Mills designates the Project Location as rural, with lands within 300 m designated as rural and some as provincially significant wetlands. The upper-tier municipality (County of Lennox & Addington) designates the Project Location as rural area, with lands within 300 m designated as rural. None of the lands within the project location are zoned or designated as Prime Agricultural. **Figure 4** depicts the land uses in the Project Location and within 300 m based on information from multiple sources including Ecological Land Classification surveys, and Canada Land Inventory mapping and Official Plans. Lands are currently used for agricultural purposes or are undeveloped.

7.9.2 Potential Effects

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

7.9.3 Proposed Mitigation and/or Monitoring Plans

The temporary use of the land for the solar facility will not impact future uses of the land, or current operations of adjacent lands. Lands will be restored to their pre-construction condition, or a similar state at the time of decommissioning and adjacent lands have the ability to continue to be used for existing practices. Mitigation measures to be implemented during and after construction will include implementation of an erosion and sediment control ("ESC") plan, avoidance of major excavation works or fill placement, and grading techniques to meet pre-existing drainage conditions. Where appropriate, vegetation will be grown beneath and between the PV panel rows to stabilize soils. Mitigation measures to address temporary changes in land use include landscaping to reduce visual impact.

7.10 Provincial and Local Infrastructure

Municipal roads will be required during construction to facilitate deliveries of materials, and access to the site for construction workforce. The municipal water supply may be accessed during construction for dust suppression or other uses as needed.

7.10.1 Existing Conditions

Existing municipal roads in the vicinity of the Project Location may be required for use during the construction phase of the Project. This may include paved roads (such as Frizzell Road, Miller Road, County Road 41, County Road 14, County Road 3, and County Road 27, Sharpe's Corner Road), and gravel roads (such as Craigen Road, Hinch Road, Centreville Road, Rattie Road, Road, Teskey Road, Lockridge Road, Murphy Road). Road Use Agreements will be in place with the Township of Stone Mills and Lennox & Addington County, as required, prior to the start of construction.

Municipal water mains are located throughout the Township. Connection into the municipal water supply will be discussed with the municipality prior to construction.

7.10.2 Potential Effects

Existing roads in the vicinity of the Project Location may be required for use during the construction phase of the Project and may experience additional wear from heavy construction loads. Road damage will be repaired by the Proponent based on terms set out in the Road Use Agreement(s) to be established between the Proponent and the Township of Stone Mills and Lennox & Addington County. Periodic traffic disruptions are possible along the aforementioned roads, and some local roads.

Municipal water supply is not anticipated to be required for construction of the solar facility. It is not anticipated that a disruption to service will be required to connect a water service. No adverse effects are anticipated due to connection of a service to the municipal water supply.

7.10.3 Proposed Mitigation and/or Monitoring Plans

Mitigation measures to minimize disruption and impacts to roads will be identified during development of a Traffic Management Plan. The Traffic Management Plan will outline the haul routes for construction materials and will consider the load limits on local roads in the area of the Project Location. Road damage will be addressed through the Road Use Agreements to be established between the Proponent and the Township of Stone Mills and Lennox & Addington County. Permission to connect to the water supply will be obtained from the municipality prior to construction.

7.11 Public Health and Safety

7.11.1 Existing Conditions

The Project Location lands for the Loyalist Solar Project are zoned as rural. This land use poses minimal risk to public health and safety.

7.11.2 Potential Effects

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

- excessive noise, vibration, equipment emissions and dust can be attributed to human health impacts
- injury or death of construction workers or members of the public due to accidents involving equipment and construction vehicles; or
- electrical or brush fires at the Project Location causing a risk to personnel and neighbouring properties

It should be noted that there is potential for wildfires or fires at the Project Location. The solar PV panels and related equipment represent a negligible increase in fire potential, however construction activities (including operation of construction equipment, usage of fuel sources, and installation of electrical components) and the proximity of vegetation represent an increase to the risk.

7.11.3 Proposed Mitigation and/or Monitoring Plans

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

- All construction activities will be conducted by licensed on-site contractors in accordance with required standards and codes and all activities will abide by all applicable regulations.
- All equipment will be maintained in good working order.

- The Project will comply with all applicable *Ontario Occupational Health and Safety Act* ("OHS") regulations and requirements during the construction period.
- It will be the on-site contractor's responsibility to prepare site-specific Health and Safety procedures.
- During construction, the site security measures will be in place to discourage unauthorized access. Areas to be avoided will be flagged and/or fenced for public safety, as appropriate.
- Smoking will be prohibited except in designated areas.
- Fire safety equipment (including fire extinguishers) will be available on site and stored in designated construction vehicles and site trailers as appropriate.
- Spill prevention and containment measures will be implemented to avoid impacts to groundwater and transfer of deleterious fluids to sensitive natural features. Fluids such as fuel, coolant, lubricants, hydraulic fluid, etc. will be stored more than 30 m from water bodies. Spill containment measures will be stored on site.
- The Proponent will work with the Township of Stone Mills fire department to develop an emergency response plan for the Project that includes the construction phase. This plan will be outlined in the ERCPs.
- ERCPs will be prepared in the event of an emergency on the site and will provide key contact information for relevant responders, regulators, landowners and other stakeholders. This plan is discussed in the *Design and Operations Report.*

7.12 Areas Protected under Provincial Plans and Policies

7.12.1 Existing Conditions

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

7.12.2 Potential Effects

As the Project is not within any areas subject to Provincial Land Use Plans, no impact to protected areas will occur.

7.12.3 Proposed Mitigation and/or Monitoring Plans

As the Project is not within any areas subject to Provincial Land Use Plans, no mitigation measures or monitoring plans are required.

7.13 Summary of Potential Environmental Effects

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

Table 4: Summary of Potential Environmental Effects During Construction

Affected Feature(s) or Environmental Component	Potential Effect	Magnitude	Likelihood	Performance Objective	Summary of Mitigation Measures	Monitoring[4]		Contingency Measures
						Monitoring Location	Frequency and Duration	
Cultural Heritage and Archaeological Resources								
Cultural heritage resources. Archaeological resources.	Disruption or destruction of cultural or archaeological materials.	Low	Low	Minimize impacts to cultural heritage resources Minimize impacts to archaeological resources	Mitigation for archaeological resources will be implemented as outlined by the Stage 2, 3 and Stage 4 Archaeological Assessments and Cultural Heritage Assessment. Avoidance or implementation of buffers where construction is to be located close to cultural heritage resources. Conduct further analysis of vibration-related impacts where buffers are not feasible. No construction activities will take place in the vicinity of known archaeological finds until the assessments have been completed and clearance has been obtained from the MTCS.	N/A	N/A	Should a previously undocumented archaeological resource be discovered, alteration of the site will immediately cease, and additional fieldwork will be undertaken by a licensed archaeologist in accordance with Section 48(1) of the *Ontario Heritage Act.* Should human remains be found, the police or regional coroner's office, the Registrar of Cemeteries and any applicable Aboriginal Communities will be contacted in accordance with the *Cemeteries Act.*
Natural Heritage Features								
(Assumed) Provincially Significant Wetlands Significant Woodlands (Treated as) Significant Waterfowl Stopover and Staging Areas~ (Treated as) Significant Turtle Overwintering Area (Treated as) Significant Reptile Hibernaculum (Treated as) Significant Colonially Nesting Bird Breeding Habitat (Trees & Shrubs) Significant Other Rare Vegetation Communities Significant Carolina Whitlow-	**Physical Effects** Alteration of wetland vegetation composition Permanent removal or degradation of woodland and/or wildlife habitat area Mortality of wildlife species moving across Project area due to increased traffic volumes during construction. Mortality of avian species due to collision with overhead connection lines. **Functional Effects** Change in surface water/drainage run-off volumes and patterns to wetlands and associated wildlife habitat.	Low	Moderate	Persistence of significant natural features Significant wildlife habitat will continue to meet the criteria for significance post-construction. General connectivity between woodlands maintained at a local landscape level	Cleared lands to be vegetated as soon as practical following construction activities. Setbacks • Setbacks between significant woodlands and the project perimeter fence, collector and collection line poles to follow ISA Arborist standards. • A minimum 5 m setback to be applied to significant wildlife habitat and wetland areas adjacent to the Project Location where PV panels and/or the Project substation is located. Erosion and Sediment Control (ESC) Minimize soil exposure. Install erosion and sediment control measures based on final Project ESC Plan prior to vegetation clearing, grubbing and grading to prevent mobilization of sediment and other contaminants from the Project location into the surrounding landscape. Restrict vegetation clearing to lands within Project Location identified for development.	ESC measures to be monitored where implemented according to the ESC plan. Wildlife monitoring to occur where fencing to exclude wildlife has been installed near significant wildlife habitat. Monitor for surface water quality at locations identified in the SWM Plan and/or REA issued by the MOECC.	Monitor ESC measures regularly during construction. ESC monitoring to occur monthly or after rain events 10 mm or greater (within 24 hrs) until vegetation is re-established. Wildlife monitoring to determine if species present in construction disturbance area(s) to occur on an ongoing basis throughout the construction phase.	Repair deficiencies in ESC structures as soon as possible upon notification of breach in ESC structure and/or insufficient measures based on site conditions. Repair deficiencies in wildlife exclusion fencing within 24 hours of notification of breach. If performance objectives are not achieved following the first year of post-construction monitoring and significant wildlife habitat is not re-evaluated as significant, the MNRF will be made aware of the monitoring results and an additional year of post-construction monitoring will occur. The maximum length of time for post-construction monitoring will not exceed three years. If turtles are found to nest in those areas of access road external to the perimeter fence, a qualified biologist will be consulted and efforts to increase nesting success implemented. These efforts will be at the discretion of the qualified biologist and

[4] Please refer to the *Natural Heritage Assessment Environmental Impact Study* for additional monitoring information for natural features and to the *Water Bodies Report* for additional monitoring information for water bodies.

