

## ADMINISTRATIVE MATTERS

### *The Applicant*

1. Northland Power Solar Empire L.P., Northland Power Solar Martin's Meadows L.P., Northland Power Solar Abitibi L.P., and Northland Power Solar Long Lake L.P. (collectively the "**Applicant**" or the "**Applicants**") are limited partnerships constituted under the laws of the Province of Ontario. The Applicant general partners are Northland Power Solar Empire GP Inc., Northland Power Solar Martin's Meadows GP Inc., Northland Power Solar Abitibi GP Inc., and Northland Power Solar Long Lake GP Inc., respectively, each general partner being a wholly owned subsidiary of Northland Power Inc. ("**NPI**"). NPI and Northland Power Limited Partner Holdings Inc. are the limited partners, holding 99.9% and 0.1% limited partner interest, respectively, in each of the Applicants. Information concerning the authorized representatives of the Applicants is provided on the cover page to this Application.
2. NPI is an Ontario corporation with its head office in the city of Toronto. Founded in 1987, NPI is an experienced developer, owner and operator of renewable power generation in Canada and abroad. NPI activities include developing, constructing, managing, financing and owning renewable energy facilities. NPI is a publicly traded Independent Power Producer (IPP) with a market capitalization of over \$1.6 billion and over 1,000 MW of generation.

### *Business of Applicants*

3. The Applicants are in the business of developing, constructing, owning and operating renewable generation projects and related facilities. Each of the four Applicants is constructing one 10 MW ground mount solar electricity generation facility in the vicinity of the Town of Cochrane, and each of the four generation facilities is subject to an Ontario Power Authority ("**OPA**") Feed-in Tariff ("**FIT**") contract (the four generation projects are collectively referred to as the "**Generation Projects**").
4. The Applicants have a co-ownership agreement in place for the transmission line and associated facilities, including approximately twenty-two (22) kilometres of 115 kV above-ground transmission line, five hundred (500) metres of underground transmission cable, two (2) 115 kV transformer substations, a transition station, and a switching yard ("**the Transmission Facilities**") that are the subject of this Application. A diagram of the Applicants' co-ownership structure is provided in Exhibit B, Tab 1, Schedule 2. The Applicants will be entering into an operation and maintenance agreement ("**O&M Agreement**") with NPI for the operation and maintenance of the Transmission Facilities.

*Purpose of Transmission Facilities*

5. The Applicants seek leave to construct the Transmission Facilities in order to connect and permit electricity generated by the Generation Projects to be transmitted to the Ontario transmission system in accordance with the terms of their FIT contracts. The Transmission Facilities shall connect the Generation Projects to the transmission system at Hydro One Networks Inc. ("HONI") 115 kV circuit C2H, located north of Hunta, Ontario. A map depicting the location of the Generation Projects and Transmission Facilities can be found in Exhibit B, Tab 2, Schedule 2.

*Description and Location of Generation Projects*

6. The Generation Projects will be located in the Cochrane region in northern Ontario, as follows:
  - (a) Empire: generation site is approximately 122.1 hectares (ha) in size and located north of the Town of Cochrane and southeast of Genier. Lot 17, Part 1, and Lot 18, Part 3, Concession 7, Glackmeyer Township (Town of Cochrane).
  - (b) Martin's Meadows: generation site is approximately 82.3 ha in size and located north of the Town of Cochrane and southeast of Genier. Lot 16, Parts 7 and 9, Concession 8, Glackmeyer Township (Town of Cochrane).
  - (c) Abitibi: generation site is approximately 97.95 ha in size and located north of the Town of Cochrane and southeast of Genier. Lot 14 and Part 4 of Lot 15, Concession 8, Glackmeyer Township (Town of Cochrane).
  - (d) Long Lake: generation site is located in the unorganized Township of Calder, and is approximately 123.1 ha in size and located north of Highway 11, west of Highway 668, where it intersects with Concession 8 and 9. Lot 2, Part 1 and Lot 3, Part 2, Concession 8, Calder Township.
7. A small "step-up" transformer will be used at each inverter block to transform the electricity generated by inverters at each inverter block from 360 V to 27.6 kV, for further transmittal through the medium voltage (27.6 kV) collector system at each generation site. One (1) Unit Substation will be installed at each one of the Martin's Meadows, Abitibi and Empire Generation Project sites. The purpose of the Unit Substations is to combine the 27.6 kV cabling of the medium voltage collector system down to a single "home run" feeder per site and to provide switchgear including disconnection means for the incoming and outgoing feeders, as required by the Electrical Code. The medium voltage collector system of each Generation Project site will comprise of underground and/or overhead circuits operating at a nominal voltage of 27.6 kV.

*Description and Location of Transmission Facilities*

8. The Martin's Meadows, Abitibi and Empire Generation Projects will be grouped together at a common 115 kV bus in a 27.6-115 kV step-up transformer substation (the Main Transformer Substation or "Main TS") and will connect to the HONI C2H circuit by way of a 21 km 115 kV primarily overhead transmission line that will leave the Martin's Meadows Generation Project site and run west along Concession 8 and 9. There will be an underground cable portion to this transmission line, near the point of connection to C2H, with an approximate length of 350-400 m. This portion of the subject transmission line is referred to as "Segment A" below.
9. The Long Lake Generation Project will also have a 27.6-115 kV transformer substation (the Calder Transformer Substation or "Calder TS") and connect to C2H via an approximately 0.5 km long 115 kV overhead line, running east along Concession 8 and 9. This portion of the subject transmission line is referred to as "Segment B" below.
10. The transmission line Segment A from the Martin's Meadows, Abitibi and Empire Generation Projects and the transmission line Segment B from Long Lake Generation Project will be joined together at the 115 kV bus of a new switching station ("Calder SS"), which will be constructed at the point of connection with the HONI C2H circuit.
11. The Transmission Facilities consist of the following components discussed in greater detail below (applicable GPS coordinates are shown where available):
  - (a) The Main Transformer Substation ("Main TS") (49.145205, -81.274333);
  - (b) The Calder Transformer Substation ("Calder TS") (49.145230, -81.275142);
  - (c) High Voltage Transmission Line (Segment A and Segment B);
  - (d) Transition Station (49.145429, -81.271016); and
  - (e) The Calder Switching Station ("Calder SS") (49.145230, -81.275142) and HONI Interconnection (49.145205, -81.274333).

- **The Main Transformer Substation**

12. The Main TS is located on the Martin's Meadows Generation Project site. More particularly, the Main TS will be located on the north-west corner of Martin's Meadows site, within Glackmeyer Township, Lot 1, Concession 8. The Main TS will include three (3) transformers, each transformer with a proposed peak capacity of 12 MVA, for the purposes of stepping up generation from the Martin's Meadows, Abitibi and Empire Generation Project sites from 27.6 kV, the nominal voltage of the medium voltage collector system, to 113-132 kV, the voltage required for connection to the HONI transmission system. The Main TS will include breakers, switches, metering, protections, controls, SCADA and auxiliary equipment required for safe and reliable operation of medium and high voltage facilities of the Generation Projects and the new 115 kV

transmission line (Segment A). The Main TS will also include three (3) sets of IESO revenue metering equipment, one set for each of the Martin's Meadows, Abitibi and Empire Generation Projects. The Main TS will include perimeter fencing, which will comply with the requirements of the Ontario Electrical Safety Code.

13. For economic, operations and maintenance reasons, the Applicants are considering amending their current SIA and CIA, to allow the Applicants to combine the energy generated by the Martin's Meadows, Abitibi and Empire Generation Projects sites at the 27.6 kV bus of the Main TS. This would allow the Applicants to explore a reduction in the required number of step-up transformers from three (3) down to a single unit. The Applicants may select this alternative and if so, the Applicants will pursue an amendment to the existing SIA and CIA with the IESO and HONI respectively to reflect the new arrangement. For greater clarity, this alternative will not result in a change in location of the Transmission Facilities.

- **The Calder Transformer Substation**

14. The Calder TS will be located on the north-east corner of the Long Lake Generation Project site, Calder Township, Lot 2, Concession 8. The Calder TS will include a single transformer with a proposed peak capacity of 12 MVA, for the purposes of stepping up generation from the Long Lake Generation Project from 27.6 kV, the nominal voltage of the medium voltage collector system, to 113-132 kV, the voltage required for connection to the HONI transmission system. The Calder TS will include breakers, switches, metering, protections, controls, SCADA and auxiliary equipment required for safe and reliable operation of medium and high voltage facilities of the solar stations and the new 115 kV transmission line (Segment B). The Calder TS will also include one (1) set of IESO revenue metering equipment for the Long Lake Generation Project site. The Calder TS will include perimeter fencing, which will comply with the requirements of the Ontario Electrical Safety Code.

- **High Voltage Transmission Line**

15. The Main TS, Calder TS and Calder SS will inter-connect via a three-terminal configuration, single-circuit arrangement, 115 kV transmission line. The 115 kV transmission line will consist of two segments:
  - (a) Segment A - Main TS to Calder SS:
    - (i) The 115 kV transmission line will leave the Main TS and travel overhead in a westward direction, along Concessions 8 and 9, for a distance of approximately 20.5 km, at which point the overhead line will enter an overhead to underground transition station (the "Transition Station"). The underground cable will then leave the Transition Station, travel in a westward direction for approximately 350 to 400 meters and rise up for

termination at the 115 kV bus of Calder SS, at the point of connection to HONI circuit C2H.

- (ii) The overhead portion of Segment A will cross Ontario Northland Railway, Frederick House River as well as Algonquin Power's 115 kV Long Sault GS tap line (as further described in Exhibit C, Tab 1, Schedule 1). It is anticipated that new 115 kV transmission line will cross over the Algonquin Power circuit.
  - (iii) The 115 kV underground cable is necessary to allow for crossing of three (3) 115 kV overhead lines, belonging to HONI (C2H and C3H) as well as H2O Power LP, which exist between the Transition Station and Calder SS. The underground cable will cross Highway 668.
  - (iv) It is proposed to run the underground cable straight across Highway 668 from the Transition Station, across Lot 1, Concession 8, Calder Township, to terminate at the Calder SS.
- (b) Segment B – Calder TS to Calder SS:
- (i) The 115 kV transmission line will leave the Calder TS and travel overhead in an eastward direction, along Concessions 8 and 9 for a distance of approximately 0.5 km. The overhead line will terminate at the 115 kV bus of Calder SS, at the point of connection to HONI circuit C2H.

- **Transition Station**

16. The overhead portion of Segment A of the new 115 kV transmission line will transition to a buried cable approximately 70 metres from the northeast corner of the intersection of Highway 688 and Concession 8 and 9. The Transition Station will be located on Lot 28, Concession 9, Township of Clute. NPI has a land option agreement in place with the property owner. The Transition Station will contain all equipment necessary to transition Segment A of the new 115 kV transition line from overhead wire to insulated underground cable. The structure will contain overhead wire/insulated cable terminations, surge protection, grounding and auxiliary equipment.

- **Calder SS and HONI Interconnection**

17. Segment A and Segment B of the new 115 kV transmission line will join at the 115 kV bus of Calder SS. The Calder SS will be located on Lot 1 Concession 8; approximately 175 metres west of the intersection of Highway 688 and Concessions 8 and 9. NPI has sent a land option agreement to the property owner and its terms and conditions are being finalized. Final connection of the Generation Projects to the HONI 115 kV transmission system will be via a line tap to HONI 115 kV circuit C2H from Calder SS. The location of the line tap will be at or near C2H Tower 269 (49.145744, -81.274209), near the

intersection of Highway 668 and Concessions 8-9 Clute/Glackmeyer, approximately 4.1 km north of Hydro One's Hunta Switching Station.

18. The tapping arrangement to HONI circuit C2H will be determined in consultation with HONI, following the execution of the HONI Connection and Cost Recovery Agreement ("CCRA"). Calder SS will contain all equipment necessary to join Segment A and Segment B of the new 115 kV transmission line to the outgoing HONI line tap. Other equipment, which will be located in the Calder SS, includes breakers, disconnect switches, buswork, equipment related to auxiliary services as well as a modular building containing HONI interconnection and new 115 kV transmission line protections, metering, controls and HONI/IESIO SCADA/telemetry equipment. The Calder SS will include perimeter fencing, which will comply with the requirements of the Ontario Electrical Safety Code.

#### *Financial Structuring*

19. Ownership of the Transmission Facilities is contemplated as follows:
- (a) Northland Power Solar Empire L.P., Northland Power Solar Martin's Meadows L.P., and Northland Power Solar Abitibi L.P., will each own:
    - (i) one-third of (a) the Main TS, and (b) the twenty one (21) kilometers of aboveground transmission line;
    - (ii) one-third of Segment A consisting of approximately 350 metres of underground transmission line connecting the Main TS to the Calder SS; and
    - (iii) a 25% interest in the Calder SS.
  - (b) Northland Power Solar Long Lake L.P will own:
    - (i) 100% of the Calder TS;
    - (ii) 100% of Segment B consisting of the aboveground transmission line connecting the Calder TS to the Calder SS; and
    - (iii) a 25% interest in the Calder SS.

As mentioned above, NPI shall be responsible for the operation and maintenance of the Transmission Facilities pursuant to the terms of an O&M Agreement.

20. NPI and Northland Power Limited Partner Holdings Inc. are the limited partners of each of the Applicants. NPI holds 99.9% of the limited partner interest in the Applicants and will be funding the development and construction of both the Transmission Facilities and Generation Projects, which are anticipated to have a total capital cost of \$200 million.

