CanadianSolar

GoodLight SOLAR

# GoodLight

## MODIFICATIONS DOCUMENT

*JANUARY 2014*

DILLON CONSULTING

## Table of Contents



## List of Appendices

## 1. Introduction

Canadian Solar Solutions Inc. ("Canadian Solar") is developing a 10-megawatt (MW) solar photovoltaic project to be known as GoodLight. The project has been approved to be located on approximately 31 hectares (77 acres) of land at 1175 and 2002 Sandringham Road near Woodville, in the City of Kawartha Lakes, Ontario. A Renewable Energy Approval (REA) application was submitted to the Ontario Ministry of the Environment (MOE) in June 2012 in accordance with the requirements of *Ontario Regulation 359/09*.[1]

On June 13, 2013 an REA was issued for the construction of GoodLight (REA Number 4324-96UL4W), which is outlined in **Appendix A**. An amendment to this approval based on a settlement at the Environmental Review Tribunal is underway (Minutes of Settlement dated August 16, 2013; Environmental Review Tribunal File No. 13-076). Since that time, White Construction Inc. (White Construction) has completed detailed design of the solar facility. During this process, White Construction has identified technical changes that could only be identified through detailed design of the project. Primarily, the availability of more efficient equipment that allows for the reduction of the number inverter locations has required a redesign of the overall layout of the project. As such, the proponent is proposing some technical changes to the preliminary design. Since the REA is based on the preliminary design, the proponent is seeking a technical change to the REA. This report outlines the proposed amendments and any potential impacts that may be anticipated to the natural environment and neighbouring landowners.

To avoid confusion, this report focuses on the final design as prepared by White. To review the preliminary design as submitted to the MOE as part of the REA application, please visit: http://www.goodlightsolar.com/

[1] It should be noted that the Proposal to Engage for this project was issued prior to January 1, 2011, and as such, the proponent is permitted to continue under the 2009/2010 pre-submission rules. For clarity, this report has been prepared in accordance with the 2011 pre-submission rules and fulfills the requirements of *Ontario Regulation 359/09*, as amended on November 2, 2012.

## 2. Overview of the Minor Amendment

The basis for this technical change amendment is the availability of more efficient equipment that allows for the reduction of the number inverter locations, resulting in a revised project layout that optimizes the overall efficiency of the facility. Based on this, detailed engineering designs for GoodLight have been undertaken and the proponent identified the need to amend the original REA. Through consultation with the MOE in November 2013, it is expected that the proposed modification detailed within this amendment report are insignificant in nature and represent a reduction in overall environmental effects of the project (see **Appendix B** for agency correspondence). As such, the proposed changes constitute a technical change amendment.

This Modifications Document focuses on the following proposed changes:

- Reduction of the project area inside the perimeter fence;
- Change in access road locations;
- Alternate panel module manufacturer and energy output;
- An increase in the temporary construction laydown area from 1.19 ha to 1.32 ha;
- Identification of the final number of panels;
- Alternate location for the site entrance;
- Alternate location for the Point of Common Coupling (PCC);
- Alternate location for the overhead line;
- Alternate location for the communications tower;
- Revisions to inverter unit locations and model; and
- A decrease in the number of inverter units from 10 to 7.

## 3. Proponent Contact Information

Should there be any questions about the technical changes proposed for GoodLight please contact:

| | |
|---|---|
| **Full Name of Company:** | *2243913 Ontario Corp.* |
| **Address:** | *545 Speedvale Avenue West, Guelph, ON. N1K 1E6* |
| **Telephone:** | *519-837-1881 ext. 2293* |
| **Fax:** | *519-837-2550* |
| **Prime Contact:** | *Grace Pasceri, Permitting Manager – Solar Farms* |
| **Email:** | *grace.pasceri@canadiansolar.com* |

## 4. Project Size and Layout

The nameplate capacity of the project as outlined in the REA application has been maintained at 10 MW alternating current (AC); however, the area inside the perimeter fence and overall number of solar modules has been reduced. To accommodate this, the internal access roads have been reconfigured, and the total length of the access roads has been reduced from approximately 8.2 km to approximately 3.3 km. The construction laydown area has been increased slightly from 1.19 ha to 1.32 ha and has been reconfigured within the perimeter fence. The communications tower has shifted northeast approximately 50 m to accommodate the revised location of the Point of Common Coupling (PCC), which has moved northwest of its original location by approximately 200 m. Subsequently, the overhead line has been reconfigured to meet the new location of the PCC. A comparison of preliminary design and final design layouts is provided in **Appendix C**.

### 4.1 Ministry of Natural Resources

Further consultation with the Ministry of Natural Resources was not warranted for the proposed technical changes. As the final design for the project does not exceed the original project location boundary, no amendments to the Natural Heritage Assessment are required. The Ministry of Natural Resources has been circulated as part of the stakeholder notification that there are proposed technical amendments proposed to this project. Any correspondence received in response from the Ministry of Natural Resources will be subsequently forwarded to the MOE.

### 4.2 Ministry of Tourism, Culture and Sport

This reduction in the project area does not require amendments to either the Cultural Heritage or Archaeological Assessments completed and reviewed by the Ministry of Tourism, Culture and Sport. The extent of the project location did not increase and the project area was studied and commented on in the original REA submission. The locations of the project components, installation methods or equipment specifications would not change the results or information presented related to cultural heritage or archaeological resources for this project. The Ministry of Tourism, Culture and Sport has been circulated as part of the stakeholder notification that there are proposed technical amendments proposed to this project. Any correspondence received in response from the Ministry of Tourism, Culture and Sport will be subsequently forwarded to the MOE.

## 5. Solar Panels

To facilitate the optimization of the facility, the module mix has been adjusted from 30,000 to 100,000 60 – 300 W panels to approximately 47,000 28 to 305 W modules. The proponent has also opted to use a CS6X 285/290/295/300/305W model, rather than the Canadian Solar CSA230 W or Trina TSM-DA05 220 W panel indicated in the *Design and Operations Report*. The new modules are more efficient, and as a result, allow for the reduction of the project area within the perimeter fence. No negative environmental effects are anticipated as a result of the reduction in the number of solar modules.

## 6. Racking System

Due to the increased productivity of the facility's final design (discussed in **Section 4**), it is anticipated that fewer overall racks will be required. The dimensions of the racking as specified in the original REA submission remains unchanged, with a fixed design which will be attached to galvanized steel and/or aluminum support structures. Any complaints or concerns submitted regarding the visual impacts of the racks will be documented by the proponent, and visual barriers will be installed and/or upgraded as necessary. No negative effects are anticipated to wildlife or other natural heritage features as a result of the reduction in the number of racks.

## 7. Inverter Stations

It has been decided that the SMA Sunny Central 800CP-CS inverter station will be used, rather than the SMA Sunny Central 500HE inverter station indicated in the *Design and Operations Report*. This change in inverter station model requires the following changes to the original REA submission:

- The nameplate capacity of the new inverter station is higher than was indicated in the *Design and Operations Report*;
- The total number of inverter stations has been reduced from 10 to 7;
- The locations of the inverter stations have changed; and,
- An updated *Noise Study Report* has been prepared. Further details regarding the *Noise Study Report* are in **Section 9.1** and the full revised report is in **Appendix G.**

The revised *Noise Study Report* concludes that this component can be installed and meet the noise standards of the Ministry of the Environment. To review details about the inverter station, please refer to the manufacturer's specification sheet in **Appendix E**. Please see **Appendix G** for a table with updated UTM coordinates of each inverter station. It is not anticipated that the change in the location of the inverter stations will affect project visibility from neighbouring residences or result in additional negative environmental effects.

## 8. Substation

The proponent has opted to use a 7500/10000 MVA fluid-filled step-up transformer manufactured by Virginia Transformer rather than the SMA Sunny Central 1000 MV substation indicated in the preliminary design. The substation will use Envirotemp FR3 dielectric fluid. As specified in the REA approval, spill containment provisions will be provided at the substation transformer. Please refer to **Appendix F** for more detailed information on the substation. As indicated in **Section 9.1**, below, the movement of the substation transformer will not result in an exceedence of the 40 dBA requirement for noise, and the facility will remain in compliance with MOE standards.

## 9. Supporting Documentation

### 9.1 Noise Study Report

The proponent has prepared a revised *Noise Study Report*, as included in **Appendix G**, based on the technical changes discussed above. The revised *Noise Study Report* indicates that GoodLight will be in compliance with the MOE's noise standards provided that acoustic louvers are installed at Inverters 1, 2, 3 and 7. Figures from both the preliminary and revised *Noise Study Reports* that show the overall 40dBA contour footprints are provided in **Appendix C.** The complete revised *Noise Study Report* is presented in **Appendix G.**

## 10. Environmental Effects

There are no additional potential environmental effects as a result of the proposed minor amendments that were not previously anticipated in the *Project Description Report*, *Design and Operations Report*, *Construction Plan Report, Natural Heritage Assessment Reports, Water Assessment and Water Body Report* and *Decommissioning Plan Report* that were submitted as part of the original REA application. Mitigation measures proposed to reduce or eliminate potential negative effects to the natural and human environments are documented in the *Construction Plan Report, Design and Operations Report, Water Assessment and Water Body Report* and *Natural Heritage Assessment Reports* provided with the original application.

## 11. Amendments to the Original REA Submission Package

Based on the original REA submission to the MOE approved on June 13, 2013, the following table outlines which reports in the original REA submission would be affected by the proposed minor changes. For each proposed change, the report and section(s) affected are listed where the proposed changes as outlined in this REA Amendment Report would replace the text in the original report where the details are related to GoodLight. Changes to the *Noise Study Report* are addressed through the submission of the revised report in **Appendix G**.

| Proposed Change | Report | Section Affected |
|---|---|---|
| **Reduction of the project area inside the perimeter fence** | Project Description Report | Section 3, Figure 2, Figure 3 |
| | Construction Plan Report | Section 3, Figure 2, Figure 3, Figure 4 |
| | Design and Operations Report | Section 3, Figure 2, Figure 3, Figure 4 |
| | Decommissioning Plan Report | Section 3, Figure 2 |
| | NHA Records Review | Figure 2, Figure 3 |
| | NHA Site Investigation | Figure 2, 3, 4, 5, 6, 7, 8, Appendix A3 |
| | NHA Evaluation of Significance | Figure 2, 3, 4, 5, 6, 7, 8, 9, Appendix A2, Appendix A3, Appendix E |
| | NHA Environmental Impact Study | Figure 2, Figure 3 |
| **Change in access road locations and coverage** | Project Description Report | Figure 3 |
| | Construction Plan Report | Section 4.2, Figure 2 |
| | Design and Operations Report | Figure 3 |
| | NHA Records Review | Figure 2 |
| | NHA Site Investigation | Figure 2, Appendix A2 |
| | NHA Evaluation of Significance | Figure 2, Appendix A2 |
| | NHA Environmental Impact Study | Figure 2 |
| **Alternate number of panels, panel model, manufacturer, and energy output** | Project Description Report | Section 5.4.1 |
| | Construction Plan Report | Section 4.2, Section 5.9, Figure 2 |
| | Design and Operations Report | Section 5.3.1, Figure 3 |
| | Decommissioning Plan Report | Section 5.4 |
| | NHA Environmental Impact Study | Section 7.1 |
| **Increase in the temporary construction laydown area** | Project Description Report | Figure 3 |
| | Construction Plan Report | Section 4.3, Section 5.7, Figure 2 |
| | Design and Operations Report | Figure 3 |
| | NHA Records Review | Figure 2, Figure 3 |
| | NHA Site Investigation | Figure 2, 3, 4, 5, 6, 7, 8, Appendix A3 |
| | NHA Evaluation of Significance | Figure 2, 3, 4, 5, 6, 7, 8, 9, Appendix A2, Appendix A3, Appendix E |
| | NHA Environmental Impact Study | Figure 2, Figure 3 |

| Proposed Change | Report | Section Affected |
|---|---|---|
| **Alternate site entrance location** | Project Description Report | Section 5.5.1, Figure 3 |
| | Construction Plan Report | Section 5.4, Section 5.10, Figure 2 |
| | Design and Operations Report | Figure 3 |
| | NHA Records Review | Figure 2, Figure 3 |
| | NHA Site Investigation | Figure 2, 3, 4, 5, 6, 7, 8, Appendix A3 |
| | NHA Evaluation of Significance | Figure 2, 3, 4, 5, 6, 7, 8, 9, Appendix A2, Appendix A3, Appendix E |
| | NHA Environmental Impact Study | Figure 2, Figure 3 |
| **Change in location, model and number of inverter units (from 10 to 7).** | Project Description Report | Section 5.4.2, Figure 3 |
| | Construction Plan Report | Section 5.10, Figure 2 |
| | Design and Operations Report | Section 5.3.2, Figure 3, Appendix A |
| | NHA Records Review | Figure 2, Figure 3 |
| | NHA Site Investigation | Figure 2, 3, 4, 5, 6, 7, 8, Appendix A3 |
| | NHA Evaluation of Significance | Figure 2, 3, 4, 5, 6, 7, 8, 9, Appendix A2, Appendix A3, Appendix E |
| | NHA Environmental Impact Study | Figure 2, Figure 3 |
| **Change in location of communications tower.** | Project Description Report | Figure 3 |
| | Construction Plan Report | Section 4.3, Section 5.7, Figure 2 |
| | Design and Operations Report | Figure 3 |
| | NHA Records Review | Figure 2, Figure 3 |
| | NHA Site Investigation | Figure 2, 3, 4, 5, 6, 7, 8, Appendix A3 |
| | NHA Evaluation of Significance | Figure 2, 3, 4, 5, 6, 7, 8, 9, Appendix A2, Appendix A3, Appendix E |
| | NHA Environmental Impact Study | Figure 2, Figure 3 |
| **Change in location of Point of Common Coupling (PCC).** | Project Description Report | Figure 3 |
| | Construction Plan Report | Section 4.3, Section 5.7, Figure 2 |
| | Design and Operations Report | Figure 3 |
| | NHA Records Review | Figure 2, Figure 3 |
| | NHA Site Investigation | Figure 2, 3, 4, 5, 6, 7, 8, Appendix A3 |
| | NHA Evaluation of Significance | Figure 2, 3, 4, 5, 6, 7, 8, 9, Appendix A2, Appendix A3, Appendix E |

| Proposed Change | Report | Section Affected |
|---|---|---|
| | NHA Environmental Impact Study | Figure 2, Figure 3 |
| **Change in location of overhead line.** | Project Description Report | Figure 3 |
| | Construction Plan Report | Section 4.3, Section 5.7, Figure 2 |
| | Design and Operations Report | Figure 3 |
| | NHA Records Review | Figure 2, Figure 3 |
| | NHA Site Investigation | Figure 2, 3, 4, 5, 6, 7, 8, Appendix A3 |
| | NHA Evaluation of Significance | Figure 2, 3, 4, 5, 6, 7, 8, 9, Appendix A2, Appendix A3, Appendix E |
| | NHA Environmental Impact Study | Figure 2, Figure 3 |

## 12. Summary

Our view is that the above-listed amendments to the GoodLight Solar Project are improvements for the neighbouring residents and the environment. None of the amendments will create any potential negative environmental effects to natural features or neighbouring residents for which mitigation was not already proposed in the preliminary design. A Notice of REA Amendment and covering letter outlining the proposed changes were distributed to all project stakeholders on January 8, 2014 and published in the “Kawartha Lakes This Week” and “The Brock Citizen” newspaper on January 16, 2014. A copy of the letter and notice are included in **Appendix H.**

# Appendix A

REA NUMBER 4324-96UL4W

Ontario

**Ministry of the Environment**
**Ministère de l'Environnement**

## RENEWABLE ENERGY APPROVAL

NUMBER 4324-96UL4W
Issue Date: June 13, 2013

2241656 Ontario Corp. operating as GoodLight LP
545 Speedvale Ave W
Guelph, Ontario
N1K 1E6

Project Location: 1175 and 2002 Sandringham Road
Part of Lot 20, Concession 5 Sandringham Rd and Part of Lot 2
Kawartha Lakes City,
K0M 2T0

*You have applied in accordance with Section 47.4 of the Environmental Protection Act for approval to engage in a renewable energy project in respect ofClass 3 solar facilityconsisting of the following:*

- the construction, installation, operation, use and retiring of a Class 3 solar facility with a total name plate capacity of up to approximately 10 megawatts (AC).

*For the purpose of this renewable energy approval, the following definitions apply:*

1. "Acoustic Assessment Report" means the report included in the Application and entitled "Canadian Solar Goodlight, Revised Noise Study Report" , dated April 2013, prepared by Dillon Consulting and signed by Amir Iravani of Dillon Consulting.

2. "Acoustic Audit" means an investigative procedure consisting of measurements and/or acoustic modelling of all sources of noise emissions due to the operation of the Equipment, assessed to determine compliance with the Noise Performance Limits set out in this Approval;

3. "Acoustic Audit Report" means a report presenting the results of an Acoustic Audit;

4. "Acoustic Audit - Transformer Substation" means an investigative procedure that is compliant with the IEEE Standard C57.12.90 consisting of measurements and/or acoustic modelling of all noise sources comprising the transformer substation assessed to determine compliance with the Sound Power Level specification of the transformer substation described in the Acoustic Assessment Report.

5. "Acoustic Audit Report - Transformer Substation" means a report presenting the results of the Acoustic Audit - Transformer Substation.

6. "Acoustic Audit Report - Transformers and Inverters" means a report presenting the results of the Acoustic Audit - Transformers and Inverters.

7. "Acoustical Consultant" means a person currently active in the field of environmental acoustics and noise/vibration control, who is knowledgeable about Ministry noise guidelines and procedures and has a combination of formal university education, training and experience necessary to assess noise emissions from solar facilities;

8. "Act" means the *Environmental Protection Act*, R.S.O 1990, c.E.19, as amended;

9. "Adverse Effect" has the same meaning as in the Act;

10. "Application" means the application for a Renewable Energy Approval dated August 24, 2012, and signed by Colin

Parkin, General Manager, Goodlight LP and all supporting documentation submitted with the application, including amended documentation submitted up to May 3, 2013;

11. "Approval" means this Renewable Energy Approval issued in accordance with Section 47.4 of the Act, including any schedules to it;

12. "A-weighting" means the frequency weighting characteristic as specified in the International Electrotechnical Commission (IEC) Standard 61672, and intended to approximate the relative sensitivity of the normal human ear to different frequencies (pitches) of sound. It is denoted as “A”;

13. "A-weighted Sound Pressure Level" means the Sound Pressure Level modified by application of an A-weighting network. It is measured in decibels, A-weighted, and denoted “dBA”;

14. "Class 1 Area" means an area with an acoustical environment typical of a major population centre, where the background sound level is dominated by the activities of people, usually road traffic, often referred to as “urban hum”;

15. "Class 2 Area" means an area with an acoustical environment that has qualities representative of both Class 1 and Class 3 Areas:

(a) sound levels characteristic of Class 1 during daytime (07:00 to 19:00 or to 23:00 hours);

(b) low evening and night background sound level defined by natural environment and infrequent human activity starting as early as 19:00 hours (19:00 or 23:00 to 07:00 hours);

(c) no clearly audible sound from stationary sources other than from those under impact assessment.

16. "Class 3 Area" means a rural area with an acoustical environment that is dominated by natural sounds having little or no road traffic, such as the following:

(a) a small community with less than 1000 population;

(b) agricultural area;

(c) a rural recreational area such as a cottage or a resort area; or

(d) a wilderness area.

17. "Company" means Goodlight LP and includes its successors and assignees;

18. “Decibel" means a dimensionless measure of Sound Level or Sound Pressure Level, denoted as dB;

19. "Director" means a person appointed in writing by the Minister of the Environment pursuant to section 5 of the Act as a Director for the purposes of section 47.5 of the Act;

20. "District Manager" means the District Manager of the appropriate local district office of the Ministry where the Facility is geographically located;

21. "Equipment" means the inverters, transformers, and one (1) transformer substation, and associated ancillary equipment identified in this Approval and as further described in the Application, to the extent approved by this Approval;

22. "Equivalent Sound Level" is the value of the constant sound level which would result in exposure to the same total A-weighted energy as would the specified time-varying sound, if the constant sound level persisted over an equal time interval. It is denoted $L_{eq}$ and is measured in dB A-weighting (dBA);

23. "Facility" means the renewable energy generation facility, including the Equipment, as described in this Approval and as further described in the Application, to the extent approved by this Approval;

24. “IEEE Standard C57.12.90” means the IEEE Standard Test Code for Liquid-Immersed Distribution, Power, and Regulating Transformers, 2010.

25. "Independent Acoustical Consultant" means an Acoustical Consultant who is not representing the Company and was not involved in preparing the Acoustic Assessment Report. The Independent Acoustical Consultant shall not be retained by the Acoustical Consultant involved in the noise impact assessment;

26. "Ministry" means the ministry of the government of Ontario responsible for the Act and includes all officials, employees or other persons acting on its behalf;

27. "Noise Control Measures" means measures to reduce the noise emissions from the Facility and/or Equipment including, but not limited to, barriers, silencers, acoustical louvres, hoods and acoustical treatment, described in the Acoustic Assessment Report and Schedule C of this Approval;

28. “Noise Receptor” has the same meaning as in O. Reg. 359/09;

29. “O. Reg. 359/09” means Ontario Regulation 359/09 “Renewable Energy Approvals under Part V.0.1 of the Act” made under the Act;

30. "Point of Reception" has the same meaning as in Publication NPC-205 or Publication NPC-232, as applicable, and is subject to the same qualifications described in those documents;

31. “Publication NPC-103” means the Ministry Publication NPC-103, “Procedures”, August 1978;

32. "Publication NPC-104" means the Ministry Publication NPC-104, "Sound Level Adjustments", August 1978;

33. “Publication NPC-205” means the Ministry Publication NPC-205, "Sound Level Limits for Stationary Sources in Class 1 & 2 Areas (Urban)", October 1995;

34. "Publication NPC-232" means the Ministry Publication NPC-232, "Sound Level Limits for Stationary Sources in Class 3 Areas (Rural)", October 1995;

35. "Publication NPC-233” means the Ministry Publication NPC-233, “Information to be Submitted for Approval of Stationary Sources of Sound”, October 1995;

36. "Sound Level" means the A-weighted Sound Pressure Level;

37. "Sound Level Limit" is the limiting value described in terms of the one hour A-weighted Equivalent Sound Level $L_{eq}$;

38. “Sound Power Level” means is ten times the logarithm to the base of 10 of the ratio of the sound power (Watts) of a noise source to standard reference power of $10^{-12}$ Watts;

39. "Sound Pressure" means the instantaneous difference between the actual pressure and the average or barometric pressure at a given location. The unit of measurement is the micro pascal (µPa);

40. "Sound Pressure Level" means twenty times the logarithm to the base 10 of the ratio of the effective pressure (µPa) of a sound to the reference pressure of 20 µPa;

41. "UTM" means Universal Transverse Mercator coordinate system.

*You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:*

**TERMS AND CONDITIONS**

**A - GENERAL**

A1. The Company shall construct, install, use, operate, maintain and retire the Facility in accordance with the terms and conditions of this Approval and the Application and in accordance with the following schedules attached hereto:

(a) Schedule A - Facility Description
(b) Schedule B - Coordinates of the Equipment and Noise Specifications

(c) Schedule C – Noise Control Measures

A2. Where there is a conflict between a provision of this Approval and any document submitted by the Company, the conditions in this Approval shall take precedence. Where there is a conflict between one or more of the documents submitted by the Company, the document bearing the most recent date shall take precedence.

A3. The Company shall ensure a copy of this Approval is:

(1) accessible, at all times, by Company staff operating the Facility and;

(2) submitted to the clerk of each local municipality and upper-tier municipality in which the Facility is situated.

A4. If the Company has a publicly accessible website, the Company shall ensure that the Approval and the Application are posted on the Company's publicly accessible website within five (5) business days of receiving this Approval.

A5. The Company shall, at least six (6) months prior to the anticipated retirement date of the entire Facility, or part of the Facility, review its Decommissioning Plan Report to ensure that it is still accurate. If the Company determines that the Facility cannot be decommissioned in accordance with the Decommissioning Plan Report, the Company shall provide the Director and District Manager a written description of plans for the decommissioning of the Facility.

A6. The Facility shall be retired in accordance with the Decommissioning Plan Report and any directions provided by the Director or District Manager.

A7. The Company shall provide the District Manager and the Director at least ten (10) days written notice of the following:

(1) the commencement of any construction or installation activities at the project location; and

(2) the commencement of the operation of the Facility.

**B - EXPIRY OF APPROVAL**

B1. Construction and installation of the Facility must be completed within three (3) years of the later of:

(1) the date this Approval is issued; or

(2) if there is a hearing or other litigation in respect of the issuance of this Approval, the date that this hearing or litigation is disposed of, including all appeals.

B2. This Approval ceases to apply in respect of any portion of the Facility not constructed or installed before the later of the dates identified in Condition B1.

**C - NOISE PERFORMANCE LIMITS**

C1. The Company shall ensure that:

(1) the Sound Levels from the Equipment, at the Points of Reception identified in the Acoustic Assessment Report, comply with the Sound Level Limit of 40 dBA as described in Publication NPC-232, subject to adjustment for tonality as described in Publication NPC-104;

(2) the Equipment is constructed and installed at either of the following locations:

(a) at the locations identified in Schedule B of this Approval; or

(b) at a location that does not vary by more than 10 metres from the locations identified in Schedule B of this Approval and provided that,

i) the Equipment will comply with Condition C1 (a), and

ii) all setback prohibitions established under O. Reg. 359/09 are complied with.

(3) the Equipment complies with the noise specifications set out in Schedule B of this Approval; and

(4) all of the Noise Control Measures are fully implemented prior to the commencement of the operation of the Facility.

C2. If the Company determines that some or all of the Equipment cannot be constructed in accordance with Condition C1 (b), prior to the construction and installation of the Equipment in question, the Company shall apply to the Director for an amendment to the terms and conditions of the Approval.

C3. Within three (3) months of the completion of the construction of the Facility, the Company shall submit to the Director a written confirmation signed by an individual who has the authority to bind the Company that the UTM coordinates of the "as constructed" Equipment comply with the requirements of Condition C1 (b).

**D - ACOUSTIC AUDIT**

D1. The Company shall carry out an Acoustic Audit in accordance with the procedures set out in Publication NPC-103, and shall submit to the District Manager and the Director an Acoustic Audit Report prepared by an Independent Acoustical Consultant in accordance IEEE Standard C57.12.90 and with the requirements of Publication NPC-233, no later than six (6) months after the commencement of the operation of the Facility.

**E - GROUNDWATER MONITORING**

E1. Prior to the construction and installation of the Facility, the Company shall develop a pre- and post-construction ground water monitoring program, which shall include, as a minimum, the following information:

(1) Identification of ground water monitoring wells to be established at appropriate up and down gradient boundary locations of the project location.

(2) Identification of ground water monitoring parameters, monitoring frequency, and trigger concentrations based on appropriate information as deemed necessary for the monitoring wells as described in Condition E1 (a).

E2. The Company shall report the summary of the results of the pre- and post-construction ground water monitoring program on an annual basis to the District Manager.

**F - STORMWATER MANAGEMENT**

F1. The Company shall employ best management practices for stormwater management and sediment and erosion control during construction, installation, use, operation, maintenance and retiring of the Facility, as described in the Application.

**G - WATER TAKING ACTIVITIES**

G1. The Company shall not take more than 50,000 litres of water on any day by any means during the construction, installation, use, operation, maintenance and retiring of the Facility.

**H - SEWAGE WORKS OF THE TRANSFORMER SUBSTATION SPILL CONTAINMENT FACILITY**

H1. The Company shall design and construct a transformer/substation spill containment facility which meets the following requirements:

(1) the spill containment area serving the transformer substation shall have a minimum volume equal to the volume of transformer oil and lubricants plus the volume equivalent to providing a minimum 24-hour duration, 50-year return storm capacity for the stormwater drainage area around the transformer under normal operating conditions;
(2) the containment facility shall have an impervious concrete floor and walls or impervious plastic liner on floor and walls, sloped toward an outlet, maintaining a freeboard of approximately 0.25 metres terminating approximately 0.30 metres above grade, and a minimum 300mm layer of crushed stoned (19mm to 38mm in diameter) within, all as needed in

accordance to site specific conditions and final design parameters;

(3) the containment facility shall drain to an oil control device, such as an oil/water separator, a pump-out sump, an oil absorbing material in a canister or a blind sump; and

(4) the oil control device shall be equipped with an oil detection system and appropriate sewage appurtenances, such as, but not limited to: sump, oil/grit separator, pumpout manhole, level controllers, floating oil sensors, etc., that allows for batch discharges or direct discharges and for proper implementation of the monitoring program described in Condition H4.

H2. The Company shall:

(1) prior to the construction of the transformer substation spill containment facility, provide the District Manager and Director a report and drawings issued for construction signed and stamped by an independent Professional Engineer licensed in Ontario and competent in electrical engineering.

(2) within six (6) months of the completion of the construction of the transformer substation spill containment facility, provide the District Manager and Director a report and drawings issued for construction signed and stamped by an independent Professional Engineer licensed in Ontario which includes the following:

(a) as-built drawings of the sewage works;

(b) confirmation that the transformer substation spill containment facility has been designed and installed according to appropriate specifications; and

(c) confirmation of the adequacy of the operating procedures and the emergency procedures manuals as it pertains to the installed sewage works.

(3) as a minimum, check the oil detection system on a monthly basis and create a written record of the inspections;

(4) ensure that the effluent is essentially free of floating and settle-able solids and does not contain oil or any other substance in amounts sufficient to create a visible film, sheen or foam on the receiving waters;

(5) immediately identify and clean-up all losses of oil from the transformer;

(6) upon identification of oil in the effluent pumpout, take immediate action to prevent the further occurrence of such loss; and

(7) ensure that equipment and material for the containment, clean-up and disposal of oil and materials contaminated with oil are kept within easy access and in good repair for immediate use in the event of:

(a) loss of oil from the transformer,

(b) a spill within the meaning of Part X of the Act, or

(c) the identification of an abnormal amount of oil in the effluent.

H3. The Company shall design, construct and operate the sewage works such that the concentration of the effluent parameter named in the table below does not exceed the maximum concentration objective shown for that parameter in the effluent, and shall comply with the following requirements:

| **Effluent Parameters** | **Maximum Concentration Objective** |
|---|---|
| Oil and Grease | 15mg/L |

(1) notify the District Manager as soon as reasonably possible of any exceedance of the maximum concentration objective set out in the table above;

(2) take immediate action to identify the cause of the exceedance; and

(3) take immediate action to prevent further exceedances.

H4. Upon commencement of the operation of the Facility, the Company shall establish and carry out the following monitoring program for the sewage works:

(1) the Company shall collect and analyze the required set of samples at the sampling points listed in the table below in accordance with the measurement frequency and sample type specified for the effluent parameter, oil and grease, and create a written record of the monitoring:

| Effluent Parameters | Measurement Frequency and Sample Points | Sample Type |
|---|---|---|
| Oil and Grease | B – Batch, i.e., for each discrete volume in the sewer appurtenance as per H1(4) prior to pumpout; or<br>Q – Quarterly for direct effluent discharge, i.e., four times over a year, relatively evenly spaced. | Grab |

(2) in the event of an exceedance of the maximum concentration objective set out in the table in Condition H3, the Company shall:

(a) increase the frequency of sampling to once per month, for each month that effluent discharge occurs, and

(b) provide the District Manager, on a monthly basis, with copies of the written record created for the monitoring until the District Manager provides written direction that monthly sampling and reporting is no longer required; and

(3) if over a period of twenty-four (24) months of effluent monitoring under Condition H4(1), there are no exceedances of the maximum concentration set out in the table in Condition H3, the Company may reduce the measurement frequency of effluent monitoring to a frequency as the District Manager may specify in writing, provided that the new specified frequency is never less than annual.

H5. The Company shall comply with the following methods and protocols for any sampling, analysis and recording undertaken in accordance with Condition H4:

(1) Ministry of the Environment publication "Protocol for the Sampling and Analysis of Industrial/ Municipal Wastewater", January 1999, as amended from time to time by more recently published editions, and

(2) the publication "Standard Methods for the Examination of Water and Wastewater", 21st edition, 2005, as amended from time to time by more recently published editions.

**I - TRAFFIC MANAGEMENT PLANNING**

I1. Within three (3) months of receiving this Approval, the Company shall prepare a Traffic Management Plan and provide it to the City of Kawartha Lakes.

I2. Within three (3) months of having provided the Traffic Management Plan to the City of Kawartha Lakes, the Company shall make reasonable efforts to enter into a Road Users Agreement with the City of Kawartha Lakes.

I3. If a Road Users Agreement has not been signed with the City of Kawartha Lakes within three (3) months of having provided the Traffic Management Plan to the City of Kawartha Lakes, the Company shall provide a written explanation as to why this has not occurred.

**J - ARCHAEOLOGICAL RESOURCES**

J1. The Company shall implement all of the recommendations, if any, for further archaeological fieldwork and for the protection of archaeological sites found in the consultant archaeologist's report included in the Application, and which the Company submitted to the Ministry of Tourism, Culture and Sport in order to comply with clause 22 (2) (b) of O. Reg. 359/09.

J2. Should any previously undocumented archaeological resources be discovered, the Company shall:

(1) cease all alteration of the area in which the resources were discovered immediately;

(2) engage a consultant archaeologist to carry out the archaeological fieldwork necessary to further assess the area and to either protect and avoid or excavate any sites in the area in accordance with the *Ontario Heritage Act*, the regulations under that act and the Ministry of Tourism, Culture and Sport's *Standards and Guidelines for Consultant Archaeologists*; and

(3) notify the Director as soon as reasonably possible.

**K - ENDANGERED SPECIES ACT REQUIREMENTS**

K1. No construction or installation activities shall be commenced in areas that support habitat for Bobolink or Eastern Meadowlark until the Company has received any required authorizations under the *Endangered Species Act, 2007*

**L - NATURAL HERITAGE AND PRE AND POST CONSTRUCTION MONITORING**

**GENERAL**

L1. The Company shall implement the following:

(1) the Environmental Effects Monitoring Plan, set out in Attachment C of the Design and Operations Report dated October 2012 and Table 12 of the Environmental Impact Study dated June 2012, for the Goodlight Solar Project, and included in the Application; and,

(2) the commitments made in the Environmental Impact Study, dated June 2012, prepared by Dillon Consulting Ltd., and included in the Application.

L2. If the Company determines that it must deviate from either the Environmental Effects Monitoring Plan or the Environmental Impact Study, described in Condition L1, the Company shall contact the Ministry of Natural Resources and the Director, prior to making any changes to either of these documents, and follow any directions provided.

**PRE-CONSTRUCTION MONITORING – SIGNIFICANT WILDLIFE HABITAT**

L3. The Company shall implement the pre-construction monitoring described in the Environmental Effects Monitoring Plan and the Environmental Impact Study described in Condition L1.

**POST-CONSTRUCTION MONITORING – SIGNIFICANT WILDLIFE HABITAT**

L4. The Company shall implement the post-construction monitoring described in the Environmental Effects Monitoring Plan and the Environmental Impact Study, described in Condition L1.

**HABITAT RESTORATION AND MANAGEMENT PLAN**

L5. Prior to the construction of the Facility, the Company shall develop, and submit to the Ministry of Natural Resources, the Habitat Restoration and Management Plan described in the Environmental Effects Monitoring Plan and the Environmental Impact Study, described in Condition I1, and which shall include the following:

(1) a habitat compensation and management plan for Open Country Breeding Birds; and

(2) a follow up monitoring plan on the effectiveness of the habitat management activities.

L6. The Company shall not commence construction of the Facility until it has obtained confirmation, in writing, from the Ministry of Natural Resources that the Habitat Restoration and Management Plan has been completed, and provided a copy of that confirmation to the Director.

**REPORTING AND REVIEW OF RESULTS**

L7. The Company shall report, in writing, the results of the post-construction monitoring described in Condition I4, to the Director for in accordance with reporting identified in the Environmental Effects Monitoring Plan and Environmental Impact Study,

L8. The Company shall post the following documents on the Company's website, if the Company has a website:

(1) the post-construction monitoring reports described in Condition L7; and

(2) the Habitat Restoration and Management Plan described in Condition L5.

**M - OPERATION AND MAINTENANCE**

M1. Prior to the commencement of the operation of the Facility, the Company shall prepare a written manual for use by Company staff outlining the operating procedures and a maintenance program for the Equipment that includes as a minimum the following:

(1) routine operating and maintenance procedures in accordance with good engineering practices and as recommended by the Equipment suppliers;

(2) emergency procedures;

(3) procedures for any record keeping activities relating to operation and maintenance of the Equipment; and

(4) all appropriate measures to minimize noise emissions from the Equipment.

M2. The Company shall;

(1) update, as required, the manual described in Condition M1; and

(2) make the manual described in Condition M1 available for review by the Ministry upon request.

M3. The Company shall ensure that the Facility is operated and maintained in accordance with the Approval and the manual described in Condition M1.

**N - RECORD CREATION AND RETENTION**

N1. The Company shall create written records consisting of the following:

(1) an operations log summarizing the operation and maintenance activities of the Facility;

(2) within the operations log, a summary of routine and Ministry inspections of the Facility; and

(3) a record of any complaint alleging an Adverse Effect caused by the construction, installation, use, operation, maintenance or retirement of the Facility.

N2. A record described under Condition N1(3) shall include:

(1) a description of the complaint that includes as a minimum the following:

(a) the date and time the complaint was made;

(b) the name, address and contact information of the person who submitted the complaint;

(2) a description of each incident to which the complaint relates that includes as a minimum the following:

(a) the date and time of each incident;

(b) the duration of each incident;

(c) the wind speed and wind direction at the time of each incident;

(d) the ID of the Equipment involved in each incident and its output at the time of each incident;

(e) the location of the person who submitted the complaint at the time of each incident; and

(3) a description of the measures taken to address the cause of each incident to which the complaint relates and to prevent a similar occurrence in the future.

N3. The Company shall retain, for a minimum of five (5) years from the date of their creation, all records described in Condition N1, and make these records available for review by the Ministry upon request.

**O - NOTIFICATION OF COMPLAINTS**

O1. The Company shall notify the District Manager of each complaint within two (2) business days of the receipt of the complaint.

O2. The Company shall provide the District Manager with the written records created under Condition N2 within eight (8) business days of the receipt of the complaint.

O3. If the Company receives a complaint related to groundwater, the Company shall contact the District Manager within one (1) business day of the receipt of the complaint to discuss appropriate measures to manage any potential groundwater issues.

**P - CHANGE OF OWNERSHIP**

P1. The Company shall notify the Director in writing, and forward a copy of the notification to the District Manager, within thirty (30) days of the occurrence of any of the following changes:

(1) the ownership of the Facility;

(2) the operator of the Facility;

(3) the address of the Company;

(4) the partners, where the Company is or at any time becomes a partnership and a copy of the most recent declaration filed under the *Business Names Act*, R.S.O. 1990, c.B.17, as amended, shall be included in the notification; and

(5) the name of the corporation where the Company is or at any time becomes a corporation, other than a municipal corporation, and a copy of the most current information filed under the *Corporations Information Act*, R.S.O. 1990, c. C.39, as amended, shall be included in the notification.

## SCHEDULE A

### Facility Description

The Facility shall consist of the construction, installation, operation, use and retiring of the following:

(a) ten (10) arrays of photovoltaic (PV) modules or panels with a total name plate capacity of up to approximately ten (10) megawatts (DC) or ten (10) megawatts (AC), with each array containing one (1) cluster consisting of two (2) 500 kW inverters and one (1) 27.6 kV/1-MVA transformer; and

(b) associated ancillary equipment, systems and technologies including, but not limited to, one (1) transformer substation, on-site access roads, below and above grade cabling, and below and above grade distribution lines,

all in accordance with the Application.

## SCHEDULE B

### Coordinates of the Equipment and Noise Specifications

Coordinates of the Equipment are listed below in UTM, Z17-NAD83 projection:

| Source ID | Maximum Sound Power Level (dBA) | Easting (m) | Northing (m) | Source Description |
|---|---|---|---|---|
| INV1 | 102.2 | 660863.5 | 4930896 | Inverter Cluster: See Table B2 below |
| INV2 | 102.2 | 660640.3 | 4930797 | Inverter Cluster: See Table B2 below |
| INV3 | 102.2 | 659938.2 | 4930707 | Inverter Cluster: See Table B2 below |
| INV4 | 102.2 | 659901 | 4930612 | Inverter Cluster: See Table B2 below |
| INV5 | 102.2 | 659717.2 | 4930602 | Inverter Cluster: See Table B2 below |
| INV6 | 102.2 | 659387.8 | 4930635 | Inverter Cluster: See Table B2 below |
| INV7 | 102.2 | 659436.2 | 4930370 | Inverter Cluster: See Table B2 below |
| INV8 | 102.2 | 659249.5 | 4930327 | Inverter Cluster: See Table B2 below |
| INV9 | 102.2 | 659106.3 | 4930483 | Inverter Cluster: See Table B2 below |
| INV10 | 102.2 | 659068.4 | 4930348 | Inverter Cluster: See Table B2 below |
| TRS | 89.8 | 659616.1 | 4930667 | Transformer : See Table B3 below |

**Table B2:** Maximum Sound Power Spectrum (dB Lin) of Inverter

| Inverter Cluster 1-10 | Octave Band Centre Frequency (Hz) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
| Lw (dB Lin) | 96 | 100 | 106.6 | 99.8 | 95.1 | 91.4 | 83.4 | - |

**Table B3 :** Maximum Sound Power Spectrum (dB Lin) of Transformer

| Transformer Substation | Octave Band Centre Frequency (Hz) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
| Lw (dB Lin) | 92.4 | 94.4 | 89.4 | 89.4 | 83.4 | 78.4 | 73.4 | 66.4 |

Note: Each Sound Power Level value in all the above tables corresponds to the combined output of all the identified equipment in each cluster, and includes the 5 decibel (dB) adjustment for tonality as prescribed in Publication NPC-104, but does not include barrier effect or insertion loss from acoustic louvres.

## SCHEDULE C

### Noise Control Measures

Acoustic Barrier

four (4) three-sided 4 metres high acoustic barrier, positioned as per Table 4 and Figures 5a through 5e in the Acoustic Assessment Report. The acoustic barrier shall be continuous without holes, gaps and other penetrations, and having surface mass at least 20 kilograms per square metres.