Affected Feature(s) or Environmental Component	Potential Effect	Magnitude	Likelihood	Performance Objective	Summary of Mitigation Measures	Monitoring[4]		Contingency Measures
						Monitoring Location	Frequency and Duration	
Grass Habitat (Treated as) Significant Waterfowl Nesting Area (Treated as) Significant Turtle Nesting Area (Treated as) Significant Amphibian Breeding Habitat (Woodland) Significant Woodland Area-Sensitive Bird Breeding Habitat (Treated as) Significant Terrestrial Crayfish Habitat Significant Common Nighthawk Habitat Significant Red-headed Woodpecker Habitat Significant Eastern Wood Pewee Habitat Significant Wood Thrush Habitat Significant Yellow Pond Lily Habitat (Treated as) Significant Juniper Hairstreak Habitat Generalized Candidate Significant Wildlife Habitat	Compaction of ground near treed vegetation root zone Potential changes to water quality. Reduction in quality of habitat. Potential loss of linear treed connectivity between woodlands.				<u>Stormwater Management</u> Develop and implement a Stormwater Management Plan to ensure drainage patterns are not significantly altered from existing conditions due to road drainage, reduction in surface permeability, etc. Hydrogeological work to be completed to verify that no significant changes to groundwater characteristics are anticipated as a result of the Project. A plan to address/mitigate soil compaction throughout the Project location to be developed as part of the detailed design to promote infiltration where applicable <u>Vegetation/ Habitat Considerations</u> Woodland removal and/or removal of sensitive natural features to be minimized if possible during detail design. Snags and trees with quality wildlife cavities are to be removed following dusk and before dawn if during the bat active season (generally March to November), or anytime during the winter hibernation period for bat species. Where snags and trees with quality wildlife cavities are removed, an equal number of bat boxes will be installed in similar habitat in the general area of the Project. Installation of connection line overhead poles to avoid areas of sensitive natural features such as potential reptile hibernacula entry/exit points and wetlands or vernal pools with standing water during the amphibian breeding season. To compensate for the loss of 0.65 ha of a Rare Vegetation Community (ALV21), removal of invasive species identified within the portion of the community located to the north of the Project Location or other areas identified will be undertaken. Actions taken may also include periodic thinning of woody vegetation cover to maintain an open alvar environment. Where possible, alvar indicator plants will be collected during an appropriate time of year and transplanted out of the Project Location and into an appropriate recipient site that has been carefully selected and prepared to receive the transplanted species. For installation of collector/collection lines by directional boring/drill, follow proper geotechnical assessment practices, drilling planning and execution. Time drilling activities to occur outside of sensitive timing windows as determined through consultation with the MNRF following	Monitoring for potential turtle nesting along access roads external to perimeter fencing to the intersection with municipal roads if construction of roads occurs during nesting season. Post-Construction Monitoring locations for significant natural features in the same location as pre-construction surveys where significant wildlife habitat is wholly or partially retained following construction. Monitoring of transplanted alvar species to occur in the target recipient sites. Monitoring of invasive species removal in area ALV21 located outside of the Project Location. Monitoring for frac-out to occur in wetland and/or water body locations being drilled under.	Monitor for surface water quality at a frequency and duration identified in the SWM Plan and/or REA issued by the MOECC. During construction, visual surveys for turtle nesting to occur for approximately 3 weeks between late May and early July between 7 pm and 10 pm. Frequency during this time period will be subject to weather conditions One year of post-construction monitoring for significant wildlife habitat that is wholly or partially retained following construction (see Section 13 for which wildlife habitat is subject to post-construction monitoring). Monitoring to document establishment success of transplanted alvar plant species and removal of invasive species in areas of ALV21 for a minimum period of three years following transplantation/ removal activities.	may include barriers placed over known nests to discourage predation or removal of eggs for incubation by a qualified organization. Once the nest is vacated, alternative mitigation options will be explored to discourage further nesting in consultation with the MNRF. If frac-out occurs, re-evaluate drilling pathway and assess feasibility of alternative installation methods (where available).

Affected Feature(s) or Environmental Component	Potential Effect	Magnitude	Likelihood	Performance Objective	Summary of Mitigation Measures	Monitoring[4]		Contingency Measures
						Monitoring Location	Frequency and Duration	
Natural Heritage Features (continued)					approval of the REA. Design the drill path to an appropriate depth below the water body/wetland to minimize the risk of frac-out. Develop an emergency frac-out response plan prior to undertaking direction boring activities. Should frac-out occur, the extent can be limited by careful monitoring during the boring activities and having appropriate response equipment available on-site and ready for use. Monitor the wetland and associated water body to observe signs of surface migration (frac-out) of drilling mud during boring activities. <u>Wildlife Considerations</u> The construction workforce will be educated on local wildlife that may be encountered on the Project Location at the time of site orientation. Included in the orientation will be instructions for how to identify and avoid wildlife that may be encountered. A protocol will be provided to contractors to follow in the event wildlife in encountered. This protocol will include specific measures for dealing with turtles, breeding birds and other wildlife. Wildlife located within the Project Location will be relocated to an area outside the Project Location (and into an area of appropriate habitat) as necessary. This will be completed by a professional trained in the safe handling of wildlife. Vehicle speeds restricted to 15 km/hr or less when travelling within the Project Location where PV panels and the substation are proposed. Utilize fencing (e.g., Perimeter fencing and/or silt fencing) to deter wildlife from entering the construction site during construction and decommissioning. In the vicinity of the Project Location (e.g. sections of Rattie Road, Hinch Road and Centreville Road) where traffic volumes exceed normal volumes due to construction activities, exclusion fencing shall be installed adjacent to natural habitats and wetlands areas to minimize road mortality of wildlife. Signage will be installed beyond the extents of the exclusion fencing to warn construction traffic of the potential for wildlife to be crossing the road and to indicate a speed limit of 20 km/hr. An environmental monitor shall regularly inspect the exclusion fencing to ensure it is properly installed (keyed-in) and to observe for wildlife that may be attempting to travel		Monitoring for frac-out to occur during drilling operations.	

Affected Feature(s) or Environmental Component	Potential Effect	Magnitude	Likelihood	Performance Objective	Summary of Mitigation Measures	Monitoring[4]		Contingency Measures
						Monitoring Location	Frequency and Duration	
Natural Heritage Features (continued)					around the ends of the fencing, An environmental monitor or designated personnel will monitor construction traffic speed and have the authority to direct, slow or halt construction traffic accordingly to protect against road mortality. The perimeter fencing is to have contact with the ground surface to prevent entry of wildlife. Where it is not feasible for the fence to contact the ground, other measures will be installed to prevent wildlife access under the fence. During the construction phase, in areas appropriate to protect hatchling turtles, the spacing in the chain link should be of sufficient size to prevent entry from the ground surface to a height of approximately 0.5 m. Where feasible, the perimeter fencing is to be constructed outside of the turtle active season (i.e., March- May to avoid turtles emerging from wintering habitats; May-June for nesting; September-October window to avoid turtles moving to wintering habitat). Where it is not feasible to construct perimeter fencing in its entirety during the turtle overwintering period, fencing to be temporarily supplemented with silt fencing to act as a barrier/exclusionary measure. Minimize impacts to breeding birds (from April 1 to September 15; March 15 to September 15 for areas where waterfowl nesting may occur) by clearing naturalized vegetation outside of the breeding bird season. Should clearing be required during the breeding bird season, nest searches conducted by a qualified person must be completed 48 hours prior to clearing activities. If nests are found, works within 10 m will cease until nest has fledged. If no nests are present, clearing can occur. Prohibitions under the federal *Migratory Bird Convention Act* are to be complied with. Construction vehicle speeds to be restricted to 20 km/hr on municipal roads adjacent to where wildlife exclusion fencing has been installed (as described in this table). Minimize construction traffic during nighttime hours. Vehicle speeds to be restricted to 15 km/hr or less on the Project site and speed limit signage posted Access roads located outside of the perimeter fence are to be designed to discourage turtle nesting (e.g. use of hardeners, at-grade access roads on bedrock, etc.).			