The total capital cost of the Transmission Facilities is estimated to be \$10 million. NPI will be able to fund the Transmission Facilities as NPI has enjoyed continued access to the capital markets over the past two years with the raising of specific Project Financing of over \$1,067 million for five separate projects as well as over \$300 million through issuance of convertible debentures, preferred shares and common equity shares. NPI is a public company traded on the Toronto stock exchange, with a market capitalization of \$1.6 billion on common float shares (\$2.4 billion including all classes of shares).

#### *Project Schedule*

21. Commercial operation for the four Generation Projects is expected to be on or before September 5 or 6, 2014, which are the Milestone Commercial Operations Dates ("MCOB's") prescribed by the OPA FIT contracts.
22. Subject to the receipt of the necessary permits and approvals, site work for the Transmission Facilities is expected to begin in the spring of 2013 and last for 12 to 15 months. The Transmission Facilities are expected to be in operation by September 2014. Please refer to Exhibit C, Tab 1, Schedule 1 for a Gantt chart illustrating the proposed construction schedule for the Transmission Facilities.

#### *Project Rationale*

23. The selection of the locations for the Transmission Facilities was based solely on the need to interconnect the Generation Projects to the transmission system. Typically, ground mount solar projects similar to the Generation Facilities are connected at distribution voltages (i.e. 50 kV and lower); however, in this case, the local distribution system did not have enough capacity to interconnect or accommodate the Generation Projects. Therefore, it was necessary to consider, and apply for a high voltage (i.e. 115 kV) interconnection. The Applicants are aware of one other example where this has occurred. This is Canadian Solar Solutions Inc.'s (CSSI's) three solar PV projects in new Liskeard.
24. There are significant net benefits of the Generation Projects, and therefore, by extension, the Transmission Facilities. Such benefits include the generation of clean renewable energy for Ontario, increased economic activity for the region, and employment opportunities for the local communities, particularly during the construction phase of the Generation Projects and the Transmission Facilities that are the subject of this Application. During the operational phase, the projects will also provide annual economic benefits through municipal taxes paid to Municipal Property Assessment Corporation ("MPAC"), and there will be a continuing need for services from the local economy. NPI has three existing power plants in the northern Ontario area – one nearby in Cochrane, one in Iroquois Falls and one in Kirkland Lake. NPI has experience operating power plants in Northern Ontario

*Public Interest*

25. Subsection 96(2) of the *Ontario Energy Board Act, 1998* (the “**Act**”) sets out the public interest test to be considered by the Board when considering applications made under section 92 of the Act. Subsection 96(2) states:

*“the Board shall only consider the following when, under subsection (1), it considers whether the construction, expansion or reinforcement of the electricity transmission line or electricity distribution line, or the making of the interconnection, is in the public interest:*

- 1. The interests of consumers with respect to prices and the reliability and quality of electricity service.*
  - 2. Where applicable in a manner consistent with the policies of the Government of Ontario, the promotion of the use of renewable energy sources.”*
26. With respect to the first branch of the test, the proposed Transmission Facilities are to be used solely to connect the Generation Projects into the IESO-controlled grid. The Applicants will, therefore, not be licensed or rate-regulated transmitters. The financial risk of constructing, owning, and operating the Transmission Facilities will lie solely with the Applicants.
27. With respect to the second branch of the test, the construction of the Transmission Facilities and the connection of the Generation Projects to the electricity grid will result in the promotion of the use of renewable energy sources. The Generation Projects in respect of which the Transmission Facilities will be constructed will add to Ontario’s supply of renewable electricity. The Generation Projects are all subject to OPA FIT contracts (fixed rate contracts) and will therefore not impact competition within the Province of Ontario, as the Applicant is subject to the terms of the FIT contracts with respect to pricing and contract capacity.



**Northland Power Solar Empire L.P., Northland Power Solar Martin's Meadows L.P.,  
Northland Power Solar Abitibi L.P., Northland Power Solar Long Lake L.P.**

**Exhibit B**

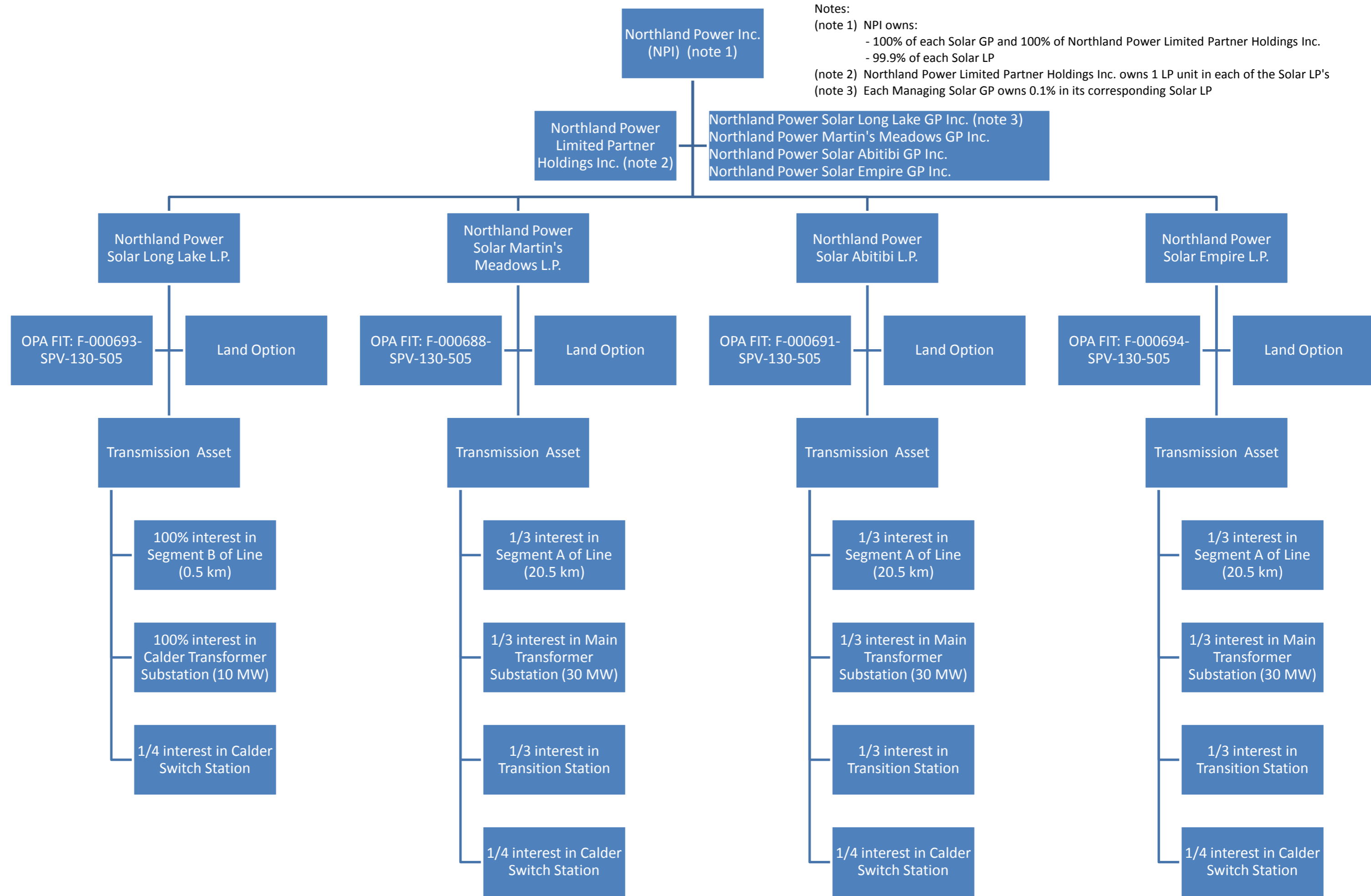
**Tab 1**

**Schedule 2**

**Page 1 of 1**

**ADMINISTRATIVE MATTERS**

**Applicants' Co-Ownership Structure**



**PROJECT OVERVIEW DOCUMENTS**

**Detailed description of location**

Please refer to Exhibit B, Tab 1, Schedule 1, paragraphs 8-18 for a detailed description of the proposed locations of the Transmission Facilities. Site plan and layout drawings for each of the Transmission Facilities are provided in Exhibit B, Tab 2, Schedule 5.

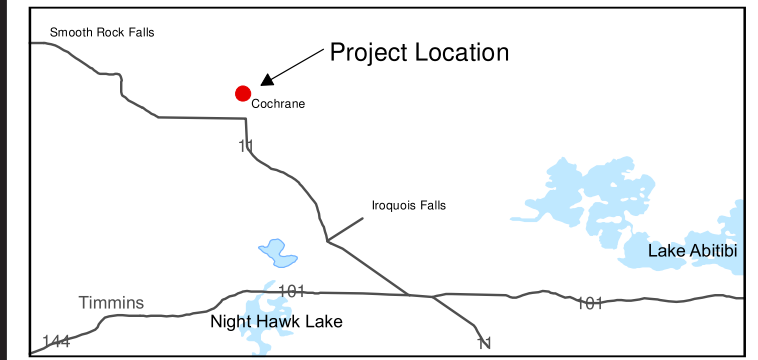
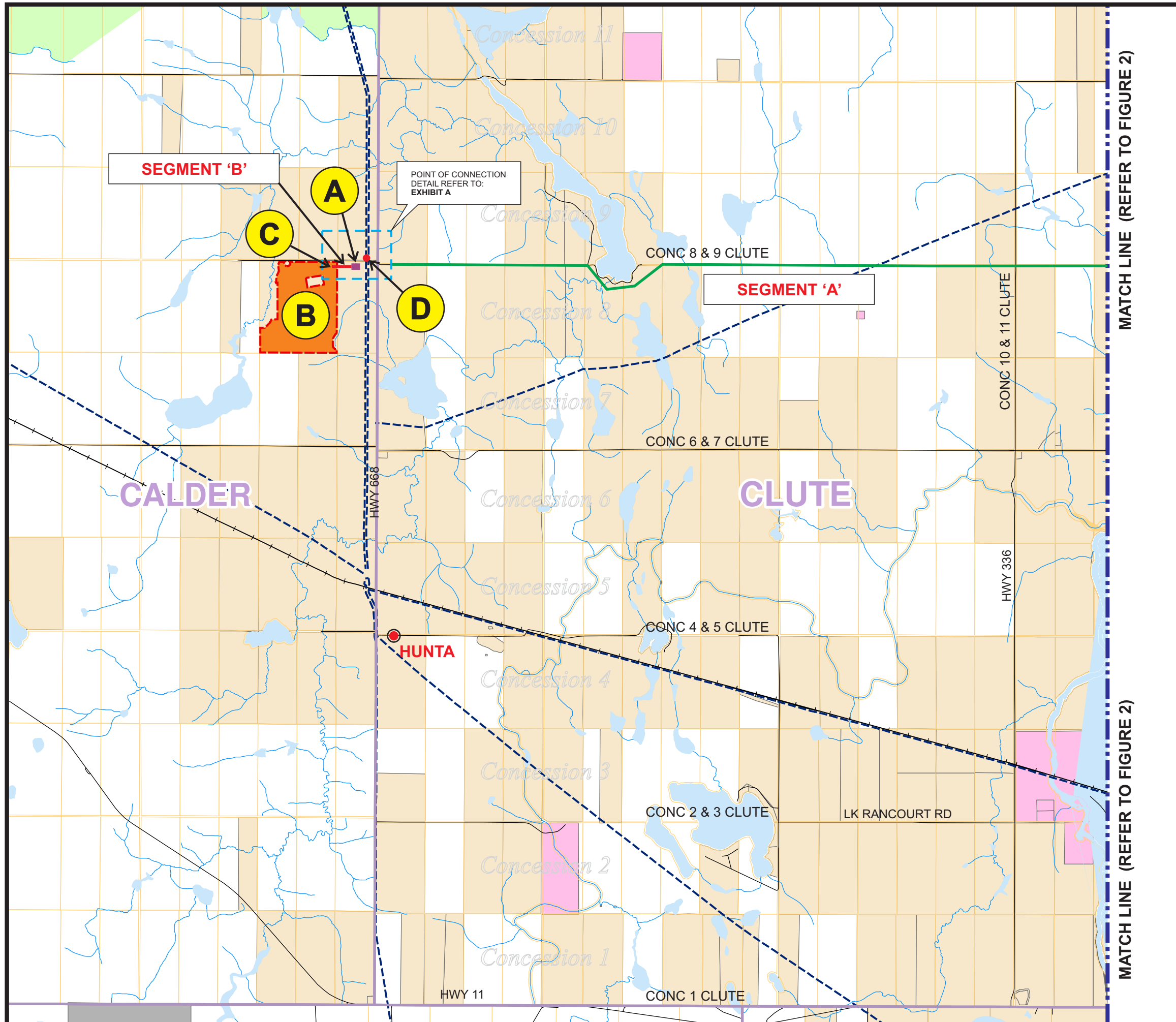
Maps showing the route, facility and ancillary facility sites are provided in Exhibit B, Tab 2, Schedule 2 to this Application.