Acoustic Enclosure

In accordance with Section 6.4 of the Acoustic Assessment Report, all inverter clusters 1-10 shall be encased in an acoustic enclosure with acoustic ventilation louvres, with the enclosure shell, including composite effect of the wall/roof materials, doors and any openings, capable of providing the following values of Insertion-Loss in 1/1 octave frequency bands:

Acoustic Enclosure Specifications, [dB]

| Name | Octave Band Centre Frequency (Hz) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
| Acoustic Enclosure with Acoustic Louvres | - | 4 | 4 | 6 | 10 | 17 | 12 | - |

*The reasons for the imposition of these terms and conditions are as follows:*

1. Conditions A1 and A2 are included to ensure that the Facility is constructed, installed, used, operated, maintained and retired in the manner in which it was described for review and upon which Approval was granted. These conditions are also included to emphasize the precedence of conditions in the Approval and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review.

2. Conditions A3 and A4 are included to require the Company to provide information to the public and the local municipality.

3. Conditions A5 and A6 are included to ensure that final retirement of the Facility is completed in an aesthetically pleasing manner, in accordance with Ministry standards, and to ensure long-term protection of the health and safety of the public and the environment.

4. Condition A7 is included to require the Company to inform the Ministry of the commencement of activities related to the construction, installation and operation of the Facility.

5. Condition B is intended to limit the time period of the Approval.

6. Condition C1 is included to provide the minimum performance requirement considered necessary to prevent an Adverse Effect resulting from the operation of the Equipment and to ensure that the noise emissions from the Equipment will be in compliance with applicable limits set in Publication NPC-232.

7. Conditions C2, C3 are included to ensure that the Equipment is constructed, installed, used, operated, maintained and retired in a way that meets the regulatory setback prohibitions set out in O. Reg. 359/09.

8. Condition D is included to require the Company to gather accurate information so that the environmental noise impact and subsequent compliance with the Act, O. Reg. 359/09, Publication NPC-232 and this Approval can be verified.

9. Conditions E, F, G, I, K and L are included to ensure that the Facility is constructed, installed, used, operated, maintained and retired in a way that does not result in an Adverse Effect or hazard to the natural environment or any persons.

10. Condition H1 is included to ensure that the sewage works of the transformer spill containment facility are designed to have adequate capacity to provide spill control. This condition is also included to enable compliance with this Approval, such that the environment is protected and deterioration, loss, injury or damage to any person, property or the environment is minimized and/or prevented.

11. Condition H2 is included to ensure that the sewage works of the transformer spill containment facility will be operated and maintained in accordance with the information submitted by the Company, and to adequately manage and clean-up any oil spill from the transformer.

12. Condition H3 is included to establish non-enforceable effluent quality objectives which the Company is required to strive

towards on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively and voluntarily before environmental impairment occurs.

13. Conditions H4 and H5 are included to require the Company to demonstrate that the performance of the sewage works of the transformer spill containment facility is at a level consistent with the design and effluent objectives specified in the Approval and is not causing any impairment to the environment.

14. Condition J is included to protect archaeological resources that may be found at the project location.

15. Condition M is included to emphasize that the Equipment must be maintained and operated according to a procedure that will result in compliance with the Act, O. Reg. 359/09 and this Approval.

16. Condition N is included to require the Company to keep records and provide information to the Ministry so that compliance with the Act, O. Reg. 359/09 and this Approval can be verified.

17. Condition O are included to ensure that any complaints regarding the construction, installation, use, operation, maintenance or retirement of the Facility are responded to in a timely and efficient manner.

18. Condition P is included to ensure that the Facility is operated under the corporate name which appears on the application form submitted for this Approval and to ensure that the Director is informed of any changes.
19.

**NOTICE REGARDING HEARINGS**

*In accordance with Section 139 of the Environmental Protection Act, within 15 days after the service of this notice, you may by further written notice served upon the Director, the Environmental Review Tribunal and the Environmental Commissioner, require a hearing by the Tribunal.*

*In accordance with Section 47 of the Environmental Bill of Rights, 1993, the Environmental Commissioner will place notice of your request for a hearing on the Environmental Registry.*

*Section 142 of the Environmental Protection Act provides that the notice requiring the hearing shall state:*

1. The portions of the renewable energy approval or each term or condition in the renewable energy approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

*The signed and dated notice requiring the hearing should also include:*

3. The name of the appellant;
4. The address of the appellant;
5. The renewable energy approval number;
6. The date of the renewable energy approval;
7. The name of the Director;
8. The municipality or municipalities within which the project is to be engaged in;

*This notice must be served upon:*

The Secretary*****
Environmental Review Tribunal
655 Bay Street, 15th Floor
Toronto, Ontario
M5G 1E5

AND

The Environmental Commissioner
1075 Bay Street, 6th Floor
Suite 605
Toronto, Ontario
M5S 2B1

AND

The Director
Section 47.5, *Environmental Protection Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

*Under Section 142.1 of the Environmental Protection Act, residents of Ontario may require a hearing by the Environmental Review Tribunal within 15 days after the day on which notice of this decision is published in the Environmental Registry. By accessing the Environmental Registry at www.ebr.gov.on.ca, you can determine when this period ends.*

*Approval for the above noted renewable energy project is issued to you under Section 47.5 of the Environmental Protection Act subject to the terms and conditions outlined above.*

DATED AT TORONTO this 13th day of June, 2013

Vic Schroter, P.Eng.
Director
Section 47.5, *Environmental Protection Act*

SM/
c: District Manager, MOE Peterborough
Mark Feenstra, Canadian Solar Solutions Inc.

# Appendix B

AGENCY CORRESPONDENCE

# FW: GoodLight Solar Park Project (REA Number: 4324-96UL4W)) - Notice of Amendment Letter

1 message

**Grace Pasceri** <Grace.Pasceri@canadiansolar.com> 20 November 2013 14:59
To: "Bellamy, Megan (mbellamy@dillon.ca)" <mbellamy@dillon.ca>

**From:** Grace Pasceri
**Sent:** Wednesday, November 20, 2013 2:59 PM
**To:** agatha.garciawright@ontario.ca
**Cc:** vic.schroter@ontario.ca; 'Raetsen, Sarah (ENE)'
**Subject:** GoodLight Solar Park Project (REA Number: 4324-96UL4W)) - Notice of Amendment Letter

Good afternoon Agatha,

Please find attached a copy of the Notice of Amendment Letter for the GoodLight Solar Park Project (REA Number: 4324-96UL4W).

A hard copy has been sent to you via courier as well.

Thanks,

Grace

**Grace Pasceri**

Permitting Manager – Solar Farms

*Canadian Solar Solutions Inc. - a subsidiary of Canadian Solar Inc.* (NASDAQ: CSIQ)

CanadianSolar

545 Speedvale Avenue West

Guelph, Ontario N1K 1E6

T: 1 519 837 1881 ext. 2293

F: 1 519 837 2550

E: Grace.Pasceri@canadiansolar.com

W: http://www.canadian-solar.ca/

Please consider the environment before printing this email.

---



---

**Initial Letter to MOE - GoodLight (3).pdf**
525K

Canadian Solar Solutions Inc.

545 Speedvale Avenue West
Guelph Ontario | Canada N1K 1E6
Phone + 1 519 837 1881
Fax + 1 519 837 2550
inquire.ca@canadiansolar.com
www.canadian-solar.ca

Ms. Agatha Garcia-Wright
Director, Environmental Approvals Branch
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, ON M4V 1L5

November 20, 2013

**RE: GOODLIGHT REA AMENDMENT LETTER**

Dear Ms. Garcia-Wright,

GoodLight LP is proposing to develop, construct and operate the GoodLight Project. A Renewable Energy Approval (REA) application was submitted for this project in October 2012. A REA was granted by the Ministry of the Environment (MOE) on June 13, 2013 (REA Number: **4324-96UL4W**). An amendment to this approval based on a settlement at the Environmental Review Tribunal is also underway. This letter provides an overview of additional technical amendments proposed for the project. We believe the amendments are minor in nature and fall within the "Technical Change" category under the MOE's revised guidance for renewable energy projects (2013). At this time we are seeking confirmation on the subsequent amendment process to be followed by the MOE. Our understanding is that the following process is applicable:

1. MOE review of this letter describing the amendment and providing a brief rationale for the changes. It is our expectation confirmation of the amendment as a "Technical Change" will be made within 2-3 business days.
2. A Modification Document will be prepared in support of the amendment application. This will be in accordance with the revised guidance document for renewable energy projects (MOE 2013). An overview of the content of this document is provided below.
3. Impacts to the Natural Heritage Assessment and Cultural Heritage/Archaeological Documentation will be reviewed and the Ministry of Natural Resources and/or Ministry of Tourism, Culture and Sport consulted if applicable.
4. Stakeholders, as defined in the Consultation Report for the project, will be circulated a Notice of Project Change. An overview of this consultation will be included in the Modifications Document.

The amended design layout for GoodLight maintains all components of the facility within the original boundaries of the project location as is outlined in the original REA application. We have attached a figure showing the differences proposed for the REA Amendment. No environmental effects are anticipated that were not previously discussed as part of the REA application. The table below summarizes the proposed changes to GoodLight.

CanadianSolar
Canadian Solar Solutions Inc.
545 Speedvale Avenue West
Guelph Ontario | Canada N1K 1E6
Phone + 1 519 837 1881
Fax + 1 519 837 2550
inquire.ca@canadiansolar.com
www.canadian-solar.ca

Table 1: Overview of Technical Changes to the Project

| Proposed Change | Overview of Proposed Change | REA Reports* Requiring Revision | Potential Environmental Effects |
|---|---|---|---|
| **Decrease in the overall footprint of the project location.** | To optimize the layout and increase efficiency of the facility. The changes to the project equipment requires less overall space for the project. | Minor Revision:<br><br>PDR, CPR, DOR, DPR, NHA, WAR, WBR | No additional environmental effects not previously discussed as part of the REA application are anticipated as a result of this change. |
| **Alternate location of site entrance(s).**<br><br>The REA documents indicated the site entrance would be located along Sandringham Road central to the project site and to the east side of the original laydown area.<br><br>The revised entrance sites are in the same general area but the one to the west of Sandringham Road has shifted south slightly | Clarification point | Minor Revision:<br><br>PDR, CPR, DOR | No additional environmental effects not previously discussed as part of the REA application are anticipated as a result of this change. |

Canadian Solar Solutions Inc.

545 Speedvale Avenue West
Guelph Ontario | Canada N1K 1E6
Phone + 1 519 837 1881
Fax + 1 519 837 2550
inquire.ca@canadiansolar.com
www.canadian-solar.ca

| Proposed Change | Overview of Proposed Change | REA Reports* Requiring Revision | Potential Environmental Effects |
|---|---|---|---|
| **Change in area and configuration of construction laydown.**<br><br>The original laydown area was located west of Sandringham Road at the site entrance location. The proposed amended construction laydown areas are located east of the substation transformer and west of Sandringham Road, south of the entrance gates. | The laydown area was changed to accommodate construction phasing and to ease movement of materials around the two sections of the project. | Minor Revision:<br><br>PDR, CPR, DOR | No additional environmental effects not previously discussed as part of the REA application are anticipated as a result of this change. |
| **Reduction in the number of inverter stations from 10 to 7, amendment to the model and small changes to the locations of remaining inverter stations**.<br><br>The original REA application indicated that SMA Sunny Central 500HE-US inverters would be used. At this time, we anticipate that SMA SC800CP-CA inverter stations will be used. | The updated inverter station model and locations optimize the project layout and increase efficiency of the facility. | Minor Revision:<br><br>PDR, CPR, DOR<br><br>Major Revision:<br><br>NSR | No additional environmental effects not previously discussed as part of the REA application are anticipated as a result of this change.<br><br>Although each inverter station has been relocated, all remain within the original project boundary. |

Canadian Solar Solutions Inc.

545 Speedvale Avenue West
Guelph Ontario | Canada N1K 1E6
Phone + 1 519 837 1881
Fax + 1 519 837 2550
inquire.ca@canadiansolar.com
www.canadian-solar.ca

| Proposed Change | Overview of Proposed Change | REA Reports* Requiring Revision | Potential Environmental Effects |
|---|---|---|---|
| Change in access road locations and reduction in road length and coverage. | To optimize the layout and increase efficiency of the facility, and to accommodate the revised locations of the inverter stations. | Minor Revision:<br><br>PDR, CPR, DOR, DPR | No additional environmental effects not previously discussed as part of the REA application are anticipated as a result of this change.<br><br>All roads remain within the original project boundary. |
| Change in the panel module mix: the original REA application indicated that either Trina TSM DA05 220W or Canadian Solar CSA 230W panels would be used. At this time, we anticipate that the Canadian Solar CS6X model will be used, with power outputs ranging between 290 and 305W. | Clarification Point | Minor Revision:<br><br>DOR | No additional environmental effects not previously discussed as part of the REA application are anticipated as a result of this change. |
| Number of panels: The REA documents indicated the facility would require between 30,000 and 100,000 panels. At this time, we expect there to be a total of 47,160 panels. | Clarification point | Minor Revision:<br><br>PDR, CPR , DOR | No additional environmental effects not previously discussed as part of the REA application are anticipated as a result of this change. |

*PDR = Project Description Report; DOR = Design and Operations Report; CPR = Construction Plan Report; NSR – Noise Study Report; DPR = Decommissioning Plan Report; NHA = Natural Heritage Assessment; WAR = Water Assessment Report; WBR = Water Body Report

Based on our review of the above proposed changes, further consultation with the Ministry of Natural Resources is not warranted as part of the minor amendment process. The Ministry of Natural Resources confirmed the original Natural Heritage Assessment (NHA) on July 5, 2012. As the final design for this project does not exceed the original project location boundary, no amendments to the Natural Heritage Assessment are required.

Canadian Solar Solutions Inc.

545 Speedvale Avenue West
Guelph Ontario | Canada N1K 1E6
Phone + 1 519 837 1881
Fax + 1 519 837 2550
inquire.ca@canadiansolar.com
www.canadian-solar.ca

Based on the overall reduction in the footprint of the project location, further consultation is not warranted with the Ministry of Natural Resources or Ministry of Tourism, Culture and Sport.

These agencies (MTCS and MNR) will be circulated the Notice of Project Change along with the other stakeholders. Should correspondence back be received, this will be included in the Modifications Document or forwarded to the MOE as appropriate.

We trust the above table contains sufficient information to confirm that the proposed changes to the above reference REA are considered minor. If additional information or clarification is required, please do not hesitate to contact me.

Sincerely,

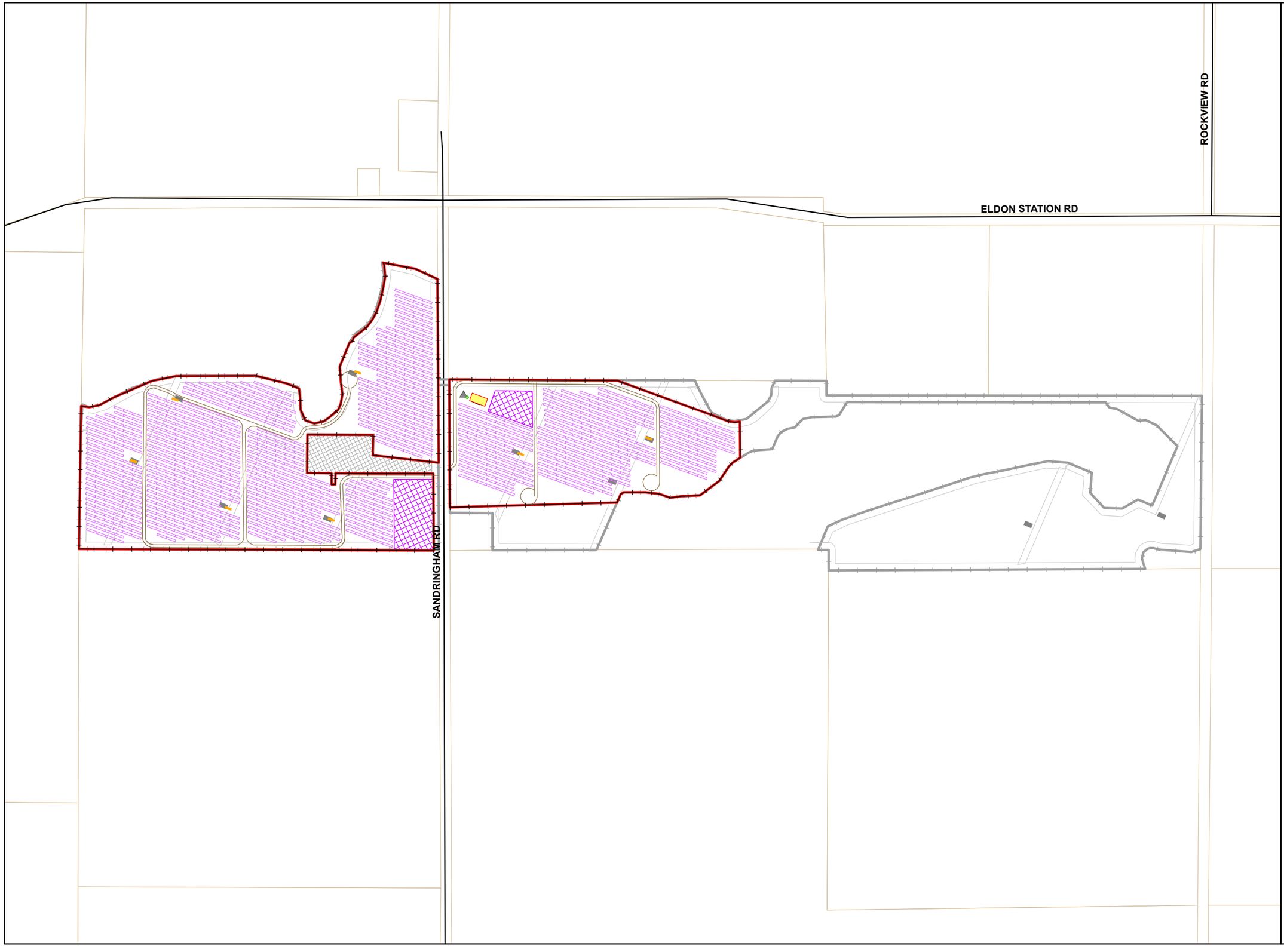
Grace Pasceri, Permitting Manager
Canadian Solar Solutions Inc.
545 Speedvale Avenue West
Guelph, ON N1K 1E6
Tel: 519-837-1881 ext. 2293
Grace.pasceri@canadiansolar.com

Attachments: Figure 1: Comparison of Project Components

Copies to:

Sarah Raetsen, Project Evaluator

Vic Schroter, Director, Section 47.5 *Environmental Protection Act*




CanadianSolar

# GoodLight
# Figure 1:
# Comparison of Preliminary and Final Project Site Plans

**Legend**

- Local Road
- Parcel Boundary

**Final Project Components**

- Access Road
- Fence Line
- Laydown Area
- Communication Tower
- Solar Panel and Rack
- Inverter
- Project Location
- Substation

**Preliminary Project Components**

- Communication Tower
- Fence
- Inverter Unit
- Substation
- Laydown Area
- Access Road
- Project Location



N
W E
S

1:6,500

0 50 100 150 200 m

DILLON CONSULTING

Created By: GM
Checked By: JLP
Date Created: 100113
Date Modified: 11/20/2013
File Path: I:\GIS\138047 EMP GoodLight LP\Mapping\

Canadian Solar Solutions Inc.

545 Speedvale Avenue West
Guelph Ontario | Canada N1K 1E6
Phone + 1 519 837 1881
Fax + 1 519 837 2550
inquire.ca@canadiansolar.com
www.canadian-solar.ca

Ms. Agatha Garcia-Wright
Director, Environmental Approvals Branch
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, ON M4V 1L5

January 8, 2014

**RE: GOODLIGHT REA AMENDMENT LETTER**

Dear Ms. Garcia-Wright,

As you are aware, GoodLight LP is proposing to develop, construct and operate the GoodLight Project. A Renewable Energy Approval (REA) application was submitted for this project in October 2012. A REA was granted by the Ministry of the Environment (MOE) on June 13, 2013 (REA Number: **4324-96UL4W**). An amendment to this approval based on a settlement at the Environmental Review Tribunal is also underway. On November 20, 2013 GoodLight LP provided you with a letter that contained an overview of additional technical amendments proposed for the project. We believe the amendments are minor in nature and fall within the "Technical Change" category under the MOE's revised guidance for renewable energy projects (2013).

Further to our letter in November, GoodLight LP would now like to clarify that three additional technical changes are also proposed, summarized in the table below:

Canadian Solar Solutions Inc.

545 Speedvale Avenue West
Guelph Ontario | Canada N1K 1E6
Phone + 1 519 837 1881
Fax + 1 519 837 2550
inquire.ca@canadiansolar.com
www.canadian-solar.ca

Table 1: Overview of Technical Changes to the Project

| Proposed Change | Rationale for Proposed Change | REA Reports* Requiring Revision | Potential Environmental Effects |
|---|---|---|---|
| **Movement of the Communications tower.** The communications tower has moved approximately 50 m to the east, closer to the main substation transformer. | To optimize the layout and increase efficiency of the facility. | Minor Revisions:<br><br>CPR, DOR, NHA<br><br>Major Revisions:<br><br>NSR | No additional environmental effects not previously anticipated are expected as a result of this change. |
| **Relocation of the Point of Common Coupling (PCC).** The PCC has moved northwest approximately 200 m to the site entrance for GoodLight. | To optimize the layout and increase efficiency of the facility. | Minor Revisions:<br><br>CPR, DOR, NHA<br><br>Major Revisions:<br><br>NSR | No additional environmental effects not previously anticipated are expected as a result of this change. |
| **Relocation of the overhead electrical cable connecting the substation to the PCC.** The overhead electrical cable has been moved to caccommodate the change in location of the PCC. | To accommodate the movement of the PCC. | Minor Revisions:<br><br>CPR, DOR, NHA<br><br>Major Revisions:<br><br>NSR | No additional environmental effects not previously anticipated are expected as a result of this change. |

*DOR = Design and Operations Report; CPR = Construction Plan Report; NSR – Noise Study Report; NHA = Natural Heritage Assessment

Canadian Solar Solutions Inc.

545 Speedvale Avenue West
Guelph Ontario | Canada N1K 1E6
Phone + 1 519 837 1881
Fax + 1 519 837 2550
inquire.ca@canadiansolar.com
www.canadian-solar.ca

Based on our review of the above proposed changes, further consultation with the Ministry of Natural Resources is not warranted as part of the minor amendment process. The Ministry of Natural Resources confirmed the original Natural Heritage Assessment (NHA) on July 5, 2012. As the final design for this project does not exceed the original project location boundary, no amendments to the Natural Heritage Assessment are required.

Based on the overall reduction in the footprint of the project location, further consultation is not warranted with the Ministry of Natural Resources or Ministry of Tourism, Culture and Sport.

These agencies (MTCS and MNR) will be circulated the Notice of Project Change along with the other stakeholders. Should correspondence back be received, this will be included in the Modifications Document or forwarded to the MOE as appropriate.

We trust the above table contains sufficient information to confirm that the proposed changes to the above reference REA are considered minor. If additional information or clarification is required, please do not hesitate to contact me.

Sincerely,

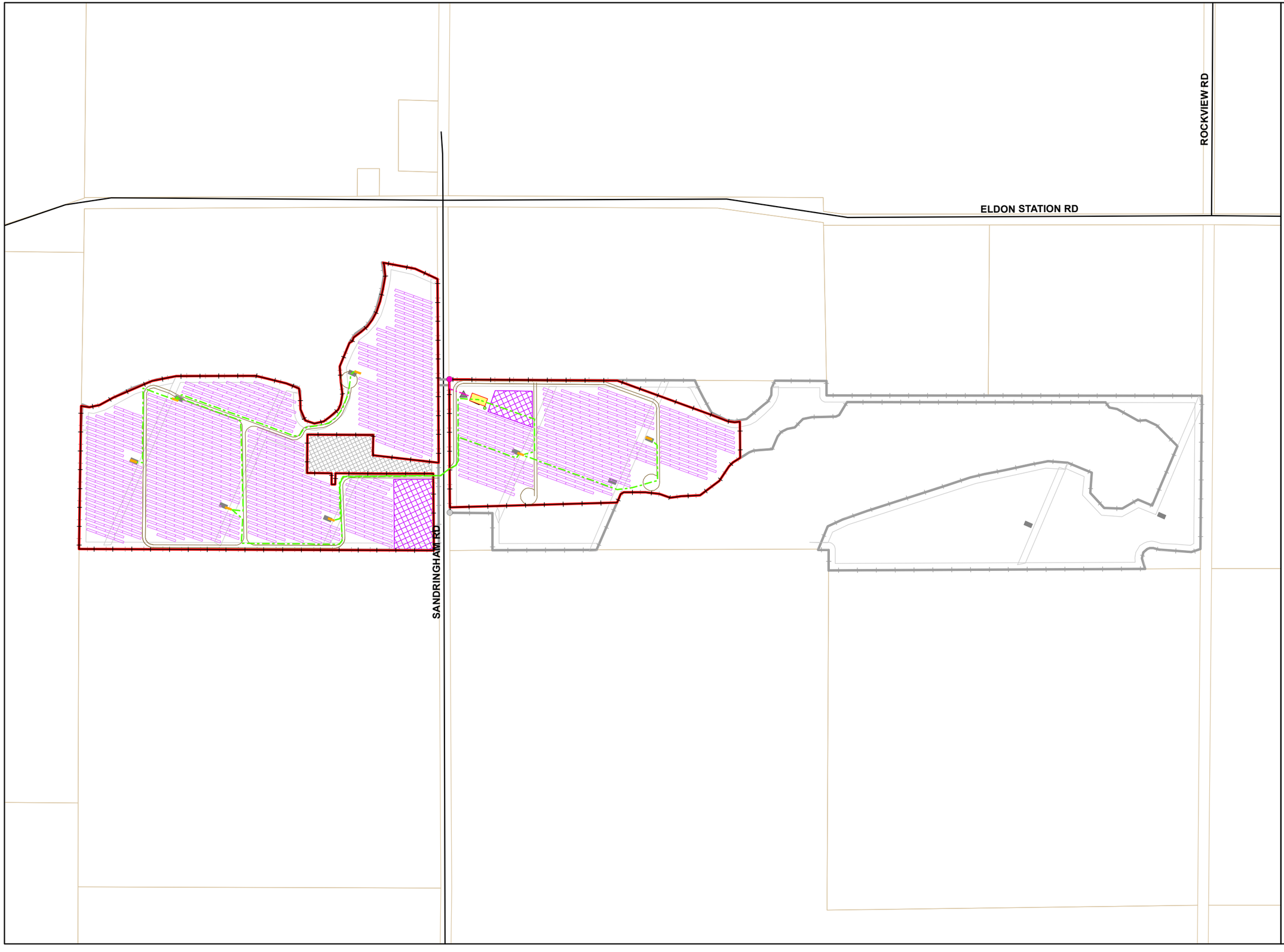
Grace Pasceri, Permitting Manager
Canadian Solar Solutions Inc.
545 Speedvale Avenue West
Guelph, ON N1K 1E6
Tel: 519-837-1881 ext. 2293
Grace.pasceri@canadiansolar.com

Attachments: Figure 1: Comparison of Project Components

Copies to:

Sarah Raetsen, Project Evaluator

Vic Schroter, Director, Section 47.5 *Environmental Protection Act*




CanadianSolar

# GoodLight
# Figure 1:
# Comparison of Preliminary and Final Project Site Plans

**Legend**

- Local Road
- Parcel Boundary

**Final Project Components**

- Point of Common Coupling
- Access Road
- Underground Cable
- Fence Line
- Overhead Cable
- Laydown Area
- Communication Tower
- Solar Panel and Rack
- Inverter
- Project Location
- Substation

**Preliminary Project Components**

- Communication Tower
- Point of Common Coupling
- Fence
- Inverter Unit
- Substation
- Laydown Area
- Access Road
- Project Location



N
W E
S

1:6,500

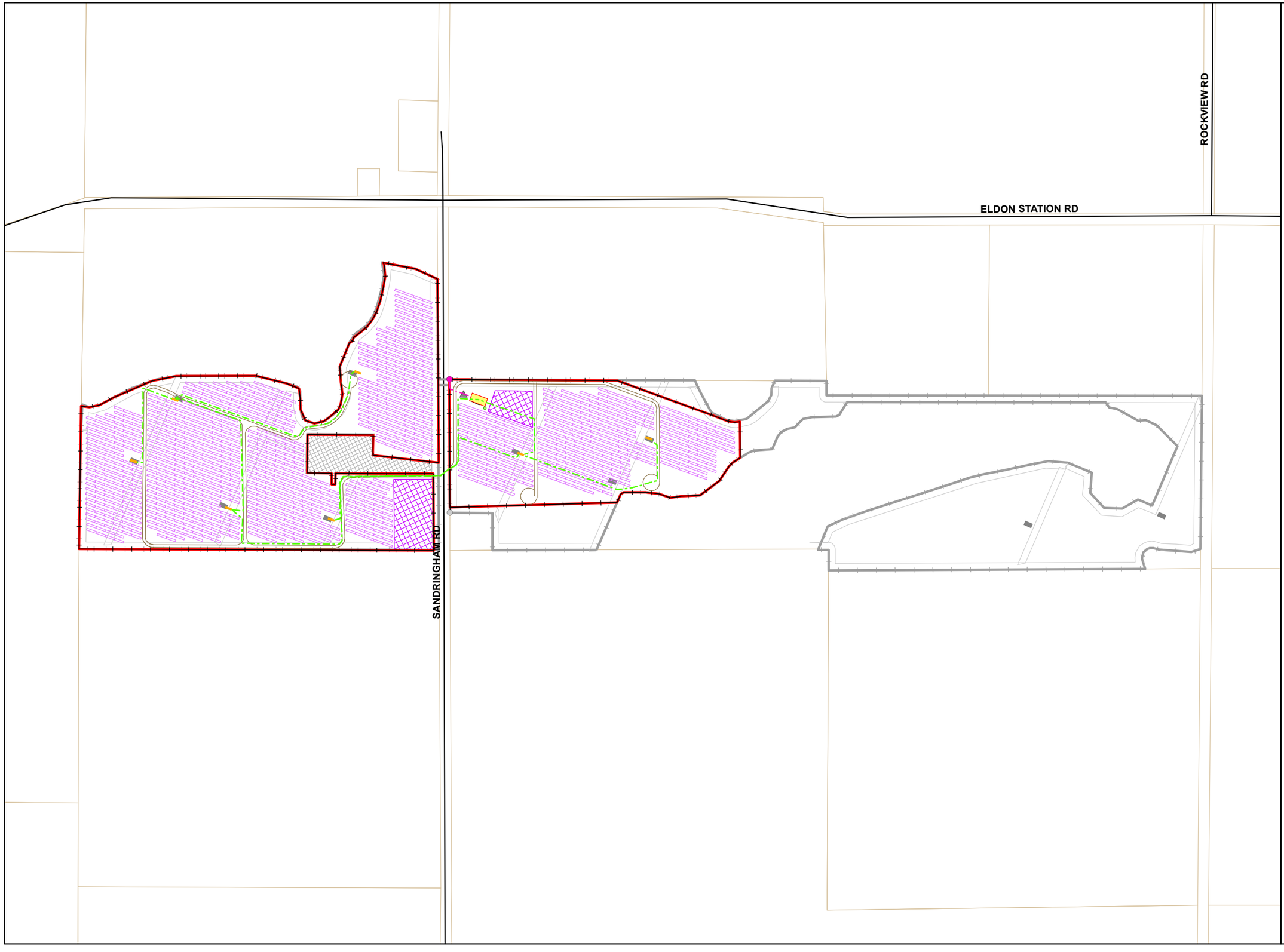
0 50 100 150 200 m

DILLON CONSULTING

Created By: GM
Checked By: JLP
Date Created: 100113
Date Modified: 12/9/2013
File Path: I:\GIS\138047 EMP GoodLight LP\Mapping\

# Appendix C

PROJECT LAYOUTS




CanadianSolar

# GoodLight
# Figure 1:
# Comparison of Preliminary and Final Project Site Plans

**Legend**

- Local Road
- Parcel Boundary

**Final Project Components**

- Point of Common Coupling
- Access Road
- Underground Cable
- Fence Line
- Overhead Cable
- Laydown Area
- Communication Tower
- Solar Panel and Rack
- Inverter
- Project Location
- Substation

**Preliminary Project Components**

- Communication Tower
- Point of Common Coupling
- Fence
- Inverter Unit
- Substation
- Laydown Area
- Access Road
- Project Location



N
W E
S

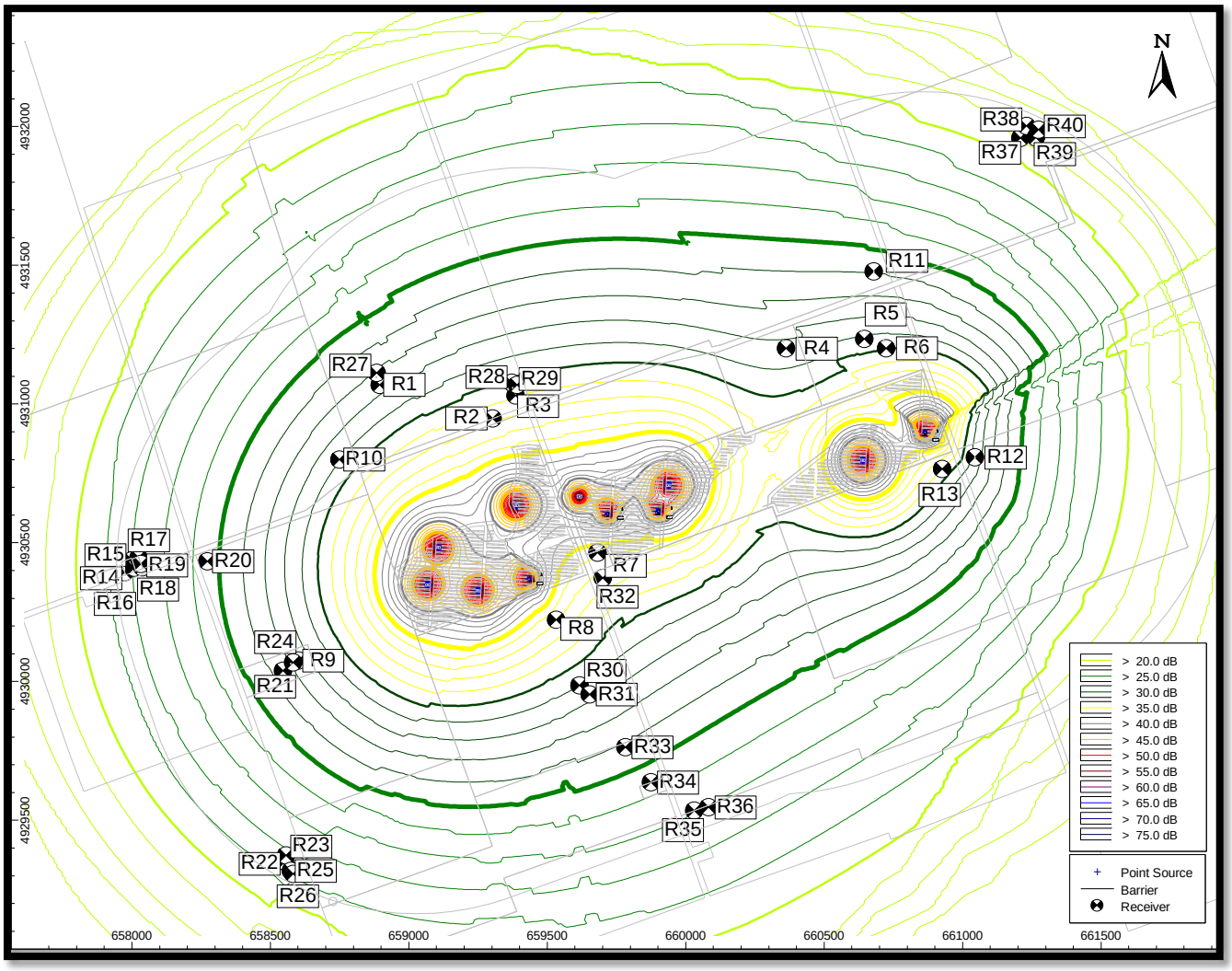
1:6,500

0 50 100 150 200 m

DILLON CONSULTING

Created By: GM
Checked By: JLP
Date Created: 100113
Date Modified: 12/9/2013
File Path: I:\GIS\138047 EMP GoodLight LP\Mapping\

**Figure 2 Predicted Sound Level Contours and Receptor Noise Levels – GoodLight**



CanadianSolar

# GoodLight
# Figure 3
# Predicted Noise Level Contours at 1.5 m Height

PROSPECT RD
ROCKVIEW RD
ELDON STATION RD
SANDRINGHAM RD

R1 R2 R3 R4 R5 R6 R7 R8 R9 R10 R11 R12 R13 R14 R15 R16 R17
VLR1 VLR2 VLR3 VLR4 VLR5 VLR6

## Legend

- Vacant Lot Noise Receptor
- Existing Noise Receptor
- 40 dBA Noise Contour at 1.5 m
- Local Road
- Parcel Boundary

## Project Components

- Access Road
- Underground Cable
- Fence Line
- Overhead Cable
- Laydown Area
- Communication Tower
- Solar Panel and Rack
- Inverter
- Project Location
- Substation
- 1000 m Project Setback



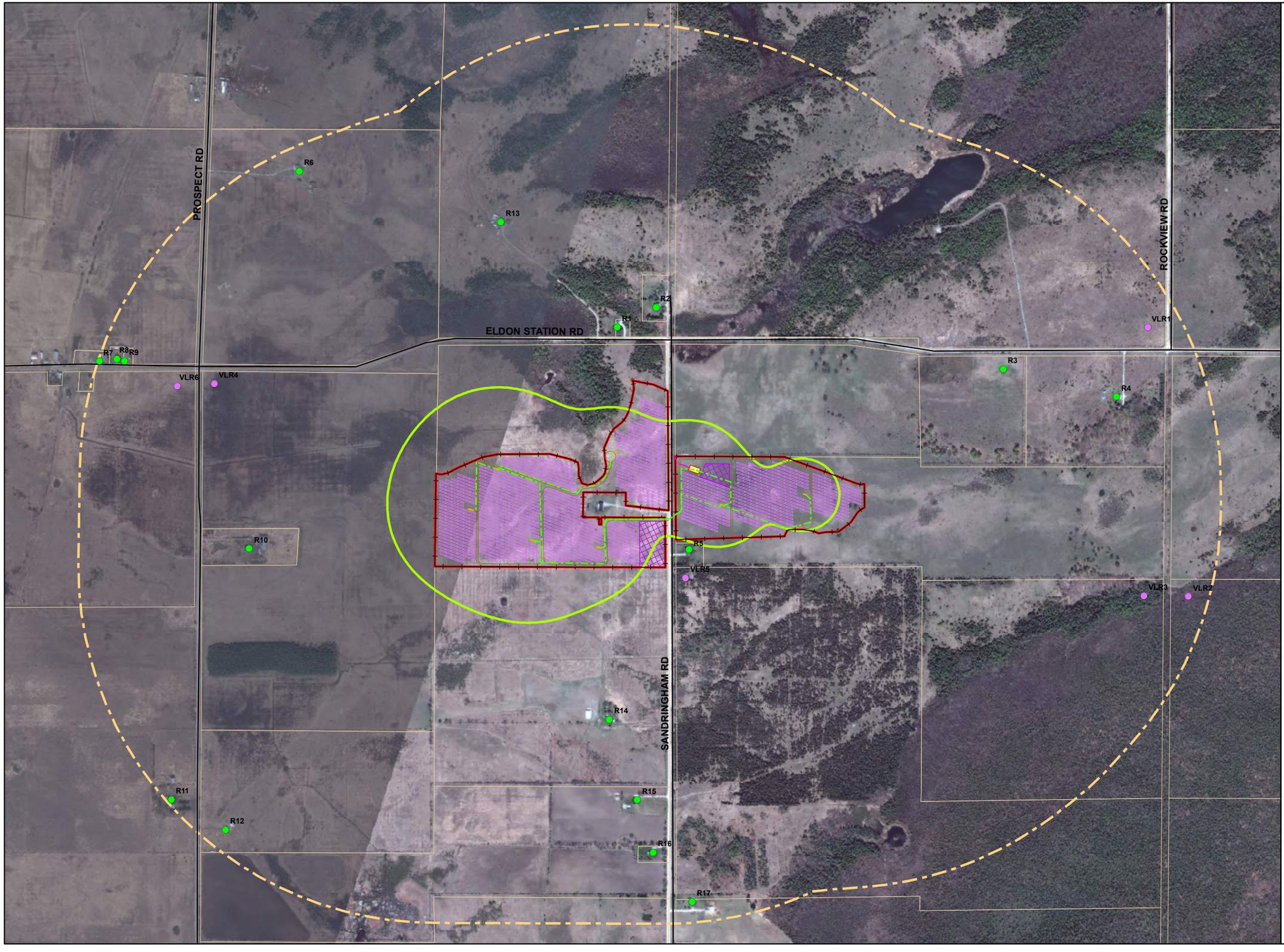
N W E S

1:10,000

0 50 100 150 200 m

DILLON CONSULTING

Created By: GM
Checked By: JLP
Date Created: 112913
Date Modified: 12/6/2013
File Path: I:\GIS\138047 EMP GoodLight LP\Mapping\Noise Assessment\




CanadianSolar

# GoodLight
# Figure 4
# Predicted Noise Level Contours at 4.5 m Height

**Legend**

- Vacant Lot Noise Receptor
- Existing Noise Receptor
- 40 dBA Noise Contour at 4.5 m
- Local Road
- Parcel Boundary

**Project Components**

- Access Road
- Underground Cable
- Fence Line
- Overhead Cable
- Laydown Area
- Communication Tower
- Solar Panel and Rack
- Inverter
- Project Location
- Substation
- 1000 m Project Setback



N
W E
S

1:10,000

0 50 100 150 200 m

DILLON CONSULTING

Created By: GM
Checked By: JLP
Date Created: 112913
Date Modified: 12/6/2013
File Path: I:\GIS\138047 EMP GoodLight LP\Mapping\Noise Assessment\

# Appendix D

PANELS

CanadianSolar

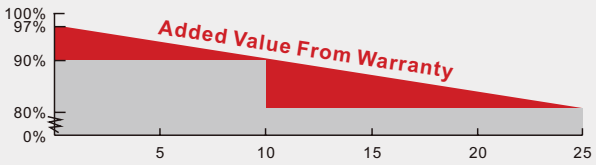
# MaxPower CS6X

## 285/290/295/300/305P

MaxPower CS6X is a robust solar module with 72 solar cells. These modules can be used for on-grid solar applications. Our meticulous design and production techniques ensure a high-yield, long-term performance for every module produced. Our rigorous quality control and in-house testing facilities guarantee Canadian Solar's modules meet the highest quality standards possible.