Affected Feature(s) or Environmental Component	Potential Effect	Magnitude	Likelihood	Performance Objective	Summary of Mitigation Measures	Monitoring[4]		Contingency Measures
						Monitoring Location	Frequency and Duration	
					Overhead connection lines and supporting poles to include mitigation measures for reducing collision mortality such as line marking in areas of known high bird activity and if a connection line is installed in the Lockridge Road unopened road allowance. Cleared lands to be vegetated as soon as practical following construction activities.			
Water Bodies								
• Mud Creek • Pennell's Creek • Seepage Area 5	Vegetation clearing and/or grading may cause changes in natural surface drainage. This may include redirection of surface flow and/or increased or decreased surface runoff, which may cause increased or decreased stream flows.	Low	Low	Maintenance of pre-existing surface drainage.	Appropriate grading techniques will be used to prevent increased run-off potential, and to maintain positive drainage. Changes to land contours will be minimized; physical land alterations (*i.e.*, grading, cut and fill, etc.) required will be designed to remain consistent with the pre-existing drainage patterns.	Throughout construction areas.	Checks to occur monthly and/or after rain events greater than 10 mm until grading is complete.	Grading techniques will be adjusted to meet pre-existing drainage outlined in construction design plans.
• Mud Creek • Tributary 2 to Mud Creek • Tributary 2.1 to Mud Creek • Salmon River • Tributary 1 to Salmon River • Tributary 2 to Salmon River • Tributary 2.1 to Salmon River • Tributary 2.2 to Salmon River • Tributary 3 to Salmon River • Tributary 3.1 to Salmon River • Black Creek • Pennell's Creek • Seepage Areas 1,2,3,5	Vegetation clearing and/or grading may cause soil erosion and mobilization. This may result in increased sedimentation, turbidity and inputs of nutrients and/or contaminants in adjacent water bodies, which may affect fish habitat (*e.g.*, spawning areas, food sources, benthic composition).	Low	Low	Minimize surface runoff and soil mobilization to receiving water bodies.	Mitigation measures from the ESC plan will be implemented, including: • Identifying and protecting trees and plants not shown for removal that are contained within the construction area. • Maintaining existing riparian vegetation buffers around water bodies. • Installing silt fences (placed at the downslope side of proposed grading activities, proposed stockpile areas, and the site limits) and necessary erosion control measures prior to commencing construction activities. • Re-vegetation of disturbed areas after construction has been completed (either through natural re-growth or planting, as necessary).	At areas where ESC measures are constructed.	Checks to occur monthly and/or after rain events greater than 10 mm until vegetative cover is established.	Breaches to ESC measures will be repaired within 24 hours of identification.

Affected Feature(s) or Environmental Component	Potential Effect	Magnitude	Likelihood	Performance Objective	Summary of Mitigation Measures	Monitoring[4]		Contingency Measures
						Monitoring Location	Frequency and Duration	
• Mud Creek • Seepage Area 5	Construction of access roads and soil compaction from use of equipment in Project Location may cause decreased surface permeability, redirection of runoff, and/or soil erosion and mobilization. This may result in increased sedimentation, turbidity and inputs of nutrients and/or contaminants into adjacent water bodies, potentially impacting water quality and fish habitat (*e.g.*, spawning areas, food sources, benthic composition).	Low	Low	Maintenance of surface infiltration and minimization of surface runoff and soil mobilization to receiving water bodies.	Access roads will be designed to promote infiltration. Mitigation measures from the ESC plan implemented to include: • Maintaining existing riparian vegetation buffers around water bodies where possible. • Installing silt fences (placed at the downslope side of proposed grading activities, proposed stockpile areas, and the site limits) and necessary erosion control measures prior to commencing construction activities. • Reduce soil compaction by scarifying land (or by other appropriate means) following the construction phase. • Re-vegetation of disturbed areas after construction has been completed (either through natural re-growth or planting, as necessary).	At access roads and areas where ESC measures are constructed.	Checks to occur monthly and/or after rain events greater than 10 mm until vegetative cover is established.	Breaches to ESC controls will be repaired within 24 hours of notification.
• Mud Creek • Pennell's Creek • Seepage Area 5	Temporary water takings during installation of underground Project components may affect local hydrological regime (groundwater). The overland dispersal of water during temporary water takings may increase surface runoff and increase erosion and sedimentation to adjacent water bodies.	Low	Low	Minimization of impacts to hydrological regime. Maintenance of surface runoff volume.	• The rate and timing of water pumping will be controlled. Water will be pumped onto vegetated surfaces if possible or into a filter bag or temporary retention basin. Pumped water is to re-infiltrate the ground without causing increased run-off or significant changes to local hydrological regime. If possible, water takings will be restricted to less than 50,000 litres per day. Should water takings in excess of 50,000 L/day be required (i.e., 50,000 – 400,000 L/day), the Proponent will file the water taking on the EASR in accordance with EASR requirements. Dewatering will not occur until the EASR application has been filed. ESC measures will be implemented and monitored according to the Project ESC plan	Where installation of Project component(s) requires temporary water takings.	Once during construction/during installation of Project components.	If temporary water takings cause increased soil mobilization or surface run-off in areas of exposed soil, temporary water taking activities will be stopped until additional ESC measures can be implemented. If water taking needs to exceed 50,000 L/day, the MOECC will be consulted for appropriate approvals (i.e., filing the activity on the EASR).
• Water Body 1 • Mud Creek • Tributary 2 to Mud Creek • Tributary 2.1 to Mud Creek • Salmon River • Tributary 1 to Salmon River • Tributary 2 to Salmon River • Tributary 2.1 to Salmon River	The installation of overhead collector/collection line(s) may cause contamination of soil by spills from equipment and machinery, and may cause increased erosion, sedimentation, and/or turbidity in the water body.	Low	Low	• Ensure equipment and materials are stored more than 30 m from the water body • Minimize mobilization of sediment in riparian areas.	• Avoid placing poles on meander belts, active floodplains or other unstable areas that may result in erosion or scouring of the stream bed. Locate poles above the high water mark where possible. • Design construction approaches to be perpendicular to water bodies to minimize disturbance. • A Spill Prevention and Contingency Plan and spill response kits are to be developed and kept on site during installation. • In accordance with the ESC plan, install effective sediment and erosion control measures to reduce the potential for entry of sediment into the water body.	Riparian areas around water bodies that are crossed by overhead collector/ connection lines	• Regularly, during installation of overhead line. • Once following installation and re-vegetation measures.	If mobilization of sediment is insufficiently controlled, additional ESC measures (e.g. more silt fencing) will be installed. ESC measures will be implemented and maintained until vegetation is observed to be established and thriving.

Affected Feature(s) or Environmental Component	Potential Effect	Magnitude	Likelihood	Performance Objective	Summary of Mitigation Measures	Monitoring[4]		Contingency Measures
						Monitoring Location	Frequency and Duration	
• Tributary 2.2 to Salmon River • Tributary 3 to Salmon River • Tributary 3.1 to Salmon River • Black Creek • Pennell's Creek • Seepage Areas 1,2,3	These effects may be caused from movement of equipment, machinery and personnel on-site leading to vegetation damage and/or loss, soil compaction and increased surface water run-off into riparian areas. *Note: The environmental effects and mitigation measures have been provided for various options of constructing the collector and connection lines. The method of installation will be determined during detailed design.*			Ensure re-establishment of riparian vegetation to pre-disturbance conditions in disturbed areas following installation.	• Operate machinery in locations that maximize distance from the water body, and that minimize disturbance to riparian areas. • Construction equipment and materials will be primarily stored in temporary construction laydown area(s). No equipment or materials are to be stored within 30 m of a water body. • Following the construction phase and prior to vegetation establishment, areas of soil compaction will be rectified by methods such as scarification, etc. • Minimize loss of vegetative cover to the extent possible. Area(s) of vegetation damage and/or loss will be re-vegetated to reduce erosion potential. Although Fisheries and Oceans Operational Statement for Overhead Line Construction (DFO 2007a) is no longer in circulation following changes to the federal *Fisheries Act*, the measures to protect fish and fish habitat when constructing overhead lines outlined in this document should be consulted.			
• Mud Creek • Tributary 2 to Mud Creek • Tributary 2.1 to Mud Creek • Salmon River • Tributary 1 to Salmon River • Tributary 2 to Salmon River • Tributary 2.1 to Salmon River • Tributary 2.2 to Salmon River • Tributary 3 to Salmon River • Tributary 3.1 to Salmon River • Black Creek • Pennell's Creek • Seepage Areas 1,2,3	The installation of underground collector/collection line(s) via isolated or dry open-cut water body crossing may cause barriers to species movement, contamination of soil by spills from equipment and machinery, and may cause increased erosion, sedimentation, and/or turbidity in the water body. These effects may be caused from movement of equipment, machinery and personnel on-site leading to vegetation damage and/or loss, soil compaction and increased surface water run-off into riparian areas. *Note: The environmental effects and mitigation measures have been provided for various options of constructing the collector and connection lines. The method of installation will be determined during detailed design.*	Low	Low	• Ensure equipment and materials are stored more than 30 m from the water body • Minimize mobilization of sediment in riparian areas. • Ensure re-establishment of water body banks and riparian vegetation to pre-disturbance conditions in disturbed areas following installation.	• Where possible for intermittent streams, conduct activities when the water body is dry. • Minimize duration of in-stream work and time crossings to prevent sensitive life fish stages (fish timing windows). • Use portable dams, pea gravel bags, concrete blocks, steel or wood walls, clean rock, sheet pile or other appropriate designs to separate the dewatered work site from flowing water. • Before dewatering, rescue any fish from within the isolate and release them downstream. • Divert water around the isolate area to maintain natural downstream flows and prevent upstream ponding. • Avoid construction during wet, rainy or winter thaw conditions where possible. • The construction area adjacent to sensitive features should be clearly delineated by sediment or erosion control fencing, or other similar boundary, to avoid impacting the adjacent feature(s). • Restore and stabilize the streambed, substrate and banks to their original shape and condition. Although Fisheries and Oceans Operational Statement for Isolated or Dry Open-cut Stream Crossings (DFO 2008) is no longer in circulation following changes to the federal *Fisheries Act*, the measures to protect fish and fish habitat when carrying out an isolated or dry open-cut stream crossing outlined in this document should be consulted.	Riparian areas around water bodies that are crossed by underground connection/collector lines	• Regularly, during installation of underground line. • Once, following installation and re-vegetation measures.	If mobilization of sediment is insufficiently controlled, additional ESC measures (e.g. more silt fencing) will be installed. ESC measures will be implemented and maintained until vegetation is observed to be established and thriving. If required, additional bank restoration is to be completed if water body channel not restored to pre-construction condition.