**Northland Power Solar Empire L.P., Northland Power Solar Martin's Meadows L.P.  
Northland Power Solar Abitibi L.P., Northland Power Solar Long Lake L.P.**

**Exhibit B  
Tab 2  
Schedule 2  
Page 1 of 1**

**PROJECT OVERVIEW DOCUMENTS**

**Project Map**



**LEGEND**

- ROAD
- +— RAIL
- - - TRANSMISSION LINE
- MINE CLAIM
- MINING ALIENATION (SURFACE RIGHT WITHDRAWN)
- ACTIVE (MINING) DISPOSITION
- REGULATED PROVINCIAL PARK
- GEOGRAPHIC TOWNSHIP
- PARCEL
- WATER BODY

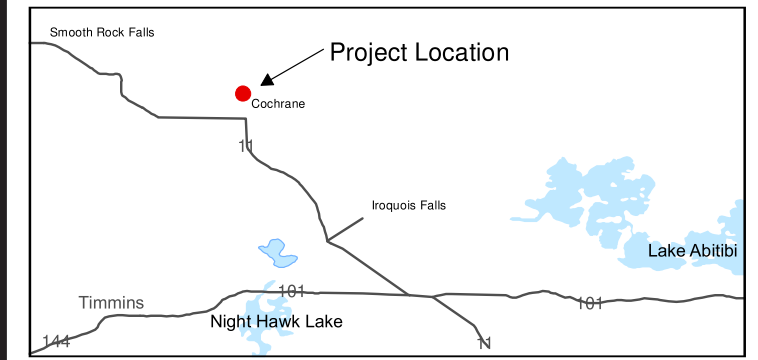
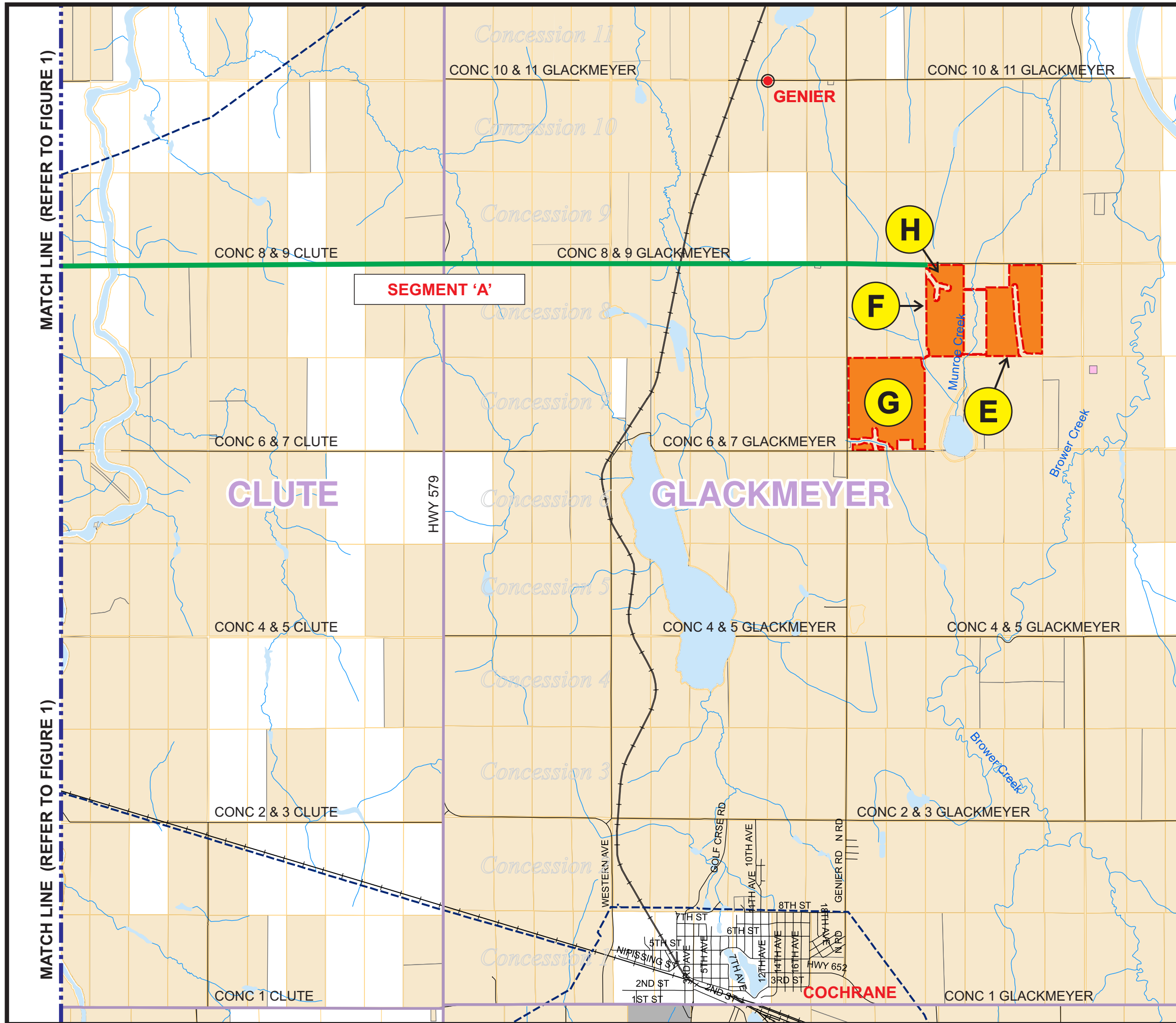
**PROJECT COMPONENTS**

- SOLAR PROJECT LOCATION
- A** CALDER SWITCHING STATION  
GPS Coordinates: 49.145230, -81.275142
- B** NORTHLAND POWER SOLAR LONG LAKES  
Parcel 1525 of Lot 3 & Parcel 2255 of Lot 2,  
Concession 8, Township of Calder  
GPS Coordinates: 49.164016, -81.281204
- C** CALDER TRANSFORMER SUBSTATION (10MW)  
GPS Coordinates: 49.145146, -81.280174
- D** POINT OF CONNECTION  
GPS Coordinates: 49.145205, -81.274333
- PROPOSED TRANSMISSION LINE (SEGMENT A) 30MW
- PROPOSED TRANSMISSION LINE (SEGMENT B) 10MW

**FIGURE: 1**  
Proposed Transmission Line Route for  
Abitibi, Martin's Meadows, Empire &  
Long Lakes

Notes:  
1. Produced by Hatch under licence from Ontario Ministry of Natural Resources, Copyright (c) Queens Printer 2011.  
2. Spatial referencing UTM NAD 83.





**LEGEND**

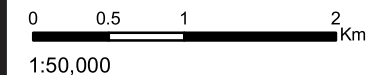
- ROAD
- +— RAIL
- - - TRANSMISSION LINE
- MINE CLAIM
- MINING ALIENATION (SURFACE RIGHT WITHDRAWN)
- ACTIVE (MINING) DISPOSITION
- REGULATED PROVINCIAL PARK
- GEOGRAPHIC TOWNSHIP
- PARCEL
- WATER BODY

**PROJECT COMPONENTS**

- SOLAR PROJECT LOCATION
- E** NORTHLAND POWER SOLAR ABITIBI  
Parcel 2488 of Lot 14 & Parcel 2487 of Lot 15,  
Concession 8, Township of Glackmeyer  
GPS Coordinates: 49.140073, -80.971227
- F** NORTHLAND POWER SOLAR MARTIN'S MEADOWS  
Parcel 2051 of Lot 16, Concession 8, Township of Glackmeyer  
GPS Coordinates: 49.141101, -80.984888
- G** NORTHLAND POWER SOLAR EMPIRE  
Parcel 1352 of Lot 18 & Parcel 1356 of Lot 17,  
Concession 7, Township of Glackmeyer  
GPS Coordinates: 49.134396, -80.997448
- H** MAIN TRANSFORMER SUBSTATION (30 MW)  
OPTION 1 GPS Coordinates: 49.145205, -81.274333
- PROPOSED TRANSMISSION LINE (SEGMENT A) 30MW

**FIGURE: 2**  
Proposed Transmission Line Route for  
Abitibi, Martin's Meadows, Empire

Notes:  
1. Produced by Hatch under licence from Ontario Ministry of Natural Resources, Copyright (c) Queens Printer 2011.  
2. Spatial referencing UTM NAD 83.



MATCH LINE (REFER TO FIGURE 1)

MATCH LINE (REFER TO FIGURE 1)

**Northland Power Solar Empire L.P., Northland Power Solar Martin's Meadows L.P.,  
Northland Power Solar Abitibi L.P. Northland Power Solar Long Lake L.P.**

**Exhibit B**

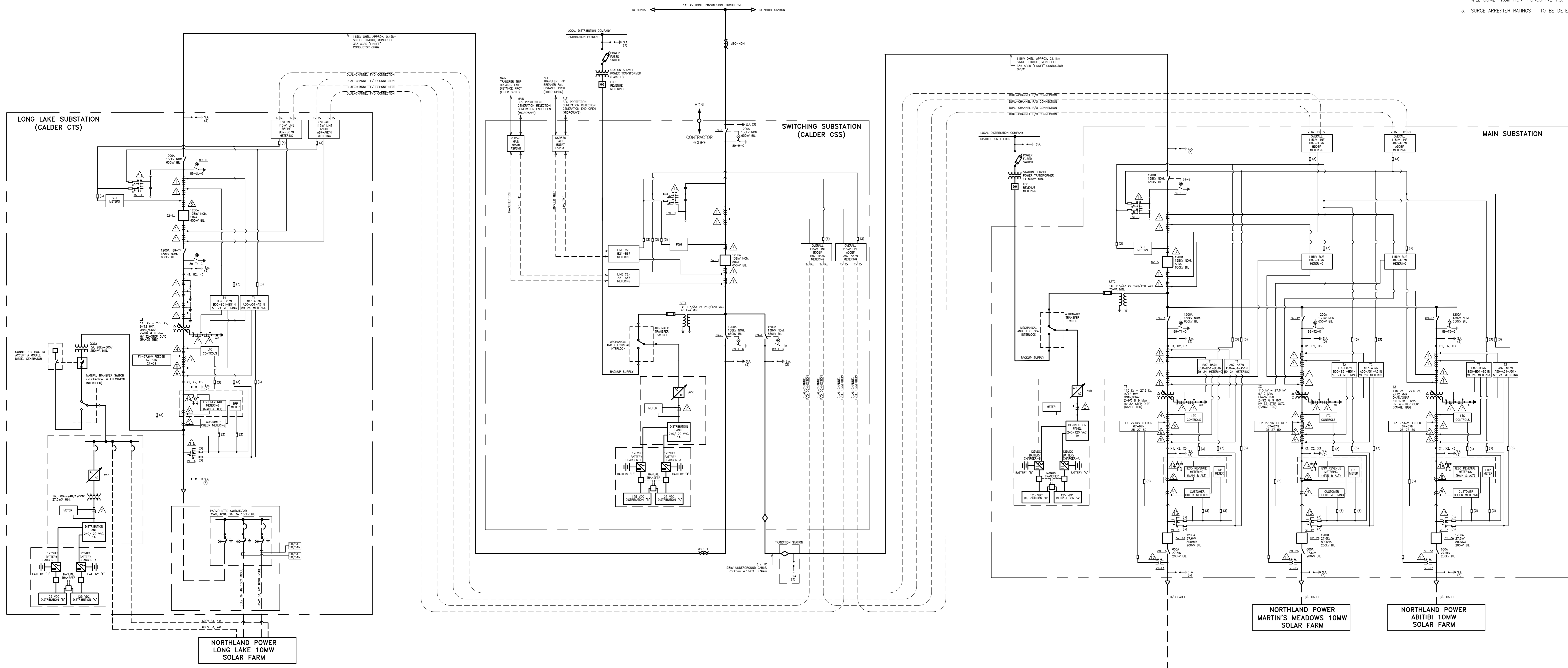
**Tab 2**

**Schedule 3**

**Page 1 of 1**

**PROJECT OVERVIEW DOCUMENTS**

**Line Drawings – Supply Connection(s)**



- NOTES:
1. HORN TRIPPER TRIP WILL COME FROM HUNTA SS VIA BLACK FIBER.
  2. THE SPECIAL PROTECTION SYSTEM GENERATION REJECTION SIGNAL WILL COME FROM HORN-POURCUNE T.S.
  3. SURGE ARRESTER RATINGS - TO BE DETERMINED.