## Key Features

- High module efficiency up to 15.90%
- Positive power tolerance: 0 ~ +5W
- Robust frame to up to 5400 Pa load
- Self-cleaning surface
- Outstanding performance at low irradiance
- High energy yield at Low NOCT
- **Backed By Our New 10/25 Linear Power Warranty Plus our added 25 year insurance coverage**




- 10 year product warranty on materials and workmanship
- 25 year linear power output warranty

## Best Quality

- 235 quality control points in module production
- EL screening to eliminate product defects
- Current binning to improve system performance
- Accredited Salt mist/Ammonia resistance
- High PID Resistance

## Best Warranty Insurance

- 25 years worldwide coverage
- 100% warranty term coverage
- Providing third party bankruptcy rights
- Non-cancellable
- Immediate coverage
- Insured by 3 world top insurance companies

## Comprehensive Certificates

- IEC 61215, IEC 61730, UL 1703, IEC61701 ED2, IEC 62716, KEMCO, CEC Listed, CE, MCS
- ISO9001: 2008: Quality Management System
- ISO/TS16949:2009: The automotive quality management system
- ISO14001:2004: Standards for Environmental management system
- QC080000 HSPM: The Certification for Hazardous Substances Regulations
- OHSAS 18001:2007: International standards for occupational health and safety
- REACH Compliance

www.canadiansolar.com

# CS6X-285/290/295/300/305P
## MaxPower

## Electrical Data

| STC | CS6X-285P | CS6X-290P | CS6X-295P | CS6X-300P | CS6X-305P |
|---|---|---|---|---|---|
| Nominal Maximum Power (Pmax) | 285W | 290W | 295W | 300W | 305W |
| Optimum Operating Voltage (Vmp) | 35.8V | 35.9V | 36.0V | 36.1V | 36.3V |
| Optimum Operating Current (Imp) | 7.96A | 8.08A | 8.19A | 8.30A | 8.41A |
| Open Circuit Voltage (Voc) | 44.3V | 44.4V | 44.5V | 44.6V | 44.8V |
| Short Circuit Current (Isc) | 8.53A | 8.64A | 8.76A | 8.87A | 8.97A |
| Module Efficiency | 14.85% | 15.11% | 15.37% | 15.63% | 15.90% |
| Operating Temperature | -40℃~+85℃ | | | | |
| Maximum System Voltage | 1000V (IEC) /600V (UL) | | | | |
| Maximum Series Fuse Rating | 15A | | | | |
| Application Classification | Clase A | | | | |
| Power Tolerance | 0 ~ +5W | | | | |

Under Standard Test Conditions (STC) of irradiance of 1000W/m$^2$, spectrum AM 1.5 and cell temperature of 25℃

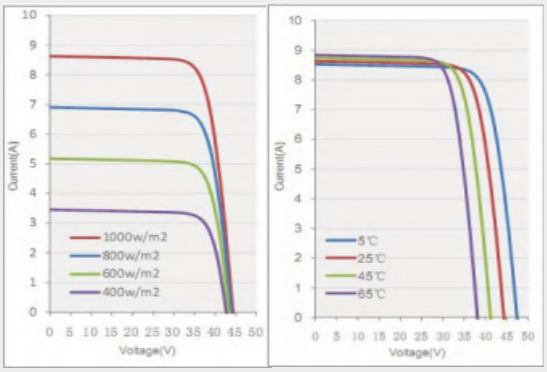
| NOCT | CS6X-285P | CS6X-290P | CS6X-295P | CS6X-300P | CS6X-305P |
|---|---|---|---|---|---|
| Nominal Maximum Power (Pmax) | 207W | 210W | 214W | 218W | 221W |
| Optimum Operating Voltage (Vmp) | 32.7V | 32.7V | 32.8V | 32.9V | 33.1V |
| Optimum Operating Current (Imp) | 6.33A | 6.42A | 6.51A | 6.61A | 6.68A |
| Open Circuit Voltage (Voc) | 40.7V | 40.8V | 40.9V | 41.0V | 41.2V |
| Short Circuit Current (Isc) | 6.91A | 7.00A | 7.10A | 7.19A | 7.27A |

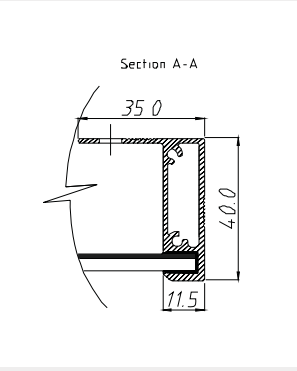
Under Normal Operating Cell Temperature, Irradiance of 800 W/m$^2$, spectrum AM 1.5, ambient temperature 20℃, wind speed 1 m/s

## Mechanical Data

| | |
|---|---|
| Cell Type | Poly-crystalline 156 x 156mm, 2 or 3 Busbars |
| Cell Arrangement | 72 (6 x 12) |
| Dimensions | 1954 x 982 x 40mm (76.93 x 38.7 x 1.57in) |
| Weight | 23kg (50.7 lbs) |
| Front Cover | 3.2mm Tempered glass |
| Frame Material | Anodized aluminium alloy |
| J-BOX | IP65, 3 diodes |
| Cable | 4mm$^2$(IEC)/12AWG(UL), 1150mm |
| Connectors | MC4 or MC4 Comparable |
| Standard Packaging (Modules per Pallet) | 24pcs |
| Module Pieces per container (40 ft . Container) | 528pcs (40'HQ) |

## I-V Curves (CS6X-290P)



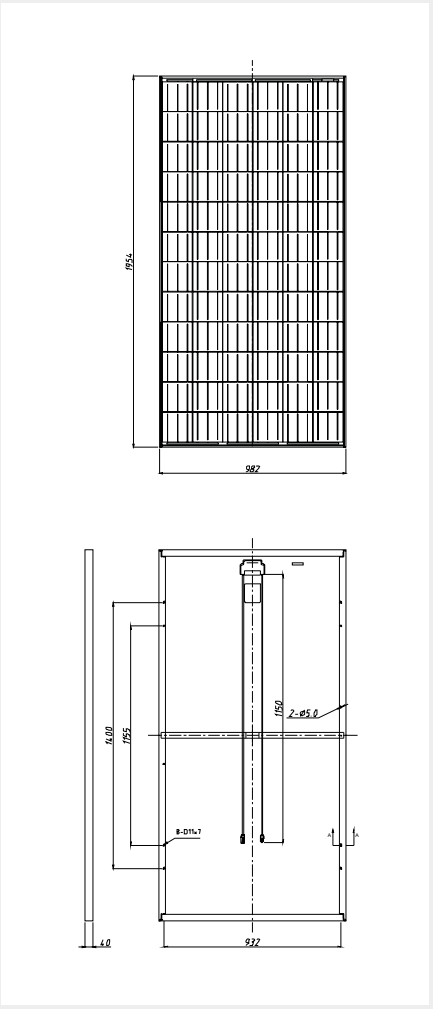

## Temperature Characteristics

| | | |
|---|---|---|
| Temperature Coefficient | Pmax | -0.43%/℃ |
| | Voc | -0.34 %/℃ |
| | Isc | 0.065 %/℃ |
| Normal Operating Cell Temperature | | 45±2℃ |

## Performance at Low Irradiance

Industry leading performance at low irradiation environment, +95.5% module efficiency from an irradiance of 1000w/m$^2$ to 200w/m$^2$ (AM 1.5, 25 ℃)

## Engineering Drawings




*Specifications included in this datasheet are subject to change without prior notice.

## About Canadian Solar

**Canadian Solar Inc. is one of the world's largest solar companies. As a leading vertically-integrated manufacturer of ingots, wafers, cells, solar modules and solar systems, Canadian Solar delivers solar power products of uncompromising quality to worldwide customers. Canadian Solar's world class team of professionals works closely with our customers to provide them with solutions for all their solar needs.**

**Canadian Solar was founded in Canada in 2001 and was successfully listed on NASDAQ Exchange (symbol: CSIQ) in November 2006. Canadian Solar has module manufacturing capacity of 2.05GW and cell manufacturing capacity of 1.3GW.**


Headquarters | 545 Speedvale Avenue West
Guelph | Ontario N1K 1E6 | Canada
Tel: +1 519 837 1881
Fax: +1 519 837 2550
inquire.ca@canadiansolar.com
www.canadiansolar.com

# Appendix E

INVERTER STATIONS


**Economical**
- Savings in balance of system costs due to 1,000 V operating voltage
- Outdoor enclosure allows for direct field deployment
- Small footprint and light weight for easy shipping and installation

**Efficient**
- Highest efficiency in its power class
- Full nominal power at ambient temperatures up to 50 °C
- 10% additional power for continuous operation at ambient temperatures up to 25 °C

**Flexible**
- Configurable DC voltage range
- Integrated AC disconnect for NEC 2011 compliance
- Optional DC disconnects

**Reliable**
- Easy and safe installation and with large, separate connection area
- Powerful grid management functions (incl. LVRT and Frequency Ride Through)
- Full UL1741 and IEEE 1547 compliance

# SUNNY CENTRAL
# 500CP-US / 630CP-US / 720CP-US / 750CP-US / 800CP-US

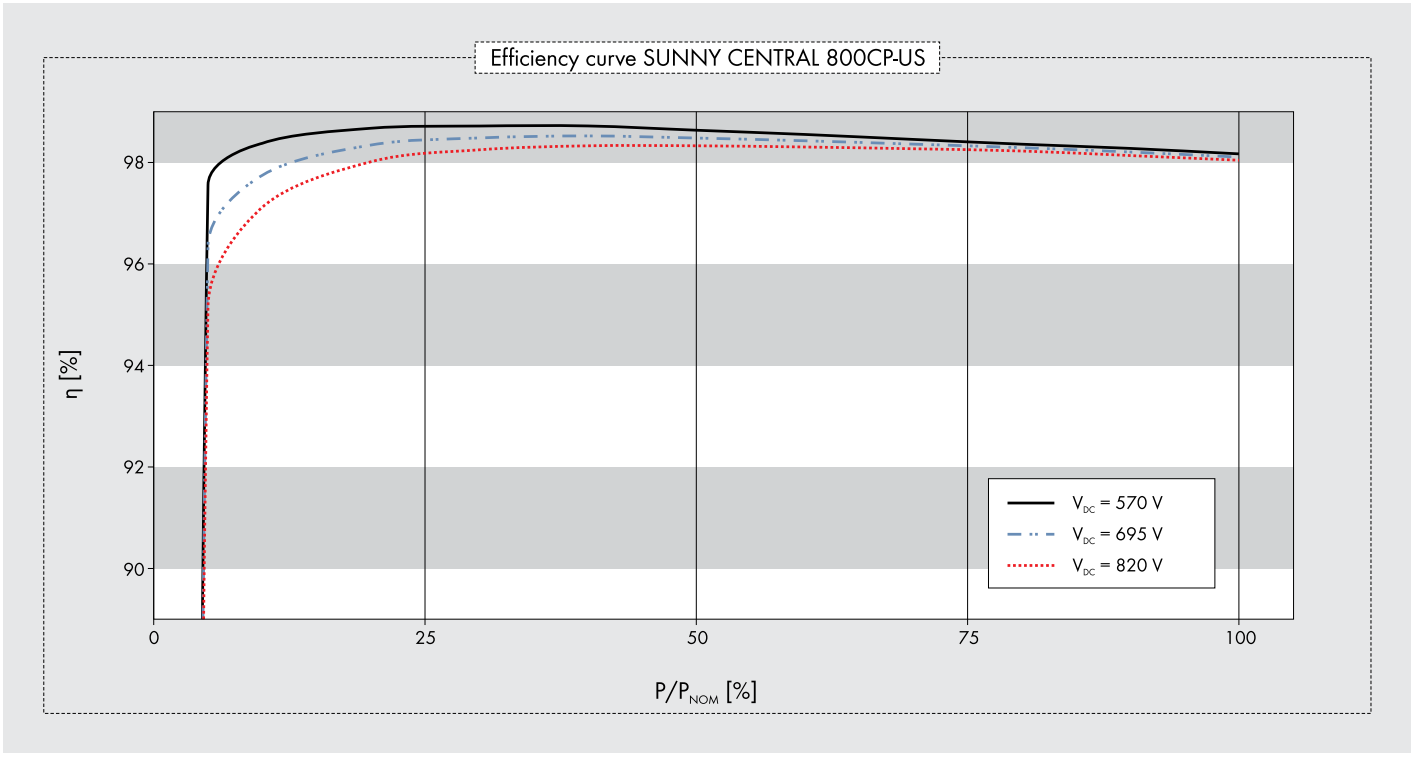
UL listed for commercial and utility-scale projects

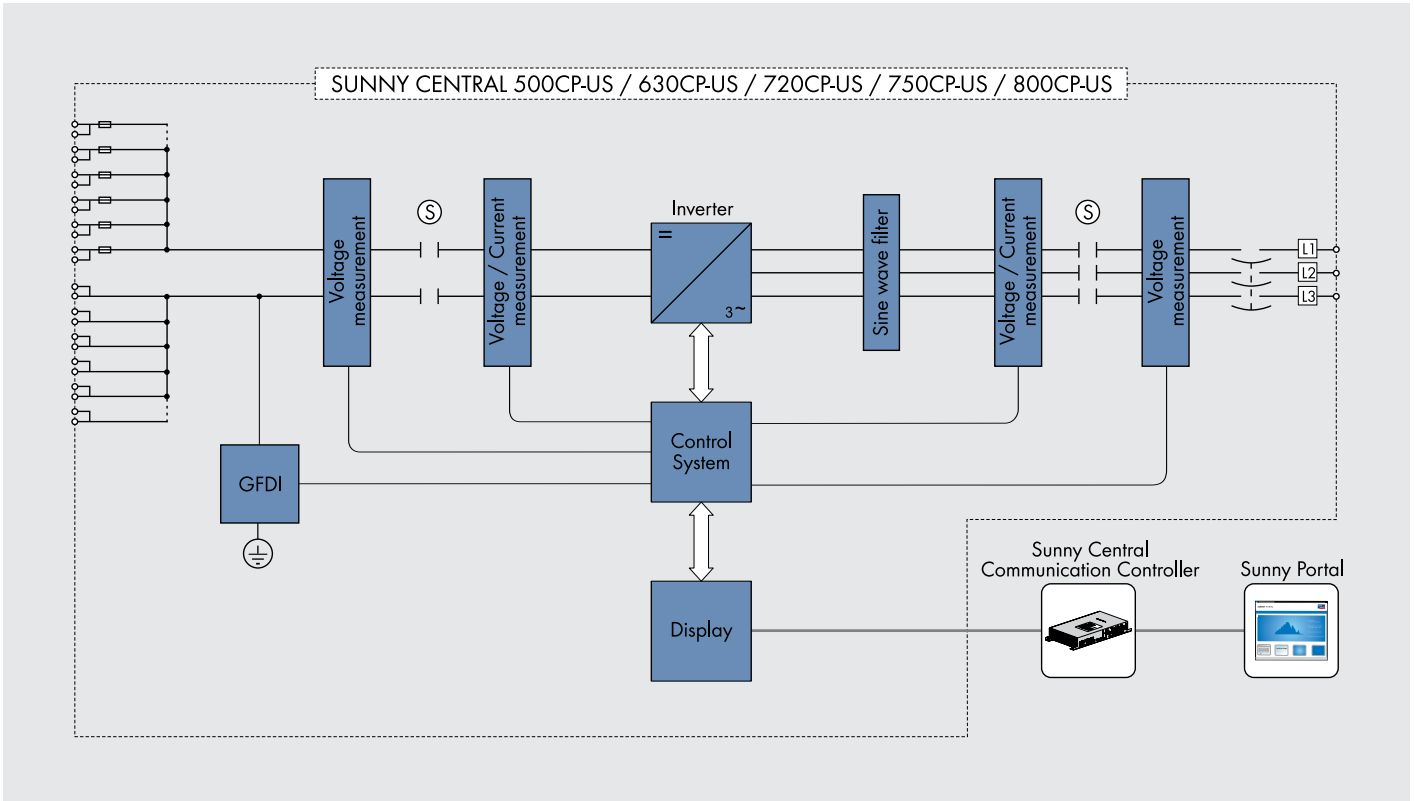
The Sunny Central CP-US series delivers outstanding performance. In combination with an external transformer, the Sunny Central CP-US can be connected to any utility grid or three-phase commercial service while directly providing grid management functions. The CP-US family is UL listed at 1,000 V DC and features an integrated AC disconnect in accordance with NEC 2011 requirements. Both the outdoor enclosure with the OptiCool™ cooling concept and the separate connection area ensures simple installation while maximizing returns. With a peak efficiency of 98.7 percent, it outperforms all other inverters in its class. The Sunny Central CP-US can also be integrated with the Power Plant Controller as well as the Medium-voltage Power Platform for utility-scale applications.

| Technical data | Sunny Central 500CP-US | Sunny Central 630CP-US |
|---|---|---|
| **Input (DC)** | | |
| Max. DC power (@ cos φ = 1) | 560 kW | 713 kW |
| Max. input voltage[1] | 1000 V | 1000 V |
| MPP voltage range (@ 25 °C / @ 50 °C at 60 Hz) | 430 V – 820 V / 430 V – 820 V [1,2] | 500 V – 820 V / 500 V – 820 V [1,2] |
| Rated input voltage | 480 V | 550 V |
| Max. input current | 1250 A | 1350 A |
| Min. input voltage / $V_{MPP\_min}$ at $I_{MPP} < I_{DCmax}$ | 429 V | 498 V |
| Number of independent MPP inputs | 1 | 1 |
| Number of DC inputs | 1; 6 – 9 | 1; 6 – 9 |
| **Output (AC)** | | |
| Rated power (@ 25 °C) / nominal AC power (@ 50 °C) | 550 kVA / 500 kVA | 700 kVA / 630 kVA |
| Rated grid voltage / nominal AC voltage range | 270 V / 243 V – 297 V | 315 V / 284 V – 347 V |
| AC power frequency / range | 50 Hz, 60 Hz / 47 Hz ... 63 Hz | 50 Hz, 60 Hz / 47 Hz ... 63 Hz |
| Rated power frequency / rated grid voltage | 50 Hz, 60 Hz / 270 V | 50 Hz, 60 Hz / 315 V |
| Max. output current | 1176 A | 1283 A |
| Max. total harmonic factor | < 3 % | < 3 % |
| Power factor at rated power / displacement power factor adjustable | 1 / 0.8 leading – 0.8 lagging | |
| Feed-in phases / connection phases | 3 / 3 | 3 / 3 |
| **Efficiency[3]** | | |
| Max. efficiency / European weighted efficiency / CEC efficiency | 98.5 % / 98.3 % / 98.0 % | 98.5 % / 98.3 % / 98.0 % |
| **Protective devices** | | |
| DC disconnect device | DC contactor | |
| AC disconnect device | AC circuit breaker | |
| DC overvoltage protection | Surge Arrester Type II | |
| Grid monitoring | ● | ● |
| Ground-fault monitoring | o | o |
| Ungrounded PV array[4] | o | o |
| Lightning protection | Lightning protection level III | Lightning protection level III |
| Insulation monitoring | o | o |
| Surge arresters for auxiliary power supply | ● | ● |
| Protection class / overvoltage category | I / IV | I / IV |
| **General data** | | |
| Dimensions (W / H / D) | 2562 / 2279 / 956 mm (101 / 90 / 38 inches) | |
| Weight | 1800 kg / 4000 lb | 1800 kg / 4000 lb |
| Operating temperature range | -25 °C ... +50 °C / -13 °F ... +122 °F | -25 °C ... +50 °C / -13 °F ... +122 °F |
| Noise emission[5] | 60 db(A) | 60 db(A) |
| Max. self-consumption (in operation) / self-consumption (at night)[6] | 1700 W / < 100 W | 1700 W / < 100 W |
| External auxiliary supply voltage | 230 / 400 V (3/N/PE) | 230 / 400 V (3/N/PE) |
| Cooling concept | OptiCool | OptiCool |
| Degree of protection: electronics / connection area | NEMA 3R / NEMA 3R | NEMA 3R / NEMA 3R |
| Degree of protection | 4C2, 4S2 | 4C2, 4S2 |
| Application | In unprotected outdoor environments | In unprotected outdoor environments |
| Max. permissible value for relative humidity (non-condensing) | 15 % ... 95 % | 15 % ... 95 % |
| Max. operating altitude above mean sea level | 2000 m | 2000 m |
| Fresh-air consumption (inverter) | 3000 m³/h | 3000 m³/h |
| **Features** | | |
| DC connection | Ring terminal lug / cage clamp | Ring terminal lug / cage clamp |
| AC connection | Ring terminal lug / cage clamp | Ring terminal lug / cage clamp |
| Display | o | o |
| Communication / protocols | Ethernet (optical fiber optional), Modbus | Ethernet (optical fiber optional), Modbus |
| Communication with Sunny String-Monitor | RS485 | RS485 |
| Transformer for auxiliary power supply | o | o |
| SC-COM | ● | ● |
| Color of enclosure, door, base, roof | RAL 9016 / 9016 / 7005 / 7004 | |
| Warranty: 5 / 10 / 15 / 20 / 25 years | ● / o / o / o / o | ● / o / o / o / o |
| Certificates and approvals (more available on request) | EMC conformity according to FCC, Part 15, Class A, UL 1741, UL 1998, IEEE 1547 | |
| ● Standard equipment o Optional features – Not available | | |
| Type designation | SC 500CP-US-10 | SC 630CP-US-10 |

| Sunny Central 720CP-US | Sunny Central 750CP-US | Sunny Central 800CP-US | |
|---|---|---|---|
| 808 kW | 853 kW | 898 kW | |
| 1000 V | 1000 V | 1000 V | |
| 525 V – 820 V / 525 V – 820 V [1,2] | 545 V – 820 V / 545 V – 820 V [1,2] | 570 V – 820 V / 570 V – 820 V [1,2] | |
| 565 V | 595 V | 620 V | |
| 1600 A | 1600 A | 1600 A | |
| 515 V | 545 V | 568 V | |
| 1 | 1 | 1 | |
| 1; 6 – 9 | 1; 6 – 9 | 1; 6 – 9 | |
| | | | |
| 792 kVA / 720 kVA | 825 kVA / 750 kVA | 880 kVA / 800 kVA | |
| 324 V / 292 V – 356 V | 342 V / 308 V – 376 V | 360 V / 324 V – 396 V | |
| 50 Hz, 60 Hz / 47 Hz ... 63 Hz | 50 Hz, 60 Hz / 47 Hz ... 63 Hz | 50 Hz, 60 Hz / 47 Hz ... 63 Hz | |
| 50 Hz, 60 Hz / 324 V | 50 Hz, 60 Hz / 342 V | 50 Hz, 60 Hz / 360 V | |
| 1411 A | 1411 A | 1411 A | |
| < 3 % | < 3 % | < 3 % | |
| 1 / 0.8 leading – 0.8 lagging | | | |
| 3 / 3 | 3 / 3 | 3 / 3 | |
| | | | |
| 98.6 % / 98.4 % / 98.0 % | 98.6 % / 98.4 % / 98.0 % | 98.7 % / 98.4 % / 98.5 % | |
| | | | |
| DC contactor | | | |
| AC circuit breaker | | | |
| Surge Arrester Type II | | | |
| ● | ● | ● | |
| ○ | ○ | ○ | |
| ○ | ○ | ○ | |
| Lightning protection level III | Lightning protection level III | Lightning protection level III | |
| ○ | ○ | ○ | |
| ● | ● | ● | |
| I / IV | I / IV | I / IV | |
| | | | |
| 2562 / 2279 / 956 mm (101 / 90 / 38 inches) | | | |
| 1800 kg / 4000 lb | 1800 kg / 4000 lb | 1800 kg / 4000 lb | |
| -25 °C ... +50 °C / -13 °F ... +122 °F | -25 °C ... +50 °C / -13 °F ... +122 °F | -25 °C ... +50 °C / -13 °F ... +122 °F | |
| 60 db(A) | 60 db(A) | 61 db(A) | |
| 1700 W / 100 W | 1700 W / < 100 W | 1700 W / < 100 W | |
| 230 / 400 V (3/N/PE) | 230 / 400 V (3/N/PE) | 230 / 400 V (3/N/PE) | |
| OptiCool | OptiCool | OptiCool | |
| NEMA 3R / NEMA 3R | NEMA 3R / NEMA 3R | NEMA 3R / NEMA 3R | |
| 4C2, 4S2 | 4C2, 4S2 | 4C2, 4S2 | |
| In unprotected outdoor environments | In unprotected outdoor environments | In unprotected outdoor environments | |
| 15 % ... 95 % | 15 % ... 95 % | 15 % ... 95 % | |
| 2000 m | 2000 m | 2000 m | |
| 3000 m³/h | 3000 m³/h | 3000 m³/h | |
| | | | |
| Ring terminal lug / cage clamp | Ring terminal lug / cage clamp | Ring terminal lug / cage clamp | |
| Ring terminal lug / cage clamp | Ring terminal lug / cage clamp | Ring terminal lug / cage clamp | |
| ○ | ○ | ○ | |
| Ethernet (optical fiber optional), Modbus | Ethernet (optical fiber optional), Modbus | Ethernet (optical fiber optional), Modbus | |
| RS485 | RS485 | RS485 | |
| ○ | ○ | ○ | |
| ● | ● | ● | |
| RAL 9016 / 9016 / 7005 / 7004 | | | |
| ● / ○ / ○ / ○ / ○ | ● / ○ / ○ / ○ / ○ | ● / ○ / ○ / ○ / ○ | |
| EMC conformity according to FCC, Part 15, Class A, UL 1741, UL 1998, IEEE 1547 | | | |
| | | | |
| SC 720CP-US-10 | SC 750CP-US-10 | SC 800CP-US-10 | |

[1] At 1.00 $U_{AC, nom}$ and cos φ = 1
[2] The inverter will track MPP to 850V before self-protecting
[3] Measured efficiency includes all auxiliary power
[4] Included in the inverter's UL listing
[5] Sound pressure level at a distance of 10 m
[6] Self-consumption at rated operation






**Toll Free +1 888 4 SMA USA**
**www.SMA-America.com**

**SMA America, LLC**

# Appendix F

SUBSTATION

VIRGINIA TRANSFORMER CORP

220 Glade View Drive,
Roanoke, VA 24012
Ph. 540.345.9892
www.vatransformer.com

---

Proposal X131101A Rev. 1 Date: 7/19/2013

Prepared For JUWI Little Creek Solar Facility

Attn: William Sanders, William.Sanders@rmtinc.com

VTC Contact: Larry Horne, Larry_Horne@vatransformer.com
Ph: 540-345-9892 Ext 213

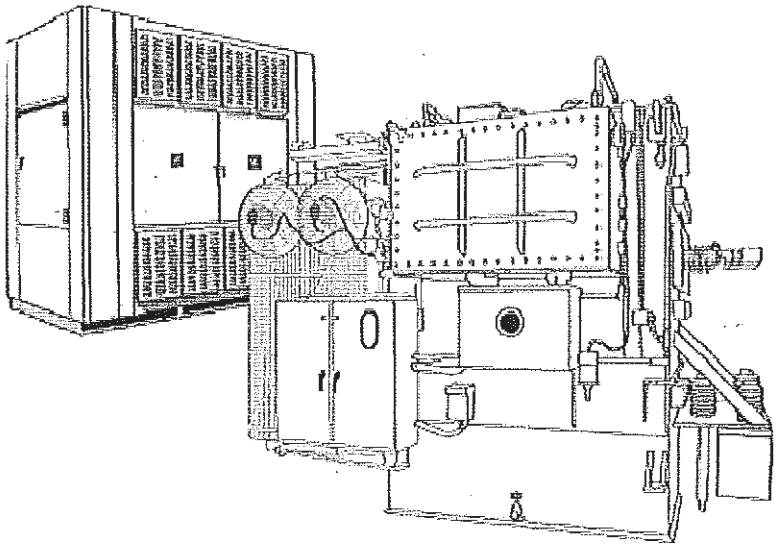
Description 7500/10000 MVA Step -up Transformer

---

For over 40 years, innovative technology and a commitment to superior customer service and support have established Virginia Transformer Corporation (VTC) as an engineering company leading in manufacturing a verity of Transformers.

VTC designs and manufactures custom power transformers ranging from 300 KVA to 300 MVA, 230 kV class, both liquid-filled and dry-type units.

VTC has design and manufacturing facilities in Roanoke, VA; Pocatello, ID and Chihuahua, Mexico. In addition, VTC has design and procurement capabilities in Delhi, India - establishing a world-wide presence as a supplier of transformer solutions. VTC reserves the right to manufacture the product quoted herein at any of these plants.



## PROPOSAL SUMMARY

Option: 1 FR3 Fluid

| ITEM | DESCRIPTION | QTY | UNIT PRICE | EXTENDED PRICE |
|---|---|---|---|---|
| 1 | 7500 / 10000 KVA | 01 | | |

Option: 2 Mineral Oil

| ITEM | DESCRIPTION | QTY | UNIT PRICE | EXTENDED PRICE |
|---|---|---|---|---|
| 1 | 7500 / 10000 KVA | 01 | | 0 |

The Firm price offer is for shipment by 9/20/2013 and order by 4/19/2013. If shipment is delayed for customer reason, the price will be increased at a rate of 1.0% per month effective the first day after the shipment date expires. The validity of Index Price offer expires 12 months from the date of original proposal.

| SHIPPING INFORMATION | |
|---|---|
| Validity of Quotation | 8/19/2013 |
| Shipment By | 11/15/2013 |
| F.O.B. | Destination |
| Freight | DAP Greater Napanee, Ontario, Canada |

| PAYMENT TERMS |
|---|
| 20% with acknowledgement of P.O. |
| 30% with Approval Drawing Submittal, Net 30 days |
| 50% invoiced at time of shipment, Net 30 days |

VA Transformer: Accounting, Phone: 540-345-9892, E-mail:accounting@vatransformer.com

NOTES

1. All prices are excluding any State, Federal, Sales or Use Tax.
2. Written Purchase Orders are required prior to any Engineering, Manufacturing, or Order Entry by VTC. The stated delivery date contained in this proposal is predicated on the factory loading at the time of quotation. The actual delivery date will only be confirmed at the time an order is received. Our acknowledgement will confirm the committed shipment date. Virginia Transformer Corp. reserves the option to ship this unit within a window of four to six (4 to 6) weeks prior to the date requested on the purchase order.
3. Access to final site and all access roads leading thereto must be suitable for un-impeded delivery by special, heavy-duty trucks carrying large transformers, including grades, turning radii, and surface conditions capable of supporting the combined weight of these trucks and transformers.

   VTC will include its standard O&M manual with a Final, As-Built package of drawings and cat cuts of the devices. Reference VTC website for a sample copy of our standard O&M manual (www.vatransformer.com > Brochures & White Papers > Liquid Filled Installation and Operation).

**This proposal is Virginia Transformer's complete understanding of the specification requirements provided, and is the basis for acceptance of any resulting orders. The table below describes the salient ratings of the transformer(s) in the proposal:**

## ITEM #1

## TECHNICAL SPECIFICATION:

| ITEM #1 | QUANTITY #1 | | |
|---|---|---|---|
| **KVA** | 7500 / 10000 | **Application** | Generator step-up |
| **Cooling Class** | KNAN / KNAF | **Winding Temp Rise (AVG)** | 65°C |
| **# Phases** | 3 | **Dielectric Fluid** | Envirotemp FR3 |
| **Frequency (Hertz)** | 60 | **Conductor Material** | Copper |
| **HV Rating(V)** | 44000 Delta | **LV Rating(V)** | 27600 GrdY / 15935 |
| **HV BIL(kV)** | 250 | **LV BIL(kV)** | 200 |
| **LV Taps** | 2 FCAN, 2 FCBN @ 2.50 % | **Nom. Impedance** | 5.75 %; ±7.50% @7500 KVA 7.5%; @ 10000KVA |
| **HV Bushing Mounting** | Segment III, Cover Mounted | **LV Bushing Mounting** | Segment I, Cover Mounted |
| **HV Terminal Chamber** | NA | **LV Terminal Chamber** | NA |
| **Radiators** | Hot dip Galvanized unpainted w/Valve | **Paint Color / Type** | 70 / III Polyamide Epoxy Over urethane |
| **Losses** | Guaranteed Max per ANSI Tolerance | **Coil Type** | CIRCULAR |
| **No Load Losses** | 7 kW at 100% volts | **Load Losses** | 30 kW @ 7500 KVA |

## TANK FEATURES:

1. De-energized Manual No Load Tap Changer
2. Diagrammatic Name Plate
3. Gasketed Manhole in Cover
4. Panel Type Radiators
5. Sealed Tank with Dry Nitrogen Blanket
6. Two Stainless Steel Ground Pads welded to Base on Diagonally Opposite Corners
7. Welded Top Cover

## STANDARD GAUGES AND ADDITIONAL FIXTURES / ACCESSORIES

| Gauge Details |
|---|
| Liquid Temperature Gauge with contacts |
| Pressure Vacuum Gauge & Bleeder |
| Liquid Level Gauge with Contacts |
| Pressure Relief Device with Flag & contacts |
| Simulated Winding Temperature Gauge with contacts |
| Sudden Pressure Relay – GAS and OIL |
| Seal in Relay |
| RTD for main tank |

Note: Unless otherwise stated, all gauges and accessories shall be of VTC preferred provision.

## BUSHINGS, CURRENT TRANSFORMERS AND LIGHTNING ARRESTERS

**Details of Bushings:**

| Bushing | BIL | Location | Quantity/Phase | Make |
|---|---|---|---|---|
| HV | 250 | Segment III | 1 | VTC STD |
| LV | 200 | Segment I | 1 | VTC STD |

**Details of Current Transformers:**

| Location | Quantity/Phase | CT Radio | Single Ratio / Multi Ratio | Class / Accuracy |
|---|---|---|---|---|
| HV* | 1 | 600:5 | MR | 0.3B2.0 |
| LV | 1 | 600:5 | MR | C400 |
| LV Neutral | 1 | 600:5 | MR | C400 |

*See the clarifications

**Details of Arresters*:**

| Location | KV Class | MCOV | Class | Manufacturer |
|---|---|---|---|---|
| HV | 46 | 42 kV | Station Class | VTC STD |
| LV | 27 | 22 kV | Station Class | VTC STD |

***VTC has quoted for Polymer station class arresters and not porcelain.**

**Radiators**

VTC standard radiators are Hot Dipped Galvanized and do not require painting. These radiators are suitable for all climatic conditions that include chemical, petro-chemical and marine conditions. Unless specified differently below, these standard, galvanized radiators will be provided.

| Radiators included in this quoted transformer - Standard per above | |
|---|---|
| Demount | Hot Dipped Galvanized |

## TESTING:

1. Routine.
2. Impulse.
3. DGA.
4. Power factor.

## AMBIENT CONDITIONS:

| | |
|---|---|
| Ambient Temperature (*C) | Min. -20 / Av. 25 / Max. 40 |
| Seismic Zone | Zone 1 & 2 |
| Altitude (Feet) | ≤3300 ft. |
| Sound Level | STD NEMA TR-1 |

## SHIPPING & HANDLING DETAILS:

| [A] Shipping & Overall Dimensions: | | |
|---|---|---|
| **Dimension** | **Overall Dimensions(Inches)** | **Shipping Dimensions (Inches)** |
| Width | 134 | 128.38 |
| Depth | 127 | 123.30 |
| Height | 155 | 152.88 |

| [B] Shipping & Estimated Weight: | |
|---|---|
| **Estimated Weight of the Unit (Lbs)** | **Approximate Shipping Weight (Lbs)** |
| 51,000 | 51,100 |

**Remarks:**

1. The above dimensions are approximate.

**[C] Parts to be shipped separately:**

**None**

Note: Assembly of ship separate parts is by others unless Value Added Options for installation services are included.

## SUGGESTED SPARE PARTS:

| Suggested Spare Parts | |
|---|---|
| **Particulars** | **Price ($)** |
| GASKET SET | |
| FANS | |
| HV BUSHINGS | |
| LV BUSHINGS | |

## VALUE ADDED OPTIONS

| | |
|---|---|
| Standard Warranty 12/18 Months | Included |
| Extended Warranty 60/60 Months | Included |
| Test Witness Option | |
| Field Service: Unloading, Installation (make up-oil) and Filed Testing | |
| Impact Recorder | |
| VTC Final As-Built Package (FABP) | With Order |
| Final as-built Drawings | With FABP |
| Operation & Maintenance Manual | With Shipment/FABP |
| Catalog cuts for components | With Drawings/FABP |
| Spare parts price list for five-year operation | With FABP |

## CLARIFICATIONS/EXCEPTIONS TO THE SPECIFICATION

- VTC had assumed impedance 5.75% @ 7500KVA for this quote and 7.50% @ 10000KVA
- VTC has quoted for 600:5A, 0.3B2.0 accuracy class instead of 600:5, 0.15B1.8. See the CT Details.
- VTC has provided NEMA 3R control cabinet without Stainless steel.
- VTC takes exception for the clause 4.2.10 (Power factor not exceeding 0.5%).

Quote JUWI

| | | |
|---|---|---|
| No Load Loss (KW) | 7 | |
| KVA Rating | 7500 | |
| Load Loss at Reference Temp (KW) | 30 | |
| Impedance | 5.75 | % |

**Regulation Calculation**

| | | |
|---|---|---|
| %R | 0.40000 | |
| %X | 5.73607 | |

| | PF | SinY | |
|---|---|---|---|
| Power Factor | 1 | 0 | 0.56451 |
| | 1 | 0.00 | 0.56451 |

**Efficiency Calculation at Various Percent of Load**

| | | Power Factor | |
|---|---|---|---|
| | | 1 | 1 |
| 125% | 1.25 | 99.43 | 99.43 |
| 100% | 1.00 | 99.51 | 99.51 |
| 75% | 0.75 | 99.58 | 99.58 |
| 50% | 0.50 | 99.61 | 99.61 |
| 25% | 0.25 | 99.53 | 99.53 |

**X/R Ratio**

| |
|---|
| 14.34 |

**Load Loss at Various Percent of Load**

| | | |
|---|---|---|
| 125% | 1.25 | 46.88 |
| 100% | 1.00 | 30.00 |
| 75% | 0.75 | 16.88 |
| 50% | 0.50 | 7.50 |
| 25% | 0.25 | 1.88 |

## 9. DATA TO BE SUBMITTED WITH BID

1. Transformer Dimensions:
   a. Shipping: H: 153" W: 128" D: 123"
   b. Assembled: H: 155" W: 134" D: 127"
   c. Will transformer be shipped with the radiators installed? YES

2. Weight:
   a. Shipping 51,100 pounds
   b. Assembled 51,100 pounds

3. Oil:
   a. Type FR3 / OPTION - MINERAL OIL
   b. Volume 1780 gallons
   c. Will transformer be shipped with oil? YES

4. Transformer data:
   a. Manufacturer VIRGINIA TRANSFORMER CORP
   b. Type GSU
   c. Temperature rise 65° C.
   d. HV side voltage 44 KV DELTA
   e. LV side voltage 27.6 KV GRDY
   f. Winding material COPPER
   g. Winding type DISC / HELICAL
   h. Vector group
   i. Impulse withstand voltage (BIL)
      - HV side winding 250 BIL
      - LV side winding 200 BIL
      - Neutral winding 200 BIL
      - HV side bushing SEE PROPOSAL
      - LV side bushing "
      - Neutral bushing "
   j. Impedance at 10MVA 7.5% ± 7.5%
   k. X/R ratio 14.34
   l. Losses
      - No load 7 KW
      - Load 30 KW
      - Auxiliary 2 KW

5. Manufacturing Location ROANOKE, VA

CIMA

6. Schedule:

| | | |
|---|---|---|
| a. Drawing lead time ARO | 3-4 WKS | weeks |
| b. Available witnessing points ARO | 9-10 | weeks |
| c. Testing ARO | 12-13 | weeks |
| d. Shipping ARO | 14-15 | weeks |

7. Warranty 60/60 INCLUDED

CIMA

# Appendix G

NOISE STUDY REPORT

**UTM Coordinates – Noise Sources**

| Noise Source ID | Centre of Cluster – UTM Coordinates (NAD 83) | |
|---|---|---|
| | X (m) | Y (m) |
| INV1 | 659934 | 4930708 |
| INV2 | 659724 | 4930601 |
| INV3 | 659441 | 4930371 |
| INV4 | 659257 | 4930326 |
| INV5 | 659066 | 4930348 |
| INV6 | 659098 | 4930479 |
| INV7 | 659398 | 4930640 |
| INVTR1 | 659941 | 4930708 |
| INVTR2 | 659731 | 4930601 |
| INVTR3 | 659447 | 4930371 |
| INVTR4 | 659264 | 4930326 |
| INVTR5 | 659072 | 4930348 |
| INVTR6 | 659105 | 4930479 |
| INVTR7 | 659392 | 4930640 |
| TRS (substation) | 659620 | 4930668 |

WHITE
an IEA company

# GoodLight Solar Project

GoodLight SOLAR

## REVISED FINAL NOISE STUDY REPORT

DILLON CONSULTING

## Table of Contents

**Page**

## List of Figures



## List of Tables



## Appendices

## 1. Introduction

Canadian Solar Solutions Inc., acting on behalf of GoodLight LP, proposes to develop a solar facility with a maximum name plate capacity of approximately 10 MW AC, located near Eldon, in the City of Kawartha Lakes, Ontario (**Figure 1**). The renewable energy facility will be known as GoodLight and will be rated as a Class 3 Solar Facility. GoodLight LP has received a contract from the Ontario Power Authority (OPA) for the sale of electricity generated by this renewable facility through the province's Feed-in-Tariff (FIT) program (enabled by the *Green Energy and Green Economy Act*). The project has received a Renewable Energy Approval (REA) as per *Ontario Regulation 359/09* under Part V.0.1 of the *Ontario Environmental Protection Act*.

This revised *Noise Study* Report (NSR) reflects the final design and technology selection for the project and is being submitted to the Ministry of the Environment for a technical change amendment to the issued REA (REA No. **4324-96UL4W**), all in accordance with the process as outlined in *Ontario Regulation 359/09*. This assessment documents the compliance of all existing noise sources at GoodLight with MOE Publication *NPC-232 Sound Level Limits for Stationary Sources in Class 3 Areas (Rural)*.