Affected Feature(s) or Environmental Component	Potential Effect	Magnitude	Likelihood	Performance Objective	Summary of Mitigation Measures	Monitoring[4]		Contingency Measures
						Monitoring Location	Frequency and Duration	
• Mud Creek • Tributary 2 to Mud Creek • Tributary 2.1 to Mud Creek • Salmon River • Tributary 1 to Salmon River • Tributary 2 to Salmon River • Tributary 2.1 to Salmon River • Tributary 2.2 to Salmon River • Tributary 3 to Salmon River • Tributary 3.1 to Salmon River • Black Creek • Pennell's Creek • Seepage Areas 1,2,3	The installation of underground collector/collection line(s) via directional boring (also termed HDD) may cause contamination of soil by spills from equipment and machinery, and may cause increased contamination, erosion, sedimentation, and/or turbidity in the water body. These effects may be caused from movement of equipment, machinery and personnel on-site leading to vegetation damage and/or loss, soil compaction and increased surface water run-off into riparian areas. Directional boring also has the potential for frac-outs. *Note: The environmental effects and mitigation measures have been provided for various options of constructing the collector and connection lines. The method of installation will be determined during detailed design.*	Low	Low	No observable effects from directional boring observed in water body	• Maintaining existing riparian vegetation buffers around water bodies. The boring entry and exit points are to be far enough from the water body/wetland to have minimal impact. • Proper geotechnical assessment practices, drilling planning and execution to be followed. Design the drill path to an appropriate depth below the water body/wetland to minimize the risk of frac-out. Develop an emergency frac-out response plan prior to undertaking direction boring activities. • Equipment should not be operated within the limits of the water body/wetland area. • Extent of a frac-out can be limited by careful monitoring during the boring activities and having appropriate response equipment available on-site and ready for use. Monitor the water body/wetland to observe signs of surface migration (frac-out) of drilling mud during boring activities. Although Fisheries and Oceans Operational Statement for High-Pressure Directional Drilling (DFO 2007b) is no longer in circulation following changes to the federal *Fisheries Act*, the measures to protect fish and fish habitat when high-pressure directional drilling outlined in this document should be consulted	Monitoring to occur in general area of underground crossing and immediately downstream, from a vantage point that allows for safe viewing.	Regularly, during drilling of underground line.	• If a frac-out occurs, implement emergency frac-out response plan. • Notify relevant agencies of frac-out. Implement the contingency crossing plan, which may include measures to either re-drill at a different location or to isolate the water body to complete the crossing at the current location.

Affected Feature(s) or Environmental Component	Potential Effect	Magnitude	Likelihood	Performance Objective	Summary of Mitigation Measures	Monitoring[4]		Contingency Measures
						Monitoring Location	Frequency and Duration	
• Water Body 1 • Mud Creek • Tributary 2 to Mud Creek • Tributary 2.1 to Mud Creek • Salmon River • Tributary 1 to Salmon River • Tributary 2 to Salmon River • Tributary 2.1 to Salmon River • Tributary 2.2 to Salmon River • Tributary 2.4 to Salmon River • Tributary 3 to Salmon River • Tributary 3.1 to Salmon River • Black Creek • Pennell's Creek • Seepage Areas 1-5	Storage and use of construction materials and equipment may cause contamination of soils and/or water bodies from accidental spills, from surface runoff, from wind, or from the transport of materials by equipment and machinery onto paved public roads and subsequent surface runoff or wind.	Low	Low	• Ensure equipment and materials are stored more than 30 m from a water body. • Use mud mats or other means to prevent off-site transport of soils and/or other deleterious materials. • Ensure soils transported off-site are washed away from water bodies if road washing is required. • Keep public roads clear of construction debris.	• Existing vegetation in the Project Location should be maintained wherever possible to act as a natural buffer. • A Spill Prevention and Contingency Plan and spill response kits are to be developed and kept on site during construction. • Construction equipment and materials will be primarily stored in temporary construction laydown area(s). No equipment or materials are to be stored within 30 m of a water body. • Utilize good management practices to reduce the transport of materials (e.g. soil, vegetation, etc.) off site. This may include installing construction entrance features such as mud mats at vehicle access points adjacent to paved roads or as otherwise agreed to with the municipality. • Following the construction phase and prior to vegetation establishment, areas of soil compaction will be rectified by methods such as scarification, etc. • Re-vegetate disturbed areas in the Project Location following the construction phase.	Main facility entrance points and in the construction laydown areas.	Regularly, during the construction phase.	If soil is mobilized onto paved public roads by equipment, clearing activities to avoid mobilizing soil into nearby water bodies
Air, Odour and Dust								
Neighbouring land uses. Neighbouring landowners.	Deposition of dust on adjacent lands. Air quality and odour nuisance.	Low	Low	Minimize dust and odour resulting from construction activities.	Vehicle idling will be limited where possible. Equipment will be maintained in good working order. Vehicular traffic will be minimized in areas of exposed soils and high traffic areas will be stabilized with fresh gravel. Gravel roads will be watered down (or other measures taken) during construction as needed to reduce dust. Construction activities causing increased odour or dust will be carried out in accordance with applicable regulations and standards.	N/A	N/A	N/A
Groundwater								
Groundwater table	Accidental fuel spillage/releases from equipment. Stormwater run-off. Minor waste generation.	Low	Low	Minimize impacts to groundwater during construction.	Spill containment around the substation area. A Spill Prevention and Contingency to be in place prior to the start of construction. Erosion and sediment control measures (e.g., silt fencing).	N/A	N/A	N/A

Affected Feature(s) or Environmental Component	Potential Effect	Magnitude	Likelihood	Performance Objective	Summary of Mitigation Measures	Monitoring[4]		Contingency Measures
						Monitoring Location	Frequency and Duration	
Noise								
Neighbouring landowners	Increased noise disturbance due to construction activities.	Low	Moderate	Minimization of noise resulting from construction.	Vehicle idling will be prohibited, where possible. Noise levels within the Township of Stone Mills are governed by Bylaw 98-56. The bylaw stipulates that noise as a result of operation of any equipment in connection with construction will not be permitted within the hours of 8PM and 7AM, and 24 hours on Sundays. Construction activities resulting in noise emissions will typically take place during normal business hours. Should work need to be conducted on outside permissible hours, a by-law exemption shall be sought. Work will be done in accordance with local regulations and policies to minimize disturbance to the surrounding community. All equipment will be maintained in good working order. Any noise complaints will be investigated and documented as discussed in the Communications Plan (see the *Design and Operations Report*).	N/A	N/A	N/A
Land Use and Resources								
Land use at the Project Location.	Removal of land from agricultural production.	Moderate	High	N/A	Lands will be restored to their pre-construction condition, or a similar state at the time of decommissioning and adjacent lands have the ability to continue to be used for existing practices. Mitigation measures will include implementation of an erosion and sediment control (ESC) plan, avoidance of major excavation works or fill placement, and grading techniques to meet pre-existing drainage conditions.	N/A	N/A	N/A
Neighbouring landowners.	Visual impact.	Low	Low	N/A	Visual impacts during construction will be temporary in nature.	N/A	N/A	N/A
Provincial and Local Infrastructure								
	Periodic traffic disruption.	Low	Moderate	Limit traffic flow disruption.	A Traffic Management Plan will be prepared during detailed design in consultation with the Township and County.	N/A	N/A	N/A
	Damage to local roads.	Low	Moderate	N/A	Roads will be returned to or maintained at pre-construction condition in accordance with Road Use Agreements established with the Township of Stone Mills and the County of Lennox & Addington.	N/A	N/A	N/A

Affected Feature(s) or Environmental Component	Potential Effect	Magnitude	Likelihood	Performance Objective	Summary of Mitigation Measures	Monitoring[4]		Contingency Measures
						Monitoring Location	Frequency and Duration	
Public Health and Safety								
Neighbouring landowners and other members of the community.	Equipment emissions.	Low	Low	N/A	The project will comply with the *Occupational Health and Safety Act* regulation requirements during the construction phase. All equipment will be operated by qualified contractors. All construction activities will be conducted by qualified contractors in accordance with required standards and codes. All activities will abide by local laws and regulations. The contractor will create site-specific health and safety procedures. The contractor will also provide job safety assessment information prior to construction start up. All equipment will be maintained in good working order. The Project Location will be monitored during construction to discourage unauthorized access. Restricted areas will also be flagged, as appropriate. Smoking will be prohibited except in designated areas. Appropriate fire safety equipment (including fire extinguishers) will be available on site and stored in construction vehicles and site trailers as appropriate. An ERCP will be prepared in the event of an emergency on the site and will provide key contact information for relevant responders, regulators, landowners and other stakeholders.	N/A	N/A	N/A
Construction workers. Neighbouring landowners and other members of the community.	Injury or death to construction workers or members of the public due to accidents related to construction equipment or traffic.	High	Low	No injuries or deaths		N/A	N/A	N/A
Construction workers. Neighbouring landowners and other members of the community. Municipal firefighters.	Fires (electrical, wildfire, etc.) at the Project Location during construction.	Moderate Low Moderate	Low Low Low	Minimize fire potential at Project Location.		N/A	N/A	Implementation of ERCPs.
Areas Protected Under Provincial Plans and Policies								
No potential negative effects are anticipated to the Greenbelt Protected Countryside, Greenbelt Natural Heritage System, Oak Ridges Moraine and/or Lake Simcoe Watershed.								