DATE (mm dd yyyy)	ISSUED FOR	REV
JAN 04 2013	REVIEW	A
JAN 11 2013	REVIEW	B

PREPARED FOR

CLIENT DWG No. \_\_\_\_\_  
CONSULTANTS

**Chimax Inc.**  
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This drawing has been prepared solely for the use of NORTHLAND POWER and there are no representations of any kind made by IBI Group to any party with whom IBI Group has not entered into a contract

Project Manager PIERO LUCCI	Architect/Engineer K.P. JACKSON
Project Leader PIERO LUCCI	Drawn JR
Date JAN 03 2013	Checked ALI SABER

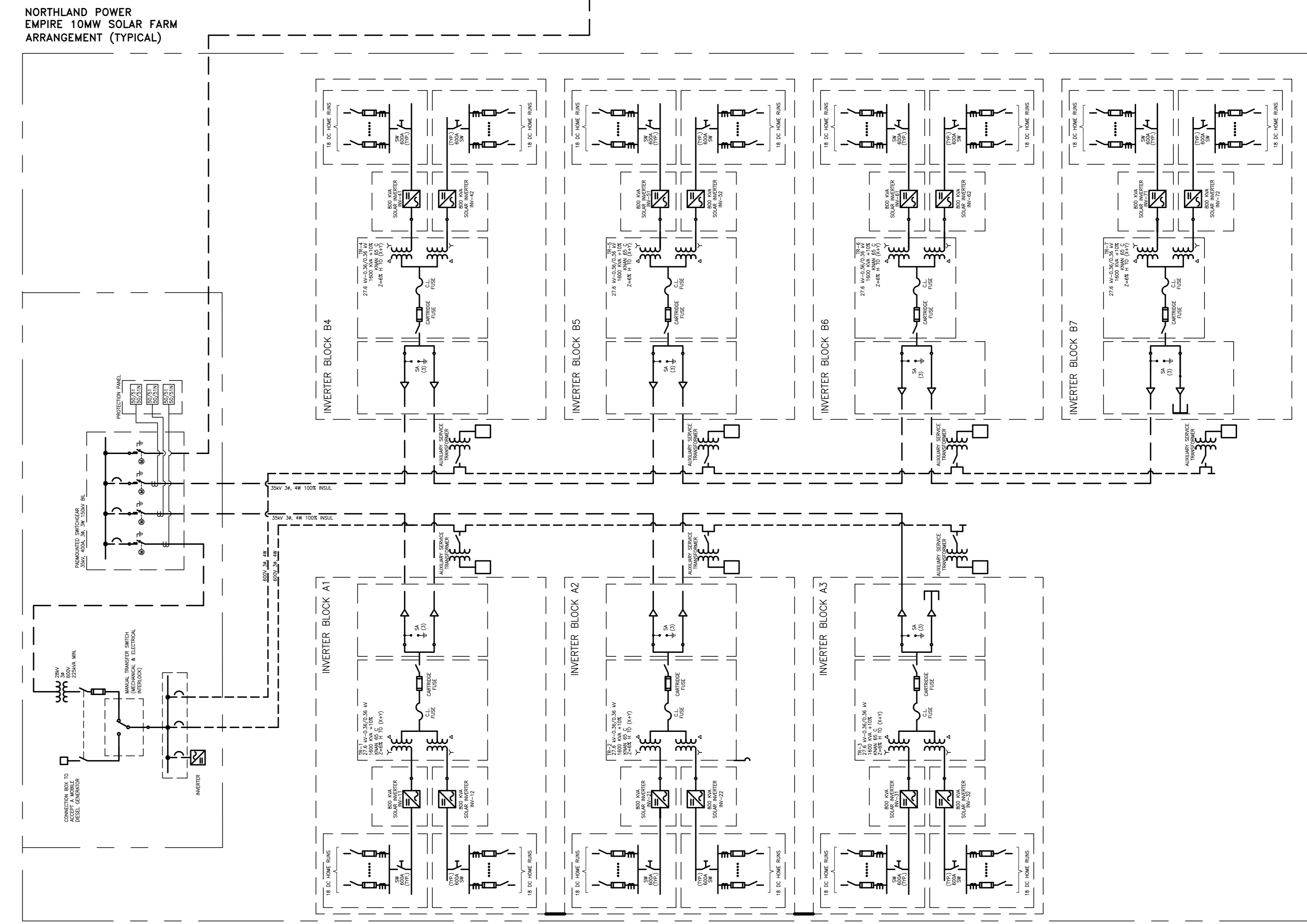
Client  
**NORTHLAND POWER**  
NORTHERN SOLAR  
Toronto, Ontario

Project  
**LONG LAKE, EMPIRE,  
MARTIN'S MEADOWS  
AND ABITIBI**

Drawing Title  
**OVERALL  
SINGLE LINE DIAGRAM**

Check Scale (may be photo-reduced)  
0 1 inch 10mm

Project No. 24RX12-0695 Drawing No. E10-00-01



INSTRUMENT TRANSFORMERS

3 x 1000/5000-5A, Y# 0.5S01 CERT: 2 # MAX. CT RATING: # 30% AMBIENT	3 x 15/0001 0.5S01
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1 x 300-5A, Y# 0.5S01-1 CERT: 1.2 # MAX. CT RATING: # 30% AMBIENT	1 x 14/0001 0.5S01
3 x 300/150-5A, Y# 0.5S01-1 CERT: 1.5 # MAX. CT RATING: # 30% AMBIENT MEASUREMENT CIRCUIT APPROVED COMB IT WITH	3 x 14/0001 0.5S01
3 x 300/150-5A, Y# 0.5S01-1 CERT: 1.5 # MAX. CT RATING: # 30% AMBIENT	3 x 14/0001 0.5S01



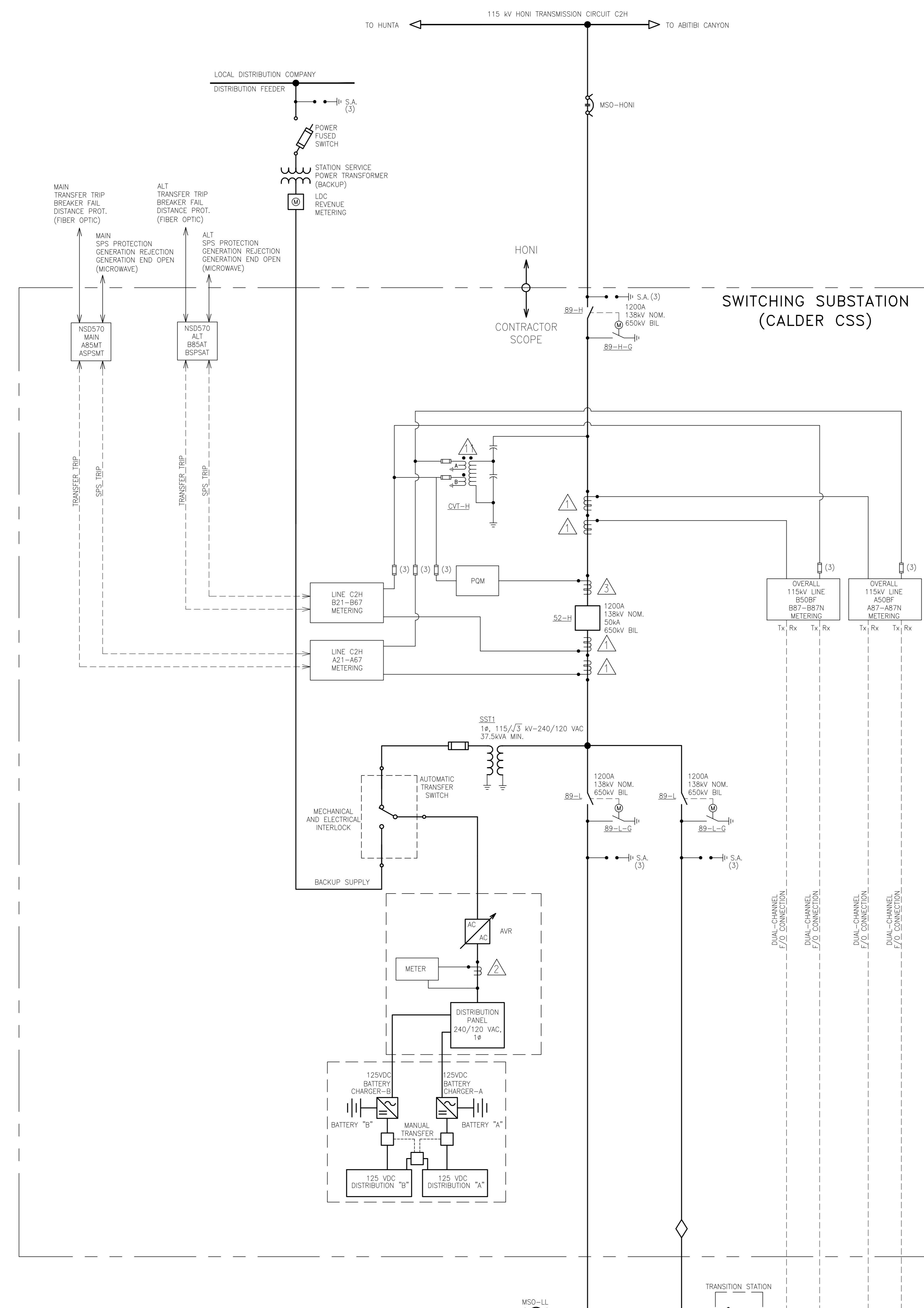
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- 3 X 1000/5000-5A, Y-  
C400  
0.381.8  
CCRF: 2 @ MAX. CT RATING, @ 30°C AMBIENT
- 1 X 300/150-5A, Y-  
0.381.8  
CCRF: 1.5 @ MAX. CT RATING, @ 30°C AMBIENT
- 3 X 200/150-5A, Y-  
0.381.8  
CCRF: 1.5 @ MAX. CT RATING, @ 30°C AMBIENT
- 1 X 300-5A, Y-  
0.381.8  
CCRF: 1.2 @ MAX. CT RATING, @ 30°C AMBIENT
- 3 X 300-5A, Y-  
C200  
CCRF: 1.2 @ MAX. CT RATING, @ 30°C AMBIENT
- 3 X 300-5A, Y-  
200  
0.381.8  
CCRF: 1.2 @ MAX. CT RATING, @ 30°C AMBIENT
- 1 X 300-5A, Y-  
C200  
CCRF: 1.2 @ MAX. CT RATING, @ 30°C AMBIENT
- 3 X 300/150-5A, Y-  
0.155B1.8  
CCRF: 1.5 @ MAX. CT RATING, @ 30°C AMBIENT  
MEASUREMENT CANADA APPROVED  
COMBO IT WITH
- 3 X 300/150-5A, Y-  
0.381.8  
CCRF: 1.5 @ MAX. CT RATING, @ 30°C AMBIENT

- 3 X 69.000V, Y-  
69V-69V  
0.3WXY
- 1 X 16.800V, Y-  
69V  
0.3WXY
- 3 X 16.800V, Y-  
120V-69V  
0.3WXY
- 3 X 16.800V, Y-  
120V  
0.3WXY  
MEASUREMENT CANADA APPROVED  
COMBO IT WITH

REFER TO DRAWING E10-01-02 FOR CONTINUATION

DUAL-CHANNEL F/O CONNECTION  
DUAL-CHANNEL F/O CONNECTION  
DUAL-CHANNEL F/O CONNECTION  
DUAL-CHANNEL F/O CONNECTION



- NOTES:
- HONI TRANSFER TRIP WILL COME FROM HUNTA SS VIA BLACK FIBER.
  - THE SPECIAL PROTECTION SYSTEM GENERATION REJECTION SIGNAL WILL COME FROM HONI-PORCUPINE T.S.
  - SURGE ARRESTER RATINGS - TO BE DETERMINED.

DATE (mm dd yyyy)	ISSUED FOR	REV
JAN 16 2013	FINAL REVIEW	A

PREPARED FOR

CLIENT DWG No. \_\_\_\_\_  
CONSULTANTS

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Project Manager PIERO LUCCI	Architect/Engineer K.F. ACCOCK
Project Leader PIERO LUCCI	Drawn JR
Date JAN 03 2013	Checked ALI SABER
Client <b>NORTHLAND POWER</b> NORTHERN SOLAR Toronto, Ontario	

Project  
**LONG LAKE, EMPIRE, MARTIN'S MEADOWS AND ABITIBI**

Drawing Title  
**SWITCHING SUBSTATION SINGLE LINE DIAGRAM**

Check Scale (may be photo-reduced)	
0	10mm
0	1 inch
Project No. 24RX12-0695	Drawing No. E10-01-01

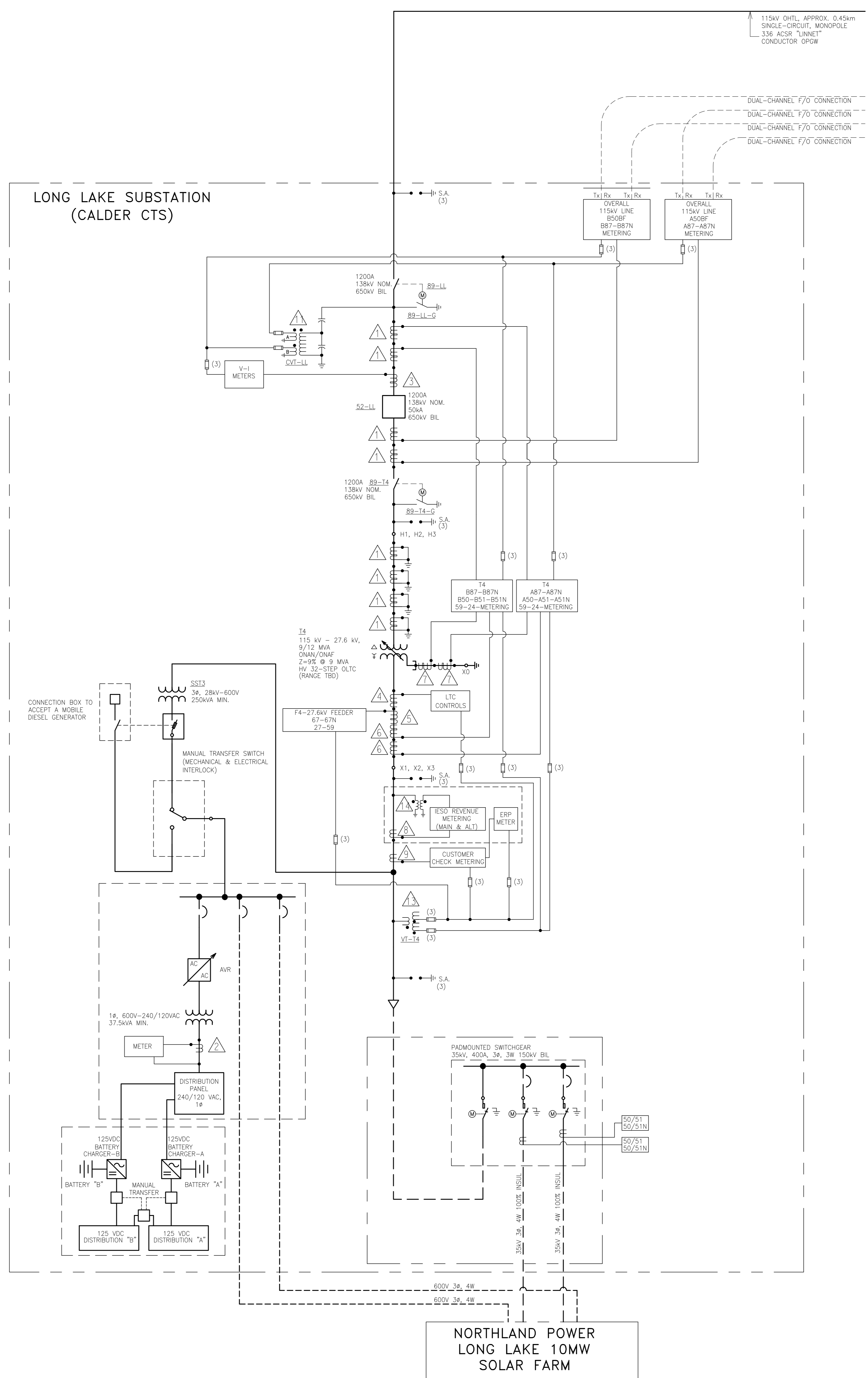
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DUAL-CHANNEL F/O CONNECTION  
DUAL-CHANNEL F/O CONNECTION  
DUAL-CHANNEL F/O CONNECTION