## 2. The Proponent

Canadian Solar Solutions Inc. is managing and coordinating the approvals process for GoodLight LP. Canadian Solar is an experienced developer, owner and operator of power generation and energy delivery assets. Company activities include developing, building, owning and operating renewable energy facilities. Canadian Solar strives to satisfy various environmental approval requirements and obtain regulatory approvals that vary depending on the jurisdiction, project capacity and site location. In addition, they build long-term relationships with the communities that host their projects and are committed to the health and welfare of the City of Kawartha Lakes, Ontario.

Contact information for the proponent is as follows:

| | |
|---|---|
| **Full Name of Company:** | *GoodLight LP* |
| **Prime Contact:** | *Grace Pasceri* |
| **Address:** | *545 Speedvale Ave. W., Guelph, Ontario, N1K 1E6* |
| **Telephone:** | *519-837-1881 x2293* |
| **Fax:** | *519-837-2550* |
| **Email:** | *Grace.pasceri@canadiansolar.com* |

Dillon Consulting Limited (Dillon) is the consultant responsible for the preparation of REA-related reports for GoodLight. The contact at Dillon is:

| | |
|---|---|
| **Full Name of Company:** | *Dillon Consulting Limited* |
| **Prime Contact:** | *Amir A. Iravani* |
| **Address:** | *235 Yorkland Boulevard, Suite 800, Toronto, Ontario, M2J 4Y8* |
| **Telephone:** | *(416) 229-4647 ext 2320* |
| **Fax:** | *(416) 229-4692* |
| **Email:** | *airavani@dillon.ca* |

## 3. Project Location

The proposed Class 3 Solar Facility consists of two properties located at 1175 and 2002 Sandringham Road, approximately 1 km from the community of Eldon. **Figure 1** shows the general location of the project in Ontario. The project location covers part of Lot 20, Concession 5 and part of Lot 20, Concession 6 of the City of Kawartha Lakes and consists of 51.14 hectares of privately owned land, with geographic coordinates (centroids) as follows:

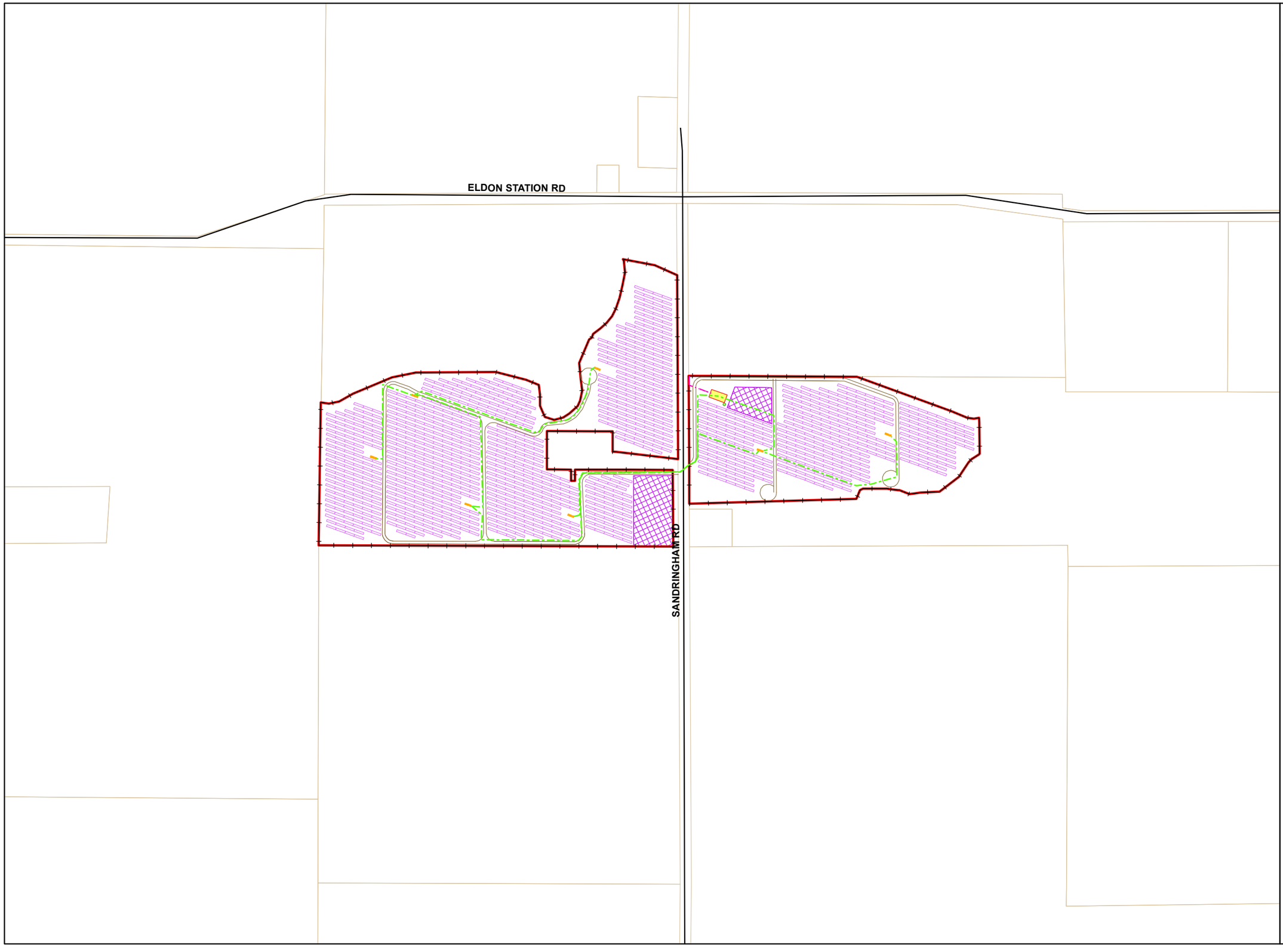
- Latitude: 44° 30’ 39.92” N
- Longitude: 78° 59’ 23.47” W

“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** shows the proposed layout and location of all project components. Further information on facility components making up the project location is provided in Sections 4 and 5 of the *Design and Operations Report*, in the REA submission.


**Figure 1: General Location of GoodLight in Ontario**

CanadianSolar

# GoodLight
# Figure 2:
# Site Plan -
# Component Layout




**Legend**

- Local Road
- Parcel Boundary

**Project Components**

- Access Road
- Underground Cable
- Fence Line
- Overhead Cable
- Laydown Area
- Communication Tower
- Solar Panel and Rack
- Inverter
- Project Location
- Substation



N
W E
S

1:6,500

0 50 100 150 200 m

DILLON CONSULTING

Created By: GM
Checked By: JLP
Date Created: 100113
Date Modified: 12/6/2013
File Path: I:\GIS\138047 EMP GoodLight LP\Mapping\

# 4. Overview of Noise Study

## 4.1 Summary of Acoustic Environment & Applicable Noise Limits

The background ambient noise, exclusive of that generated by GoodLight, can be characterized as having qualities of a Class 3 (Rural) Area, as described in the Ontario Ministry of the Environment (MOE) Noise Pollution Control Publication NPC-232 *Sound Level Limits for Stationary Sources in Class 3 Areas (Rural).* The primary contributor to the background sound during the daytime and nighttime periods are natural sounds and occasional vehicle traffic on nearby roadways.

The NPC-232 Class 3 Area exclusion limits of 45 dBA for daytime (07:00 – 19:00), 40 dBA for evening (19:00 to 23:00) and 40 dBA for nighttime (23:00 to 07:00) were selected to represent the performance limits at noise sensitive receptors [note: for the purposes of this report, since the limits for evening and nighttime are the same, the nighttime is defined as 19:00 to 07:00].

## 4.2 Statement of Compliance

With the implementation of the noise mitigation measures presented in this assessment, the proposed project complies with the daytime and nighttime noise criteria as defined in NPC-232 for all sources assessed in this study.

## 5. Facility Description

The GoodLight facility will consist of approximately 48,000 solar PV modules. These will be contained in a series of fixed racking systems which will be attached to galvanized steel support structures. Based on the results of the Geotechnical Assessment, driven piles, screw piles or concrete foundations will be used as appropriate. An aluminum or steel racking system will be installed on the foundations to support the panels. Foundation types may consist of ground screws or plate-mounted steel beams (with possible pre-drilling), installed using a mechanical, hydraulic or vibratory pile hammer mounted on a rig, excavator or boom truck. The hydraulic drive motor would rotate the screw pile into the ground. Alternatively, if driven piles are to be used, they would be installed in a similar fashion but would be driven rather than rotated or screwed into the ground. Solar PV panels (285 - 305 watts each) will be mounted on the racks and the panels and racks will be aligned in rows approximately 4 - 10 metres apart.

Inverters and transformers will be installed to convert DC to AC current and boost the voltage for connection to the grid. The components that emit noise are as follows:

**Substation Transformer (Source ID: TRS)**

One (1) 44 kV, 10 MVA (max) substation transformer will be installed to step up the current for connection with the grid. The substation transformer will be manufactured by Virginia Transformer Corp. The transformer specifications, including NEMA noise rating and dimensions are provided in **Appendix A**. The octave spectrum for the substation transformer was calculated using IEEE standard, accounting for 0.3m increase in dimensions. The transformer is oversized and can handle up to 10 MVA (ONAF). Noise spectrum calculation is presented in **Appendix A**. The sound power calculation includes a 5 dB tonal penalty across the octave band.

**Inverter Stations (Source IDs: INV1 – INV7)**

For the project, there are 7 inverter stations, each consisting of two (2) inverters and one (1) 1600 kW inverter transformer (See **Appendix A**).

- **Inverters –** A total of fourteen (14) inverters (to convert DC to AC current) will be used at the project location. Each inverter will have its own cabinet-type enclosure and will be mounted on a concrete platform inside a larger enclosure. The inverters will be SMA's Sunny Central model SC800CP-US, rated for up to 800 kVA of continuous power

output. The manufacturer's noise data for the inverter, provided in 1/3 octave band, was used for this assessment (see **Appendix A**).

- **Inverter Transformers –** A total of seven (7) inverter transformers will be installed beside the inverters to boost the AC voltage for connection to the grid. The inverter transformers will have a power rating of up to 1.6 MVA for each inverter station. The inverter transformers will be located on concrete platforms next to the inverter enclosures. The noise data for the inverter transformer was calculated based on the applicable IEEE Standard and is considered to be conservative (see **Appendix A**).

**Figure 2** identifies the inverter stations and substation transformer. The octave spectra and the overall Sound Power Levels (PWLs) for onsite noise sources are presented in **Table 1**.

**Table 1: Summary of Noise Source Types**

| Source | | Octave Spectrum (dB) | | | | | | | | | Overall | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type | Count | 31.5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | A | lin |
| Substation transformer 10 MVA | 1 | 88.6 | 94.6 | 96.6 | 91.6 | 91.6 | 85.6 | 80.6 | 75.6 | 68.6 | 92 | 100.6 |
| Inverter Transformer 1.6 MVA | 7 | 113.1 | 105.9 | 97.8 | 85.3 | 79.9 | 70.7 | 64.5 | 59.7 | 54.8 | 85.7 | 114 |
| Inverter | 14 | 96.2 | 89.1 | 86.7 | 88.2 | 88.3 | 82.7 | 86.4 | 95 | 84.4 | 97.3 | 100.4 |

Note:
A: A-weighted, Lin: Linear
The manufacturer-specified A-weighted spectra were converted to linear spectra and presented in this table.
The 5 dB tonal penalty is included in the sound power levels presented for both substation transformer and Inverter stations.

### 5.1 Operating Hours of Facility

The solar farm is designed to operate 365 days per year. The solar panels are only able to generate electricity when the sun is shining. Similarly, the inverters only operate when the solar panels are generating electricity. Furthermore, the inverters infrequently operate at full power as full power output requires a clear sky when the sun is at peak intensity. For this assessment the inverters and transformers were conservatively assumed to be operational at full power (i.e.,

maximum noise emission) during both daytime (07:00 to 19:00) and nighttime (19:00 to 07:00) hours [note: nighttime power generation occurs after 19:00 during the summer].

### 5.2 Site Plan Identifying All Significant Sources

**Figure 3** illustrates the project location and identifies all noise sources associated with the facility. **Figure 3** also illustrates all 'Potential Noise Receptors' surrounding the project location within 1000 m. In addition, as per Ontario Regulation 359/09 and guidance documents from the MOE, 'Assumed Future Noise Receptors' must be identified on vacant lots measuring at least 100 metres by 100 metres. Ten (10) vacant lots have been identified within 1 kilometre of the project location and are presented in **Figure 3**. At present there is no known existing or planned solar facilities in the vicinity that must be considered for noise modelling.

CanadianSolar

# GoodLight
# Figure 3:
# Scaled Area Location Plan

PROSPECT RD

ROCKVIEW RD

ELDON STATION RD

SANDRINGHAM RD

R1 R2 R3 R4 R5 R6 R7 R8 R9 R10 R11 R12 R13 R14 R15 R16 R17

VLR1 VLR2 VLR3 VLR4 VLR5 VLR6

## Legend

- Vacant Lot Noise Receptor
- Existing Noise Receptor
- Local Road
- Parcel Boundary

## Project Components

- Access Road
- Underground Cable
- Fence Line
- Overhead Cable
- Laydown Area
- Communication Tower
- Solar Panel and Rack
- Inverter
- Project Location
- Substation
- 1000 m Project Setback



N
W E
S

1:10,000

0 50 100 150 200 m

DILLON CONSULTING

Created By: GM
Checked By: JLP
Date Created: 112913
Date Modified: 12/6/2013
File Path: I:\GIS\138047 EMP GoodLight LP\Mapping\Noise Assessment\

# 6. Noise Source Summary

## 6.1 Noise Source Summary Table

The significant noise sources identified in this noise study are listed in **Table 2**. This table contains sound power levels, source location, sound characteristics, and any noise control measures that already exist as a part of the original equipment.

**Table 2: Noise Source Summary**

| Noise Source ID | PWL (dBA) | Source Location[1] (I or O) | Sound Characteristics[2] (S,Q,I,B,T,C) | Noise Control Measures[3] (S,A,B,L,E,O,U) | UTM | | Height (m) |
|---|---|---|---|---|---|---|---|
| | | | | | X (m) | Y (m) | |
| INV1 | 100.3 | O | T | U | 659934 | 4930708 | 2 |
| INV2 | 100.3 | O | T | U | 659724 | 4930601 | 2 |
| INV3 | 100.3 | O | T | U | 659441 | 4930371 | 2 |
| INV4 | 100.3 | O | T | U | 659257 | 4930326 | 2 |
| INV5 | 100.3 | O | T | U | 659066 | 4930348 | 2 |
| INV6 | 100.3 | O | T | U | 659098 | 4930479 | 2 |
| INV7 | 100.3 | O | T | U | 659398 | 4930640 | 2 |
| INVTR1 | 85.7 | O | T | U | 659941 | 4930708 | 2 |
| INVTR2 | 85.7 | O | T | U | 659731 | 4930601 | 2 |
| INVTR3 | 85.7 | O | T | U | 659447 | 4930371 | 2 |
| INVTR4 | 85.7 | O | T | U | 659264 | 4930326 | 2 |
| INVTR5 | 85.7 | O | T | U | 659072 | 4930348 | 2 |
| INVTR6 | 85.7 | O | T | U | 659105 | 4930479 | 2 |
| INVTR7 | 85.7 | O | T | U | 659392 | 4930640 | 2 |
| TRS | 92 | O | T | U | 659620 | 4930668 | 2.5 |

Note:

Each INV source consists of two inverters in a secondary enclosure. The UTMs are reflective of the centre of the enclosure.

1. Source Locations

O – located/installed outside of a building, including on the roof
I – located/installed inside a building

2. Sound Characteristics

S – Steady
Q – Quasi Steady Impulsive

I – Impulsive
B – Buzzing
T – Tonal
C – Cyclic
Int – Intermittent

3. Noise Control Measures

S – silencer, acoustic louver, muffler
A – acoustic lining, plenum

B – barrier, berm, screening
L – lagging
E – acoustic enclosure
O – other
U – uncontrolled

## 6.2 Noise Source Specifications

Noise source specifications including manufacturer-specified noise data and calculation of transformer noise levels are provided in **Appendix A**.

## 6.3 Source Power/Capacity Ratings

Manufacturer data for capacity and operating specifications for primary noise sources can be found in **Appendix A.**

## 6.4 Noise Control Description & Acoustical Specifications

For the Project, there are 7 inverter stations, consisting of two (2) inverters and one (1) 1600 kW inverter transformer. In all cases, the inverters will each be contained in a cabinet (as per the specifications presented in **Appendix A**) and a secondary enclosure. The secondary enclosure will have louvers for ventilation through which noise can propagate to outside. Conservatively, no additional noise mitigation measure was incorporated in the modelling for the secondary enclosure. The secondary enclosure will have openings for ventilation. Through modelling iterations it was determined that four (4) of the inverter enclosures (i.e., INV1, INV2, INV3 and INV7) will require acoustic louvers for the openings. The Transmission Loss (TL) spectrum for the required acoustic louver is presented in **Table 3**.

**Table 3: Noise Attenuation Data for Acoustic Louver**

| Noise Sources | Noise Control | | TL Spectrum (dB) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Type | Manufacturer | 125 | 250 | 500 | 1000 | 2000 | 4000 |
| INV1, INV2, INV3, INV7 | Acoustic Louver | Greenheck or equivalent | 13 | 12 | 17 | 25 | 36 | 25 |

# 7. Point of Reception Noise Impact Analysis

## 7.1 Land Use Designation

The planned solar facility will occur primarily within lands designated by the City of Kawartha Lakes as Rural. The surrounding lands are primarily rural with a few residential dwellings. Designation and land use information is found in the *Design and Operations Report* of the REA submission.

## 7.2 Scaled Area Location Plan

**Figure 4** is an aerial photo showing the location of the proposed GoodLight project as well as the surrounding area and nearby receptors.

## 7.3 Points of Reception (PORs) List and Description

The Model Municipal Noise Control By-Law defines a Point of Reception (POR) / receptor as "*any point on the premises of a person where sound or vibration originating from other than those premises is received.*" Noise-sensitive receptors, as defined in MOE Publication NPC-205 and NPC-232, include the following land uses:

- Permanent, seasonal, or rental residences;
- Hotels, motels and campgrounds;
- Schools, universities, libraries and daycare centres;
- Hospitals and clinics, nursing / retirement homes; and,
- Churches and places of worship.

A receptor height of 4.5 metres was considered for all receptors, assuming a 2-storey dwelling at each receptor location. The UTM coordinates (NAD83, zone 17) and heights of the receptors used in the noise modelling are summarized in **Table 4**. For the vacant lots, the centres of the 100 metre x 100 metre lots were chosen to represent the receptor locations, as per relevant MOE guidelines.

## Table 4: Noise Sensitive Receptors – Coordinates

| Point of Reception | | Coordinates | |
|---|---|---|---|
| ID | Description | UTM-X (m) | UTM-Y (m) |
| R1 | Existing Potential Noise Receptor | 479541 | 4995580 |
| R2 | Existing Potential Noise Receptor | 479611 | 4995873 |
| R3 | Existing Potential Noise Receptor | 479939 | 4996039 |
| R4 | Existing Potential Noise Receptor | 479372 | 4995747 |
| R5 | Existing Potential Noise Receptor | 480384 | 4996288 |
| R6 | Existing Potential Noise Receptor | 480648 | 4997252 |
| R7 | Existing Potential Noise Receptor | 480462 | 4997797 |
| R8 | Existing Potential Noise Receptor | 480428 | 4997837 |
| R9 | Existing Potential Noise Receptor | 480408 | 4997896 |
| R10 | Existing Potential Noise Receptor | 480348 | 4997976 |
| R11 | Existing Potential Noise Receptor | 480512 | 4997889 |
| R12 | Existing Potential Noise Receptor | 480567 | 4997729 |
| R13 | Existing Potential Noise Receptor | 480436 | 4997655 |
| R14 | Existing Potential Noise Receptor | 481081 | 4996658 |
| R15 | Existing Potential Noise Receptor | 480839 | 4996433 |
| R16 | Existing Potential Noise Receptor | 480862 | 4996540 |
| R17 | Existing Potential Noise Receptor | 479972 | 4996079 |
| VLR1 | Vacant Lot Receptor | 479379 | 4996962 |
| VLR2 | Vacant Lot Receptor | 479348 | 4997093 |
| VLR3 | Vacant Lot Receptor | 479731 | 4997299 |
| VLR4 | Vacant Lot Receptor | 480034 | 4997308 |
| VLR5 | Vacant Lot Receptor | 480014 | 4997446 |
| VLR6 | Vacant Lot Receptor | 480097 | 4996021 |
| VLR7 | Vacant Lot Receptor | 480573 | 4996270 |
| VLR8 | Vacant Lot Receptor | 480898 | 4996459 |
| VLR9 | Vacant Lot Receptor | 480522 | 4996379 |
| VLR10 | Vacant Lot Receptor | 480392 | 4997514 |

# 8. Procedure for Assessing Noise Impacts at Each POR

## 8.1 Method Selection Factors

The worst-case noise emission scenario at each POR was modeled using the CADNA/A software program from DataKustik GmbH. The outdoor noise propagation model is based on ISO 9613, Part 1: Calculation of the absorption of sound by the atmosphere, 1993 and Part 2: General method of calculation (ISO-9613-2: 1996). The model is capable of incorporating various site-specific features such as elevation, berms, ground absorption and barriers to accurately predict noise levels at specific receptors, pertaining to noise emissions from a particular source(s). Modelling output from the CADNA/A program is presented in **Appendix A.** Graphical outputs generated by the CADNA/A noise model, showing the noise level contours are presented in **Figures 4** and **5** for 1.5m and 4.5m receptor heights, respectively.

## 8.2 Ambient Determination

No on-site measurements were made to assess the background ambient noise level at the noise-sensitive receptors. Therefore, the MOE's default day and nighttime criteria for a Class 3 Area were used for this assessment.

## 8.3 Parameter/Assumptions for Calculations

Manufacturer-specified noise data and calculated noise levels were used in the CADNA/A software to model the noise impact at each Point of Reception (POR). Also incorporated in the modelling was the site layout for the project and the terrain elevation (i.e., elevation contours) for the project location and surrounding areas. The noise impact for each receptor was modelled assuming the worst-case noise emission scenario at the site. The dominant noise sources for the facility include:

- Inverter Stations; and,
- Substation Transformer.

**Inverter Station** – Each Inverter station consists of two (2) 800 kW inverters, located in an enclosure and one (1) pad-mounted 1600 MVA inverter step-up transformer. The components in

the Inverter stations are expected to be operational primarily during the daytime period, however, to be conservative the contributions from these sources were also included in the nighttime scenario. As per the MOE requirement, a 5 dB tonal penalty was added to the Inverter and inverter transformer noise. The Inverters and inverter transformers were modeled as point sources with hemi-spherical spreading.

**Substation Transformer** – The substation transformer was modeled using the manufacturer specified noise level and calculated (based on applicable IEEE Standard) transformer sound power spectrum (see **Appendix A**). A 5 dB tonal penalty was also added to the transformer noise spectrum. Like the inverters, and inverter transformers the transformer was conservatively modeled using the same data for nighttime as for daytime. The transformers were modeled as point sources with hemi-spherical spreading.

**Receptors** – A receptor height of 4.5 metres representing a receiver in the plane of a second floor window (i.e., 2-storey dwelling) was assumed for each of the receptors.

**Reflections** – Conservatively, sources were modeled assuming a third order reflection.

**Ground Absorption** – For the noise modeling, a ground absorption coefficient of 0.7 was used to represent the mostly absorptive, vegetated areas, between the onsite sources and receptors.

**Topography** – Although the project site may be graded for the installation of the solar panels, there are topographical features that are beyond the project boundary and will remain in place after the project is built. These features may eliminate the direct line-of-sight between some of the onsite noise sources and the receptors and thus should be incorporated in the modelling as they would more accurately depict the actual noise propagation in between sources and receptors. Nevertheless, conservatively, the topography was not included in the noise modelling.

### 8.4 Point of Reception Noise Impact Table

**Table 5** summarizes the partial noise levels (i.e., contribution from each of the onsite noise sources to the receptor noise levels) and corresponding source-receptor distance for the PORs that are closest to the project location. The sound level at the POR accounts for attenuation by divergence (distance), applicable barrier/screening effects, ground effects and atmospheric absorption. This table gives the sum total of these attenuations for each source. Details of the noise modelling (CADNA/A output file), including partial noise levels for all of the PORs are

provided in **Appendix B** – CADNA Model Output. Graphical outputs generated by the CADNA/A noise model, showing the noise level contours are presented in **Figures 4** and **5** for 1.5m and 4.5m receptor heights, respectively.

## Table 5: Point of Reception Noise Impact Table – Partial Levels (dBA)

| R1 | | | R3 | | | R5 | | | R10 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Source ID | Dist. (m) | Partial Level (dBA) | Source ID | Dist. (m) | Partial Level (dBA) | Source ID | Dist. (m) | Partial Level (dBA) | Source ID | Dist. (m) | Partial Level (dBA) |
| INV6 | 524 | 26.8 | INV4 | 1409 | 14.3 | INV4 | 444 | 28.9 | INV5 | 628 | 24.4 |
| INV4 | 644 | 24.1 | INV6 | 1450 | 13.9 | INV2 | 155 | 31.4 | INV6 | 728 | 22.6 |
| INV5 | 658 | 23.9 | INV5 | 1548 | 13.1 | INV6 | 586 | 25.3 | INV4 | 791 | 21.6 |
| TRS | 454 | 26.9 | TRS | 912 | 19.8 | TRS | 225 | 33.3 | TRS | 1268 | 16.2 |
| INV7 | 350 | 22.3 | INV1 | 660 | 15.5 | INV5 | 626 | 24.5 | INVTR5 | 633 | 19.9 |
| INVTR7 | 348 | 24.8 | INV2 | 879 | 12.4 | INVTR2 | 157 | 31.1 | INV3 | 979 | 11.3 |
| INV2 | 577 | 16.9 | INVTR1 | 656 | 19.6 | INV3 | 255 | 25.8 | INV7 | 1066 | 10.4 |
| INV3 | 620 | 16.1 | INV7 | 1110 | 9.9 | INV7 | 341 | 22.6 | INVTR6 | 734 | 18.7 |
| INV1 | 704 | 14.8 | INV3 | 1242 | 8.7 | INV1 | 359 | 22.0 | INVTR4 | 797 | 18.0 |
| INVTR6 | 522 | 21.6 | INVTR2 | 874 | 17.2 | INVTR3 | 250 | 27.4 | INV2 | 1329 | 7.9 |
| INVTR2 | 582 | 20.6 | INVTR7 | 1115 | 15.1 | INVTR7 | 346 | 24.9 | INVTR3 | 984 | 16.1 |
| INVTR3 | 622 | 20.1 | INVTR3 | 1238 | 14.2 | INVTR1 | 363 | 24.5 | INVTR7 | 1061 | 15.5 |
| INVTR4 | 644 | 19.8 | INVTR4 | 1404 | 13.1 | INVTR4 | 438 | 23.0 | INV1 | 1565 | 6.0 |
| INVTR5 | 656 | 19.6 | INVTR6 | 1444 | 12.8 | INVTR6 | 579 | 20.7 | INVTR2 | 1335 | 13.5 |
| INVTR1 | 710 | 18.9 | INVTR5 | 1543 | 12.2 | INVTR5 | 620 | 20.1 | INVTR1 | 1571 | 12.1 |

Note: Dist.: Distance between noise source and receptor in metres.

CanadianSolar

# GoodLight
# Figure 4:
# Predicted Noise Level Contours at 1.5 m Height

PROSPECT RD
ROCKVIEW RD
ELDON STATION RD
SANDRINGHAM RD

R1 R2 R3 R4 R5 R6 R7 R8 R9 R10 R11 R12 R13 R14 R15 R16 R17
VLR1 VLR2 VLR3 VLR4 VLR5 VLR6

**Legend**

- Vacant Lot Noise Receptor
- Existing Noise Receptor
- 40 dBA Noise Contour at 1.5 m
- Local Road
- Parcel Boundary

**Project Components**

- Access Road
- Underground Cable
- Fence Line
- Overhead Cable
- Laydown Area
- Communication Tower
- Solar Panel and Rack
- Inverter
- Project Location
- Substation
- 1000 m Project Setback



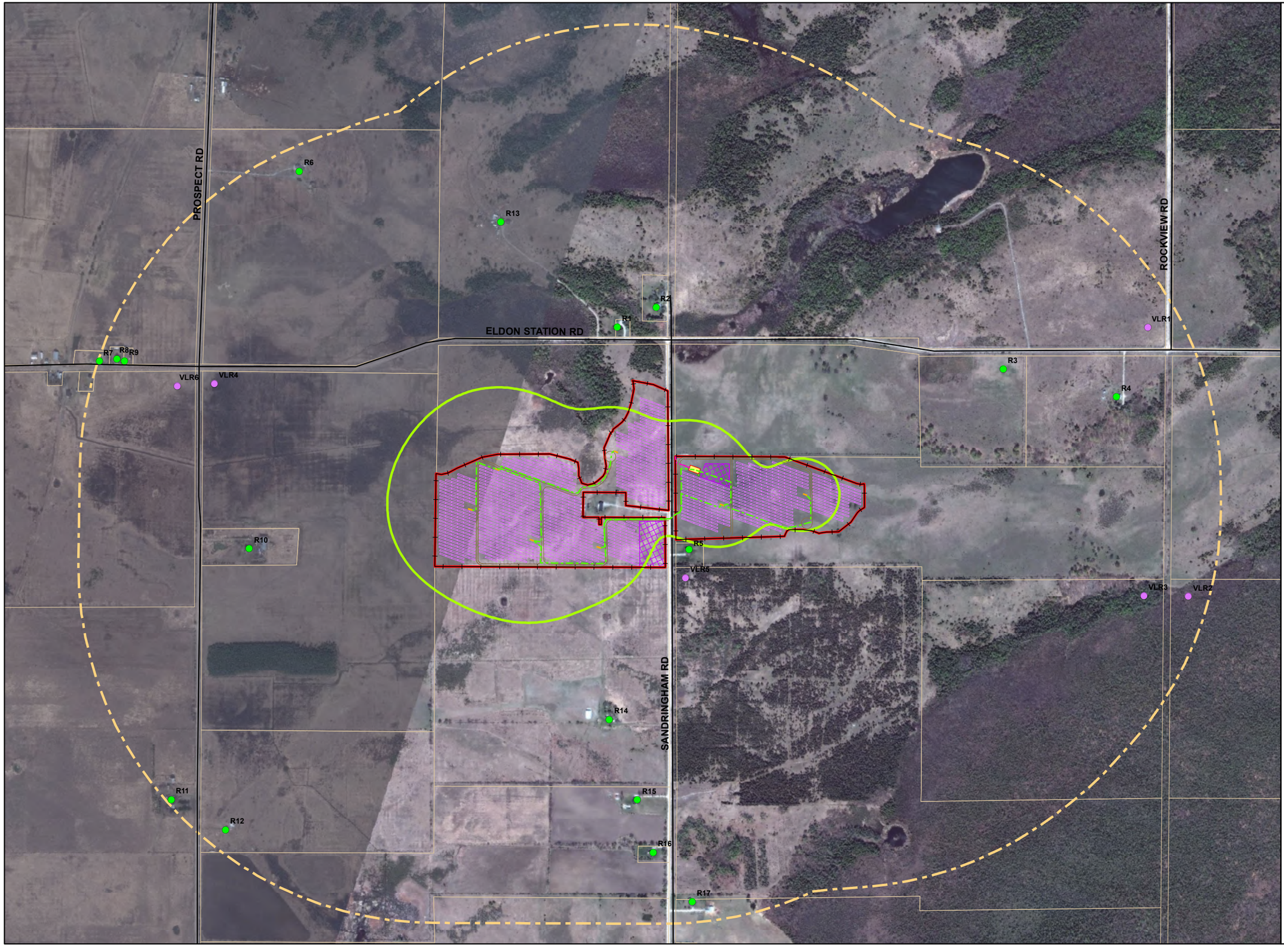
N W E S

1:10,000

0 50 100 150 200 m

DILLON CONSULTING

Created By: GM
Checked By: JLP
Date Created: 112913
Date Modified: 12/6/2013
File Path: I:\GIS\138047 EMP GoodLight LP\Mapping\Noise Assessment\




CanadianSolar

# GoodLight
# Figure 5:
# Predicted Noise Level Contours at 4.5 m Height

**Legend**

- Vacant Lot Noise Receptor
- Existing Noise Receptor
- 40 dBA Noise Contour at 4.5 m
- Local Road
- Parcel Boundary

**Project Components**

- Access Road
- Underground Cable
- Fence Line
- Overhead Cable
- Laydown Area
- Communication Tower
- Solar Panel and Rack
- Inverter
- Project Location
- Substation
- 1000 m Project Setback



N
W E
S

1:10,000

0 50 100 150 200 m

DILLON CONSULTING

Created By: GM
Checked By: JLP
Date Created: 112913
Date Modified: 12/6/2013
File Path: I:\GIS\138047 EMP GoodLight LP\Mapping\Noise Assessment\

# 9. Acoustic Assessment Summary

## 9.1 Acoustic Assessment Summary Table

**Table 6** summarizes the compliance of the proposed GoodLight project with the applicable Sound Level Performance Limits at the designated Points of Reception. The performance limits in the table reflect the applicable sound level limits in the MOE Publication NPC-232 for Class 3 Areas.

**Table 6: Acoustic Assessment Summary Table**

| Point of Reception | | Sound Level at POR (dBA, Leq)* | Verified by Acoustic Audit (Yes/No) | Performance Limit | | |
|---|---|---|---|---|---|---|
| ID | Description | | | Daytime (dBA) | Nighttime (dBA) | Compliance (Yes/No) |
| R1 | Existing Potential Noise Receptor | 34.3 | No | 45 | 40 | Yes |
| R2 | Existing Potential Noise Receptor | 33 | No | 45 | 40 | Yes |
| R3 | Existing Potential Noise Receptor | 27 | No | 45 | 40 | Yes |
| R4 | Existing Potential Noise Receptor | 24.4 | No | 45 | 40 | Yes |
| R5 | Existing Potential Noise Receptor | 39.3 | No | 45 | 40 | Yes |
| R6 | Existing Potential Noise Receptor | 26.2 | No | 45 | 40 | Yes |
| R7 | Existing Potential Noise Receptor | 24.8 | No | 45 | 40 | Yes |
| R8 | Existing Potential Noise Receptor | 25.3 | No | 45 | 40 | Yes |
| R9 | Existing Potential Noise Receptor | 25.5 | No | 45 | 40 | Yes |
| R10 | Existing Potential Noise Receptor | 30.1 | No | 45 | 40 | Yes |
| R11 | Existing Potential Noise Receptor | 24.6 | No | 45 | 40 | Yes |
| R12 | Existing Potential Noise Receptor | 25 | No | 45 | 40 | Yes |

| Point of Reception | | Sound Level at POR (dBA, Leq)* | Verified by Acoustic Audit (Yes/No) | Performance Limit | | |
|---|---|---|---|---|---|---|
| ID | Description | | | Daytime (dBA) | Nighttime (dBA) | Compliance (Yes/No) |
| R13 | Existing Potential Noise Receptor | 30 | No | 45 | 40 | Yes |
| R14 | Existing Potential Noise Receptor | 32.4 | No | 45 | 40 | Yes |
| R15 | Existing Potential Noise Receptor | 29.2 | No | 45 | 40 | Yes |
| R16 | Existing Potential Noise Receptor | 27.6 | No | 45 | 40 | Yes |
| R17 | Existing Potential Noise Receptor | 26.1 | No | 45 | 40 | Yes |
| VLR1 | Vacant Lot Receptor | 23.4 | No | 45 | 40 | Yes |
| VLR2 | Vacant Lot Receptor | 22.5 | No | 45 | 40 | Yes |
| VLR3 | Vacant Lot Receptor | 23.8 | No | 45 | 40 | Yes |
| VLR4 | Vacant Lot Receptor | 28.1 | No | 45 | 40 | Yes |
| VLR5 | Vacant Lot Receptor | 37.4 | No | 45 | 40 | Yes |

* The presented receptor sound levels are with the noise mitigation measures implemented.

## 9.2 Rationale for Selecting Applicable Noise Guideline Limits

## 9.3 Acoustic Environment

The background ambient noise, exclusive of proposed GoodLight project, can be characterized as a Class 3 Area as described in NPC-232. The sources that contribute to the background sound include sounds of nature as well as occasional vehicle traffic noise from nearby roadways.

For a project located in a Class 3 Area, the project is considered compliant with NPC-232 if the predicted cumulative noise levels at the nearby receptors are at or below either the exclusion limits (see **Table 7**) or the background ambient levels as measured or calculated.

**Table 7: NPC-232 – Class 3 Stationary Source Exclusion Limits**

| Time of Day | One Hour Leq (dBA) Class 3 Area |
|---|---|
| 07:00 – 19:00 | 45 |
| 19:00 – 23:00 | 40 |
| 23:00 – 07:00 | 40 |

The applicable nighttime limit is the most restrictive level for operation of the stationary source. The background ambient sound level at the points of reception were not measured or modeled. Therefore, the NPC-232 exclusion limits have been adopted as the performance limit at each of the PORs.

### 9.4 Predictable Worst Case Operating Scenario

The inverter unit components and substation transformer were assumed to operate on a continuous basis during daytime, evening and nighttime hours and at their maximum capacity / load. These sources were modeled as such.

## 10. Conclusion

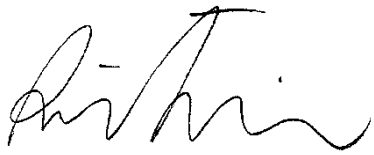
This *Noise Study Report* was prepared as a supporting document for an REA application for the proposed GoodLight 10 MW solar farm project. The assessment conforms to the guidelines for an Acoustic Assessment Report as defined in Ministry of the Environment publication NPC-233 *Information to be Submitted for the Approval of Stationary Sources of Sound*. All procedures used in this assessment were conducted in accordance with requirements of NPC-233 and additional general direction provided by the Ontario Ministry of the Environment for preparation of acoustic assessment reports for solar farms under the REA. With the implementation of the noise mitigation measures presented in this assessment (i.e., acoustic louvers on all of the enclosure openings for inverter stations 1, 2, 3 and 7), the proposed GoodLight project will comply with the daytime and nighttime noise criteria as defined in the Ontario Ministry of the Environment Noise Pollution Control Publication NPC-232 *Sound Level Limits for Stationary Sources in Class 3 Areas (Rural)*, for all sources assessed in this study.

## 11. Closure

This *Noise Study Report* has been prepared based on the information provided and/or approved by Canadian Solar Solutions Inc. and/or H.B. White Canada Corp. This report was prepared by Dillon for the sole benefit of H.B. White Canada Corp. to satisfy reporting requirements for the Ontario Ministry of the Environment. The material in the report reflects Dillon's judgment in light of the information available to Dillon at the time of this report preparation. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Dillon accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Respectfully Submitted,

**DILLON CONSULTING LIMITED**



Amir A. Iravani, Ph.D.
Associate

## 12. References

Industrial Noise Control Fundamentals and Applications, Bell, Lewis H., Marcel Dekker, Inc. 1982.

Ministry of Environment Publication NPC- 205 Sound Level Limits for Stationary Sources in Class 1 & 2 Areas (Urban), October 1995.

Ministry of Environment Publication NPC- 232 Sound Level Limits for Stationary Sources in Class 3 Areas (Rural), October 1995.

Ministry of Environment Publication NPC-233 Information to be Submitted for Approval of Stationary Sources of Sound, October 1995.

*Transformers, Regulators and Reactors*, NEMA Standards Publication No. TR 1-1993(R2000), National Electrical Manufacturers Association.

# Appendix A

## MANUFACTURER'S EQUIPMENT SPECIFICATIONS

VIRGINIA TRANSFORMER CORP
ROANOKE, VA, USA

LIQUID FILLED STEP UP TRANSFORMER

SERIAL NUMBER: 477500A176-C028A

CLASS: ONAN/ONAF — BUILT TO CAN/CSA-C88-M90

kVA: 7500/10000 AT 65°C RISE

HV: 44000 — BIL: 250 kV — COND. MATERIAL: COPPER

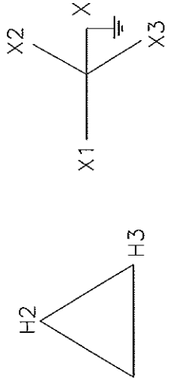
LV: 27600 GrdY/15935 — BIL: 200 kV — COND. MATERIAL: COPPER

PHASES: 3 — FREQUENCY: 60 Hz — LIQUID: TYPE II MINERAL OIL

IMPEDANCE: 5.60 % AT 7500 kVA MONTH/YEAR OF MANUFACTURE: 10/2013

| | VOLTS | AMPS @ 10000 kVA | POS |
|---|---|---|---|
| HV | 46200 | 125 | 1 |
| | 45100 | 128 | 2 |
| | 44000 | 131 | 3 |
| | 42900 | 135 | 4 |
| | 41800 | 138 | 5 |
| LV | 27600 | 209 | |

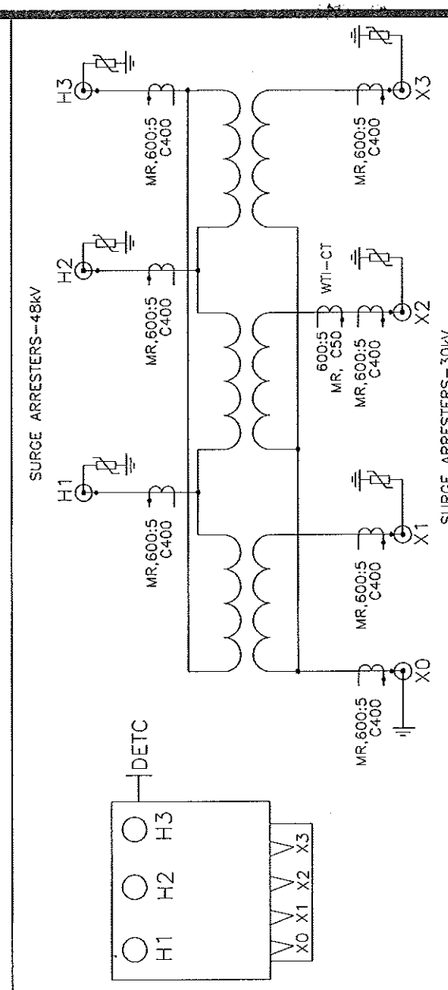
VECTOR DIAGRAM—Dyn1



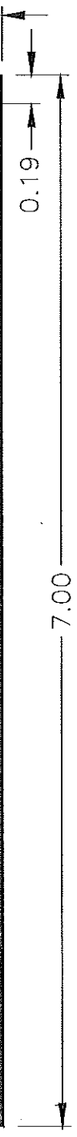

APPROXIMATE WEIGHT IN LBS (kg)

| | TOTAL WEIGHT | UNTANKING WEIGHT (HEAVIEST PIECE) |
|---|---|---|
| CORE & COILS | 20040 (9090) | 15760 (7149) |
| TANK & FITTINGS | 15760 (7149) | 12880 (5842) |
| LIQUID U.S. GALLONS ($m^3$) 1717 (6.5) | 50150 (22748) | 22340 (10133) |

MAX. OPERATING PRESSURE OF LIQUID PRESERVATION SYSTEM 9(62) lbf/in$^2$ (kPa) POSITIVE, 7(48) lbf/in$^2$ (kPa) NEGATIVE.
TANK DESIGNED FOR 15(104) lbf/in$^2$ (kPa) VACUUM FILLING. 25 °C LIQUID LEVEL TO TOP FLANGE OF MANHOLE
15.36(391) in(mm) LIQUID LEVEL CHANGES 0.58(14.73) in(mm) PER 10 °C CHANGE IN LIQUID TEMPERATURE.
CONTAINS NO DETECTABLE LEVEL OF PCB ( <2 PPM) AT THE TIME OF MANUFACTURE.