8.0 Conclusions

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

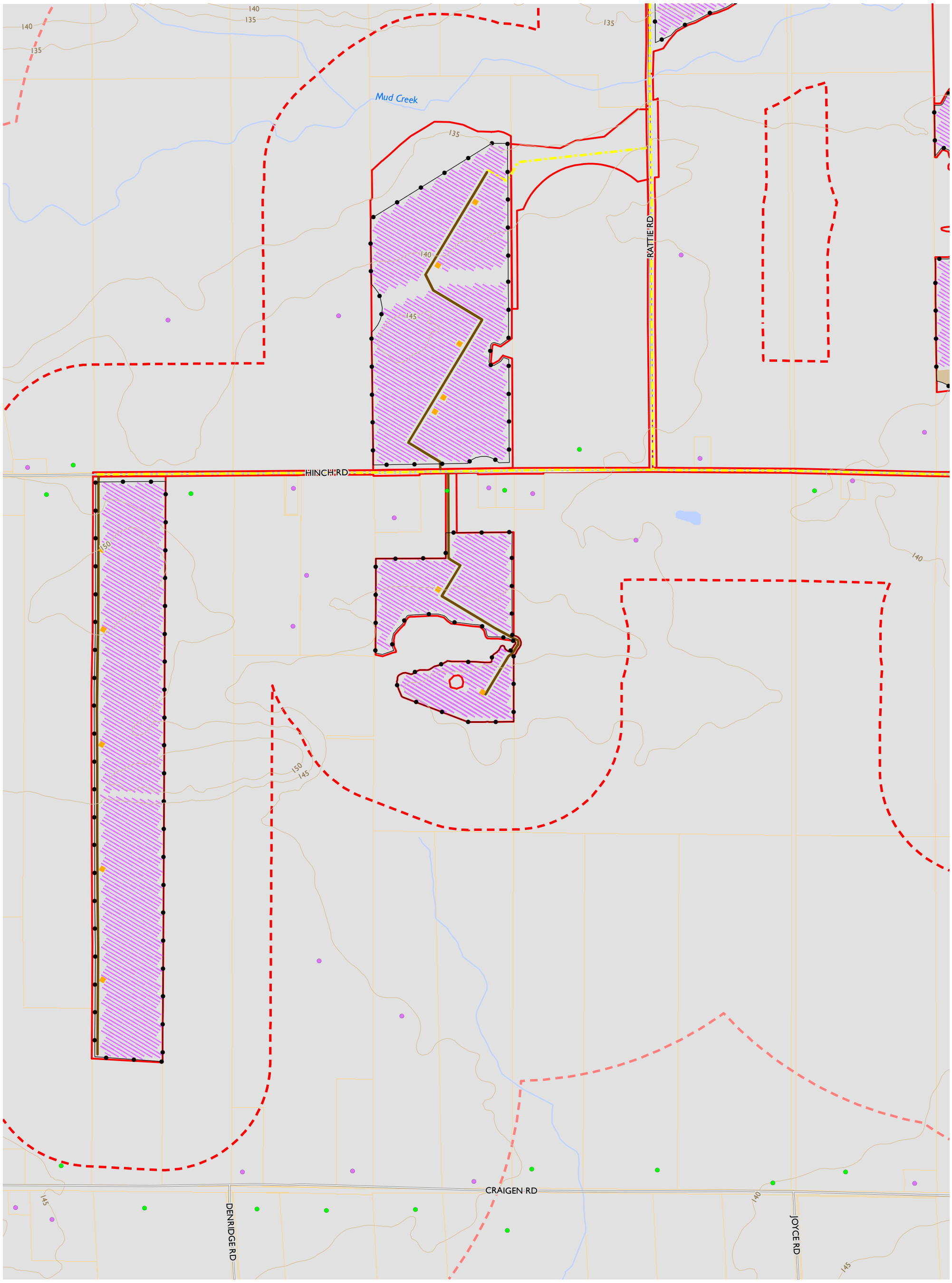
Sufficient fieldwork and data collection was performed to assist in the determination of potential construction effects to environmental features. Various mitigation measures to manage these potential effects have been identified. Significant adverse effects from construction activities to the natural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

The generation of power from solar energy will displace 54 MW_{AC} of electricity that otherwise may have been generated by fossil fuel or non-renewable power plants. As a result, the energy generated will not contribute to climate change or emissions-related health impacts. There will also be a direct benefit to the local economy in terms of the number of construction jobs that will be created, and there will also be an economic gain to the local service sector (i.e., hotels, restaurants, etc.). The Project will also contribute to the municipal tax revenues. The Project supports the goals of the Province's *Green Energy and Green Economy Act*, 2009 and *Long-Term Energy Plan* (LTEP), 2013.

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

Appendix A

Conceptual Component Layout: Figures 2a-2h



BluEarth Renewables Inc.
LOYALIST SOLAR LP

Site Plan - Conceptual Component Layout
FIGURE 2a

- Existing Noise Receptor
- Vacant Lot Noise Receptor
- CA - Connection Line Route
- Railway
- Electrical Transmission Line
- 5 m Elevation Contour
- Fence
- Inverter Station
- Solar Panel
- Electrical Collection Line
- Access Road
- Operation and Maintenance Area
- Substation
- Project Location Boundary
- Project Location 300 m Area of Investigation
- Project Location 1000 m Area of Investigation
- Parcel
- 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.

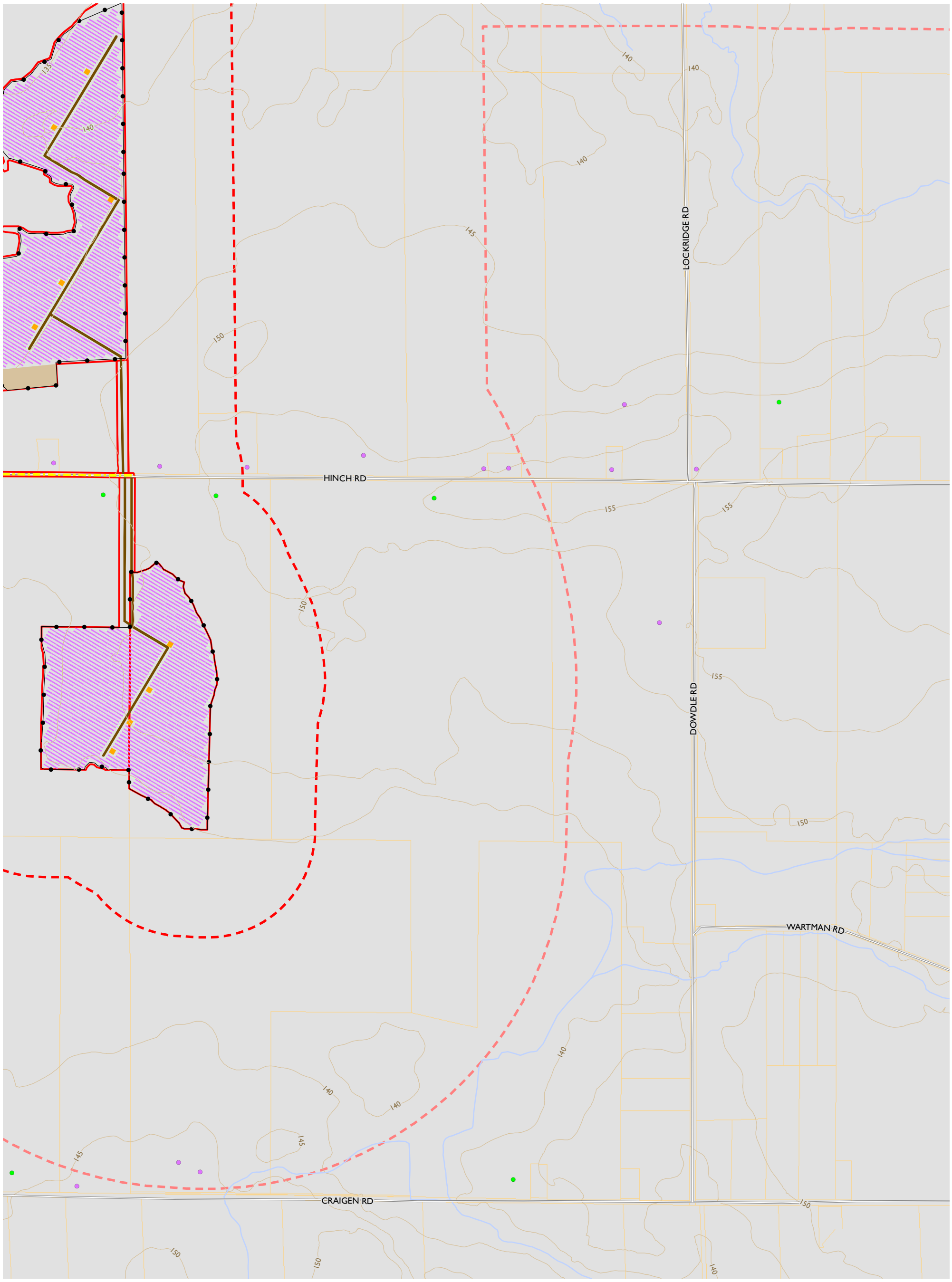
DILLON CONSULTING

MAP CREATED BY: GM
MAP CHECKED BY: JP
MAP PROJECTION: NAD 1983 UTM Zone 18N

1:10,000
0 50 100 200 m

PROJECT: 163674 STATUS: DRAFT DATE: 2017-01-27

FILE LOCATION: I:\GIS\163674 - Loyalist Solar\mxd\CPR\Figure 2 Site Plan Conceptual Component Layout.mxd