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DATE (mm dd yyyy)	ISSUED FOR	REV
JAN 16 2013	FINAL REVIEW	A

REFER TO DRAWING E10-01-01 FOR CONTINUATION



REFER TO DRAWING E10-01-04 FOR SOLAR FARM ARRANGEMENT

**INSTRUMENT TRANSFORMERS**

- 3 X 1000/5000-5A, Y#  
C400  
0.3B1.8  
CCRF: 2 @ MAX. CT RATING, @ 30°C AMBIENT
- 2 X 300/150-5A, Y#  
0.3B1.8  
CCRF: 1.5 @ MAX. CT RATING, @ 30°C AMBIENT
- 3 X 200/150-5A, Y#  
0.3B1.8  
CCRF: 1.5 @ MAX. CT RATING, @ 30°C AMBIENT
- 4 X 300-5A, Y#  
C200  
0.3B1.8  
CCRF: 1.2 @ MAX. CT RATING, @ 30°C AMBIENT
- 3 X 300-5A, Y#  
C200  
0.3B1.8  
CCRF: 1.2 @ MAX. CT RATING, @ 30°C AMBIENT
- 3 X 300-5A, Y#  
200  
0.3B1.8  
CCRF: 1.2 @ MAX. CT RATING, @ 30°C AMBIENT
- 1 X 300-5A, Y#  
C200  
0.3B1.8  
CCRF: 1.2 @ MAX. CT RATING, @ 30°C AMBIENT
- 3 X 300/150-5A, Y#  
0.155B1.8  
CCRF: 1.5 @ MAX. CT RATING, @ 30°C AMBIENT  
MEASUREMENT CANADA APPROVED  
COMBO IT WITH
- 3 X 300/150-5A, Y#  
0.3B1.8  
CCRF: 1.5 @ MAX. CT RATING, @ 30°C AMBIENT

PREPARED FOR

CLIENT DWG No.

CONSULTANTS

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Project Manager PIERO LUCCI	Architect/Engineer K.F. ACCOCK
Project Leader PIERO LUCCI	Drawn JR
Date JAN 03 2013	Checked ALI SABER

Client  
**NORTHLAND POWER**  
NORTHERN SOLAR  
Toronto, Ontario

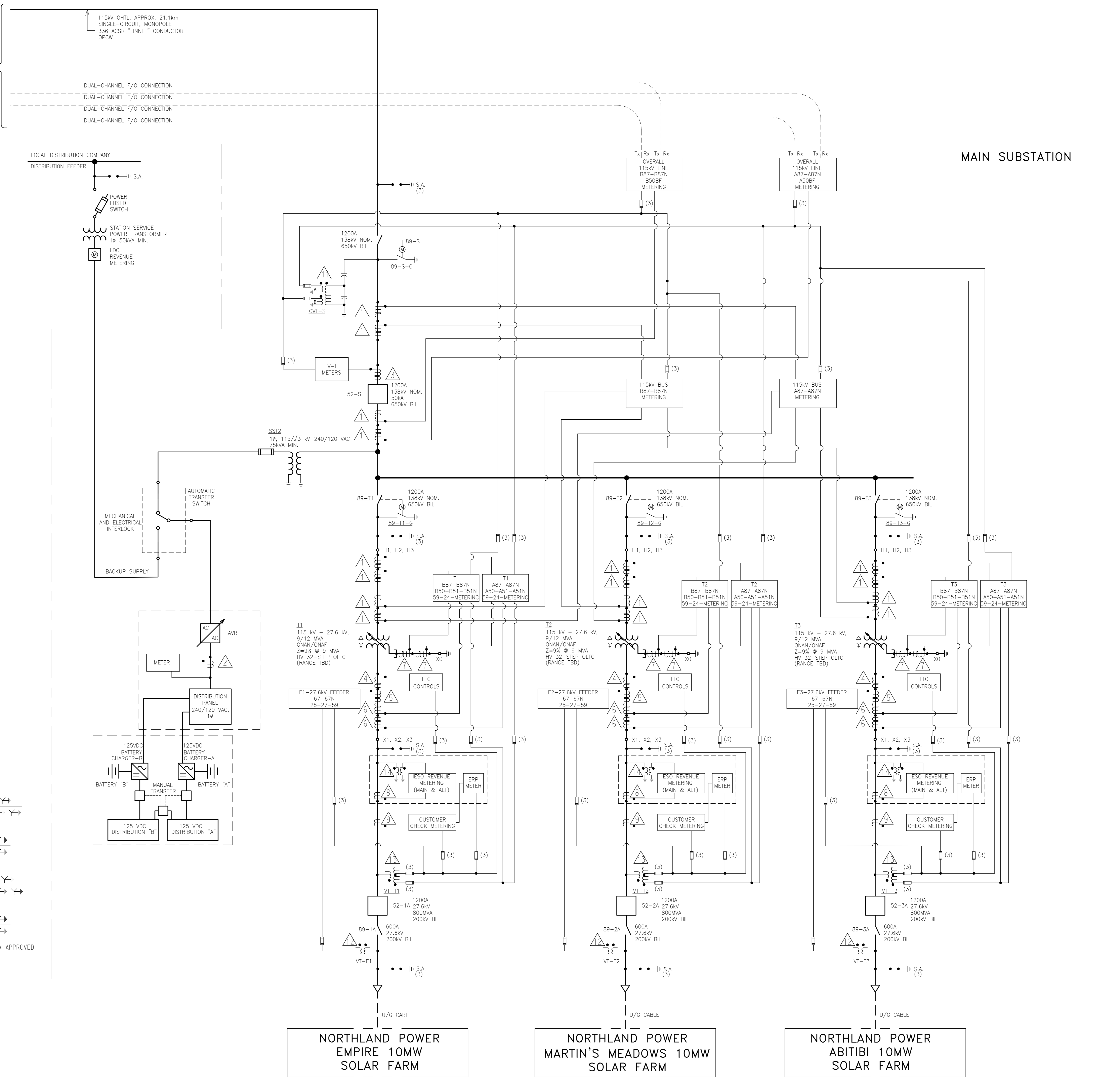
Project  
**LONG LAKE, EMPIRE,  
MARTIN'S MEADOWS  
AND ABITIBI**

Drawing Title  
**LONG LAKE SUBSTATION  
SINGLE LINE DIAGRAM**

Check Scale (may be photo-reduced)  
0 1 inch 0 10mm

Project No. 24RX12-0695 Drawing No. E10-01-02

REFER TO DRAWING E10-01-01  
FOR CONTINUATION



MAIN SUBSTATION

NORTHLAND POWER  
EMPIRE 10MW  
SOLAR FARM

NORTHLAND POWER  
MARTIN'S MEADOWS 10MW  
SOLAR FARM

NORTHLAND POWER  
ABITIBI 10MW  
SOLAR FARM

REFER TO DRAWING E10-01-05 FOR TYPICAL SOLAR FARM ARRANGEMENT

INSTRUMENT TRANSFORMERS

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0.3B1.8  
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- 1 X 300/150-5A, Y-#  
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CCRF: 1.5 @ MAX. CT RATING, @ 30°C AMBIENT
- 3 X 200/150-5A, Y-#  
0.3B1.8  
CCRF: 1.5 @ MAX. CT RATING, @ 30°C AMBIENT
- 1 X 300-5A, Y-#  
0.3B1.8  
CCRF: 1.2 @ MAX. CT RATING, @ 30°C AMBIENT
- 3 X 300-5A, Y-#  
C200  
CCRF: 1.2 @ MAX. CT RATING, @ 30°C AMBIENT
- 3 X 300-5A, Y-#  
200  
0.3B1.8  
CCRF: 1.2 @ MAX. CT RATING, @ 30°C AMBIENT
- 1 X 300-5A, Y-#  
C200  
CCRF: 1.2 @ MAX. CT RATING, @ 30°C AMBIENT
- 3 X 300/150-5A, Y-#  
0.155B1.8  
CCRF: 1.5 @ MAX. CT RATING, @ 30°C AMBIENT  
MEASUREMENT CANADA APPROVED  
COMBO IT WITH
- 3 X 300/150-5A, Y-#  
0.3B1.8  
CCRF: 1.5 @ MAX. CT RATING, @ 30°C AMBIENT

PREPARED FOR

CLIENT DWG No. \_\_\_\_\_  
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Project Manager PIERO LUCCHI	Architect/Engineer K.P. ACCOCK
Project Leader PIERO LUCCHI	Drawn JR
Date JAN 03 2013	Checked ALI SABER

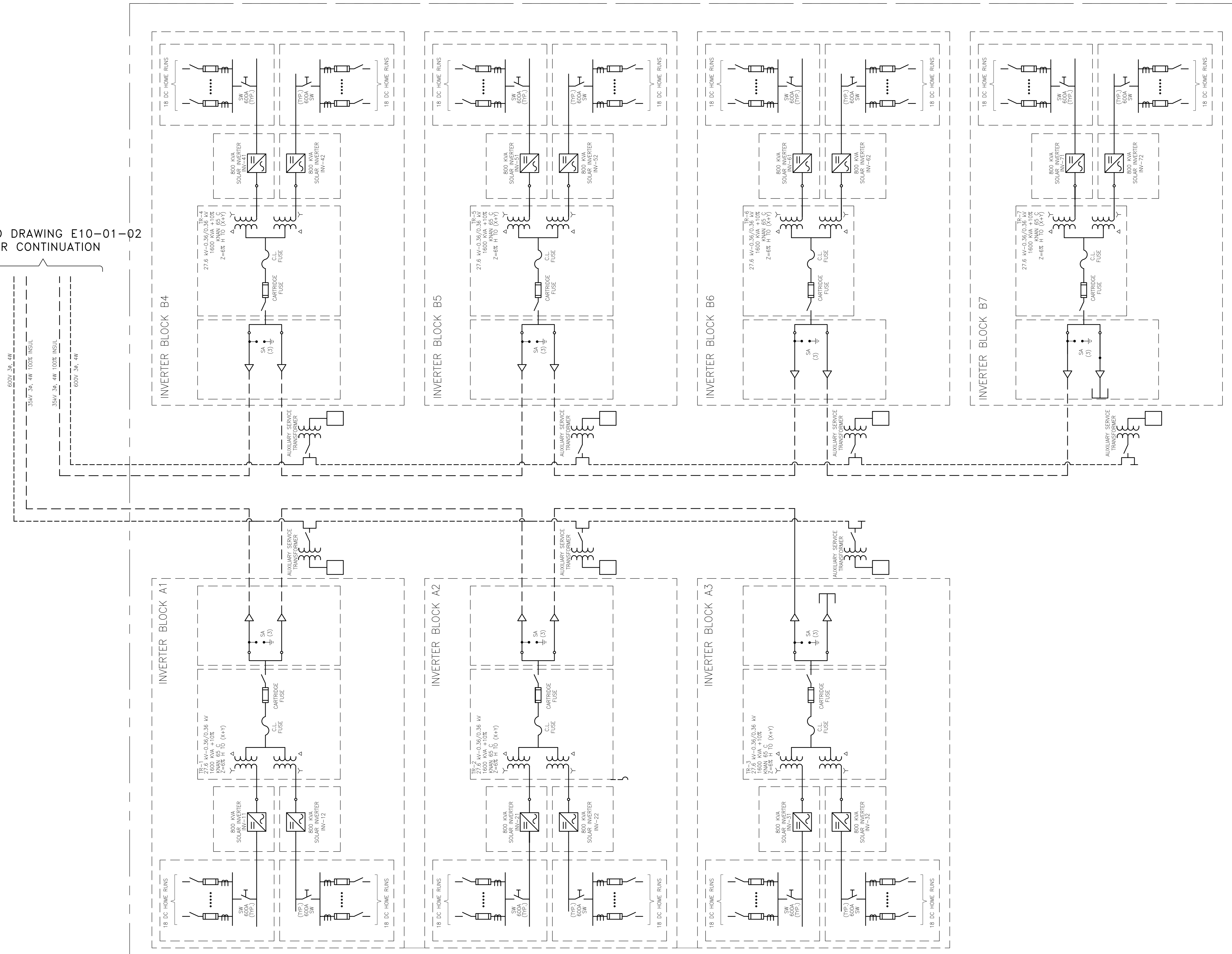
Client  
**NORTHLAND POWER  
NORTHERN SOLAR**  
Toronto, Ontario