CAUTION
DE-ENERGIZE TRANSFORMER BEFORE CHANGING TAPS
REFER TO INSTRUCTION MANUAL LF-4 BEFORE ENERGIZATION




11.00

MATERIAL: 0.023 STAINLESS STEEL
NON-CORROSIVE OUTDOOR BLACK
LETTER ENGRAVED PROTECTIVE
CLEAR PLASTIC FILM
0.1875 DIA. HOLES (4)

NOTES:

IMPEDANCE WILL BE ENTERED ON NAMEPLATE AFTER TESTING. FOR NOMINAL DESIGN IMPEDANCE SEE OUTLINE DWG.

| | |
|---|---|
| 4 | CHANGED OIL QTY AS FILLED HGB 10/23/13 |
| 3 | ADDED IMPEDANCE VALUE AS TESTED BDP 10/16/13 |
| 2 | UPDATED WEIGHTS, LEVELS AND PRESSURES ALL 09/19/13 |
| 1 | ADDED WEIGHTS, LEVELS AND PRESSURES ALL 09/12/13 |

ALL DIMENSIONS IN INCHES & IN mm IF SHOWN IN PARENTHESIS



VIRGINIA TRANSFORMER CORP.
220 GLADE VIEW DR., N.E., ROANOKE, VA 24012
(540) 345-9892

TITLE: STANDARD LIQUID FILLED NAMEPLATE JOB# C028A

DWN:3NAD | CHK:SD | DATE:08/29/13 | DWG SCALE: 1:1 | PLOT SCALE: 1:1

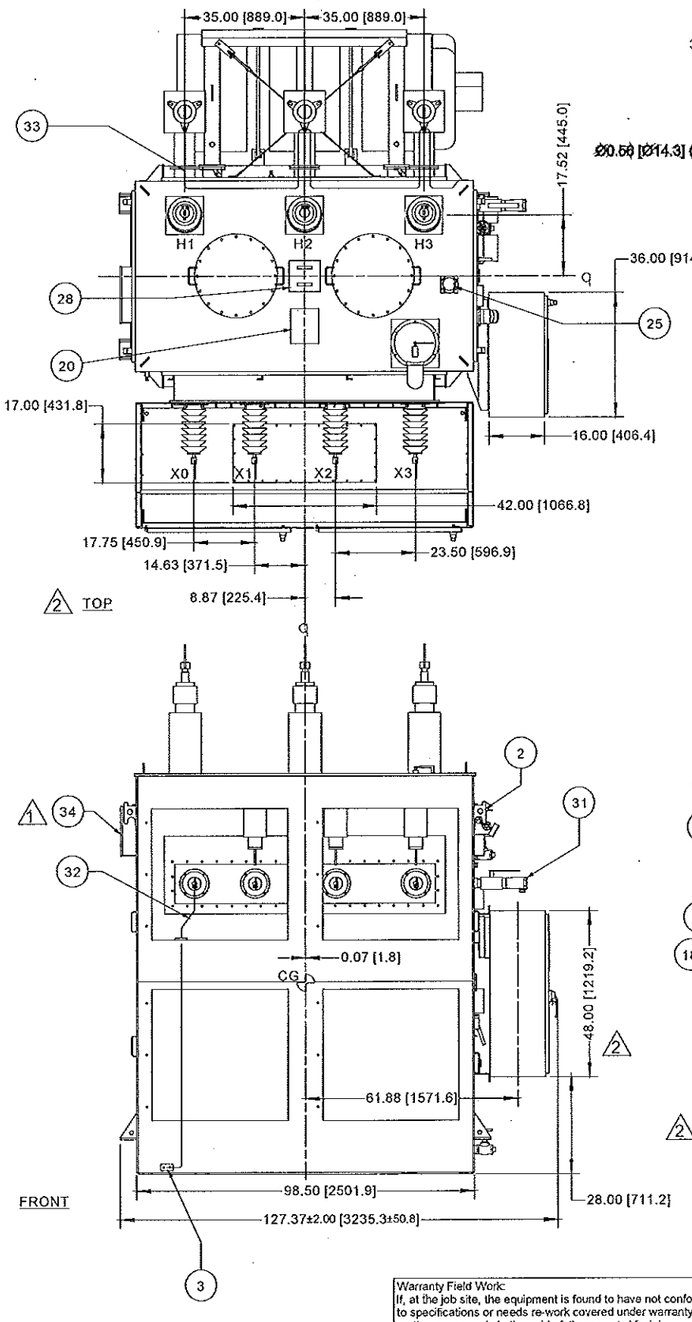
B 477500A176 SHEET 13 REV 4

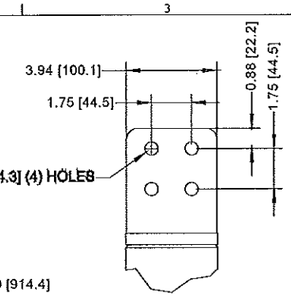
ITEMS:
1. PROVISION ON BASE FOR SKIDDING
2. TRANSFORMER LIFTING LUGS
3. STAINLESS STEEL GROUND PADS (2) ON DIAGONALLY OPPOSITE SIDE OF TANK
4. STAINLESS STEEL DIAGRAMMATIC NAMEPLATE
5. 20" DIA, MANHOLE (2) WITH COVER (BOLTED AND GASKETED)
6. WELDED TOP COVER WITH LIFTING EYES (4) FOR COVER ONLY, SLOPED FOR DRAINAGE
7. COOLING RADIATORS, HOT DIPPED GALVANIZED, UNPAINTED, DEMOUNTABLE WITH ISOLATION VALVES AND 1/2" DRAIN VALVES
8. HV DRAWLEAD BUSHING, 46 kV, 250 kV BIL (3) WITH 4 HOLE NEMA PAD
9. LV BOTTOM CONNECTED BUSHING, 34.5 kV, 200 kV BIL, (4) WITH 4 HOLE NEMA PAD
10. 2" COMBINATION LOWER DRAIN AND FILTER VALVE WITH SAMPLER, AND PLUG
11. 2" UPPER FILTER VALVE, WITH PLUG △1
12. VTC PRESSURIZATION TEST POINT WITH 1/2" BALL VALVE
13. LIQUID LEVEL GAUGE WITH CONTACTS, GAUGE CENTER IS AT 25deg C OIL LEVEL
14. OIL TEMPERATURE GAUGE WITH CONTACTS
15. PRESSURE VACUUM GAUGE WITH CONTACTS AND BLEEDER
16. PRESSURE RELIEF DEVICE WITH CONTACTS DIRECTIONAL SHROUD AND FLAG
17. DE-ENERGIZED NO LOAD MANUAL TAP CHANGER WITH PROVISION FOR PADLOCKING
18. CONTROL BOX, NEMA 4, 48 x 36 x 16 , WITH BOLTED BOTTOM PLATE
19. JACK PADS (4) WITH PULLING EYES
20. BOX FOR HV CT FEED-THRU AND CORE GROUND BUSHING
21. COOLING FANS
22. WINDING TEMPERATURE GAUGE, SIMULATION SYSTEM, WITH CONTACTS
23. BOLTED, GASKETED PLATE FOR ACCESS TO DETC
24. THERMOWELLS FOR TEMPERATURE GAUGES
25. SUDDEN PRESSURE RELAY
26. HV STATION CLASS ARRESTER, POLYMER, 48 kV, 39 kV MCOV
    MFG: ABB, CATALOG #: Q048SA039A △2
27. LV STATION CLASS ARRESTER, POLYMER, 30 kV, 24.4 kV MCOV
    MFG: ABB, CATALOG #: Q030SA024A
28. FALL PROTECTION PLATE
29. LV AIR TERMINAL CHAMBER, BOLTED ON, WITH FRONT HINGED DOORS, CABLE SUPPORTS, BOTTOM PLATE AND THERMOSTATICALLY CONTROLLED HEATERS
30. RTD THERMOWELL
31. SUDDEN PRESSURE RELAY, UNDER OIL TYPE WITH SHUT OFF VALVE
32. 4/0 BARE CU CABLE FROM X0 TO BASE GROUND PAD
33. 4/0 BARE CU CABLE FROM LV/HV ARRESTERS TO BASE GROUND PADS △1
34. BOX FOR LV CT FEED-THRU'S
35. 4/0 BARE CU CABLE FROM CONTROL BOX GROUND POINT TO TANK WALL △2

△3

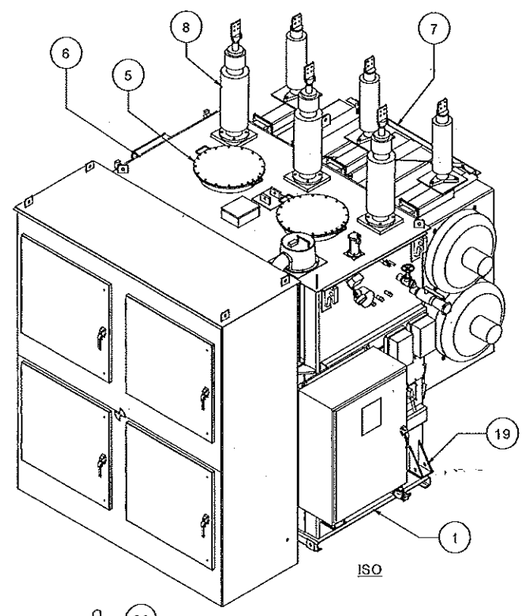
NOTES:
1. TYPE II MINERAL OIL FILLED TRANSFORMER, APPROXIMATELY 1717 GALLONS
2. OUTDOOR SERVICE
3. PAINT: ANSI-70 URETHANE OVER EPOXY (VTC PAINT SYSTEM III), TOP COVER WITH ANTI-SKID COATING
4. TOUCH UP PAINT KIT PROVIDED
5. UNIT DESIGNED FOR SEALED TYPE OIL PRESERVATION
6. SEE 20 SERIES SHEETS FOR SCHEMATIC
7. CG IS FULLY ASSEMBLED
8. UNIT DESIGNED FOR FULL VACUUM FILLING
9. UNIT SHIPS FULLY ASSEMBLED AND OIL FILLED, HV SPADES SHIP INSIDE CONTROL BOX
10. UNIT DESIGNED FOR OPERATION AT MINIMUM AMBIENT - 40deg C
11. TANK SEAMS ARE WELDED INSIDE AND OUTSIDE-NO CORNER WELDS WITHIN 6" OF CORNER
12. UNIT SHIPS WITH IMPACT RECORDER
13. 60/60 EXTENDED WARRANTY IS PROVIDED

REFER SHEET 102 FOR ADDITIONAL DETAILS △2

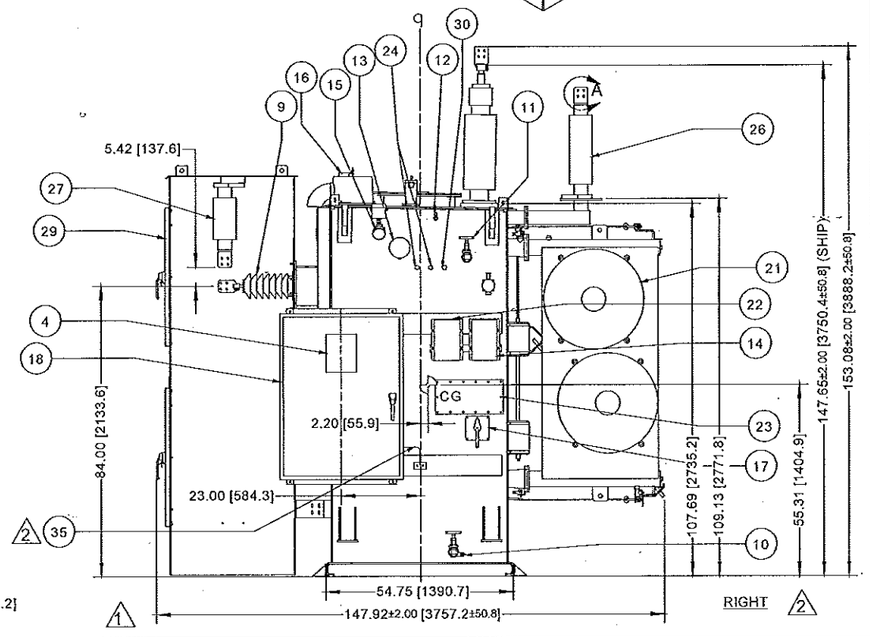



DETAIL A
ARRESTER TERMINAL
△2



ISO




RIGHT △2

Liquid Filled Transformer Data:

| | |
|---|---|
| MOD/SN: 477500A176 | MVA: 7.5/10 AT 65°C RISE |
| 3 PHASE, 60 Hz | CLASS: ONAN/ONAF |
| IMP: 5.625 % NOM. | WT: 50,150 LBS |
| WINDINGS: COPPER | |
| TAPS: 2 X 2.5 % | |
| HV: 44,000 DELTA, 250 kV BIL, 131 A NOM @ 10 MVA | |
| LV: 27,600 GrdY/15,935 , 200 kV BIL, 209 A @ 10 MVA | |

Customer: KA FACTOR GROUP INC.

Warranty Field Work:
If, at the job site, the equipment is found to have not conformed to specifications or needs re-work covered under warranty, all parties concerned shall provide full access to Virginia Transformer Corp. or their representatives to work on the unit(s) at the job site. The method of repair/re-work will be determined solely by Virginia Transformer Corp.

| | | | | |
|---|---|---|---|---|
| TOLERANCES IF NO TOLERANCES SHOWN ±0.5(12.7) OTHERWISE: Δ ±0.25(6.3) O ±1.0(25.4) | ALL DIMENSIONS IN INCHES & IN mm IF SHOWN IN PARENTHESIS | THIS DOCUMENT IS INTENDED FOR COORDINATION PURPOSES ONLY OTHER USES ARE PROHIBITED EXCEPT BY WRITTEN PERMISSION OF VTC. C028A-101.idw | 1 REVISED PER FINAL DESIGN ALL 09/12/13 | 2 REVISED PER CUSTOMER COMMENTS ALL 09/19/13 | 3 REVISED OIL QUANTITY HGB 10/23/13 |

VIRGINIA TRANSFORMER CORP.
220 GLADEVIEW DR., N.E. ROANOKE, VA 24012
(540) 345-9392

TITLE: DIMENSIONAL OUTLINE JOB # C028A
DWN: HGB CHK: SNAD DATE: 08/27/13
D 477500A176 SHEET 101 REVISION 3

| DEVICE | QTY | DESCRIPTION | LOCATION | VTC PART# |
|---|---|---|---|---|
| 8-M | 1 | CIRCUIT BREAKER, 2 POLE, 40 A | JB | 380261 |
| 8-1 | 1 | CIRCUIT BREAKER, 2 POLE, 16 A | JB | 380216 |
| 8-3 | 1 | CIRCUIT BREAKER, 1 POLE, 16 A | JB | 380116 |
| 8-2<br>8-4<br>8-5<br>8-8 | 4 | CIRCUIT BREAKER, 1 POLE, 6 A<br>CIRCUIT BREAKER, 1 POLE, 6 A<br>CIRCUIT BREAKER, 1 POLE, 6 A<br>CIRCUIT BREAKER, 1 POLE, 6 A | JB<br>JB<br>JB<br>JB | 380106 |
| 8-6<br>8-7 | 2 | CIRCUIT BREAKER, 2 POLE, 6 A<br>CIRCUIT BREAKER, 2 POLE, 6 A | JB<br>JB | 380206 |
| 63PRX | 1 | AUXILIARY RELAY, 125VDC, 2 NO & 2 NC CONTACTS | JB | 308611020P |
| CT1-6<br>NCT | 7 | OIL CURRENT TRANSFORMER, 600:5, MR, C400, TRF=2.0<br>OIL CURRENT TRANSFORMER, 600:5, MR, C400, TRF=2.0 | XFMR<br>XFMR | 400160411 |
| WTI-CT | 1 | OIL CURRENT TRANSFORMER, 600:5, MR, C50, TRF=1.5 | XFMR | 400160110 |
| 4-1 | 1 | FAN CONTACTOR, 120VAC COIL, 2 POLE | JB | 30651201 |
| 88F1<br>88F2 | 2 | FAN 26", 7496CFM, 1140 RPM, 1/3 HP, 240VAC, 1 PH<br>FAN 26", 7496CFM, 1140 RPM, 1/3 HP, 240VAC, 1 PH | XFMR<br>XFMR | 360317C1 |
| GFI1 | 1 | GND FAULT INTERRUPT RECEPTACLE, 120V, 15A | JB | 30410100 |
| H1<br>H2 | 2 | ANTI-CONDENSATION HEATER, RATED 250W@250VAC<br>ANTI-CONDENSATION HEATER, RATED 250W@250VAC | JB<br>JB | 362021 |
| H3<br>H4 | 2 | ANTI-CONDENSATION HEATER, RATED 375W@250VAC<br>ANTI-CONDENSATION HEATER, RATED 375W@250VAC | LV ATC<br>LV ATC | 362026 |
| AC<br>DC | 2 | TERMINAL BLOCK, 4 POLE<br>TERMINAL BLOCK, 4 POLE | JB<br>JB | 30125063 |
| 71Q | 1 | LIQUID LEVEL GAUGE, WITH 2 CONTACTS | XFMR | 3420381 |
| 26Q | 1 | LIQUID TEMP GAUGE, WITH 4 CONTACTS | XFMR | 3421182 |
| 63PR | 1<br>1 | PRESSURE RELIEF DEVICE WITH YELLOW FLAG<br>SHROUD WITH 1 CONTACT SET @ 10 PSI | XFMR<br>XFMR | 3420502<br>342041 |
| 63PVG | 1 | PRESSUR VACUUM GAUGE WITH BLEEDER | XFMR | 342090 |
| 63PVS | 1 | PRESSURE VACUUM SWITCH, VAC SET@-7.0PSI, PRE @ +9PSI | XFMR | 3421004 |
| 63X1<br>63X2 | 2 | SUDDEN PRESSURE SEAL IN RELAY,ALARM AND TRIP CONTACTS<br>SUDDEN PRESSURE SEAL IN RELAY,ALARM AND TRIP CONTACTS | JB<br>JB | 3420605I |
| 63SP1 | 1 | SUDDEN PRESSURE RELAY (GAS SPACE), 1 MOMENTARY CONTACT | XFMR | 342060 |
| 63SP2 | 1 | SUDDEN PRESSURE RELAY (OIL SPACE), 1 MOMENTARY CONTACT | XFMR | 342064 |
| 43F1 | 1 | FAN SELECTOR SWITCH, 3 POSITION MAINT, MANUAL/OFF/AUTO | JB | 30611416 |
| RTD | 1 | RTD, PT 100 OHMS @ 0°C, FOR MAIN TANK OIL TEMPERATURE | XFMR | 347S04 |
| A1-4<br>B1<br>D1 | 6 | TERMINAL BLCOK, 12 POLE<br>TERMINAL BLCOK, 12 POLE<br>TERMINAL BLCOK, 12 POLE | JB<br>JB<br>JB | 30122123 |
| B2<br>E1 | 2 | TERMINAL BLOCK, 6 POLE<br>TERMINAL BLOCK, 6 POLE | JB<br>JB | 30122063 |
| FTA<br>FTB<br>FTC | 3 | FEEDTHROUGH, 19 CONDUCTOR FOR CT WIRING<br>FEEDTHROUGH, 19 CONDUCTOR FOR CT WIRING<br>FEEDTHROUGH, 19 CONDUCTOR FOR CT WIRING | XFMR<br>XFMR<br>XFMR | 55101197 |
| SB1-8 | 8 | SHORTING TERMINAL BLOCK FOR CT CONNECTION | JB | 301320650 |
| E2<br>E3 | 2 | TERMINAL BLOCK, 2 POLE<br>TERMINAL BLOCK, 2 POLE | JB<br>LV ATC | 30122021 |
| GND1 | 1 | GROUND BAR, COPPER | JB | 20880080 |
| 23-1<br>23-2 | 2 | THERMOSTAT, NON ADJUSTABLE SET @ 80°F<br>THERMOSTAT, NON ADJUSTABLE SET @ 80°F | JB<br>LV ATC | 363100 |
| 49T | 1 | WINDING TEMPERATURE GAUGE, W/4 CONTACTS | XFMR | 343030 |
| CBA | 1 | CURRENT BALANCING AUTO-TRANSFORMER, SIM. WDG TEMP. | JB | 343015I |
| LT1 | 1 | JB LIGHT, LED, 120VAC, 5.5 WATTS | JB | 30390103 |
| DS1 | 1 | DOOR SWITCH FOR JB LIGHT | JB | 30620020 |
| JB | 1 | JUNCTION BOX, NEMA 4, 48 X 36 X 16, W/ BACK AND SWING PANEL | XFMR | 303203S6M |

△1

NOTE
1. ALL WIRES ARE NUMBERED ON EACH END WITH HEAT SHRINK PLASTIC SLEEVE WRAPPED WIRE MARKERS.
2. CONTROL WIRES ARE 14AWG SIS/XHHW (WHERE APPLICABLE).
3. CT AND POWER WIRES ARE 10AWG SIS/XHHW (WHERE APPLICABLE).
4. GROUNDING WIRES ARE 12AWG GREEN SIS/XHHW (WHERE APPLICABLE).
5. SHORTING LINK TO BE REMOVED FROM SHORTING TYPE TB WHEN CURRENT XFMR IS TO BE USED.
6. ALL TERMINAL CONNECTIONS TO BE MADE WITH PRE-INSULATED RING TONGUE CRIMPED TYPE LUGS.
7. ALL DEVICES IN JB PROVIDED WITH PHENOLIC NAME PLATES WITH BLACK LETTERING ON WHITE BACKGROUND.
8. NO BUTT SPLICES ARE ALLOWED.
9. NEUTRAL WIRES ARE 10AWG WHITE SIS/XHHW.
10. POWER AND CONTROL WIRE TO RUN SEPARATE.

ALL DIMENSIONS IN INCHES & IN mm IF SHOWN IN PARENTHESIS



1 DRAWING REVISED GS 10/21/13

VIRGINIA TRANSFORMER CORP.
220 GLADE VIEW DR., N.E., ROANOKE, VA 24012
(540) 345-9892

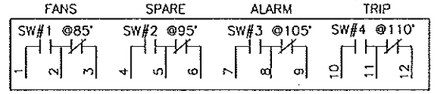
TITLE: DEVICE LEGEND AND DRAWING NOTES JOB# C028A

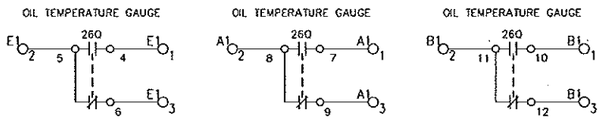
DWN: PSP | CHK: JWB | DATE: 08/26/13 | DWG SCALE: NTS | PLOT SCALE: 1:1

D | 477500A176 | SHEET 21 | DRAWING 1 OF 6 | REV 1

(FAN CONTACT SHOWN ON SHEET 22)

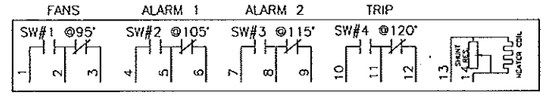
26Q
OIL TEMPERATURE GAUGE

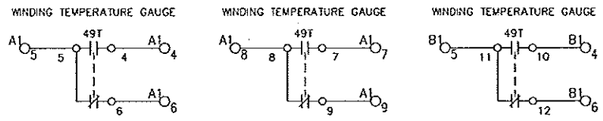


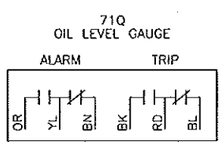

(FAN CONTACT SHOWN ON SHEET 22)

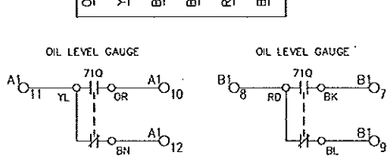
49T
WINDING TEMPERATURE GAUGE



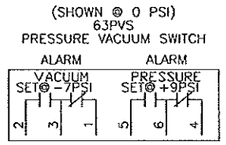

71Q
OIL LEVEL GAUGE

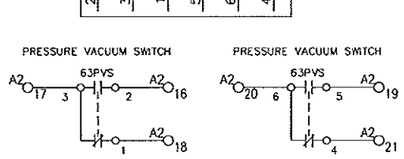



(SHOWN @ 0 PSI)

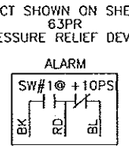
63PVS
PRESSURE VACUUM SWITCH



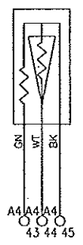




(CONTACT SHOWN ON SHEET 24)

63PR
PRESSURE RELIEF DEVICE

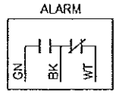



RTD
OIL TEMPERATURE
PT 100 OHMS @ 0°C



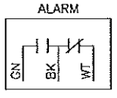

(CONTACT SHOWN ON SHEET 24)

63SP1
SUDDEN PRESSURE RELAY




(CONTACT SHOWN ON SHEET 24)

63SP2
SUDDEN PRESSURE RELAY



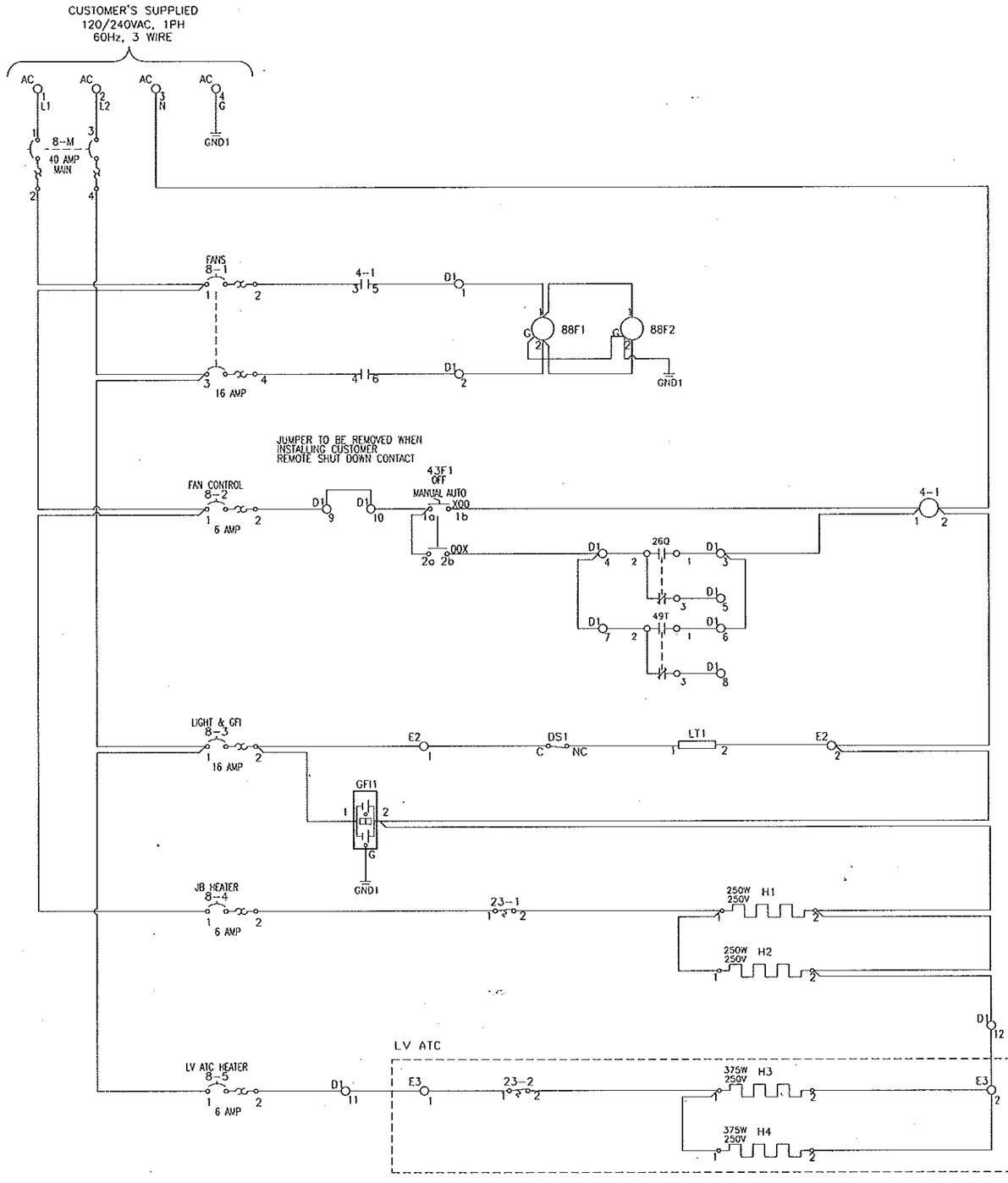

NOTE:
ALL CONTACTS ARE DRAWN IN THE NON-ALARM STATE.

NOTE
SEE DEVICE LEGEND AND WIRING NOTES ON SHEET 21

| | | | | | | |
|---|---|---|---|---|---|---|
| ALL DIMENSIONS IN INCHES & IN mm IF SHOWN IN PARENTHESIS | THIS DOCUMENT IS INTENDED FOR COORDINATION PURPOSES ONLY. OTHER USES ARE PROHIBITED EXCEPT BY WRITTEN PERMISSION OF VTC. C028A-21.1.DWG | | | | | |

VIRGINIA TRANSFORMER CORP.
220 GLADE VIEW DR., N.E., ROANOKE, VA 24012
(540) 345-9892

| | | | | | |
|---|---|---|---|---|---|
| TITLE: ACCESSORY SCHEMATIC | | | | | JOB# C028A |
| DWN: PSP | CHK: JWB | DATE: 08/26/13 | DWG SCALE: NTS | | PLOT SCALE: 1:1 |
| D | 477500A176 | | SHEET 21.1 | DRAWING 2 OF 6 | REV 0 |




| WIRE SIZE CHART | |
|---|---|
| CB SIZE | MINIMUM AWG |
| 16 AMP | 14 AWG |
| 20 AMP | 12 AWG |
| 30-40 AMP | 10 AWG |
| 41-55 AMP | 8 AWG |
| 56-75 AMP | 6 AWG |
| 76-95 AMP | 4 AWG |
| 96-110 AMP | 3 AWG |

NOTE
SEE DEVICE LEGEND AND WIRING NOTES ON SHEET 21

ALL DIMENSIONS IN INCHES & IN mm IF SHOWN IN PARENTHESIS



VIRGINIA TRANSFORMER CORP.
220 GLADE VIEW DR., N.E., ROANOKE, VA 24012
(540) 345-9892

TITLE: FAN, LIGHT, HEATER AND GFI SCHEMATICS — JOB# C028A

DWN: PSP | CHK: JWB | DATE: 08/26/13 | DWG SCALE: NTS | PLOT SCALE: 1:1

D | 477500A176 | SHEET 22 | DRAWING 3 OF 6 | REV 0

WTI-CT, 600:5, MR, C50

CT1-6, NCT, 600:5, MR, C400

CAUTION:
SHORT CIRCUIT TERMINALS 1 & 5
BEFORE DISCONNECTING SECONDARY BURDEN.

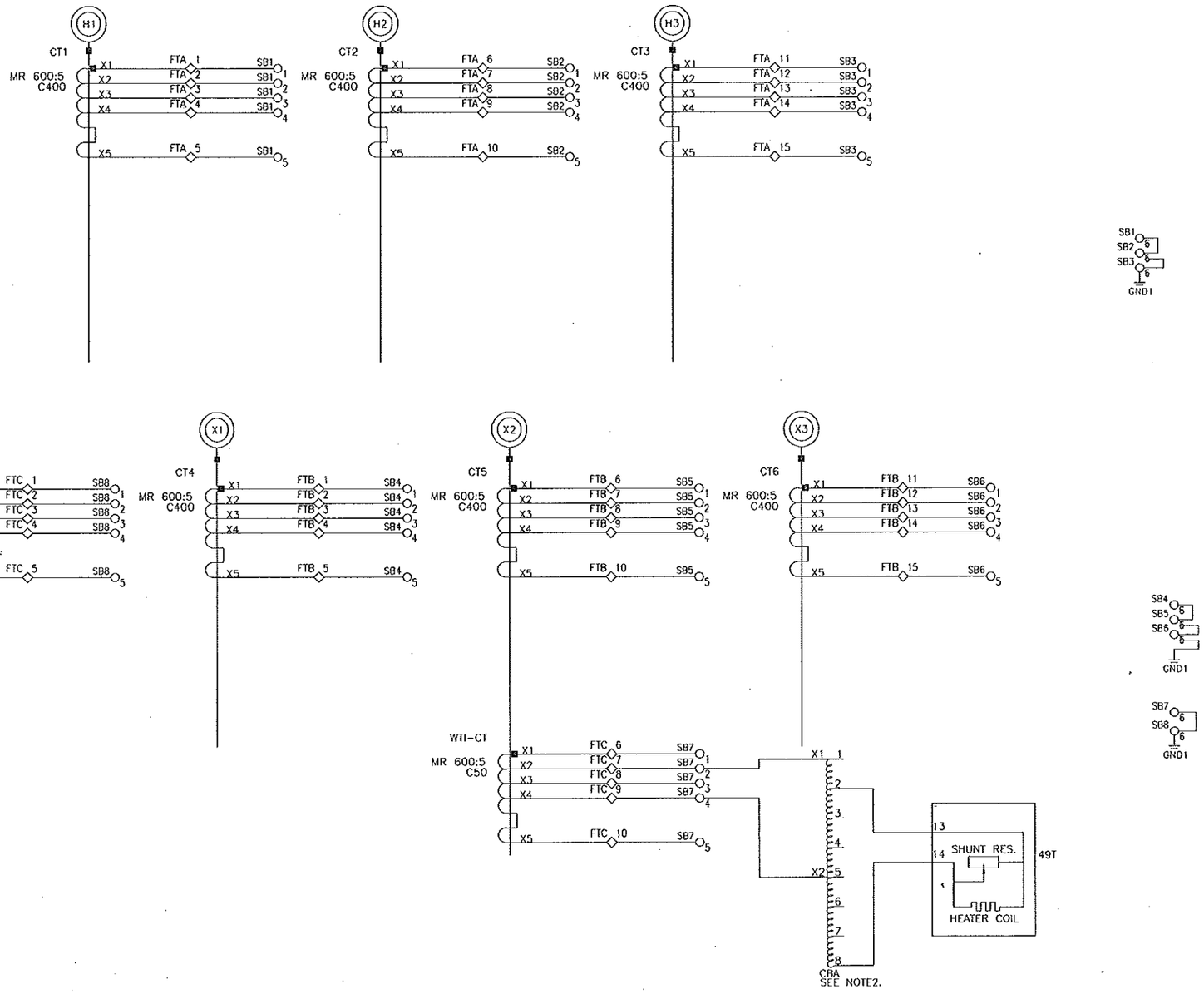
| TAP CONNECTIONS FOR 600/5 MR CT | |
|---|---|
| RATIO | TAPS |
| 50/5 | X2-X3 |
| 100/5 | X1-X2 |
| 150/5 | X1-X3 |
| 200/5 | X4-X5 |
| 250/5 | X3-X4 |
| 300/5 | X2-X4 |
| 400/5 | X1-X4 |
| 450/5 | X3-X5 |
| 500/5 | X2-X5 |
| 600/5 | X1-X5 |

TABLE 1
CURRENT BALANCING
AUTO--TRANSFORMER

| CURRENT INPUT | | CURRENT OUTPUT | | RATIO: INPUT TO OUTPUT | CONNECTION PER X |
|---|---|---|---|---|---|
| 3 | 8 | X1 | X2 | 1.41 | |
| 2 | 5 | X1 | X2 | 1.29 | |
| 2 | 6 | X1 | X2 | 1.23 | |
| 2 | 7 | X1 | X2 | 1.17 | |
| X1 | X2 | 1 | 8 | 1.12 | |
| X1 | X2 | 1 | 7 | 1.08 | |
| X1 | X2 | 1 | 6 | 1.04 | |
| X1 | X2 | 1 | 5 | 1.00 | |
| X1 | X2 | 2 | 8 | 0.90 | X |
| X1 | X2 | 2 | 7 | 0.86 | |
| X1 | X2 | 2 | 6 | 0.82 | |
| X1 | X2 | 2 | 5 | 0.78 | |
| X1 | X2 | 3 | 8 | 0.71 | |
| X1 | X2 | 3 | 7 | 0.67 | |
| X1 | X2 | 3 | 6 | 0.63 | |
| X1 | X2 | 3 | 5 | 0.59 | |
| X1 | X2 | 4 | 8 | 0.54 | |
| X1 | X2 | 4 | 7 | 0.50 | |
| X1 | X2 | 4 | 6 | 0.46 | |
| X1 | X2 | 4 | 5 | 0.42 | |
| X1 | 8 | 4 | 5 | 0.37 | |
| X1 | 8 | 2 | 4 | 0.32 | |
| 3 | 6 | 3 | 4 | 0.27 | |
| 2 | 7 | 3 | 4 | 0.20 | |

CAUTION:
SHORT TERMINALS 1 & 2 BEFORE
DISCONNECTING SECONDARY BURDEN.
NOTE2 : INPUT WIRES MAY BE MOVED FOR CALIBRATION OF
AUTOTRANSFORMER AS PER TABLE1

NOTE
SEE DEVICE LEGEND AND WIRING NOTES ON SHEET 21




ALL DIMENSIONS IN INCHES & IN mm IF SHOWN IN PARENTHESIS

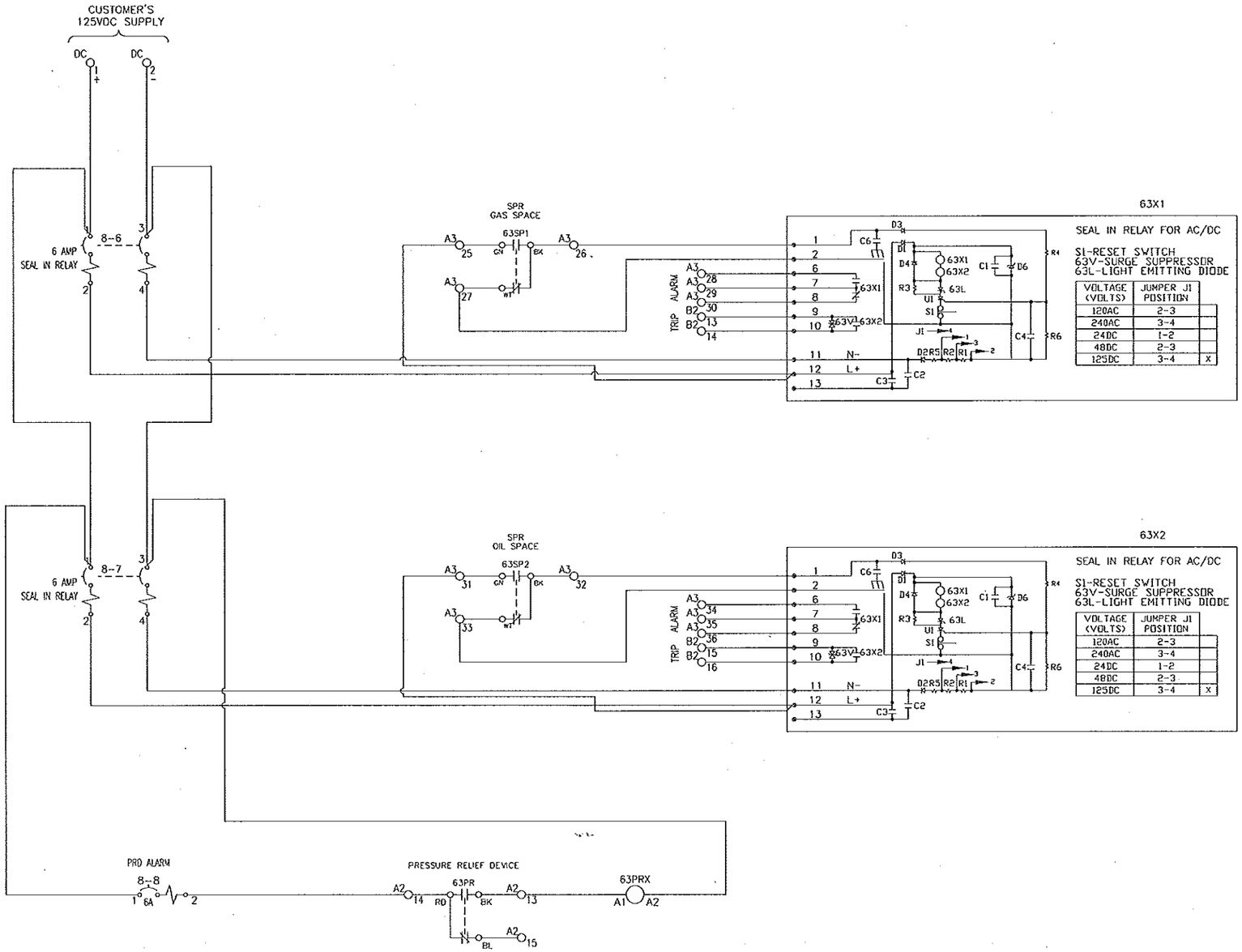


VIRGINIA TRANSFORMER CORP.
220 GLADE VIEW DR., N.E., ROANOKE, VA 24012
(540) 345-9892

TITLE: CT SCHEMATICS JOB# C028A

DWN: PSP | CHK: JWB | DATE: 08/26/13 | DWG SCALE: NTS | PLOT SCALE: 1:1

D | 477500A176 | SHEET 23 | DRAWING 4 OF 6 | REV 0




NOTE
SEE DEVICE LEGEND AND WIRING NOTES ON SHEET 21

ALL DIMENSIONS IN INCHES & (IN mm IF SHOWN IN PARENTHESIS)