BluEarth Renewables Inc.
LOYALIST SOLAR LP

Site Plan - Conceptual Component Layout
FIGURE 2b

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

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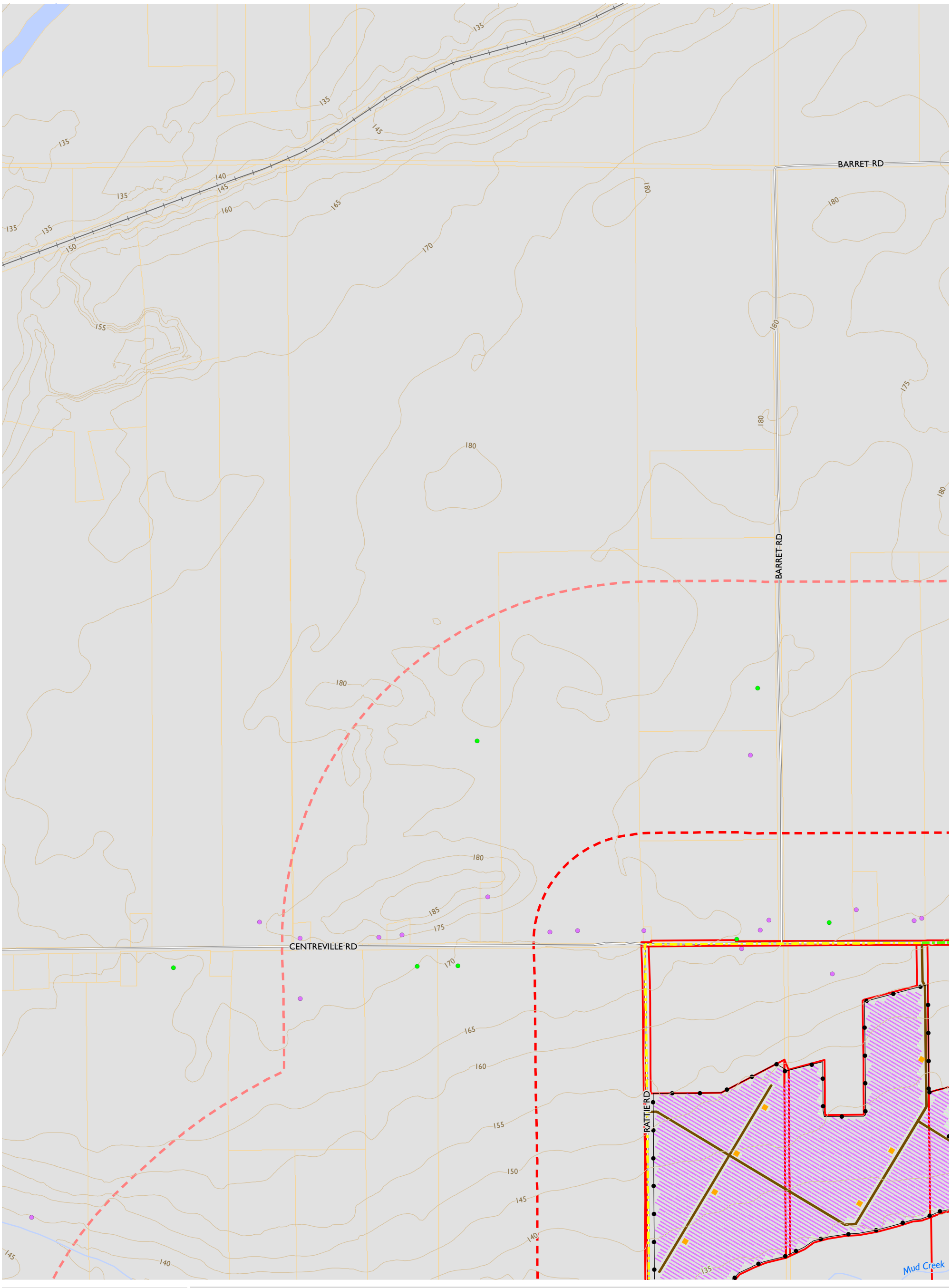
DILLON CONSULTING

MAP CREATED BY: GM
MAP CHECKED BY: JP
MAP PROJECTION: NAD 1983 UTM Zone 18N

1:10,000
0 50 100 200 m

PROJECT: 163674 STATUS: DRAFT DATE: 2017-01-27

FILE LOCATION: I:\GIS\163674 - Loyalist Solar\mxd\CPR\Figure 2 Site Plan Conceptual Component Layout.mxd



BluEarth Renewables Inc.
LOYALIST SOLAR LP

Site Plan - Conceptual Component Layout
FIGURE 2c

- Existing Noise Receptor
- Vacant Lot Noise Receptor
- CA - Connection Line Route
- Railway
- Electrical Transmission Line
- 5 m Elevation Contour
- Fence
- Inverter Station
- Solar Panel
- Electrical Collection Line
- Access Road
- Operation and Maintenance Area
- Substation
- Project Location Boundary
- Project Location 300 m Area of Investigation
- Project Location 1000 m Area of Investigation
- Parcel
- 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.

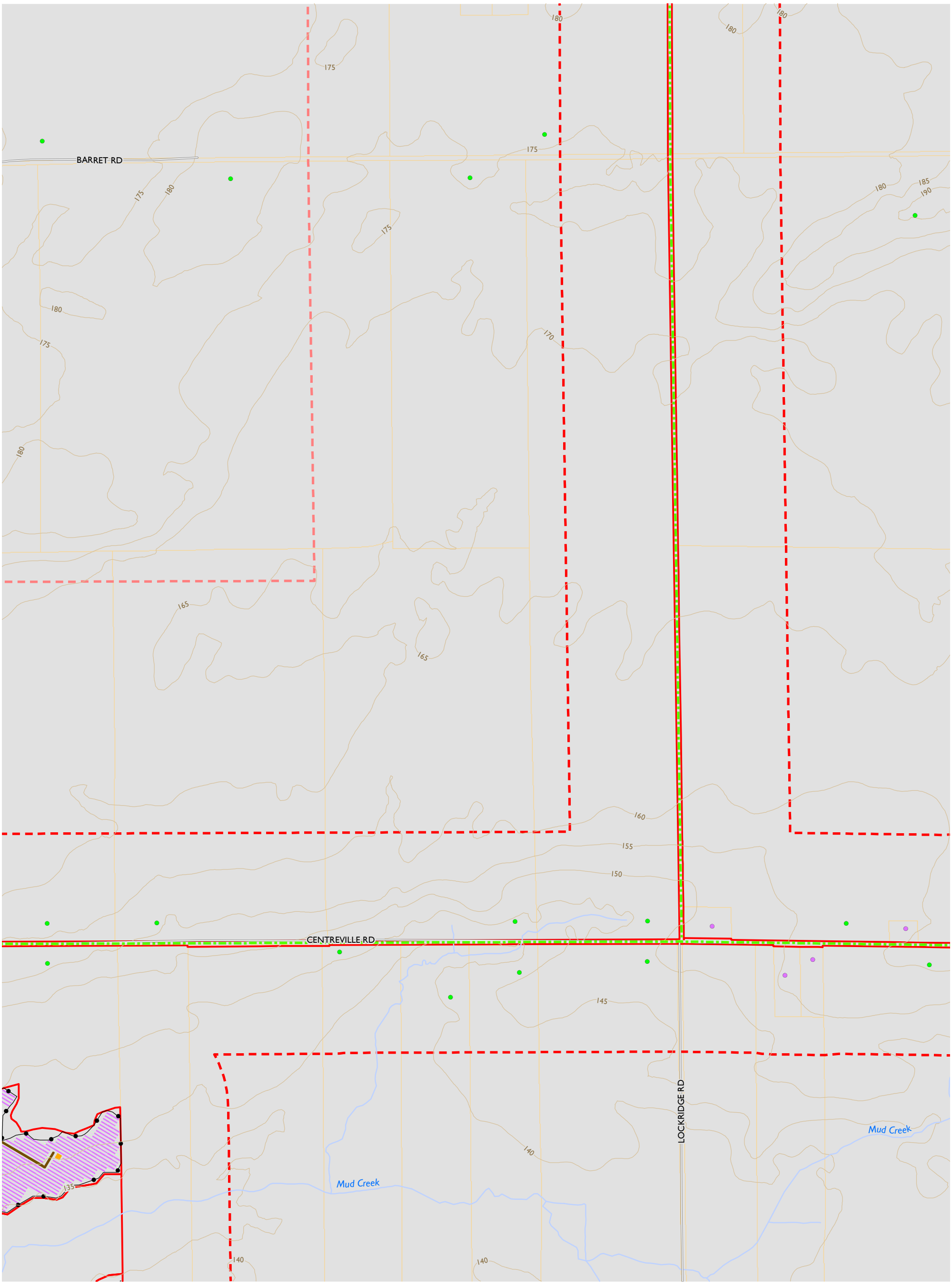
DILLON CONSULTING

MAP CREATED BY: GM
MAP CHECKED BY: JP
MAP PROJECTION: NAD 1983 UTM Zone 18N

1:10,000
0 50 100 200 m

PROJECT: 163674 STATUS: DRAFT DATE: 2017-01-27

FILE LOCATION: I:\GIS\163674 - Loyalist Solar\mxd\CPR\Figure 2 Site Plan Conceptual Component Layout.mxd



BluEarth Renewables Inc.
LOYALIST SOLAR LP

Site Plan - Conceptual Component Layout
FIGURE 2d

- Existing Noise Receptor
- Vacant Lot Noise Receptor
- CA - Connection Line Route
- Railway
- Electrical Transmission Line
- 5 m Elevation Contour
- Fence
- Inverter Station
- Solar Panel
- Electrical Collection Line
- Access Road
- Operation and Maintenance Area
- Substation
- Project Location Boundary
- Project Location 300 m Area of Investigation
- Project Location 1000 m Area of Investigation
- Parcel
- 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.