Project  
**LONG LAKE, EMPIRE,  
MARTIN'S MEADOWS  
AND ABITIBI**

Drawing Title  
**MAIN SUBSTATION  
SINGLE LINE DIAGRAM**

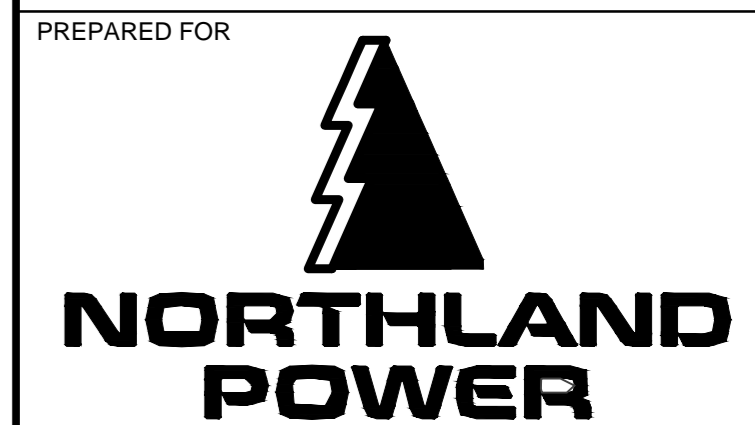
NORTHLAND POWER LONG LAKE 10MW  
SOLAR FARM ARRANGEMENT

REFER TO DRAWING E10-01-02  
FOR CONTINUATION



User Name: Steve Lacroix Plot Date/Time: Tuesday, January 22, 2013 1:31:15 PM Path and File Name: I:\v\_electrical\_engineering\ven\1\chimax\_northland\bi\_drawings\10-01-04.dwg

DATE (mm dd yyyy)	ISSUED FOR	REV
JAN 16 2013	FINAL REVIEW	A



CLIENT DWG No.  
CONSULTANTS  
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Project Manager PIERO LUCCI	Architect/Engineer K.F. ACCOCK
Project Leader PIERO LUCCI	Drawn JR
Date JAN 03 2013	Checked ALI SABER

Client  
**NORTHLAND POWER  
NORTHERN SOLAR**  
Toronto, Ontario

Project  
**LONG LAKE, EMPIRE,  
MARTIN'S MEADOWS  
AND ABITIBI**

Drawing Title  
**LONG LAKE SOLAR FARM  
ARRANGEMENT  
SINGLE LINE DIAGRAM**

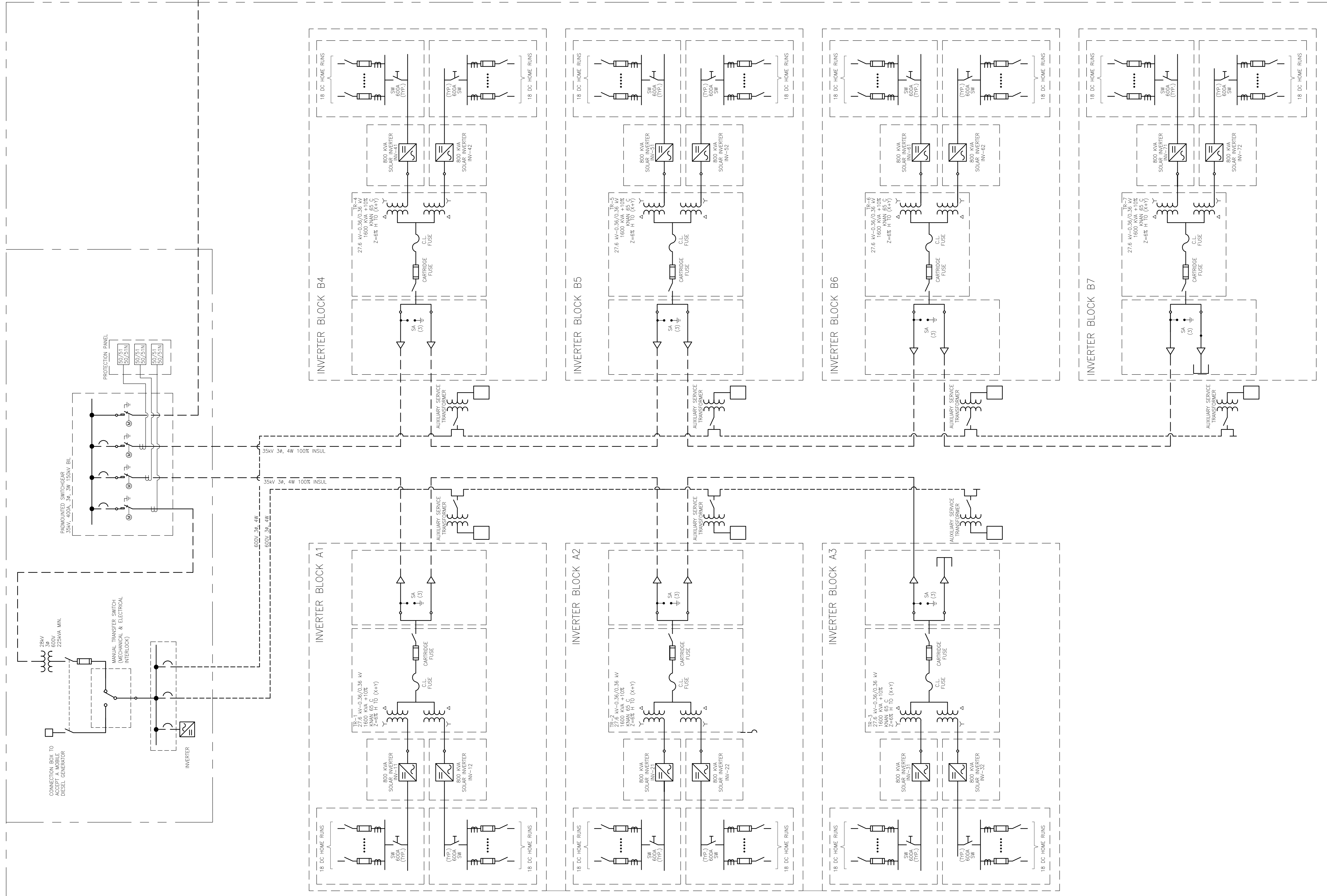
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0 10mm  
1 Inch

Project No.  
**24RX12-0695**

Drawing No.  
**E10-01-04**

NORTHLAND POWER  
10MW SOLAR FARM  
ARRANGEMENT (TYPICAL)

REFER TO DRAWING E10-01-03  
FOR CONTINUATION



DATE	ISSUED FOR	REV
JAN 16 2013	FINAL REVIEW	A

PREPARED FOR

CLIENT DWG No.  
CONSULTANTS

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Project Manager PIERO LUCCI	Architect/Engineer K.F. ACCOCK
Project Leader PIERO LUCCI	Drawn JR
Date JAN 03 2013	Checked ALI SABER
Client <b>NORTHLAND POWER</b> NORTHERN SOLAR Toronto, Ontario	

Project  
LONG LAKE, EMPIRE,  
MARTIN'S MEADOWS  
AND ABITIBI

Drawing Title  
TYPICAL SOLAR FARM  
ARRANGEMENT  
SINGLE LINE DIAGRAM

Check Scale (may be photo-reduced)  
0 1 inch 10mm

Project No.  
24RX12-0695

Drawing No.  
E10-01-05

## PROJECT OVERVIEW DOCUMENTS

### Nominal Ratings

The preliminary nominal ratings of the main components of the Transmission Facilities will be as follows:

Component(s)	Major Ratings
Main step-up transformers for the four (4) Generation Projects	Single transformer per Project: 27.6-120 kV, 9/12 MVA, ONAN/ONAF One step-up transformer may instead be used for Martin's Meadows, Abitibi and Empire: 27.6-120 kV, 27/36 MVA, ONAN/ONAF Transformer BIL of 150 kV (medium voltage winding), 95 kV (medium voltage neutral) and 650 kV (high voltage winding)
High voltage breakers	138 kV nominal, 1200A, 650 kV BIL, 50 kA interrupting capacity
High voltage disconnect switches	138 kV nominal, 1200A, 650 kV BIL, 50 kA for 1 second
Medium voltage collector system breakers	34.5 kV nominal, 1200A, 200 kV BIL, 31.5 kA interrupting capacity
Medium voltage collector system main disconnect switches	34.5 kV nominal, 1200A, 200 kV BIL, 31.5 kA for 1 second
Overhead high voltage line capacity	570 A under 40°C ambient and 100°C operating temperature
Underground high voltage line capacity	90 MVA, 90°C operating temperature
Inverter capacity	0.714 kW per inverter, 10 MW combined capacity per project

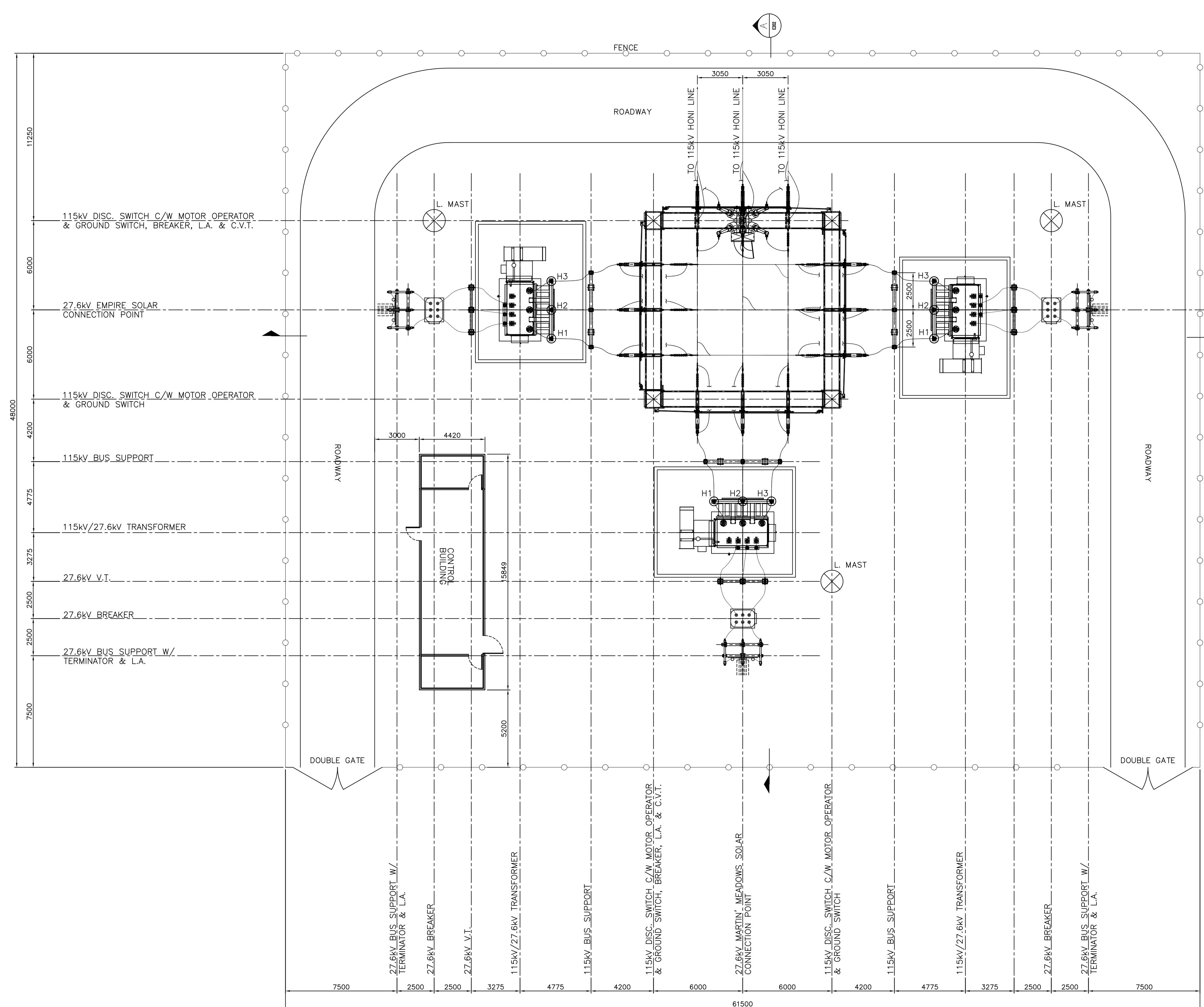
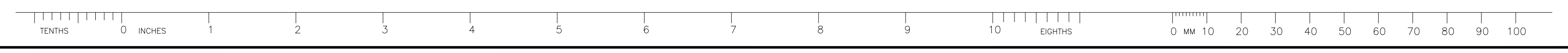
Other major equipment preliminary ratings are included on the diagrams provided in Exhibit B, Tab 2, Schedule 5.