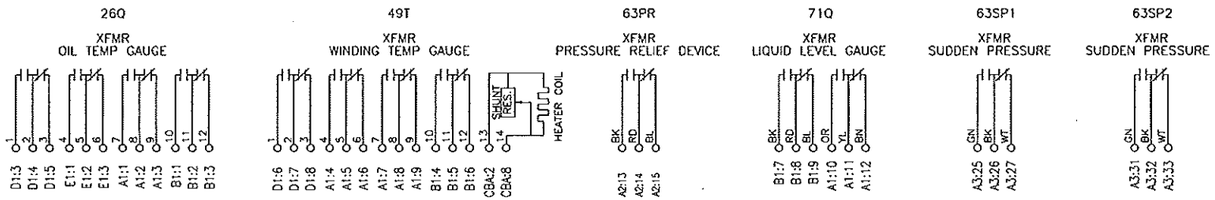
THIS DOCUMENT IS INTENDED FOR COORDINATION PURPOSES ONLY. OTHER USES ARE PROHIBITED EXCEPT BY WRITTEN PERMISSION OF VTC.
C028A-24.DWG

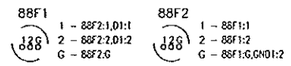
VIRGINIA TRANSFORMER CORP.
220 GLADE VIEW DR., N.E., ROANOKE, VA 24012
(540) 345-9892

TITLE: SEAL IN SCHEMATICS JOB# C028A

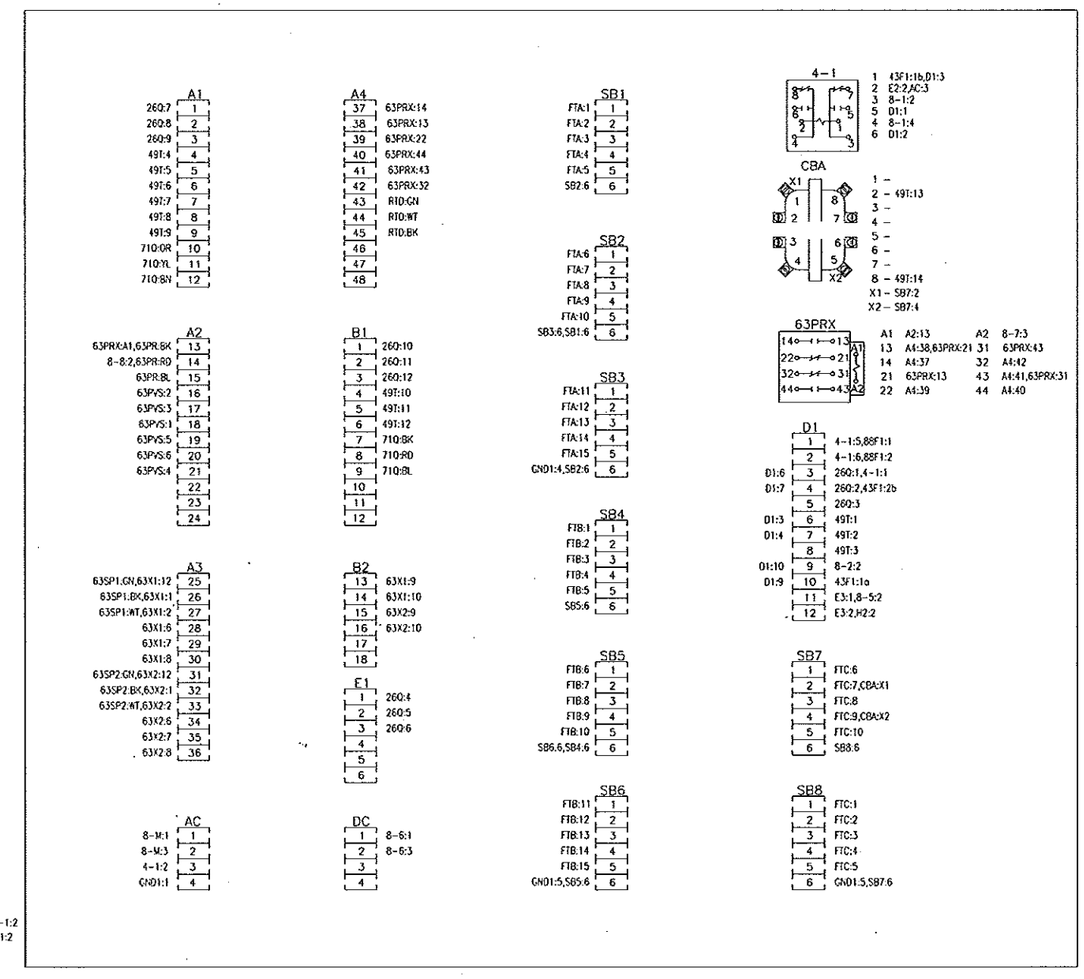
DWN: PSP | CHK: JWB | DATE: 08/26/13 | DWG SCALE: NTS | PLOT SCALE: 1:1

D | 477500A176 | SHEET 24 | DRAWING 5 OF 6 | REV 0

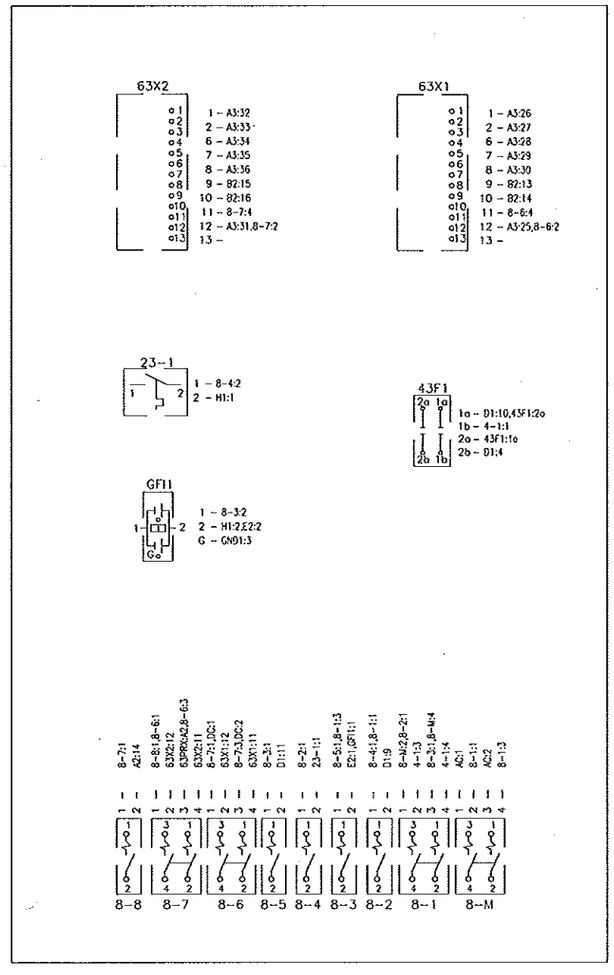


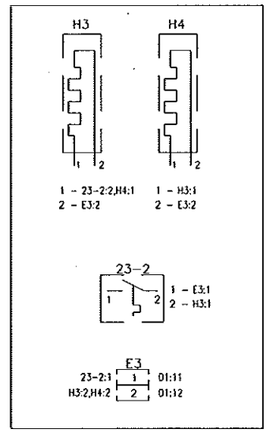

## BACK PANEL

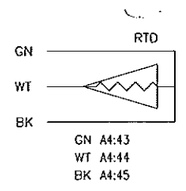


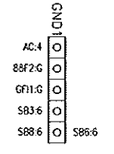

## SWING PANEL (BACK VIEW)




## LV ATC







NOTE
SEE DEVICE LEGEND AND WIRING NOTES ON SHEET 21

ALL DIMENSIONS IN INCHES & IN mm IF SHOWN IN PARENTHESIS

THIS DOCUMENT IS INTENDED FOR COORDINATION PURPOSES ONLY. OTHER USES ARE PROHIBITED EXCEPT BY WRITTEN PERMISSION OF VTC.
C028A-27.DWG

VIRGINIA TRANSFORMER CORP.
220 GLADE VIEW DR., N.E., ROANOKE, VA 24012
(540) 345-9892

TITLE: POINT TO POINT SCHEMATICS
JOB# C028A
DWN: PSP | CHK: JWB | DATE: 08/26/13 | DWG SCALE: NTS | PLOT SCALE: 1:1
D | 477500A176 | SHEET 27 | DRAWING 6 OF 6 | REV 0

# VIRGINIA TRANSFORMER CORP.

220 Glade View Drive, N.E. ◊ Roanoke, Virginia 24012, U.S.A.
Phone: (540) 345-9892 ◊ Fax: (540) 342-7694

The Commitment Company
ISO 9001 REGISTERED


## TRANSFORMER TEST REPORT

| | | | |
|---|---|---|---|
| **DATE OF TEST** | 10/04/13 | **MVA** | 7.5/10 |
| **PURCHASER** | KA FACTOR GROUP INC. | **CLASS** | ONAN/ONAF |
| **MODEL No.** | 477500A176-C028A | **RISE** | 65°C |
| **P.O. No.** | P13-361-4849 | **PHASE** | 3 |
| **HIGH VOLTAGE** | 44000 DELTA | **HERTZ** | 60 |
| **LOW VOLTAGE** | 27600 GrdY/15935 | **TYPE** | MINERAL OIL |

RESISTANCES, EXCITING CURRENTS, LOSSES, AND IMPEDANCE ARE BASED ON NORMAL RATINGS UNLESS OTHERWISE STATED. LOSSES AND REGULATION ARE BASED ON WATTMETER MEASUREMENTS. FOR THREE-PHASE TRANSFORMERS, THE RESISTANCES GIVEN ARE THE SUM OF THREE PHASES IN SERIES.

### TEMPERATURE DATA

Measured on: This Unit
Insulation Class A

| Average Temperature Rise - 100% load: | (7.5 MVA) ONAN | (10.0 MVA) ONAF | |
|---|---|---|---|
| High voltage | 57.5 | 51.4 | degrees C |
| Low voltage | 61.6 | 55.3 | degrees C |

### MEASURED TRANSFORMER DATA

Winding Resistance at 85 degrees C reference temperature:

| | | | |
|---|---|---|---|
| - High voltage | OHMS | = | 4.72354 |
| - Low voltage | OHMS | = | 0.49407 |
| No load loss at 100% of rated voltage | WATTS | = | 7030 |
| Exciting current at 100% of rated voltage | PERCENT | = | 0.170 |
| Load loss at 85 degrees C reference temperature | WATTS | = | 30870 |
| Impedance at 85 degrees C reference temperature | PERCENT | = | 5.6 |
| Sound level (ONAN/ONAF) | dB | = | 67/69 |

### CALCULATED DATA

Regulation at reference temperature 85 degrees C

| | | | |
|---|---|---|---|
| and 1.0 power factor | PERCENT | = | 0.57 |
| and 0.8 power factor | PERCENT | = | 3.77 |

| Efficiencies at: | | | |
|---|---|---|---|
| 100% full load | PERCENT | = | 99.59 |
| 75% full load | PERCENT | = | 99.69 |
| 50% full load | PERCENT | = | 99.79 |
| 25% full load | PERCENT | = | 99.90 |

### DIELECTRIC TESTS

Lightning Impulse: HV = 250 KV, LV = 200 KV BIL, ***PASS***
Applied Potential for 60 seconds:

| | | | |
|---|---|---|---|
| High voltage to low voltage and ground | KV | = | 95, ***PASS*** |
| Low voltage to high voltage and ground | KV | = | 70, ***PASS*** |

Induced Potential – double voltage at 240 cycles per second for 30 seconds, ***PASS***
Partial Discharge, ***PASS***

10/21/13
Date

Test Engineer

Project Engineer 10/21/13

C028A

# VIRGINIA TRANSFORMER CORP.

220 Glade View Drive, N.E. ◊ Roanoke, Virginia 24012, U.S.A.
Phone: (540) 345-9892 ◊ Fax: (540) 342-7694

The Commitment Company
ISO 9001 REGISTERED


## TRANSFORMER TEST REPORT

### RATIO AND PHASE RELATION TEST

| DETC Position | Calculated Ratio | Phase 1 | Phase 2 | Phase 3 |
|---|---|---|---|---|
| 1 | 2.8993 | 2.8984 | 2.8984 | 2.8986 |
| 2 | 2.8303 | 2.8306 | 2.8307 | 2.8308 |
| 3 | 2.7612 | 2.7626 | 2.7626 | 2.7627 |
| 4 | 2.6922 | 2.6946 | 2.6946 | 2.6947 |
| 5 | 2.6232 | 2.6264 | 2.6263 | 2.6264 |

Vector group verified as Dyn1

### NO-LOAD LOSS AND EXCITING CURRENT TEST

| % Voltage Applied | Measured (%) Excitation Current Calculation | Measured No-Load Loss (W) |
|---|---|---|
| 90 | 0.114 | 5357 |
| 100 | 0.170 | 7030 |
| 110 | 0.424 | 9782 |

### LOAD LOSS AND IMPEDANCE TEST

| DETC Position | Measured Impedance (%) at 85°C | Measured Load Loss (W) at 85°C |
|---|---|---|
| 1 | 5.60 | 30326 |
| 3 | 5.60 | 30870 |
| 5 | 5.65 | 31698 |

### INSULATION POWER FACTOR (%) AT 20 DEGREES C

| Energize | Ground | Guard | Ust | Test KV | Equivalent 10KV measured [mA] | Equivalent 10KV measured [Watts] | % PF corrected 20°C | Measured Winding Capacitance [pF] | Designation |
|---|---|---|---|---|---|---|---|---|---|
| High #4 | low | | | 10 KV | 26.45 | 0.7026 | 0.23 | 6971.3 | Ch + Cl |
| High #5 | | low | | 10 KV | 9.315 | 0.2336 | 0.22 | 2451.3 | Ch |
| High #3 | | | low | 10 KV | 17.09 | 0.4662 | 0.24 | 4519.6 | Chl |
| Low #4 | High | | | 10 KV | 29.67 | 0.7784 | 0.23 | 7858.8 | Cl + Ch |
| Low #5 | | High | | 10 KV | 12.70 | 0.3163 | 0.22 | 3338.9 | Cl |
| Low #3 | | | High | 10 KV | 17.25 | 0.4764 | 0.24 | 4519.5 | Chl |

### INSULATION RESISTANCE TEST FOR CORE

Applied 1 KV to Core and measured> 10000 Mega-Ohms at 20 °C.

### INSULATION RESISTANCE TEST FOR WINDINGS

Applied 10KV to HV with LV grounded and measured>15000 Mega-Ohms at 20 °C.
Applied 10KV to LV with HV grounded and measured> 14000 Mega-Ohms at 20 °C.

### AUXILIARY DEVICES AND CURRENT TRANSFORMERS

All auxiliary devices have been operated successfully.
All wiring has been hipot tested with 1.5KV and passed.
All current transformers have been ratio and polarity tested and passed.

10/21/13
Date

Test Engineer

Project Engineer 10/21/13

C028A

Virginia Transformer Corp.

**KA Factor Group INC.**

project : C028A



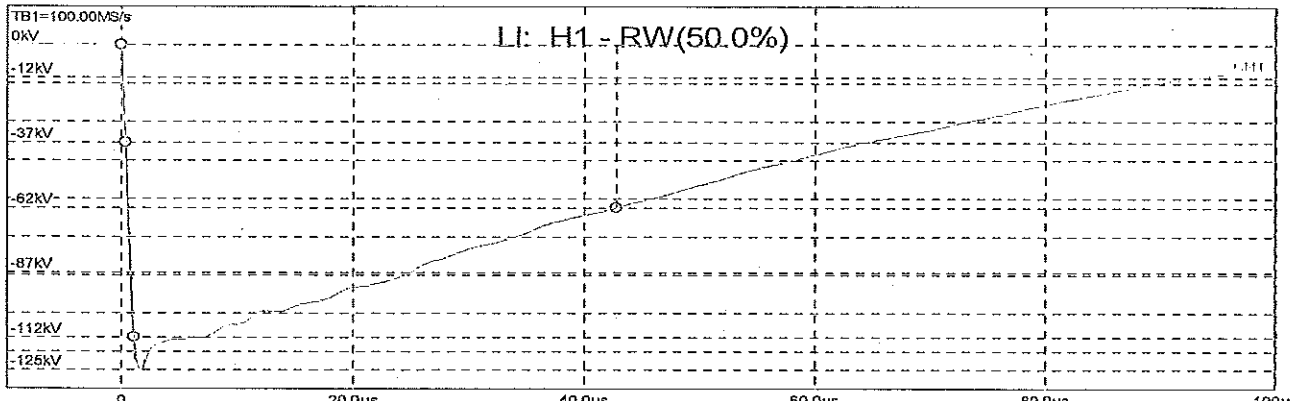
## Climate - Data

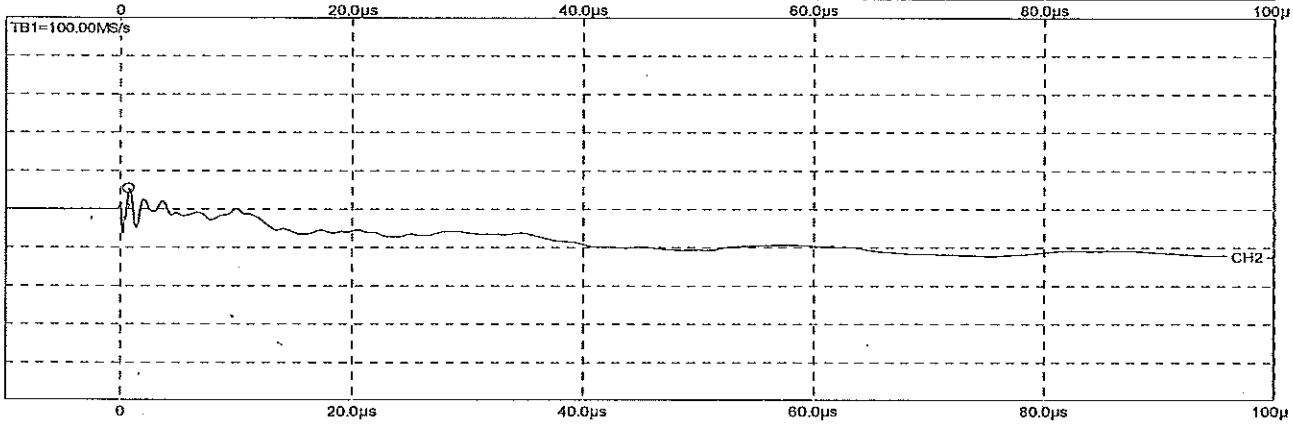
temperature °C humidity %

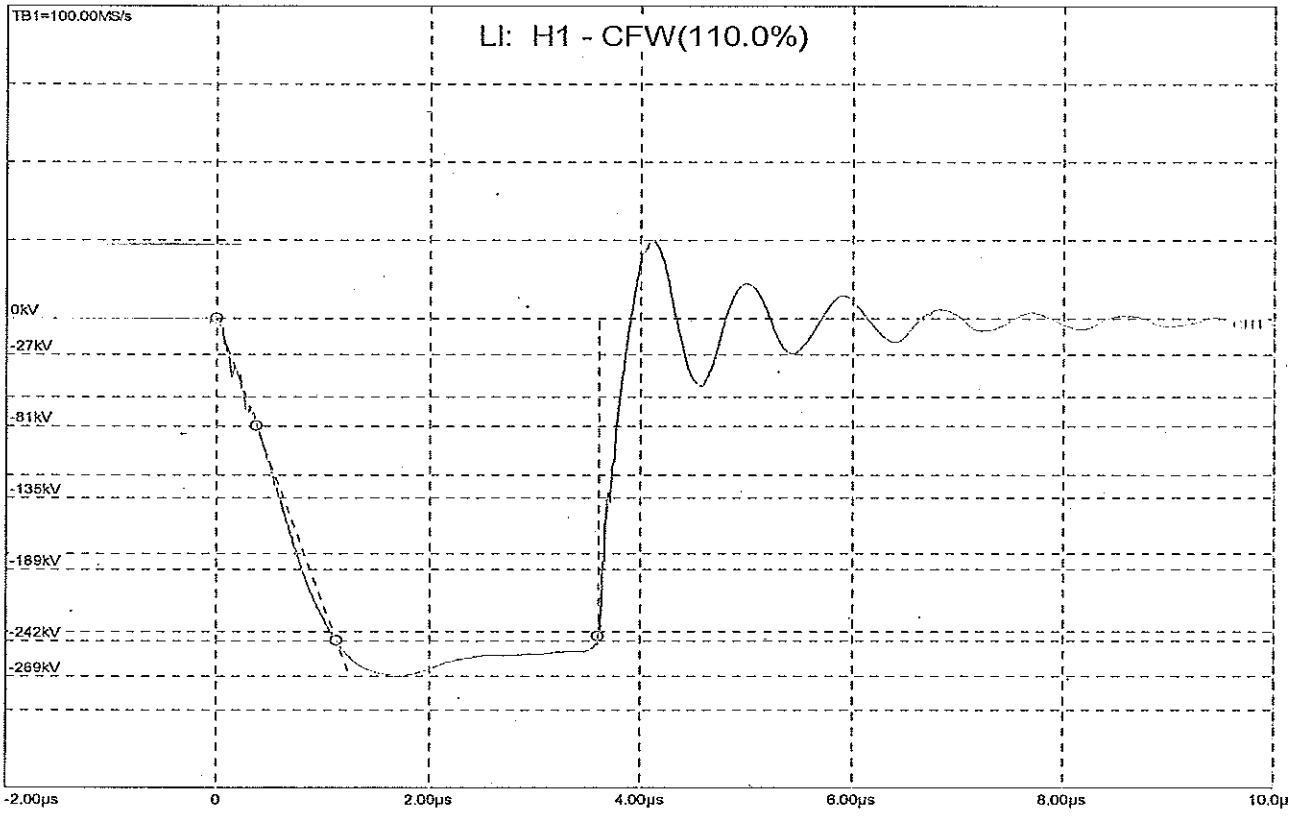
air-pressure hPa

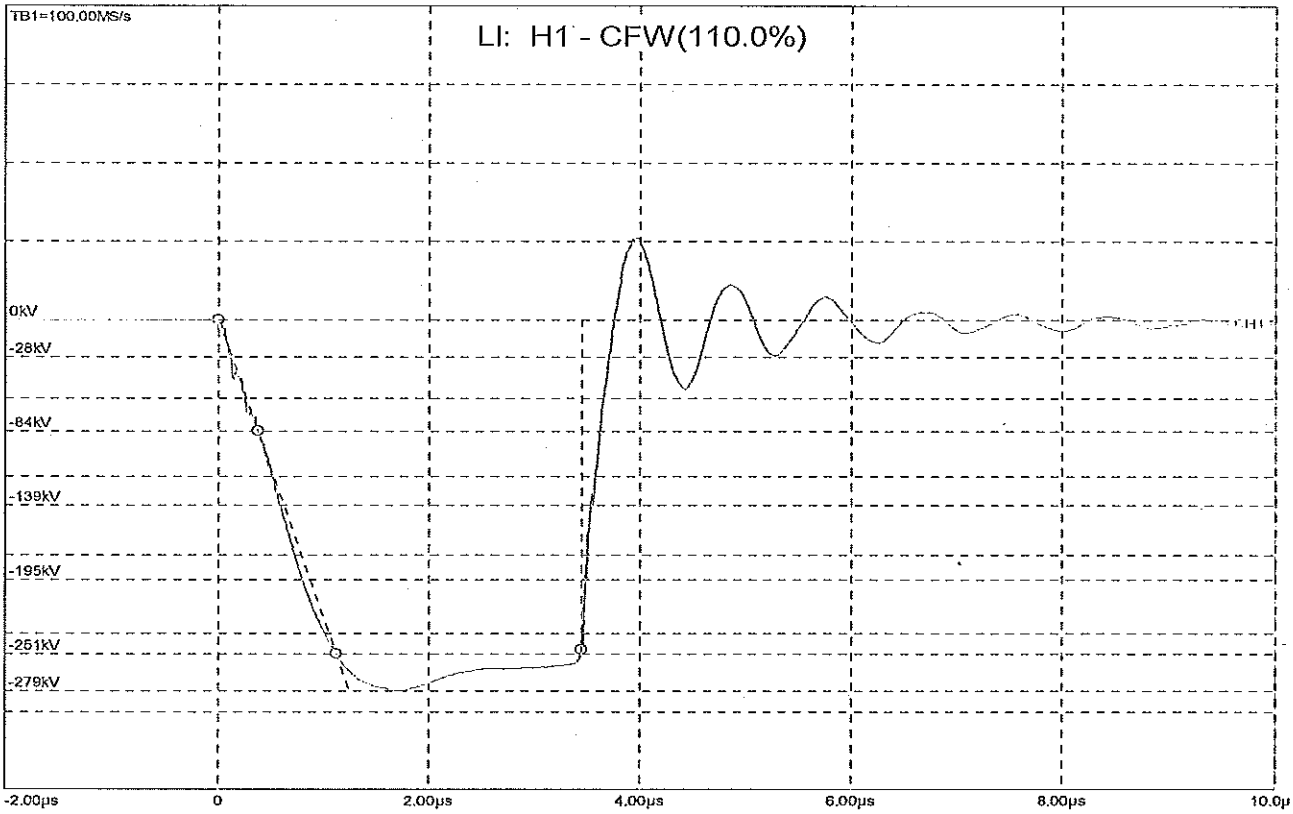
LI lightning-impulse

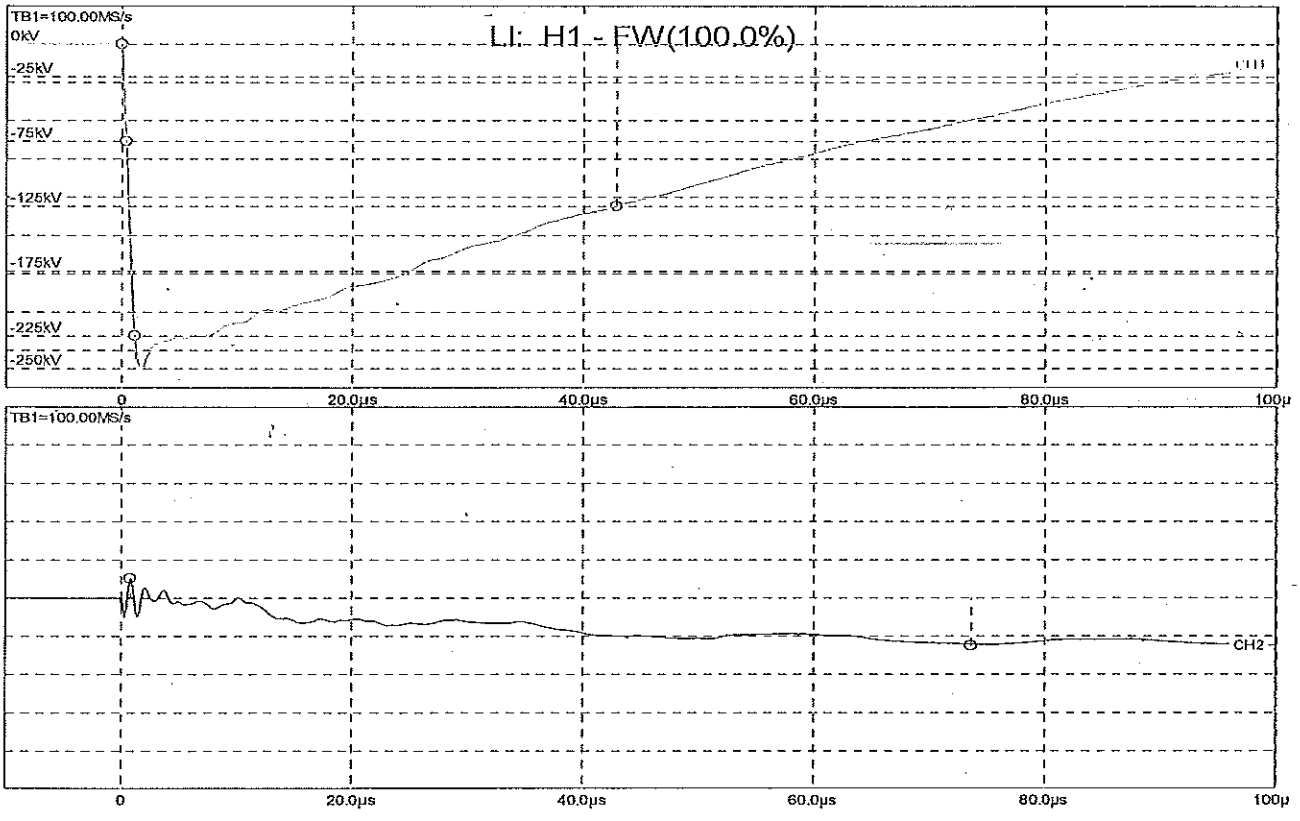
| no. | Up [kV] | T1[µs] | T2[µs] | Tc[µs] | remark |
|---|---|---|---|---|---|
| 1 | -124.9 | 1.26 | 42.8 | | LI: H1 - RW(50.0%) |
| 2 | -269.3 | 1.26 | | 3.6 | LI: H1 - CFW(110.0%) |
| 3 | -278.9 | 1.26 | | 3.45 | LI: H1 - CFW(110.0%) |
| 4 | -249.7 | 1.26 | 42.9 | | LI: H1 - FW(100.0%) |
| 5 | -126.2 | 1.25 | 42.7 | | LI: H2 - RW(50.0%) |
| 6 | -272.9 | 1.26 | | 3.5 | LI: H2 - CFW(110.0%) |
| 7 | -276.9 | 1.25 | | 3.54 | LI: H2 - CFW(110.0%) |
| 8 | -251.8 | 1.26 | 42.9 | | LI: H2 - FW(100.0%) |
| 9 | -125.3 | 1.28 | 43.2 | | LI: H3 - RW(50.0%) |
| 10 | -275.4 | 1.27 | | 3.42 | LI: H3 - CFW(110.0%) |
| 11 | -274.6 | 1.27 | | 3.43 | LI: H3 - CFW(110.0%) |
| 12 | -251.2 | 1.28 | 43.2 | | LI: H3 - FW(100.0%) |
| 13 | -99.09 | 0.95 | 41.3 | | LI: X1 - RW(50.0%) |
| 14 | -216.2 | 0.95 | | 3.68 | LI: X1 - CFW(110.0%) |
| 15 | -219.3 | 0.95 | | 3.85 | LI: X1 - CFW(110.0%) |
| 16 | -199.1 | 0.95 | 41.3 | | LI: X1 - FW(100.0%) |
| 17 | -101.2 | 0.95 | 40.9 | | LI: X2 - RW(50.0%) |
| 18 | -219.9 | 0.95 | | 3.88 | LI: X2 - CFW(110.0%) |
| 19 | -220.1 | 0.95 | | 3.81 | LI: X2 - CFW(110.0%) |
| 20 | -200.1 | 0.96 | 41.3 | | LI: X2 - FW(100.0%) |
| 21 | -100.5 | 0.95 | 41.1 | | LI: X3 - RW(50.0%) |
| 22 | -220 | 0.95 | | 3.81 | LI: X3 - CFW(110.0%) |
| 23 | -220.1 | 0.95 | | 3.79 | LI: X3 - CFW(110.0%) |
| 24 | -200.7 | 0.95 | 41.3 | | LI: X3 - FW(100.0%) |
| 25 | -100.9 | 1 | 48 | | LI: X0 - RW(50.0%) |
| 26 | -199.1 | 1 | 48.2 | | LI: X0 - FW(100.0%) |
| 27 | -200.1 | 1 | 48.1 | | LI: X0 - FW(100.0%) |

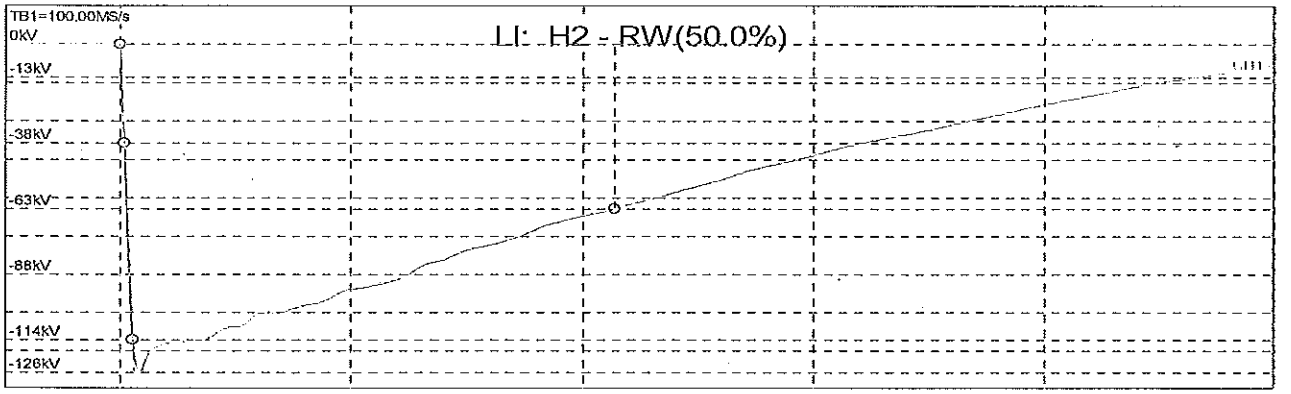

TB1=100.00MS/s
LI: H1 - RW(50.0%)
0kV
-12kV
-37kV
-62kV
-87kV
-112kV
-125kV
CH1
0
20.0µs
40.0µs
60.0µs
80.0µs
100µ

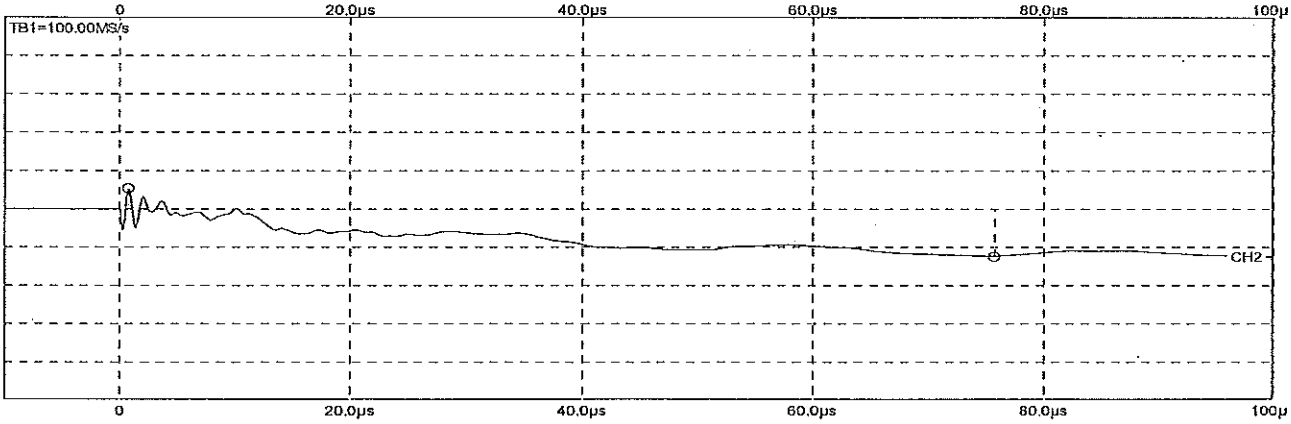

TB1=100.00MS/s
CH2
0
20.0µs
40.0µs
60.0µs
80.0µs
100µ

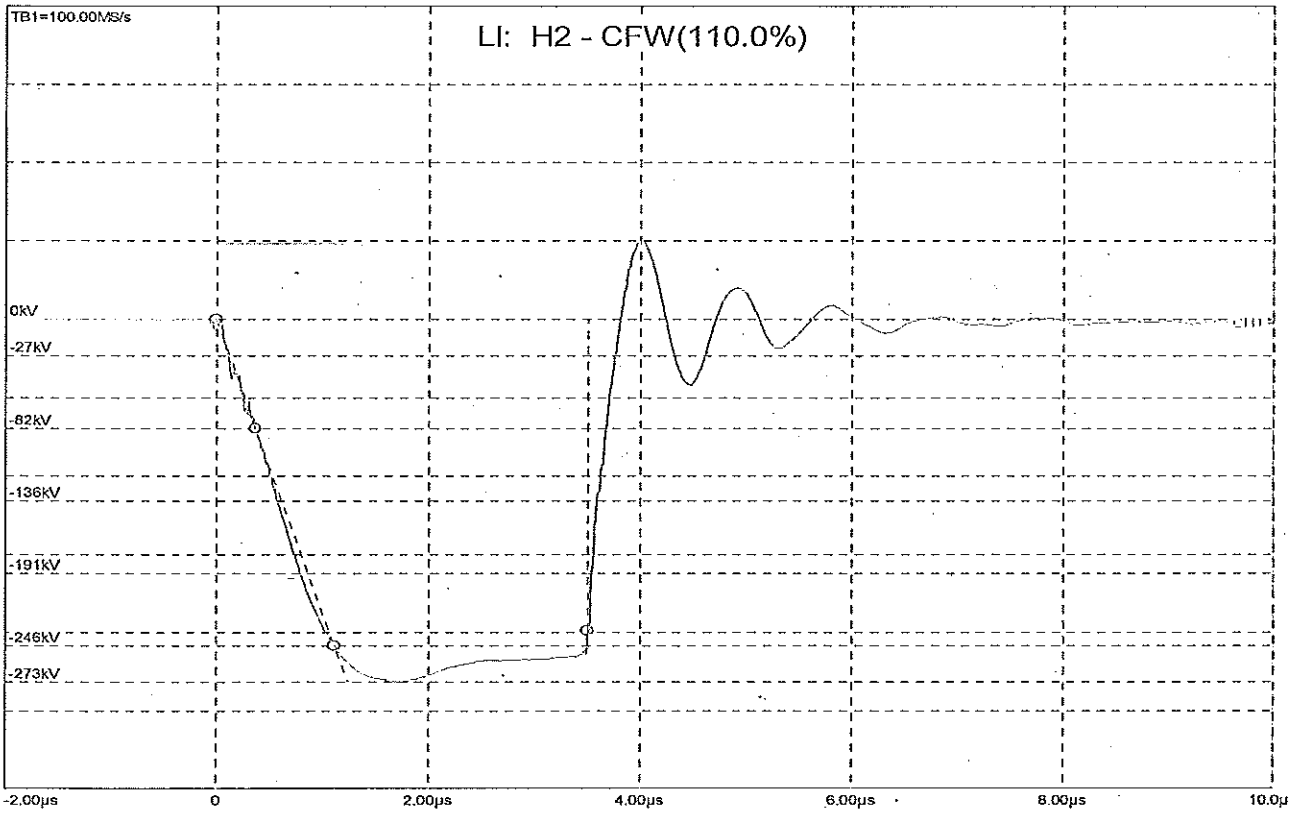

TB1=100.00MS/s
LI: H1 - CFW(110.0%)
0kV
-27kV
-81kV
-135kV
-189kV
-242kV
-269kV
CH1
-2.00µs
0
2.00µs
4.00µs
6.00µs
8.00µs
10.0µ

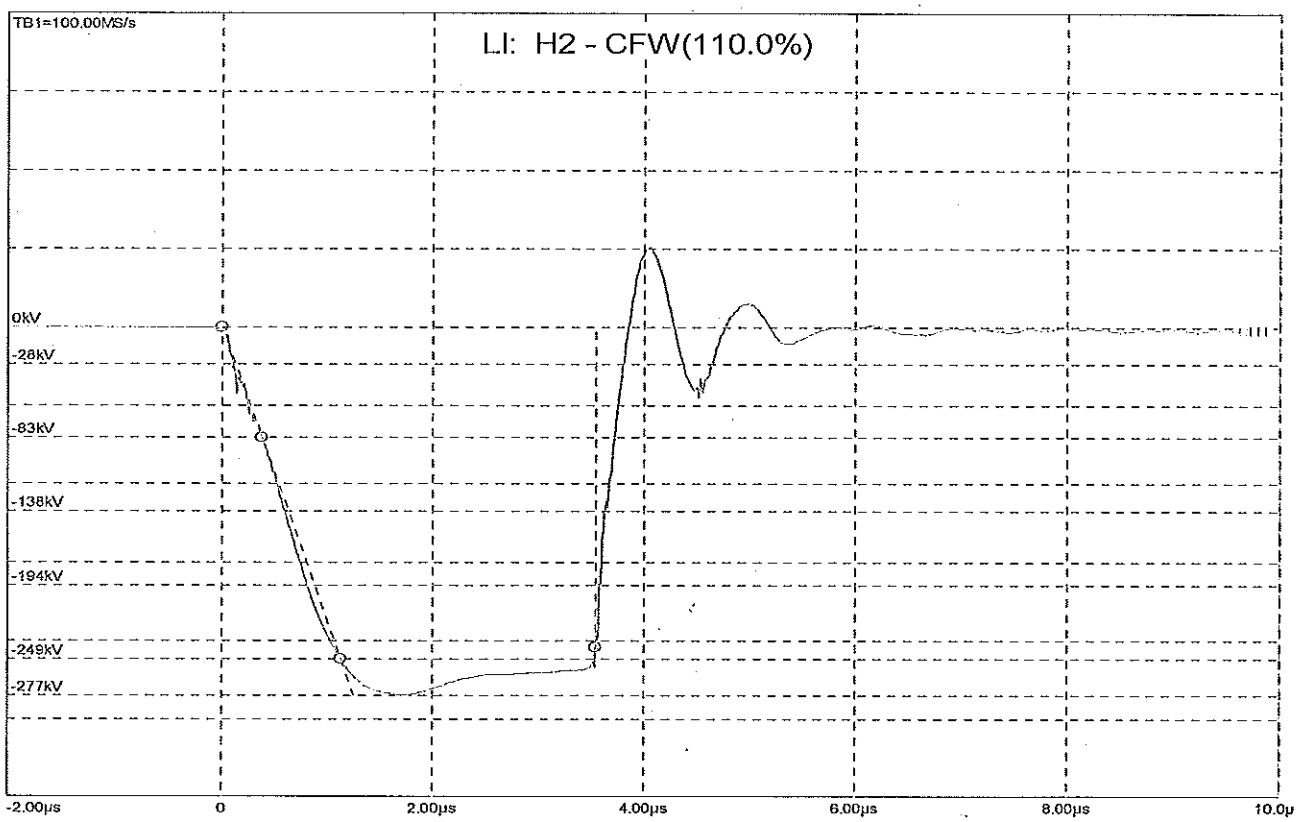

TB1=100.00MS/s
LI: H1 - CFW(110.0%)
0kV
-28kV
-84kV
-139kV
-195kV
-251kV
-279kV
CH1
-2.00µs
0
2.00µs
4.00µs
6.00µs
8.00µs
10.0µ