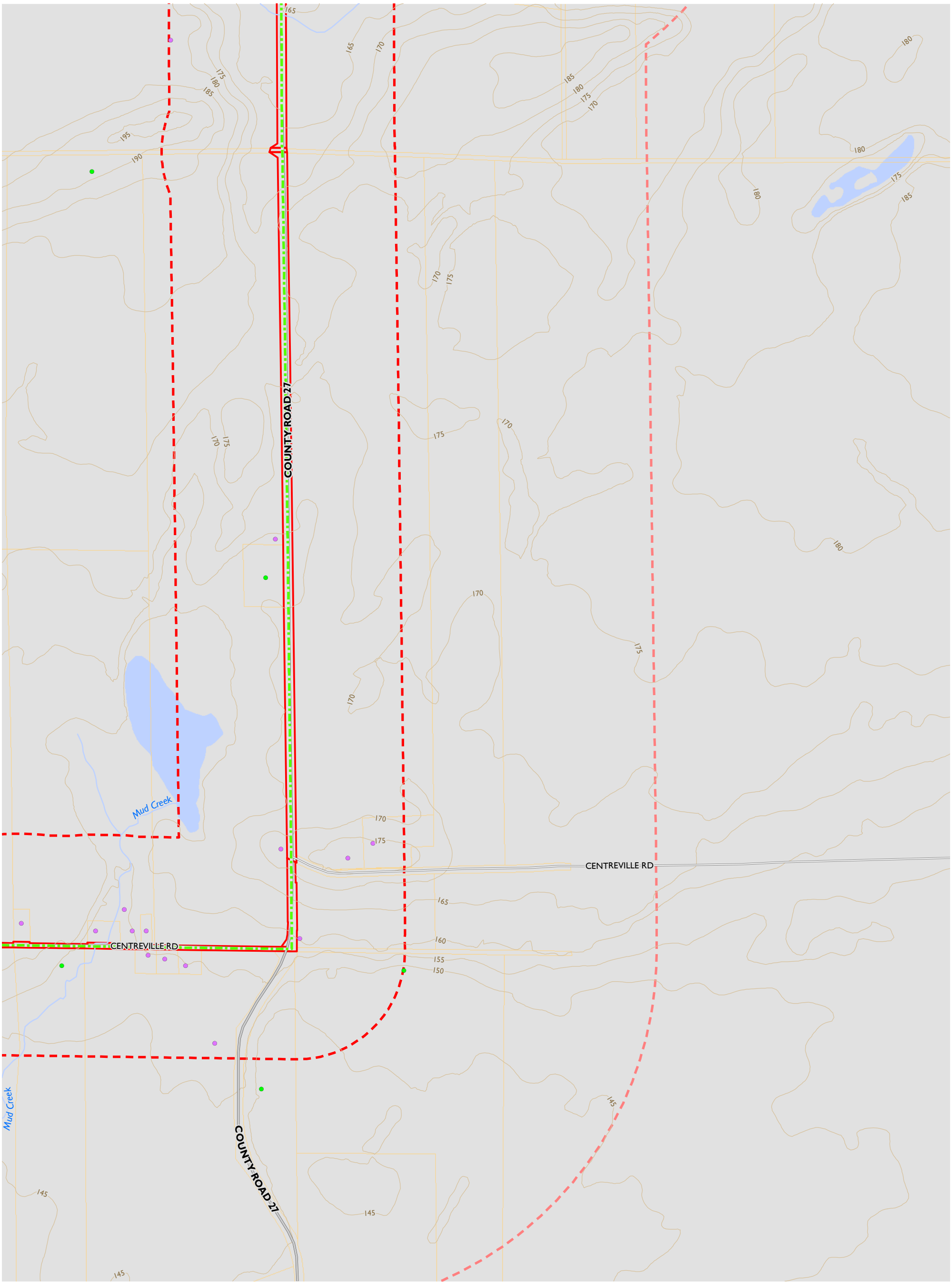
DILLON CONSULTING

MAP CREATED BY: GM
MAP CHECKED BY: JP
MAP PROJECTION: NAD 1983 UTM Zone 18N

1:10,000
0 50 100 200 m

PROJECT: 163674 STATUS: DRAFT DATE: 2017-01-27

FILE LOCATION: I:\GIS\163674 - Loyalist Solar\mxd\CPR\Figure 2 Site Plan Conceptual Component Layout.mxd



BluEarth Renewables Inc.
LOYALIST SOLAR LP

Site Plan - Conceptual Component Layout
FIGURE 2e

- Existing Noise Receptor
- Vacant Lot Noise Receptor
- CA - Connection Line Route
- Railway
- Electrical Transmission Line
- 5 m Elevation Contour
- Fence
- Inverter Station
- Solar Panel
- Electrical Collection Line
- Access Road
- Operation and Maintenance Area
- Substation
- Project Location Boundary
- Project Location 300 m Area of Investigation
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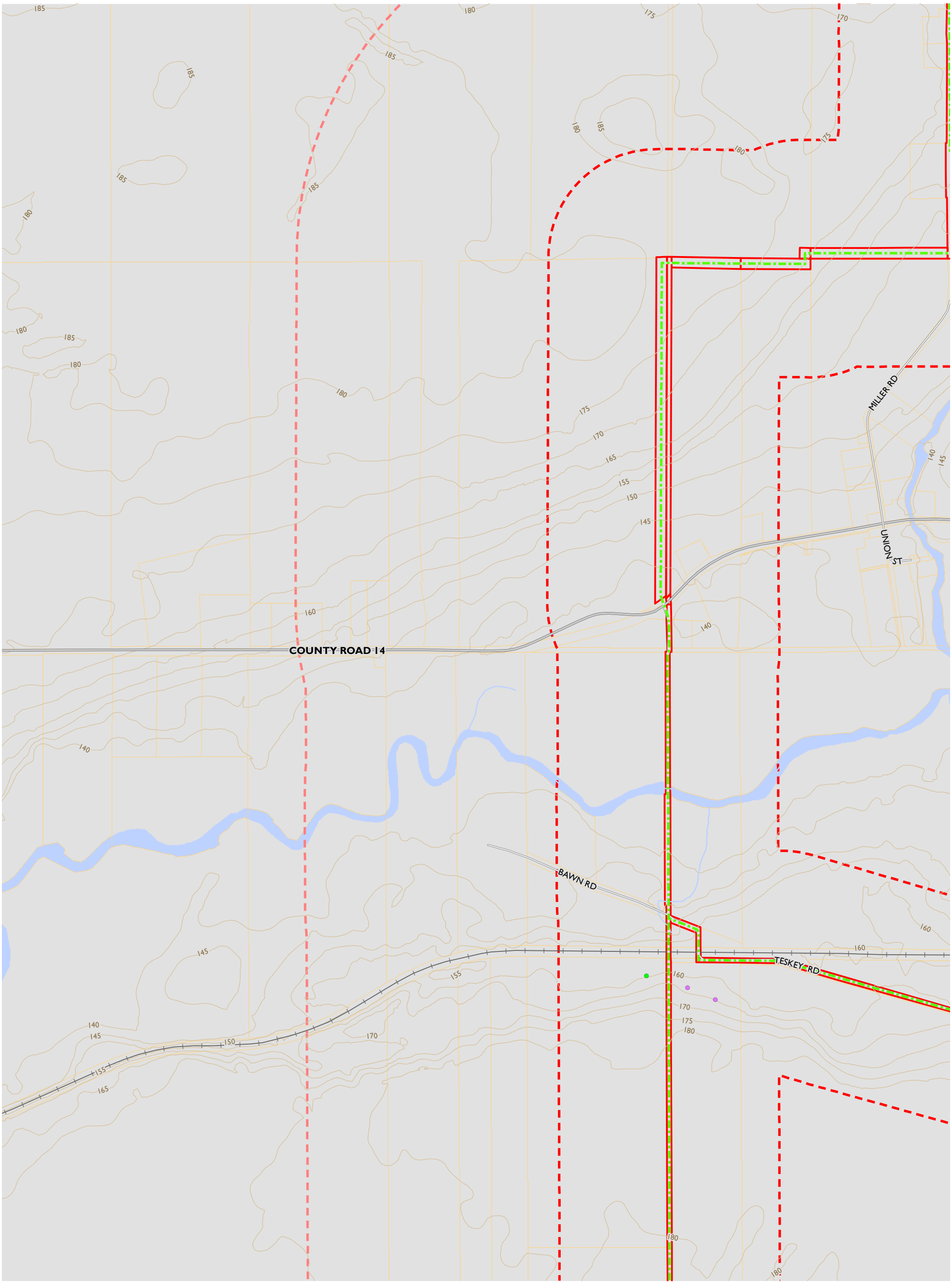
0 50 100 200 m

PROJECT: 163674 STATUS: DRAFT DATE: 2017-01-27

FILE LOCATION: I:\GIS\163674 - Loyalist Solar\mxd\CPR\Figure 2 Site Plan Conceptual Component Layout.mxd