**Northland Power Solar Empire L.P., Northland Power Solar Martin's Meadows L.P.,  
Northland Power Solar Abitibi L.P., Northland Power Solar Long Lake L.P.**

**Exhibit B  
Tab 2  
Schedule 5  
Page 1 of 1**

**PROJECT OVERVIEW DOCUMENTS**

**Site Plans and Layout Drawings – Transmission Facilities**



NOTES:  
 1. FOR MAIN GENERATING SUBSTATION SITE PLAN, SEE DWG. #1250-E101.  
 2. ALL DIMENSIONS ARE MM U.N.O.

PLAN VIEW  
(OPTION 1A)

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APPROVED FOR CONSTRUCTION

CLIENT PROJECT MGR. DEPARTMENT MGR. PROJECT MGR.

PROJECT PHASE AREA NORTHLAND POWER INC. COCHRANE SOLAR PROJECTS

PROJECT NO. ACTIVITY NO. PACKAGE CODE SUBJECT HV FACILITIES MAIN GENERATING SUBSTATION LAYOUT PLAN (OPTION 1A)

SCALE N.T.S. (11"x17") BY D/M/Y DSN. E.KWONG 23/10/12 DRN. D.MAO 23/10/12

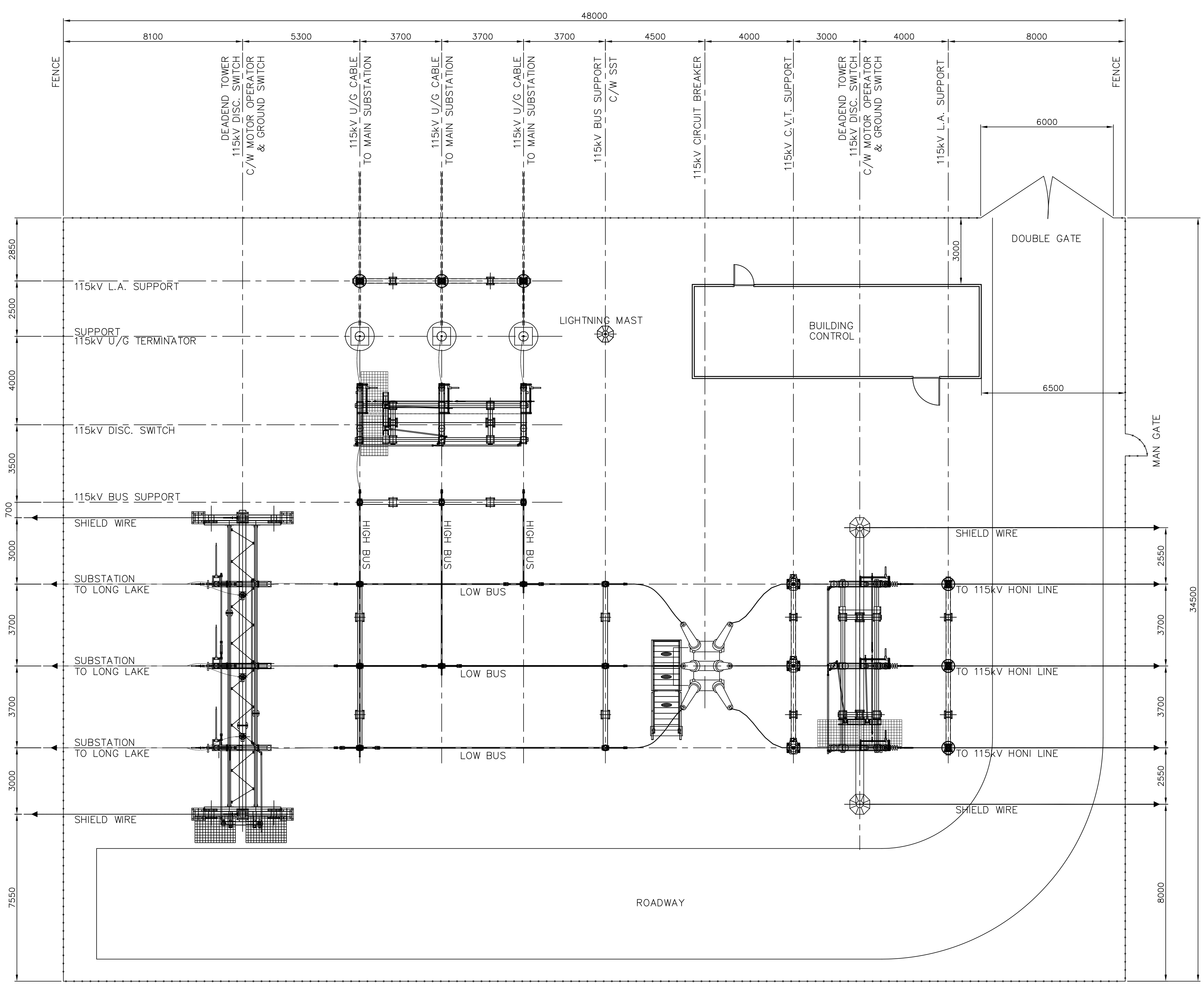
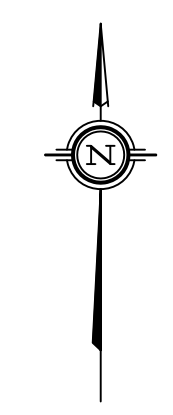
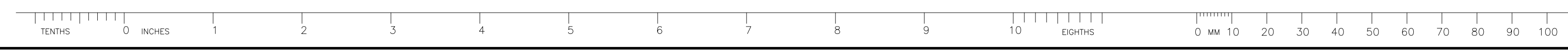
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A	12/12/12	ISSUED FOR REVIEW							A	12/12/12	ISSUED FOR REVIEW					

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- NOTES:  
 1. FOR SWITCHING STATION SITE PLAN, SEE DWG. #1250-E201B.  
 2. ALL DIMENSIONS ARE MM U.N.O.

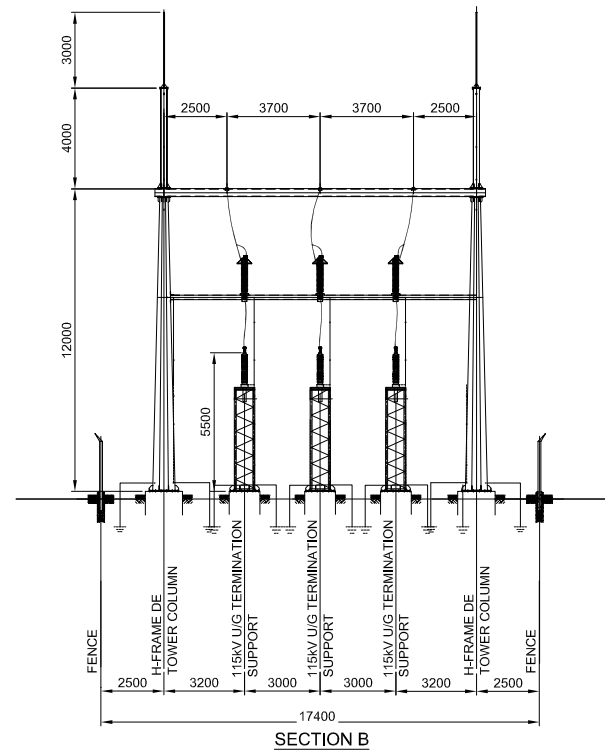
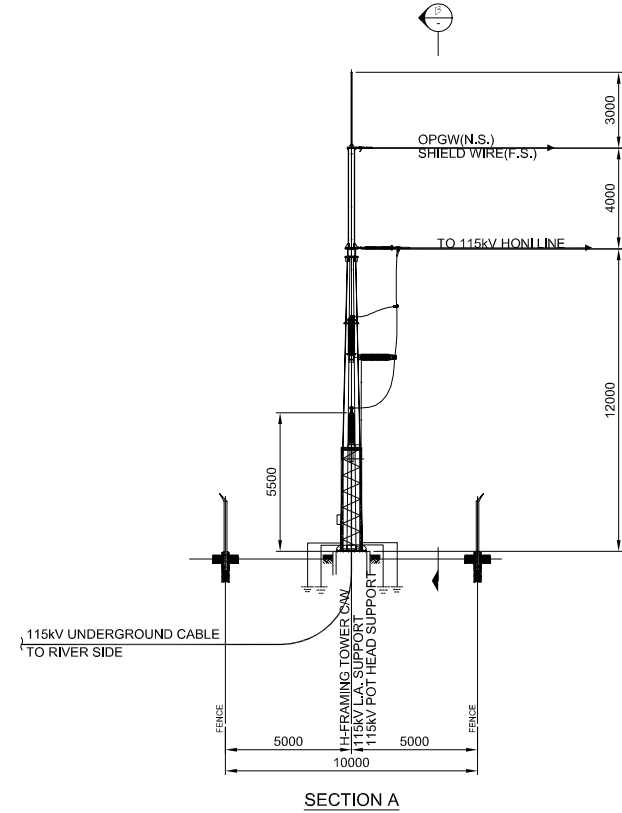
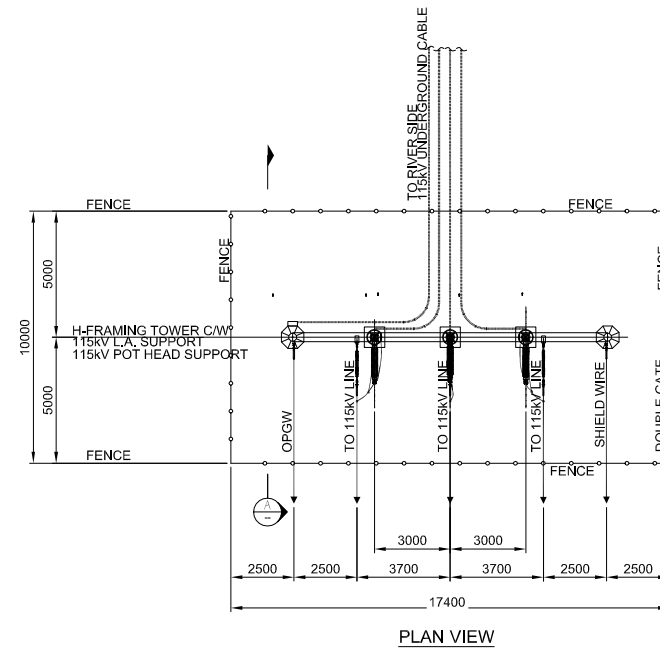
PLAN VIEW  
(OPTION 2)

A 13/12/12 ISSUED FOR REVIEW REV D/M/Y REVISION		M.H. E.K. DR CHK APP APP APP APP		A 13/12/12 ISSUED FOR REVIEW ISS D/M/Y APP ISSUED FOR		REF NUMBER TITLE REFERENCES		STAMP/SEAL PROPRIETARY INFORMATION THIS DRAWING IS THE PROPERTY OF CHIMAX INC. AND IS NOT TO BE LOANED OR REPRODUCED IN ANY WAY WITHOUT THE PERMISSION OF CHIMAX INC.		APPROVED FOR CONSTRUCTION CLIENT PROJECT MGR. DEPARTMENT MGR. PROJECT MGR.		PROJECT PHASE PROJECT NO. ACTIVITY NO. PACKAGE CODE		AREA NORTHLAND POWER INC. COCHRANE SOLAR PROJECTS		SUBJECT HV FACILITIES SWITCHING STATION OPTION 2 PLAN VIEW		CLIENT DWG. NO. DRAWING NO. 1250-E202B CADD FILE ADDRESS 1250-E202B-A		REV. A	
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NOTES:  
1. ALL DIMENSIONS ARE MM U.N.O.



115kV O/H TO U/G TRANSITION STATION  
PRIVATE EASEMENT RIGHT OF WAY  
STATION LAYOUT

REV	D/M/Y	REVISION	D.M.	E.K.	DR	CHK	APP	APP	APP	APP	ISS	D/M/Y	ISSUED FOR REVIEW	ISSUED FOR	REF	NUMBER	TITLE	REFERENCES
A	19/09/12	ISSUED FOR REVIEW										19/09/12	ISSUED FOR REVIEW					

APPROVED FOR CONSTRUCTION		
CLIENT PROJECT MGR.	DEPARTMENT MGR.	PROJECT MGR.
PROJECT PHASE		
PROJECT NO.	ACTIVITY NO.	PACKAGE CODE
SCALE N.T.S. (11"x17")		
BY D.S.N. E.KWONG D.M.AO		
D/M/Y 19/09/12		

AREA	NORTHLAND POWER INC. COCHRANE SOLAR PROJECTS
SUBJECT 115kV OVERHEAD TO UNDERGROUND TRANSITION STATION LAYOUT PLAN & SECTIONS	

**NORTHLAND POWER**

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Email: chimex@chimex.ca

CLIENT DWG. NO.