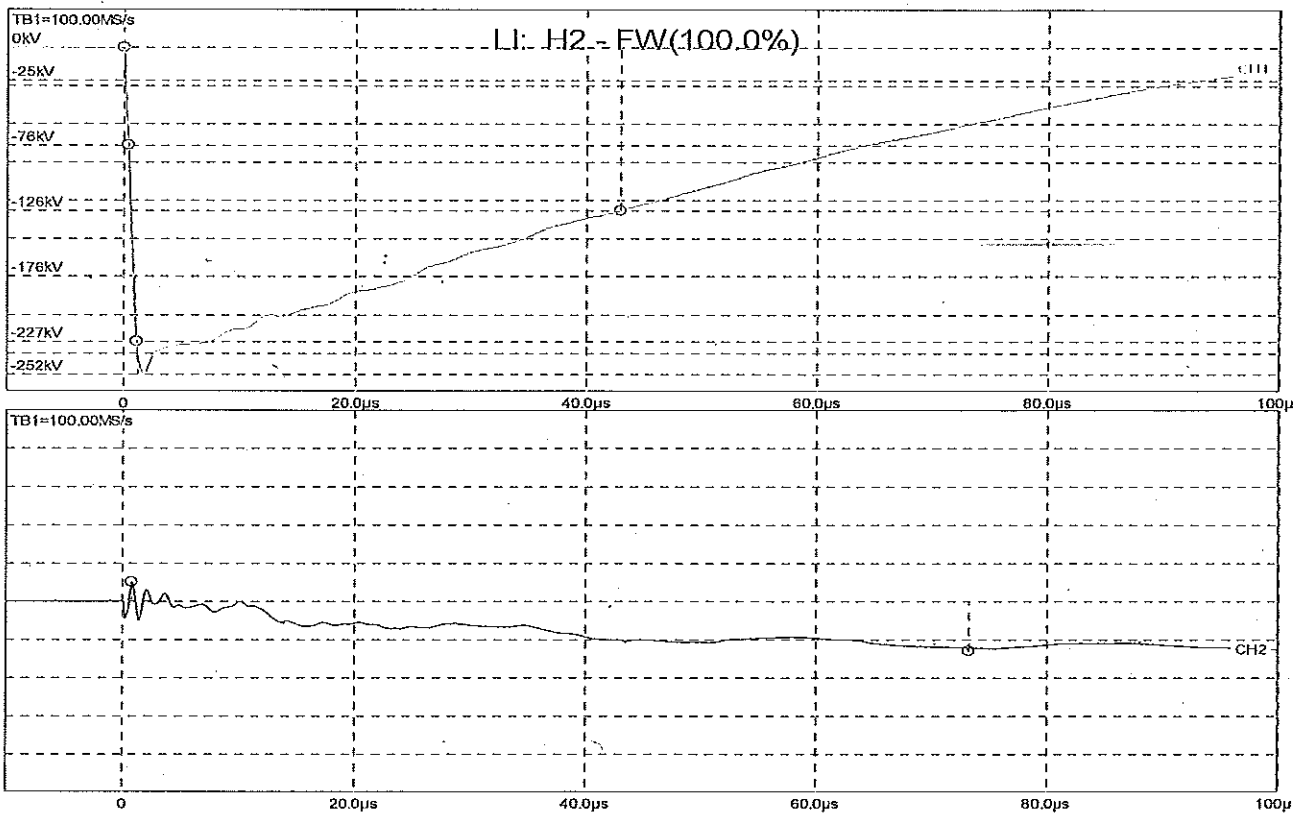

TB1=100.00MS/s
LI: H1 - FW(100.0%)
0kV
-25kV
-75kV
-125kV
-175kV
-225kV
-250kV
CH1
0
20.0µs
40.0µs
60.0µs
80.0µs
100µ
TB1=100.00MS/s
CH2
0
20.0µs
40.0µs
60.0µs
80.0µs
100µ

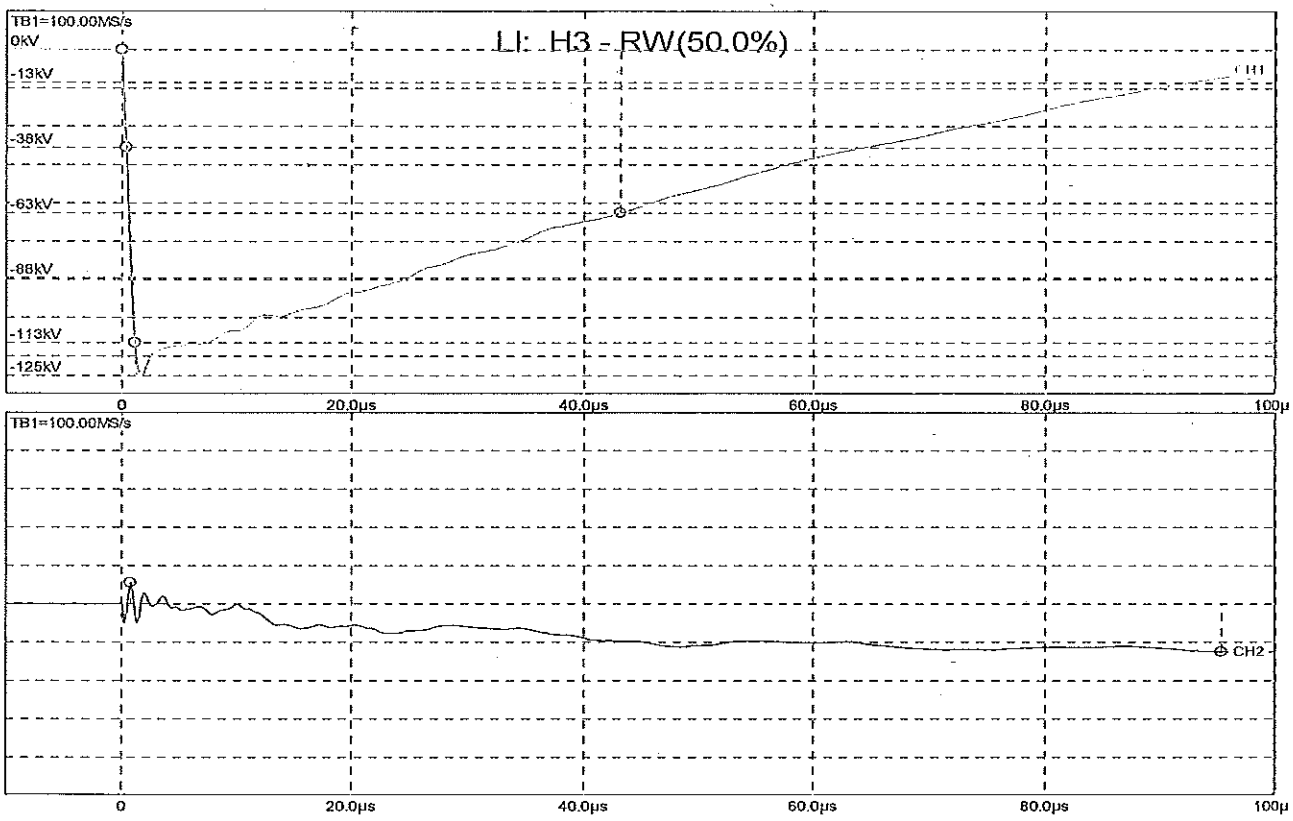

TB1=100.00MS/s
LI: H2 - RW(50.0%)
0kV
-13kV
-38kV
-63kV
-88kV
-114kV
-126kV
CH1
0
20.0µs
40.0µs
60.0µs
80.0µs
100µ

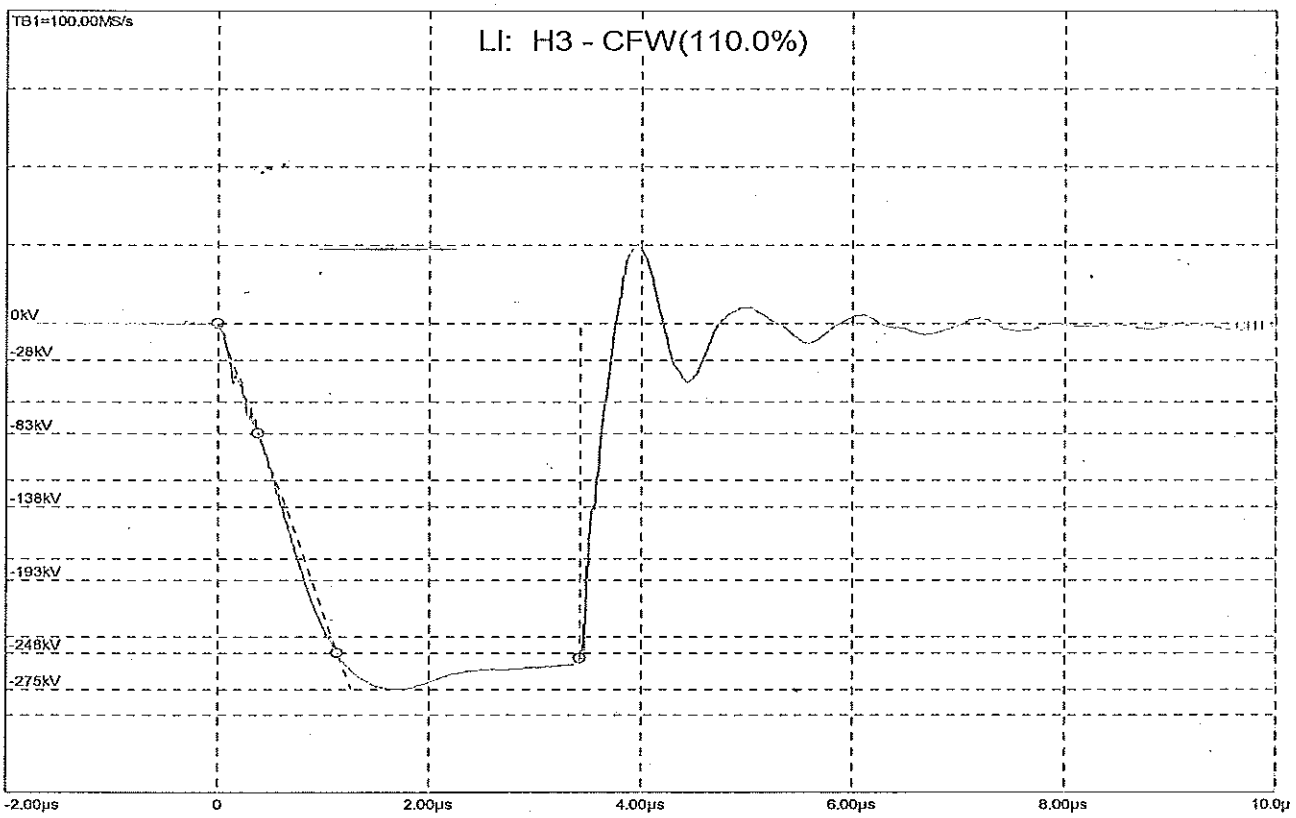

TB1=100.00MS/s
CH2
0
20.0µs
40.0µs
60.0µs
80.0µs
100µ

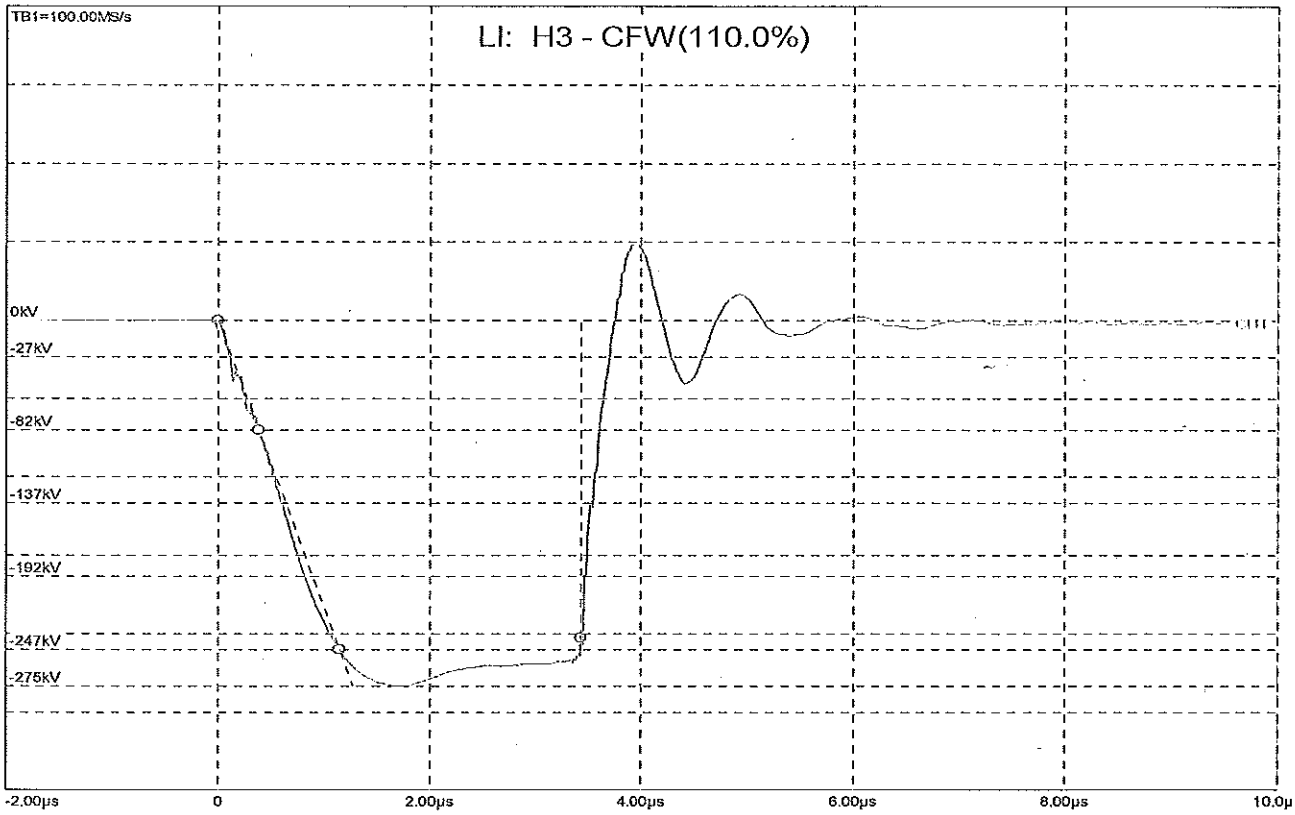

TB1=100.00MS/s
LI: H2 - CFW(110.0%)
0kV
-27kV
-82kV
-136kV
-191kV
-246kV
-273kV
CH1
-2.00µs
0
2.00µs
4.00µs
6.00µs
8.00µs
10.0µ

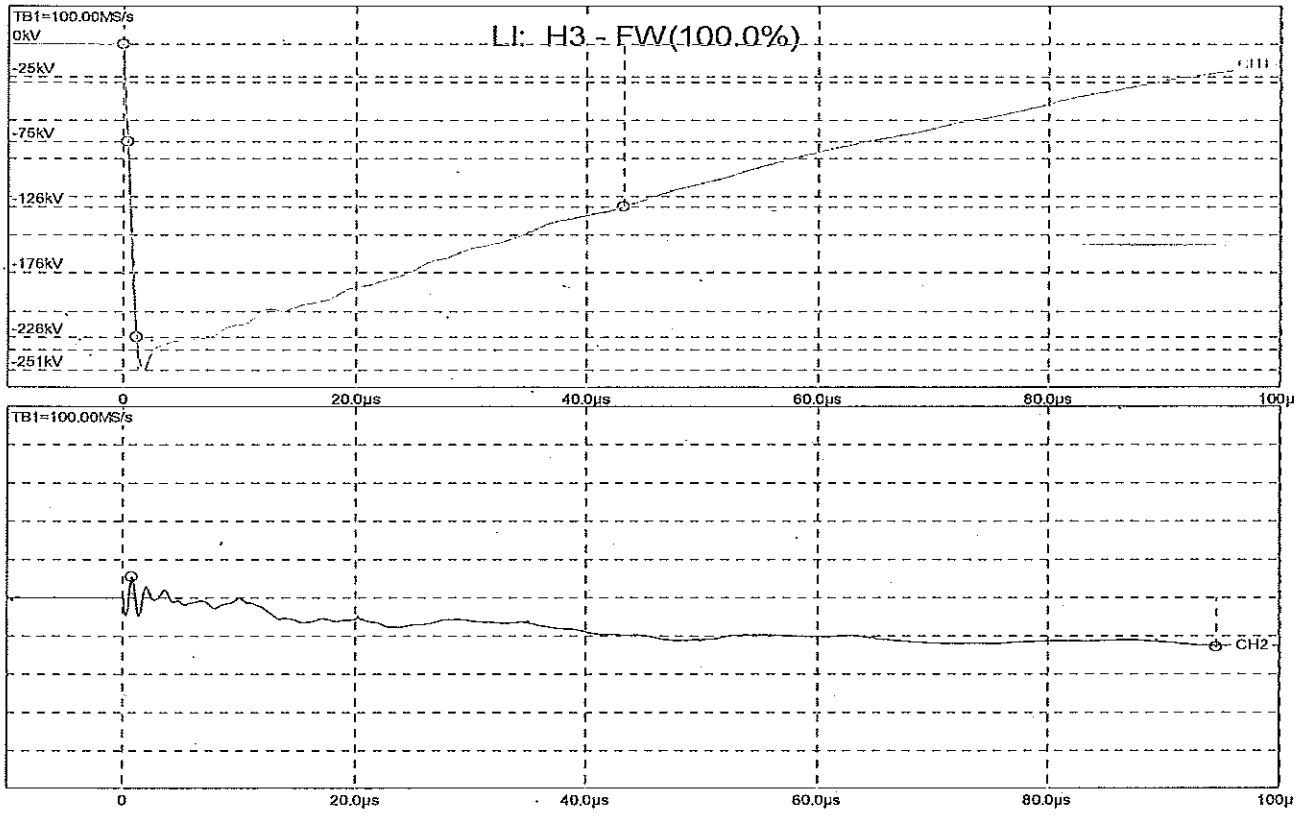

TB1=100.00MS/s
LI: H2 - CFW(110.0%)
0kV
-28kV
-83kV
-138kV
-194kV
-249kV
-277kV
-2.00µs
0
2.00µs
4.00µs
6.00µs
8.00µs
10.0µ
CH1

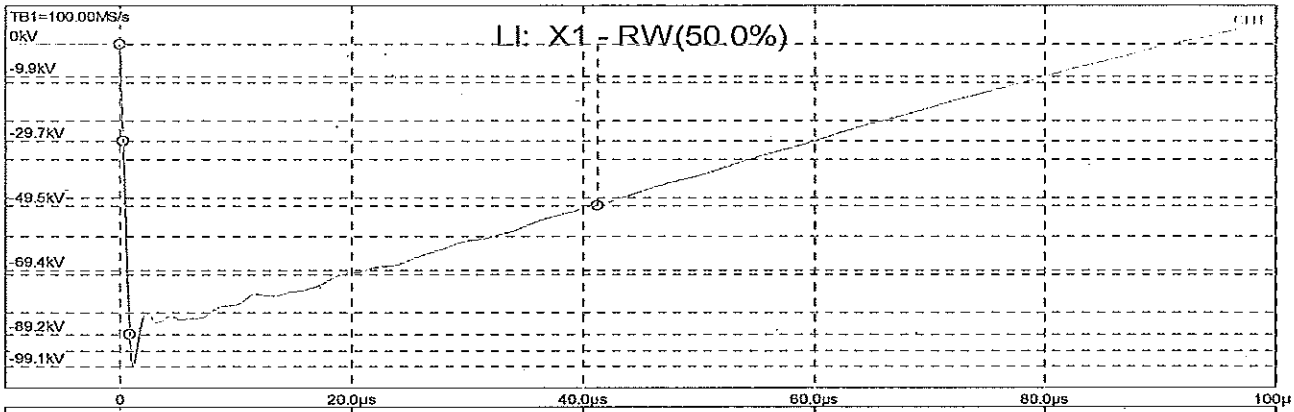

TB1=100.00MS/s
LI: H2 - FW(100.0%)
0kV
-25kV
-76kV
-126kV
-176kV
-227kV
-252kV
0
20.0µs
40.0µs
60.0µs
80.0µs
100µ
CH1
TB1=100.00MS/s
0
20.0µs
40.0µs
60.0µs
80.0µs
100µ
CH2

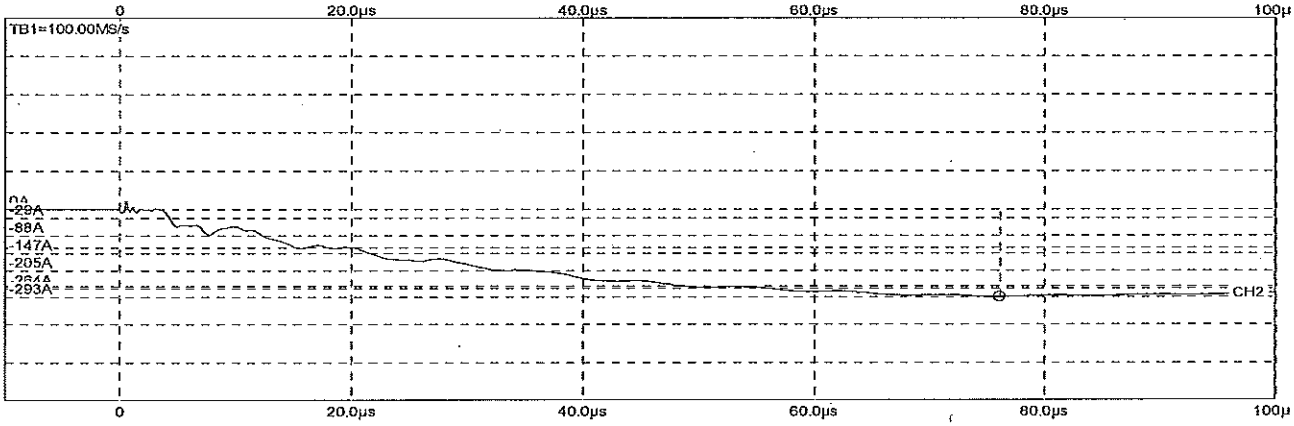

LI: H3 - RW(50.0%)
TB1=100.00MS/s
0kV
-13kV
-38kV
-63kV
-88kV
-113kV
-125kV
CH1
0
20.0µs
40.0µs
60.0µs
80.0µs
100µ
TB1=100.00MS/s
CH2
0
20.0µs
40.0µs
60.0µs
80.0µs
100µ

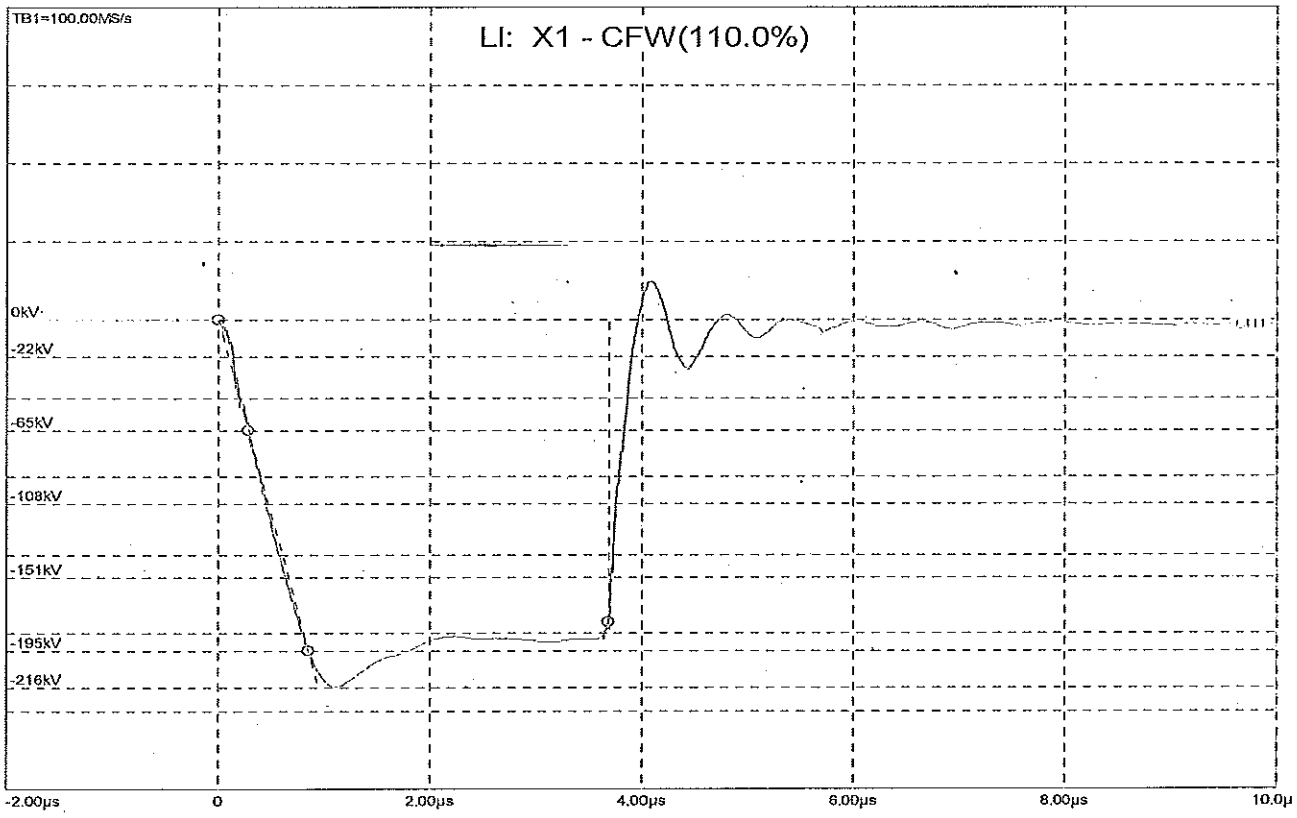

LI: H3 - CFW(110.0%)
TB1=100.00MS/s
0kV
-28kV
-83kV
-138kV
-193kV
-248kV
-275kV
CH1
-2.00µs
0
2.00µs
4.00µs
6.00µs
8.00µs
10.0µ

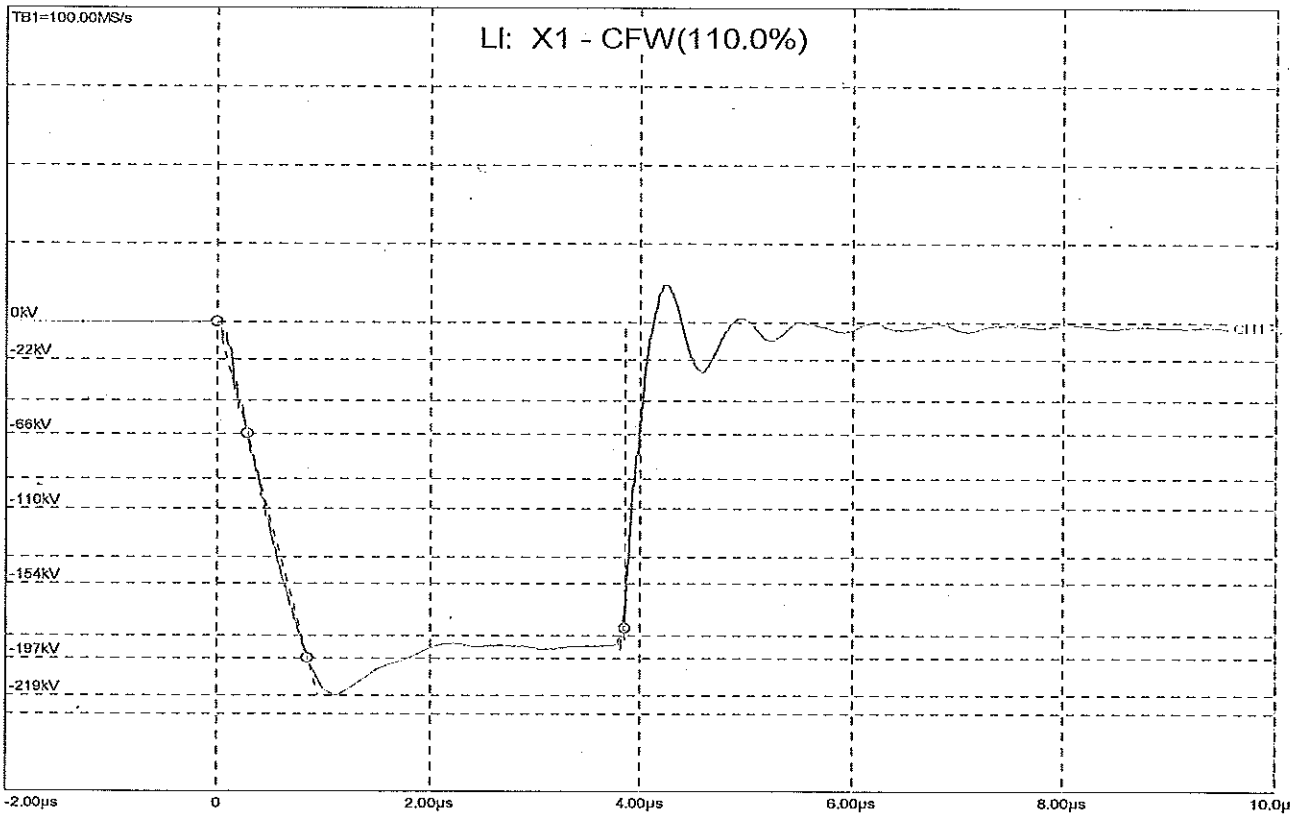

TB1=100.00MS/s
LI: H3 - CFW(110.0%)
0kV
-27kV
-82kV
-137kV
-192kV
-247kV
-275kV
CH1
-2.00µs
0
2.00µs
4.00µs
6.00µs
8.00µs
10.0µ

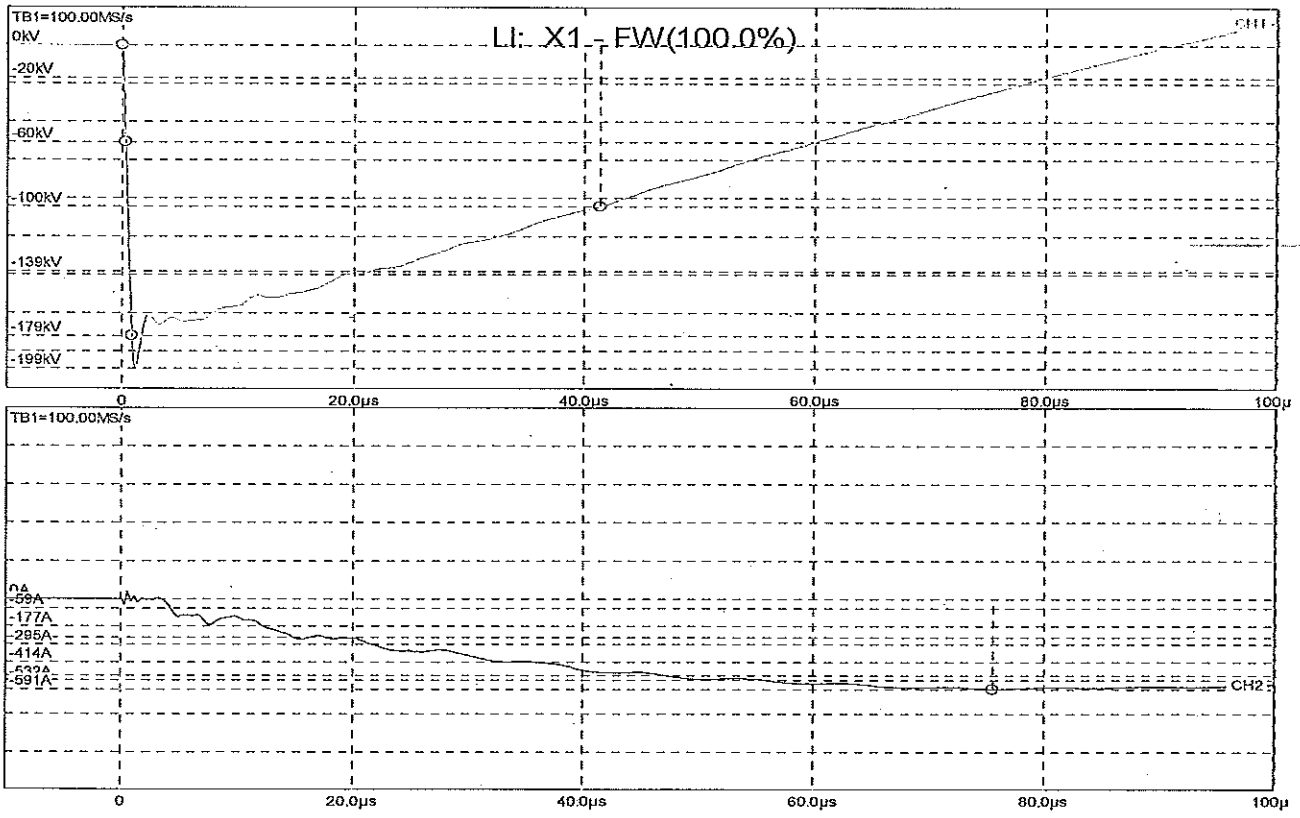

TB1=100.00MS/s
LI: H3 - FW(100.0%)
0kV
-25kV
-75kV
-126kV
-176kV
-226kV
-251kV
CH1
0
20.0µs
40.0µs
60.0µs
80.0µs
100µ
TB1=100.00MS/s
CH2
0
20.0µs
40.0µs
60.0µs
80.0µs
100µ

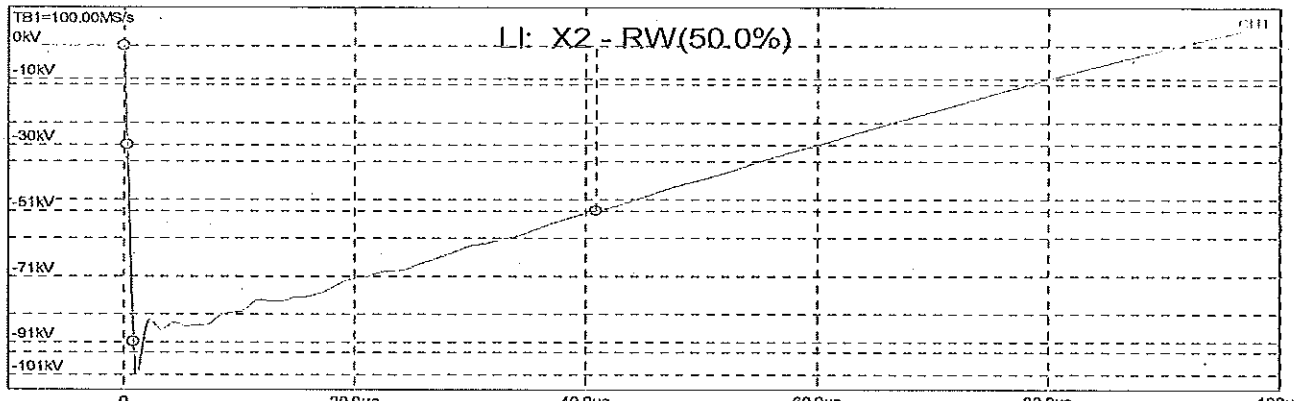

TB1=100.00MS/s
0kV
-9.9kV
-29.7kV
-49.5kV
-69.4kV
-89.2kV
-99.1kV
LI: X1 - RW(50.0%)
0
20.0µs
40.0µs
60.0µs
80.0µs
100µ

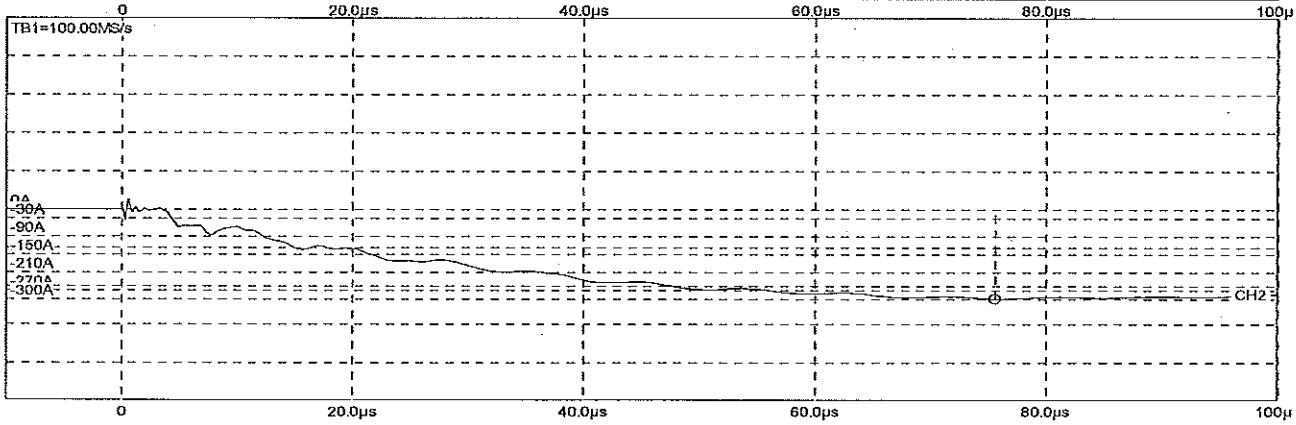

TB1=100.00MS/s
0A
-29A
-88A
-147A
-205A
-264A
-293A
CH2
0
20.0µs
40.0µs
60.0µs
80.0µs
100µ

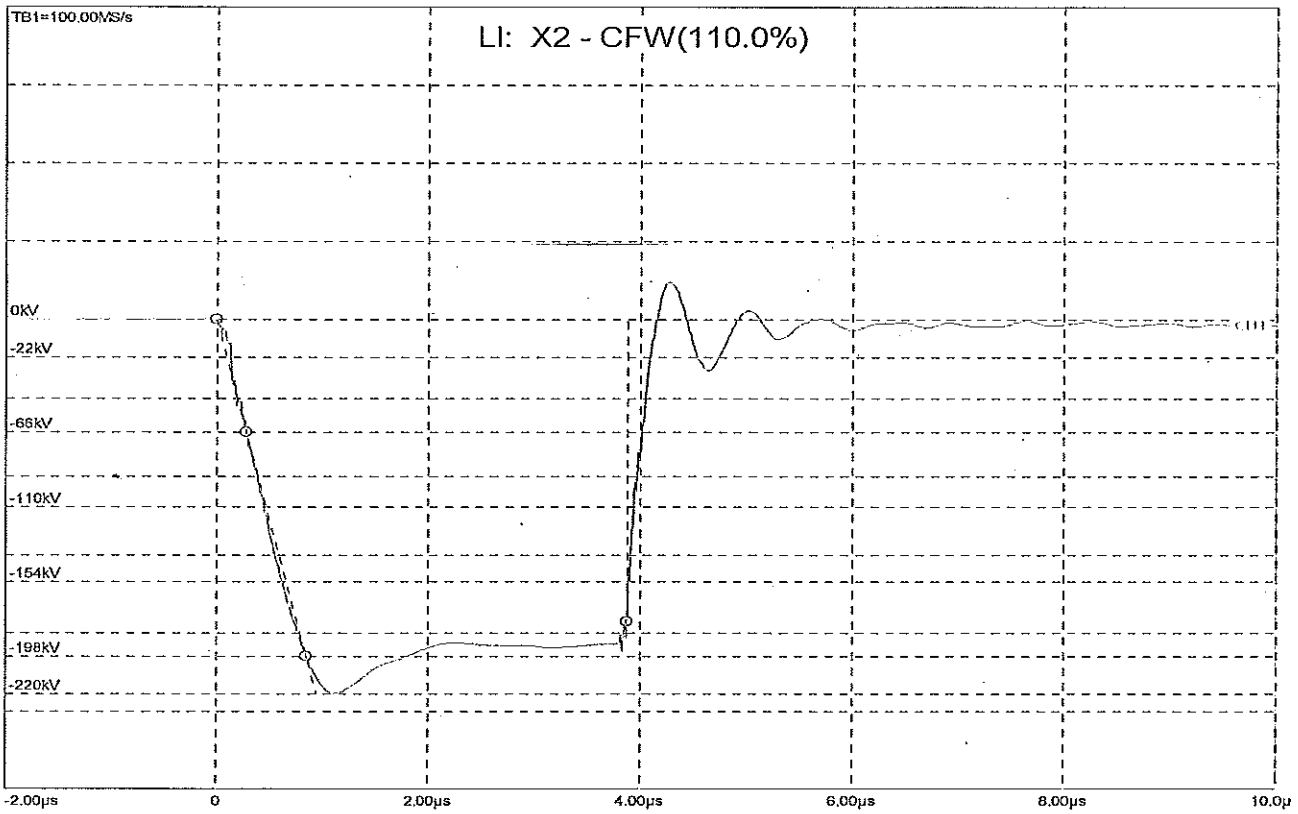

TB1=100.00MS/s
LI: X1 - CFW(110.0%)
0kV
-22kV
-65kV
-108kV
-151kV
-195kV
-216kV
-2.00µs
0
2.00µs
4.00µs
6.00µs
8.00µs
10.0µ