BluEarth Renewables Inc.
LOYALIST SOLAR LP

Site Plan - Conceptual Component Layout
FIGURE 2f

- Existing Noise Receptor
- Vacant Lot Noise Receptor
- CA - Connection Line Route
- Railway
- Electrical Transmission Line
- 5 m Elevation Contour
- Fence
- Inverter Station
- Solar Panel
- Electrical Collection Line
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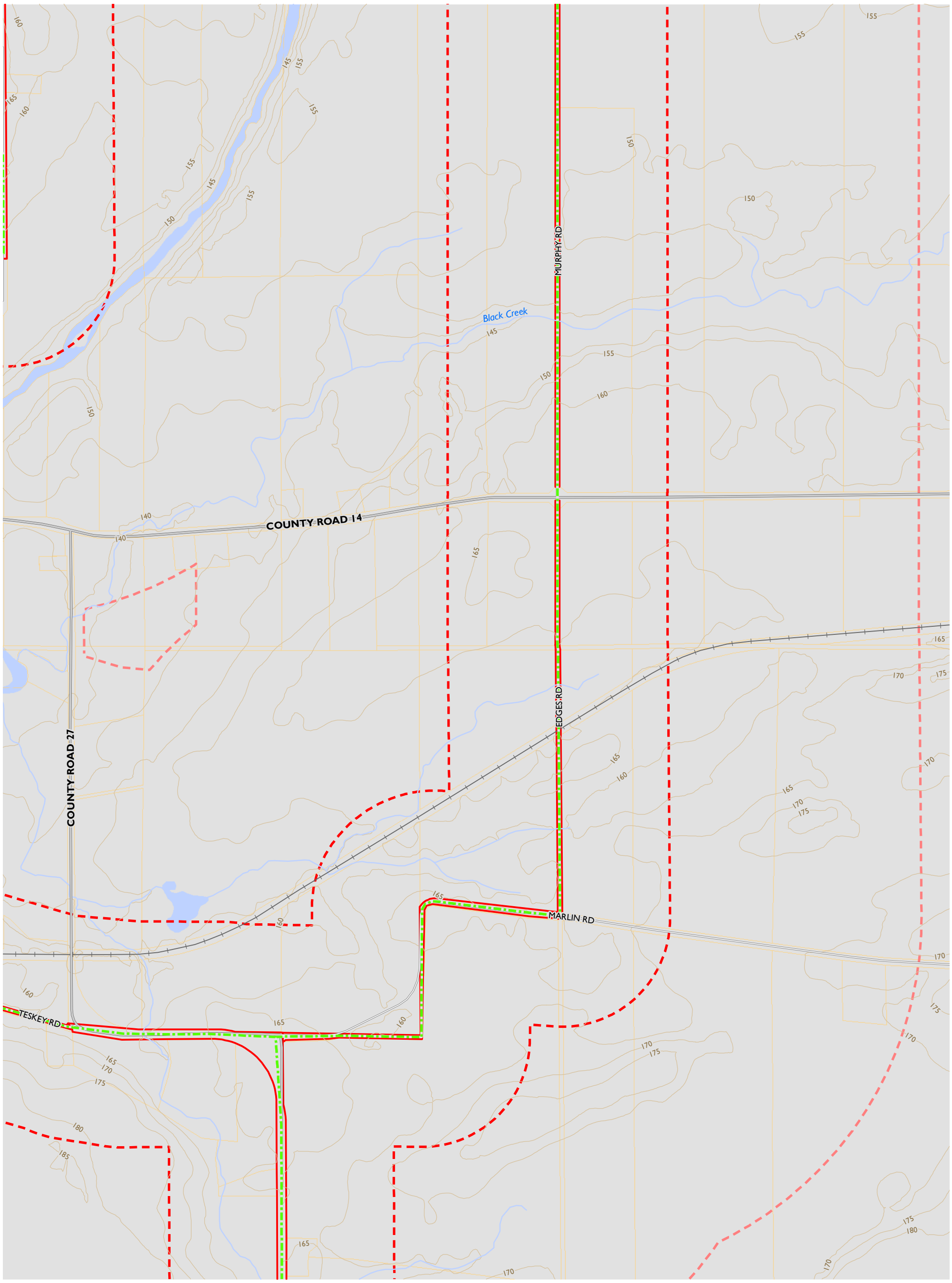
MAP CREATED BY: GM
MAP CHECKED BY: JP
MAP PROJECTION: NAD 1983 UTM Zone 18N

1:10,000
0 50 100 200 m

PROJECT: 163674 STATUS: DRAFT DATE: 2017-01-27

FILE LOCATION: I:\GIS\163674 - Loyalist Solar\mxd\CPR\Figure 2 Site Plan Conceptual Component Layout.mxd



BluEarth Renewables Inc.
LOYALIST SOLAR LP

Site Plan - Conceptual Component Layout
FIGURE 2g

- Existing Noise Receptor
- Vacant Lot Noise Receptor
- CA - Connection Line Route
- Railway
- Electrical Transmission Line
- 5 m Elevation Contour
- Fence
- Inverter Station
- Solar Panel
- Electrical Collection Line
- Access Road
- Operation and Maintenance Area
- Substation
- Project Location Boundary
- Project Location 300 m Area of Investigation
- Project Location 1000 m Area of Investigation
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- Water Body

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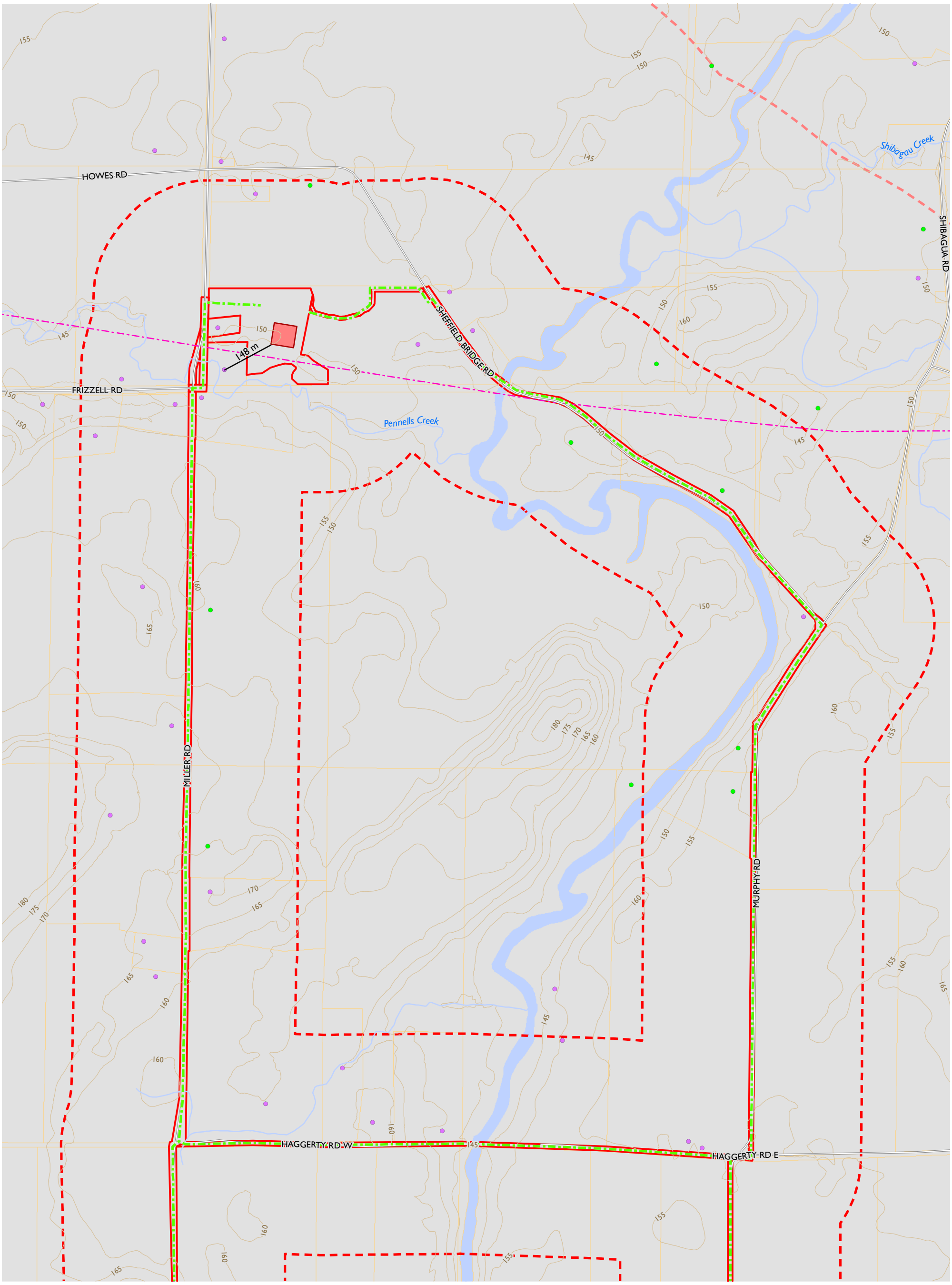
DILLON CONSULTING

MAP CREATED BY: GM
MAP CHECKED BY: JP
MAP PROJECTION: NAD 1983 UTM Zone 18N

1:10,000
0 50 100 200 m

PROJECT: 163674 STATUS: DRAFT DATE: 2017-01-27

FILE LOCATION: I:\GIS\163674 - Loyalist Solar\mxd\CPR\Figure 2 Site Plan Conceptual Component Layout.mxd



BluEarth Renewables Inc.
LOYALIST SOLAR LP

Site Plan - Conceptual Component Layout
FIGURE 2h

- Existing Noise Receptor
- Vacant Lot Noise Receptor
- CA - Connection Line Route
- Railway
- Electrical Transmission Line
- 5 m Elevation Contour
- Fence
- Inverter Station
- Solar Panel
- Electrical Collection Line
- Access Road
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FILE LOCATION: I:\GIS\163674 - Loyalist Solar\mxd\CPR\Figure 2 Site Plan Conceptual Component Layout.mxd