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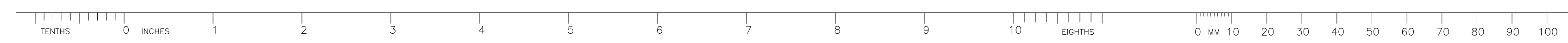
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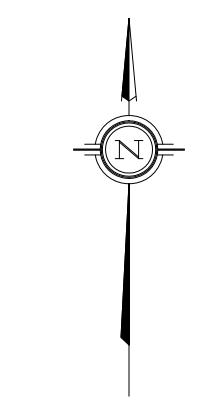
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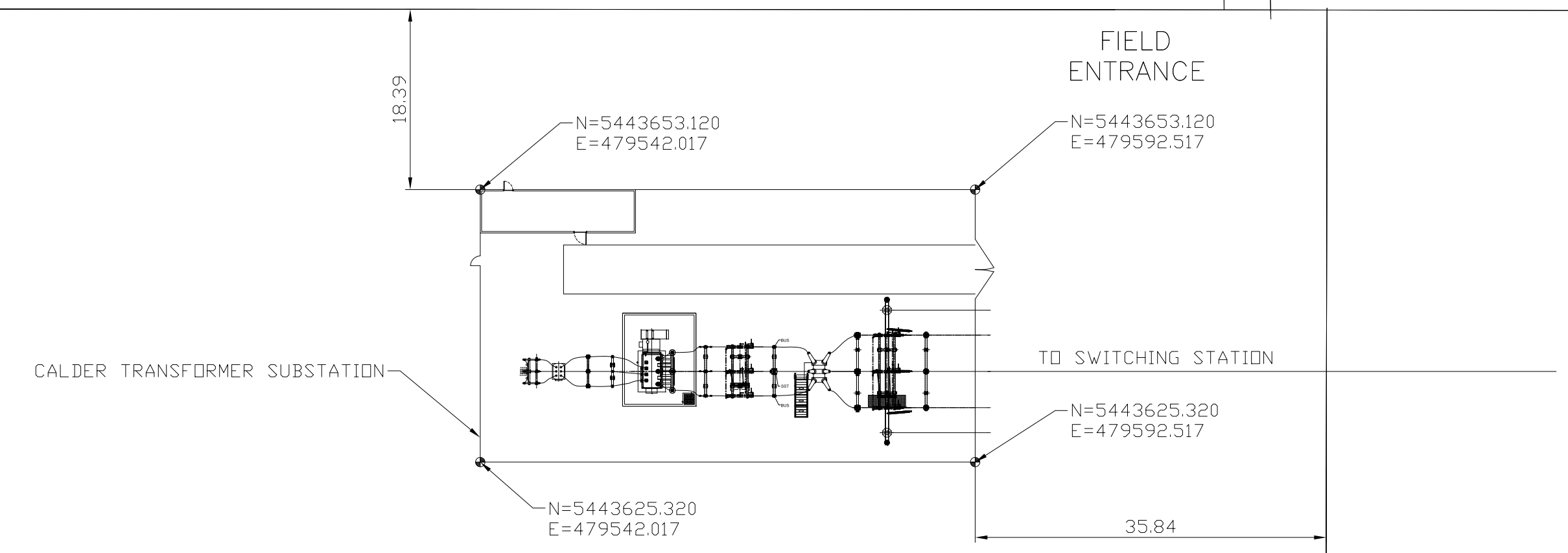
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- NOTES:  
 1. FOR CALDER TRANSFORMER SUBSTATION LAYOUT PLAN, SEE DWG. # 1250-E402B.  
 2. ALL DIMENSIONS ARE METER U.N.O.



CONCESSIONS 8 & 9, TOWNSHIP OF CALDER



LOT 2

LOT 1

**CALDER TRANSFORMER SUBSTATION  
 SITE PLAN  
 (OPTION B)**

**NORTHLAND POWER**

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 Engineering Company  
 3850 Fourteenth Ave. East, Suite 506  
 Markham, On., L3R 0A9  
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										APPROVED FOR CONSTRUCTION																																																							
										CLIENT PROJECT MGR.	DEPARTMENT MGR.	PROJECT MGR.	AREA	NORTHLAND POWER INC. COCHRANE SOLAR PROJECTS																																																			
										PROJECT NO.	ACTIVITY NO.	PACKAGE CODE	SUBJECT	CLIENT DWG. NO.																																																			
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## **NEED FOR THE PROJECT**

### *Project Rationale and Public Interest*

Please refer to Exhibit B, Tab 1, Schedule 1, paragraphs 23-27 for a description of the rationale for the Transmission Facilities and description of how these facilities meet the public interest test under subsection 96(2) of the Act.

### *Impact Assessments – Selection of Proposed Connection Point*

The Applicants applied to the IESO for a System Impact Assessment (“SIA”), and to HONI for a Connection Impact Assessment (“CIA”) in June of 2010. At the time of the original SIA and CIA applications, two (2) distinct connection points were contemplated for the Generation Projects. The connection point for the three (3) eastern Generation Projects (Martin’s Meadows, Abitibi and Empire) was selected to be on a spur line of 115 kV HONI circuit A5H, feeding the Cochrane TS and NPI’s Cochrane plant, immediately outside of the Town of Cochrane. The western Generation Project (Long Lake) would connect to HONI circuit C2H, in the same location as currently being proposed in this Application for all the Generation Projects. Please refer to Exhibit B, Tab 3, Schedule 2 for a diagram showing the originally proposed routes for Transmission Facilities.

During the SIA and CIA process, and following consultation with the IESO, it became apparent that it would not be possible to connect the three eastern Generating Projects (Martin’s Meadows, Abitibi and Empire) to the A5H spur line into the Town of Cochrane. The 59 MVA thermal capacity of the spur line was not adequate to carry the rated output of an existing power plant in addition to the approximately 30 MVA loading from the three eastern Generation Projects. The IESO subsequently directed the Applicants to alternatively connect to the main A5H line, near the Fournier Junction. The required transmission line construction or re-conductoring for this option would be approximately 22 kilometers. However, the economics of this option were questionable and the Applicants were not able to secure the required land rights for this routing alternative. The Applicants subsequently approached the IESO to provide thermal capacities of other circuits in the area. It was then determined that connecting the three eastern Generation Projects (Martin’s Meadows, Abitibi and Empire) to the same HONI circuit (C2H) as the western Generating Project (Long Lake) was the optimum alternative for various reasons, including the following:

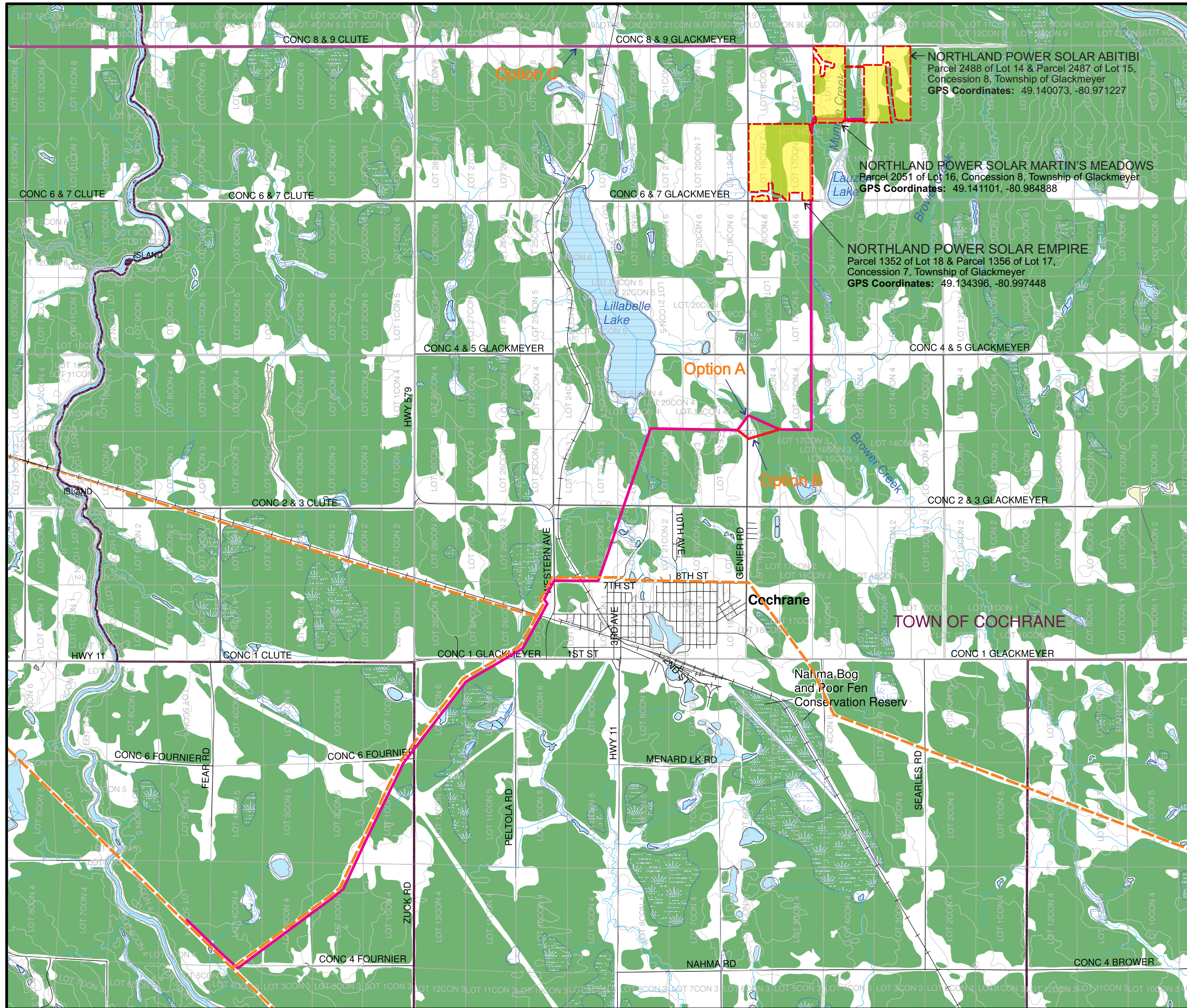
- (a) the new 115 kV transmission line from the three eastern Generation Projects (Martin’s Meadows, Abitibi and Empire) can be routed on the road allowance, thus minimizing the required number of land easements and affected landowners;
- (b) the proposed routing optimizes use of existing linear severances;
- (c) the proposed routing results in the most direct connection to the HONI transmission system;

- (d) the use of an existing municipal road right-of-way results in less environmental impact;
- (e) the route features relatively flat, gentle topography;
- (f) the route allows for adequate access in order to operate and maintain the transmission line (as opposed to going cross-country);
- (g) there is sufficient capacity on circuit C2H to accommodate the combined output of the four Generation Projects; and
- (h) The three-terminal transmission line arrangement will reduce the number of connection points to HONI's 115 kV system to one (1), resulting in a lower cost to connect and fewer assets to maintain (only one HONI interconnection station is required).

**NEED FOR PROJECT**

**Originally Proposed Route**

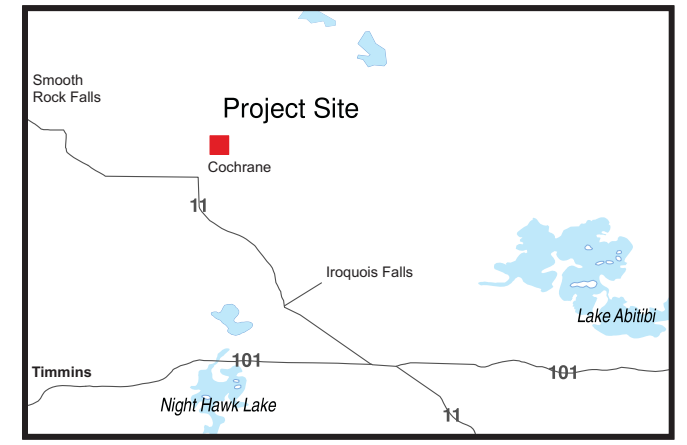
The following map sets out the original route contemplated for the three eastern Generation Projects (as presented at Public Information Centre No. 1).



← **NORTHLAND POWER SOLAR ABITIBI**  
 Parcel 2488 of Lot 14 & Parcel 2487 of Lot 15,  
 Concession 8, Township of Glackmeyer  
**GPS Coordinates: 49.140073, -80.971227**

**NORTHLAND POWER SOLAR MARTIN'S MEADOWS**  
 Parcel 2051 of Lot 16, Concession 8, Township of Glackmeyer  
**GPS Coordinates: 49.141101, -80.984888**

**NORTHLAND POWER SOLAR EMPIRE**  
 Parcel 1352 of Lot 18 & Parcel 1356 of Lot 17,  
 Concession 7, Township of Glackmeyer  
**GPS Coordinates: 49.134396, -80.997448**



**Legend**

- Road
- Railway
- Topographic Contour (5m interval)
- Existing Transmission Line
- Watercourse
- Lot
- ▭ Wild Rice Stand
- ▭ Waterbody
- ▭ Wetland Area
- ▭ Woodland Area

**Project Components**

- ▭ Project Site
- ▭ 300m from Project Location

**Transmission Options**

- Original Proposed Option A
- Original Proposed Option B
- New Proposed Option C

Notes:  
 1. OBM and NRVIS data downloaded from LIO, with permission.  
 2. Spatial referencing UTM NAD 83.



**Past and Present Proposed  
 Transmission Line Route**



**TRANSMISSION RATE IMPACT ASSESSMENT**

The proposed Transmission Facilities are to be used solely to connect the Generation Projects to the transmission system. The Applicants will therefore not be licensed or rate-regulated transmitters. The financial risk of constructing, owning, and operating the Transmission Facilities will lie solely with the Applicants.