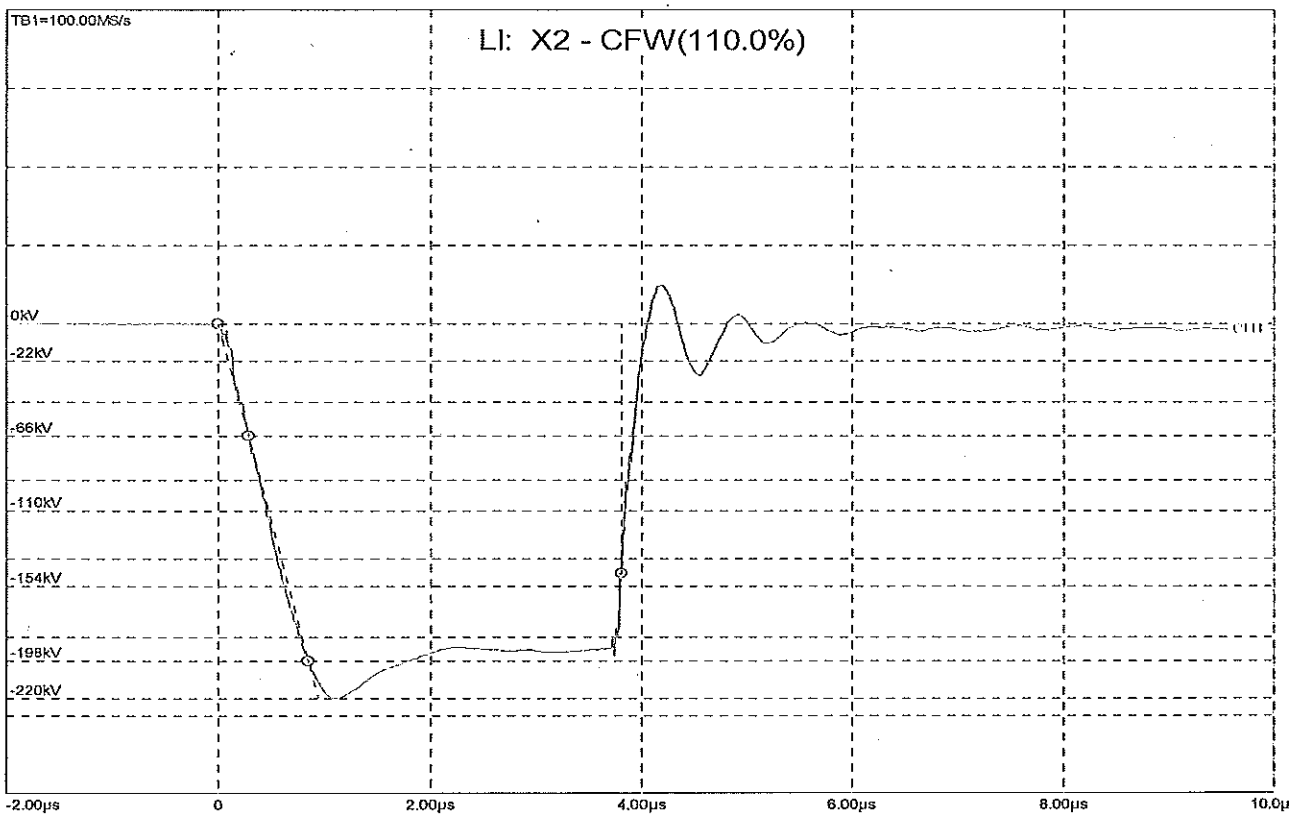

TB1=100.00MS/s
LI: X1 - CFW(110.0%)
0kV
-22kV
-66kV
-110kV
-154kV
-197kV
-219kV
CH1
-2.00µs
0
2.00µs
4.00µs
6.00µs
8.00µs
10.0µ

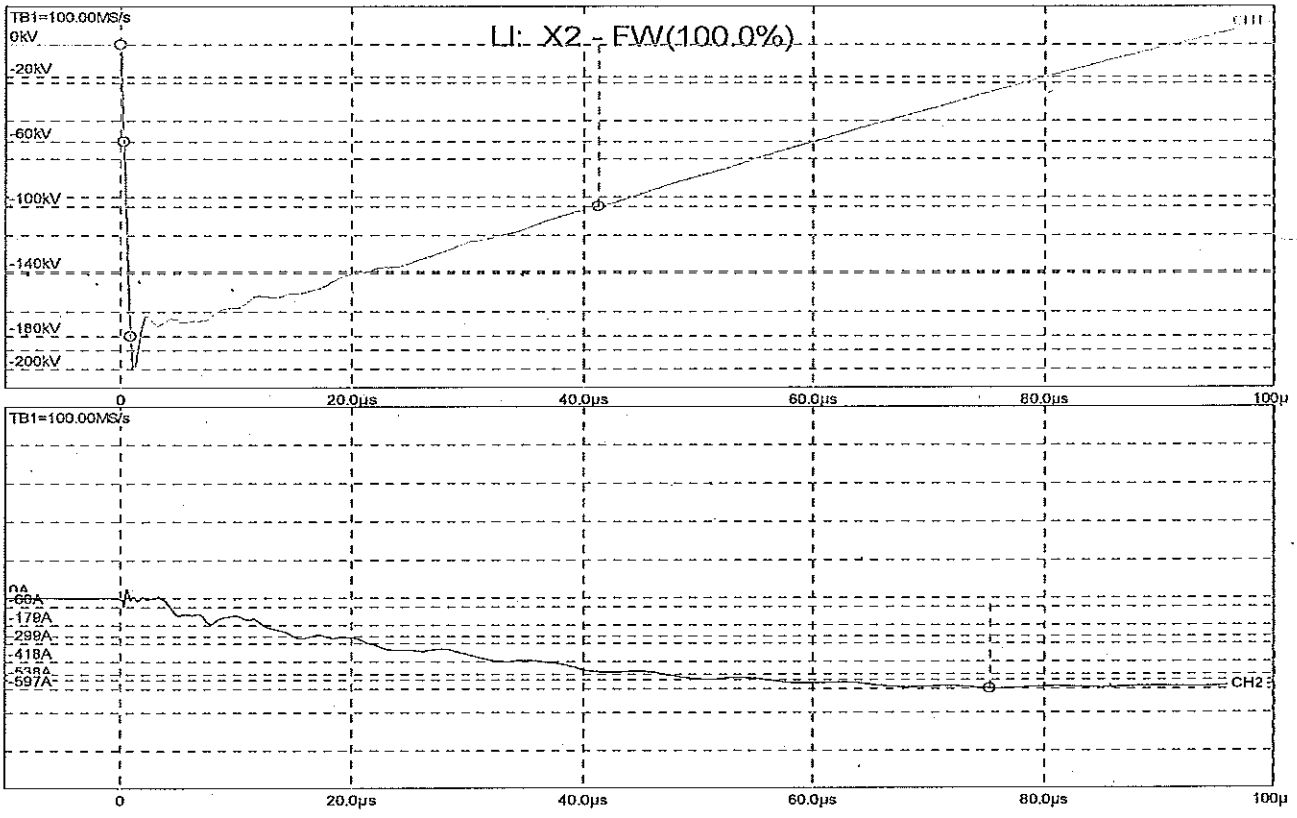

TB1=100.00MS/s
LI: X1 - FW(100.0%)
0kV
-20kV
-60kV
-100kV
-139kV
-179kV
-199kV
CH1
0
20.0µs
40.0µs
60.0µs
80.0µs
100µ
TB1=100.00MS/s
0A
-59A
-177A
-295A
-414A
-591A
CH2
0
20.0µs
40.0µs
60.0µs
80.0µs
100µ

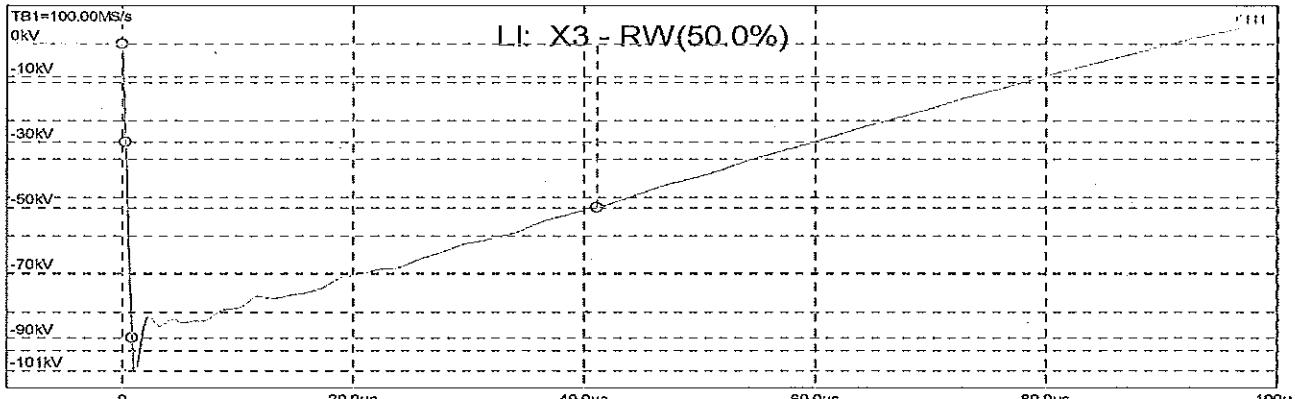

TB1=100.00MS/s
LI: X2 - RW(50.0%)
0kV
-10kV
-30kV
-51kV
-71kV
-91kV
-101kV
CH1
0
20.0µs
40.0µs
60.0µs
80.0µs
100µ

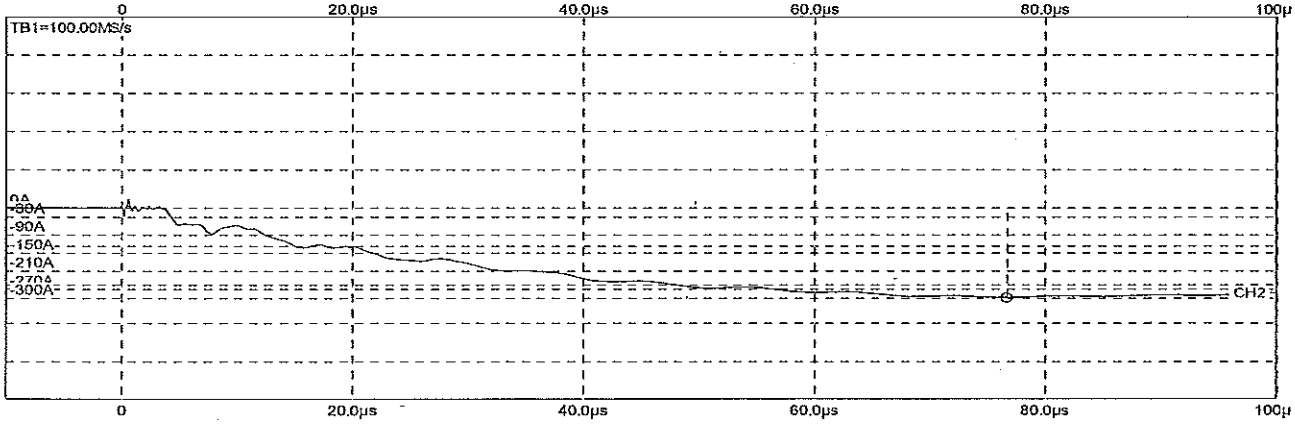

TB1=100.00MS/s
0A
-30A
-90A
-150A
-210A
-270A
-300A
CH2
0
20.0µs
40.0µs
60.0µs
80.0µs
100µ

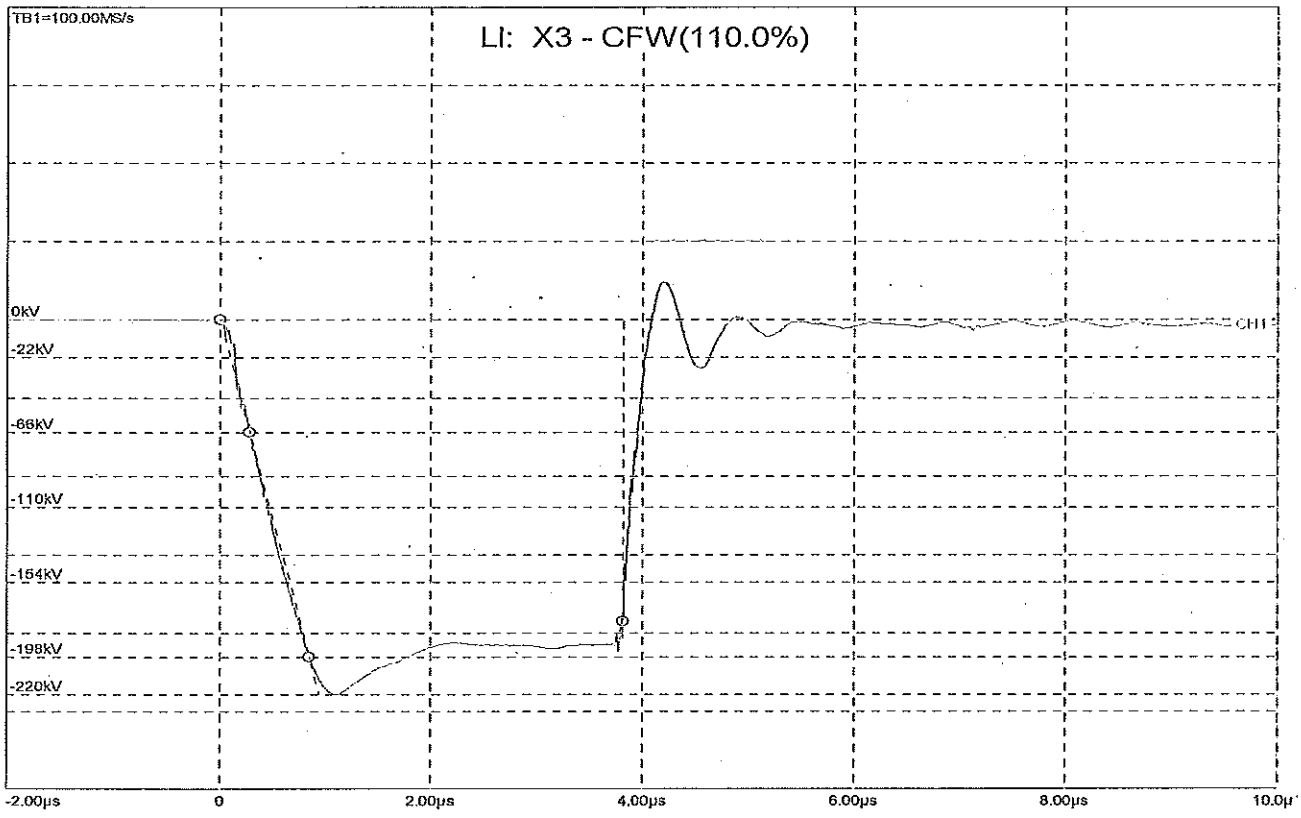

TB1=100.00MS/s
LI: X2 - CFW(110.0%)
0kV
-22kV
-66kV
-110kV
-154kV
-198kV
-220kV
CH1
-2.00µs
0
2.00µs
4.00µs
6.00µs
8.00µs
10.0µ

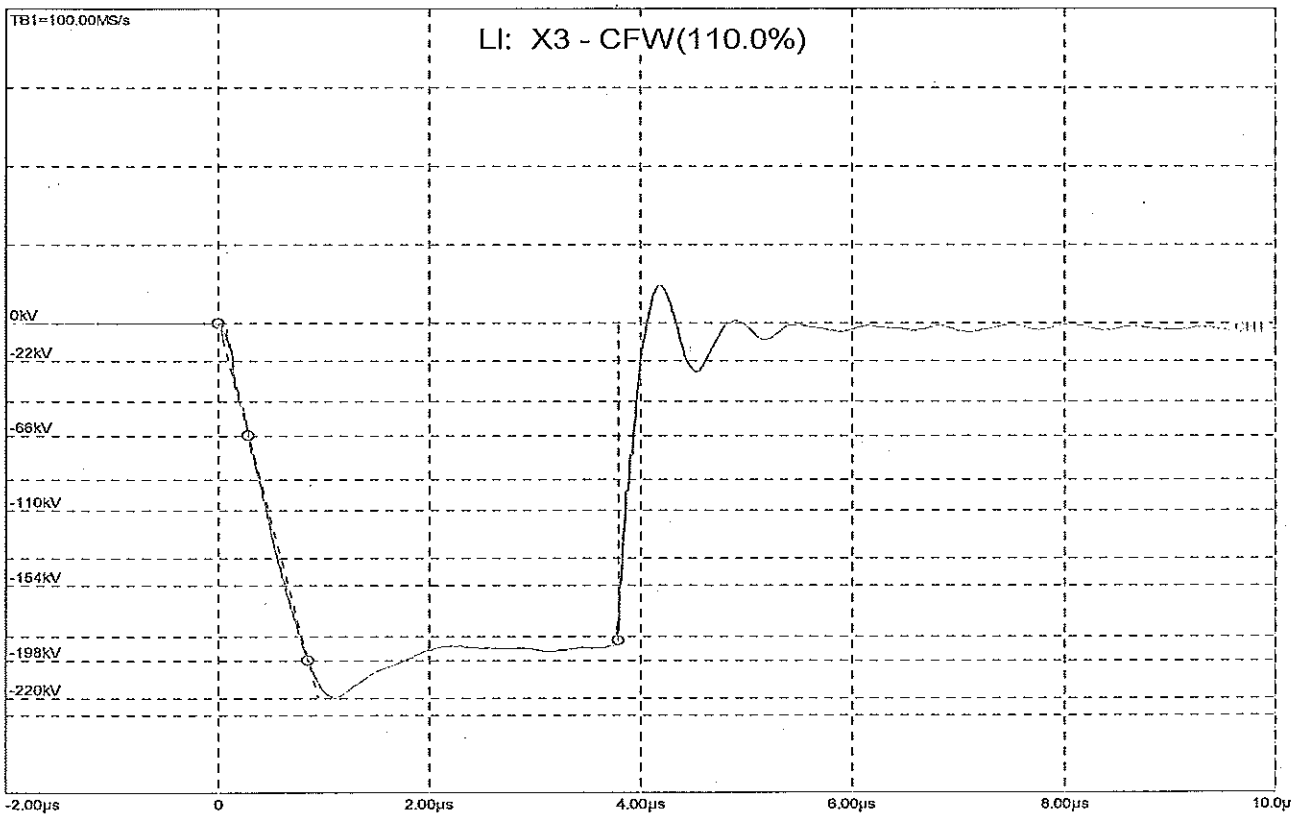

TB1=100.00MS/s
LI: X2 - CFW(110.0%)
0kV
-22kV
-66kV
-110kV
-154kV
-198kV
-220kV
-2.00µs
0
2.00µs
4.00µs
6.00µs
8.00µs
10.0µ

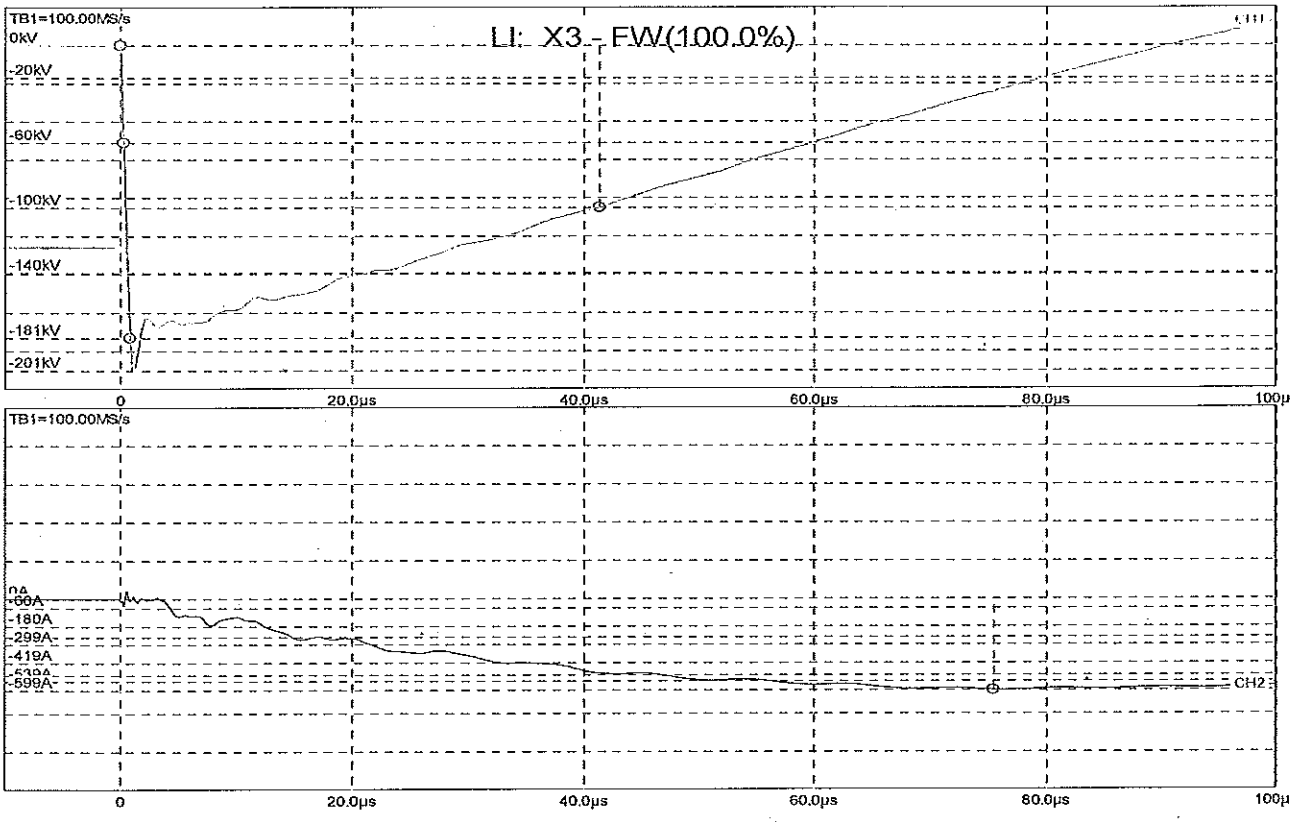

TB1=100.00MS/s
LI: X2 - FW(100.0%)
0kV
-20kV
-60kV
-100kV
-140kV
-180kV
-200kV
0
20.0µs
40.0µs
60.0µs
80.0µs
100µ
TB1=100.00MS/s
0A
-60A
-179A
-299A
-418A
-538A
-597A
CH2
0
20.0µs
40.0µs
60.0µs
80.0µs
100µ

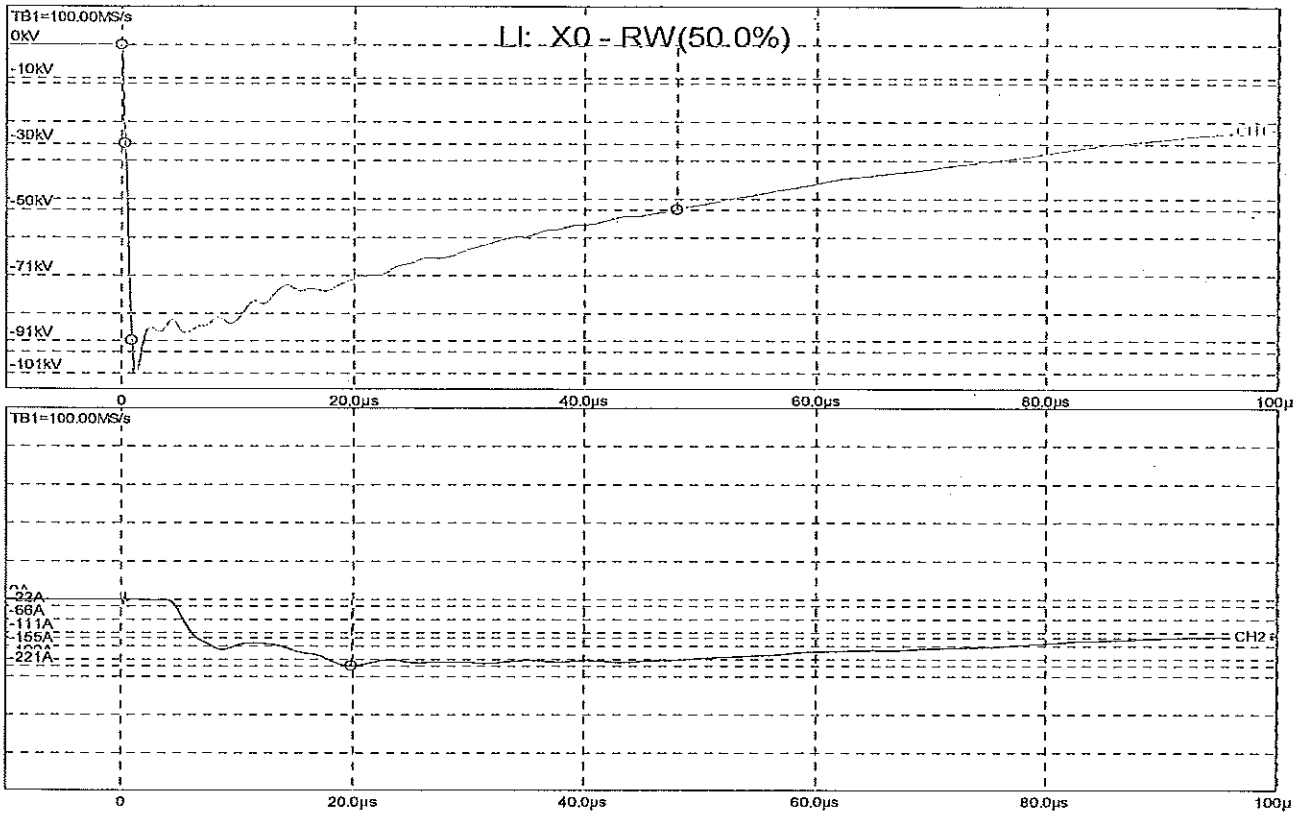

TB1=100.00MS/s
LI: X3 - RW(50.0%)
0kV
-10kV
-30kV
-50kV
-70kV
-90kV
-101kV
0
20.0µs
40.0µs
60.0µs
80.0µs
100µ

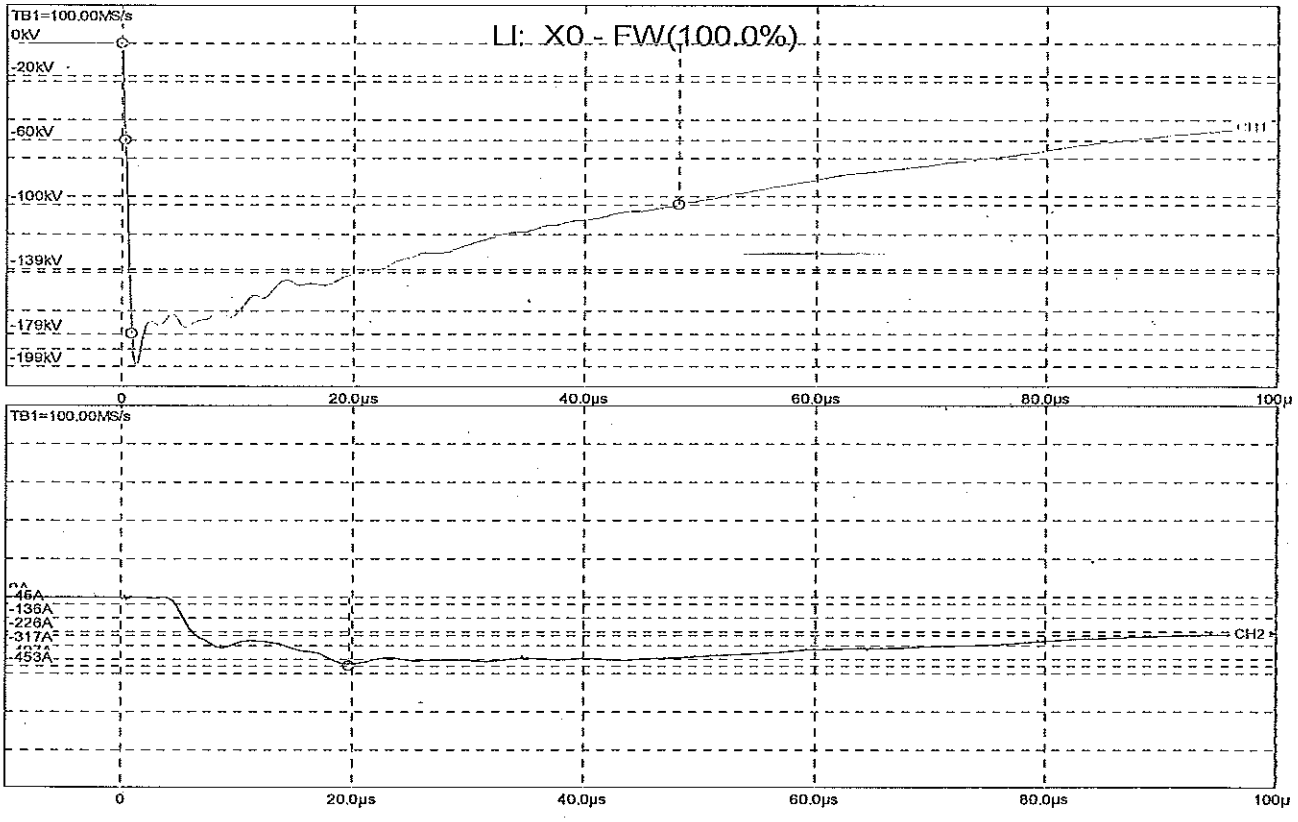

TB1=100.00MS/s
0A
-90A
-150A
-210A
-300A
CH2
0
20.0µs
40.0µs
60.0µs
80.0µs
100µ

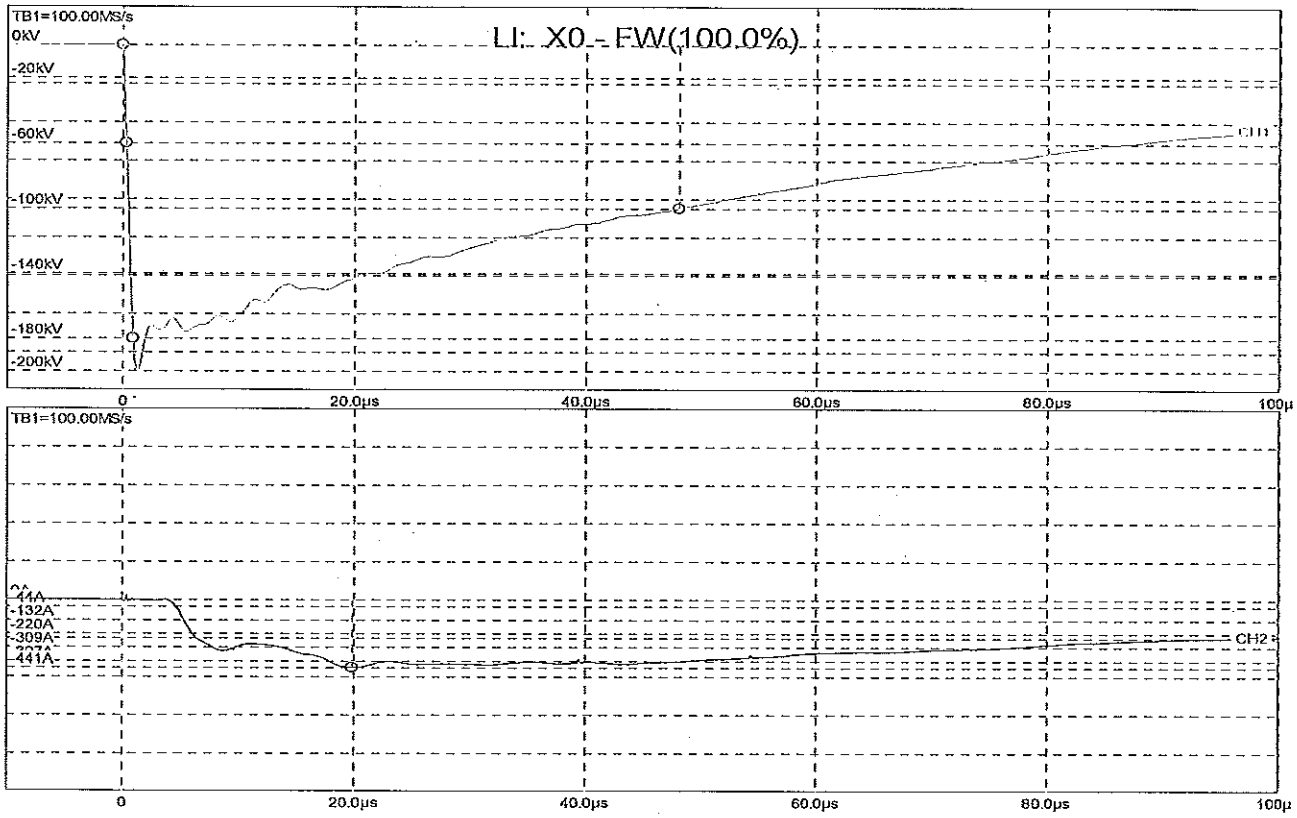

TB1=100.00MS/s
LI: X3 - CFW(110.0%)
0kV
-22kV
-66kV
-110kV
-154kV
-198kV
-220kV
CH1
-2.00µs
0
2.00µs
4.00µs
6.00µs
8.00µs
10.0µ


TB1=100.00MS/s
LI: X3 - CFW(110.0%)
0kV
-22kV
-66kV
-110kV
-154kV
-198kV
-220kV
-2.00µs
0
2.00µs
4.00µs
6.00µs
8.00µs
10.0µ


TB1=100.00MS/s
LI: X3 - FW(100.0%)
0kV
-20kV
-60kV
-100kV
-140kV
-181kV
-201kV
0
20.0µs
40.0µs
60.0µs
80.0µs
100µ
TB1=100.00MS/s
0A
-60A
-180A
-299A
-419A
-599A
CH2
0
20.0µs
40.0µs
60.0µs
80.0µs
100µ


LI: X0 - RW(50.0%)
TB1=100.00MS/s
0kV
-10kV
-30kV
-50kV
-71kV
-91kV
-101kV
CH1
0
20.0µs
40.0µs
60.0µs
80.0µs
100µ
TB1=100.00MS/s
-23A
-66A
-111A
-155A
-221A
CH2
0
20.0µs
40.0µs
60.0µs
80.0µs
100µ

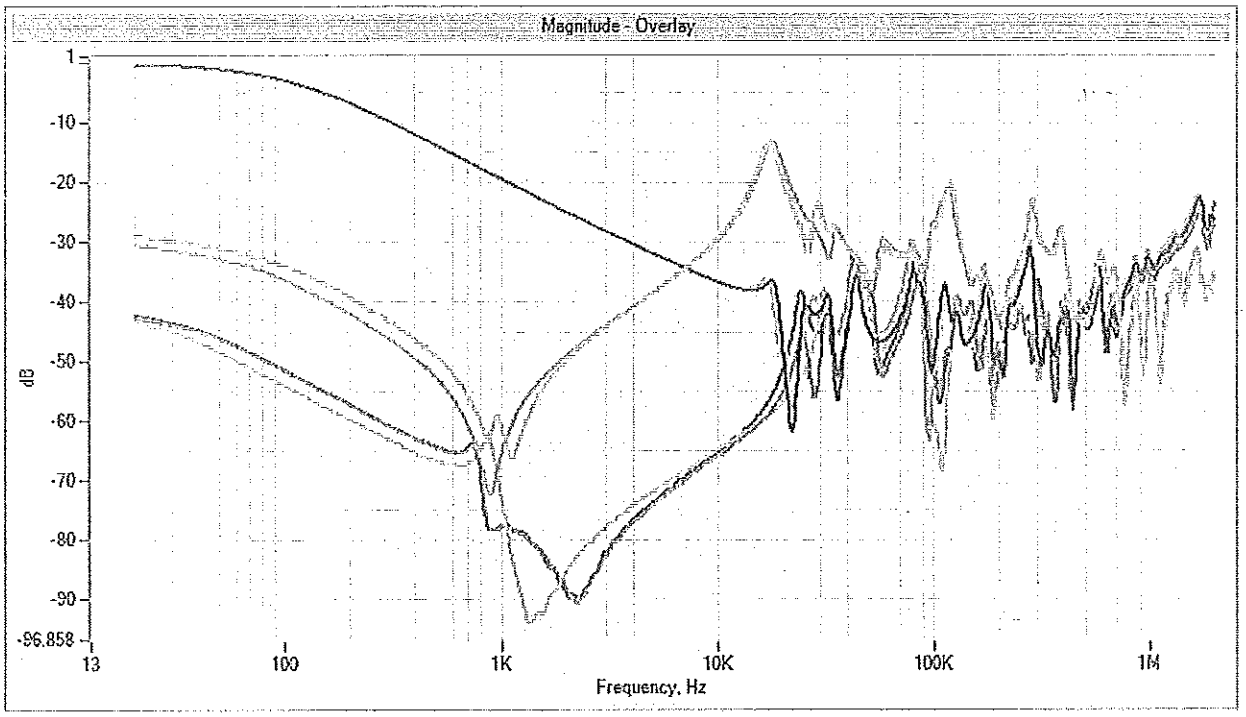

LI: X0 - FW(100.0%)
TB1=100.00MS/s
0kV
-20kV
-60kV
-100kV
-139kV
-179kV
-199kV
CH1
0
20.0µs
40.0µs
60.0µs
80.0µs
100µ
TB1=100.00MS/s
-46A
-136A
-226A
-317A
-453A
CH2
0
20.0µs
40.0µs
60.0µs
80.0µs
100µ


LI: X0 - FW(100.0%)
TB1=100.00MS/s
0kV
-20kV
-60kV
-100kV
-140kV
-180kV
-200kV
CH1
0
20.0µs
40.0µs
60.0µs
80.0µs
100µ
TB1=100.00MS/s
-44A
-132A
-220A
-309A
-441A
CH2
0
20.0µs
40.0µs
60.0µs
80.0µs
100µ

# Transformer Count: 1
# Total Test Count: 9

## 1. Manufacturer: Virginia Transformer, Serial Number: 477500A176-C028A, Special ID: CO28A

TestDate: 10/4/2013 6:14 PM, Trace Name: H1-H3_2013-10-04_18-14-29
TestDate: 10/4/2013 6:19 PM, Trace Name: H2-H1_2013-10-04_18-19-19
TestDate: 10/4/2013 6:24 PM, Trace Name: H3-H2_2013-10-04_18-24-40
TestDate: 10/4/2013 7:02 PM, Trace Name: H3-H2_2013-10-04_19-02-16
TestDate: 10/4/2013 7:05 PM, Trace Name: H2-H1_2013-10-04_19-05-57
TestDate: 10/4/2013 7:09 PM, Trace Name: H1-H3_2013-10-04_19-09-55
TestDate: 10/4/2013 7:15 PM, Trace Name: X1-X0_2013-10-04_19-15-38
TestDate: 10/4/2013 7:18 PM, Trace Name: X2-X0_2013-10-04_19-18-46
TestDate: 10/4/2013 7:21 PM, Trace Name: X3-X0_2013-10-04_19-21-46




H1-H3_2013-10-04_18-14-29 - Manufacturer Virginia TransformerSerial Number 477500A176-C028ADate: 10/4/2013 6:14:29 PM
LTC: NADETC: 3MVA Maximum: 0

H2-H1_2013-10-04_18-19-19 - Manufacturer Virginia TransformerSerial Number 477500A176-C028ADate: 10/4/2013 6:19:19 PM
LTC: NADETC: 3MVA Maximum: 0

H3-H2_2013-10-04_18-24-40 - Manufacturer Virginia TransformerSerial Number 477500A176-C028ADate: 10/4/2013 6:24:40 PM
LTC: NADETC: 3MVA Maximum: 0

H3-H2_2013-10-04_19-02-16 - Manufacturer Virginia TransformerSerial Number 477500A176-C028ADate: 10/4/2013 7:02:16 PM
LTC: NADETC: 3MVA Maximum: 0

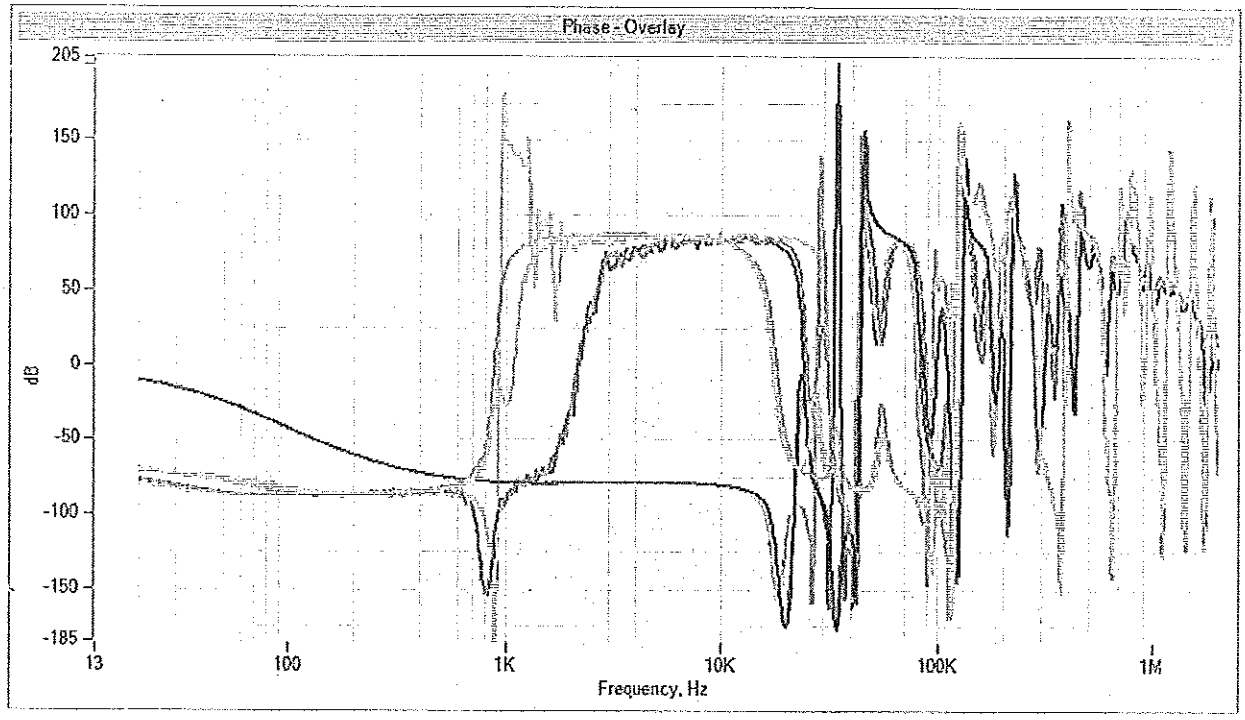
H2-H1_2013-10-04_19-05-57 - Manufacturer Virginia TransformerSerial Number 477500A176-C028ADate: 10/4/2013 7:05:57 PM
LTC: NADETC: 3MVA Maximum: 0

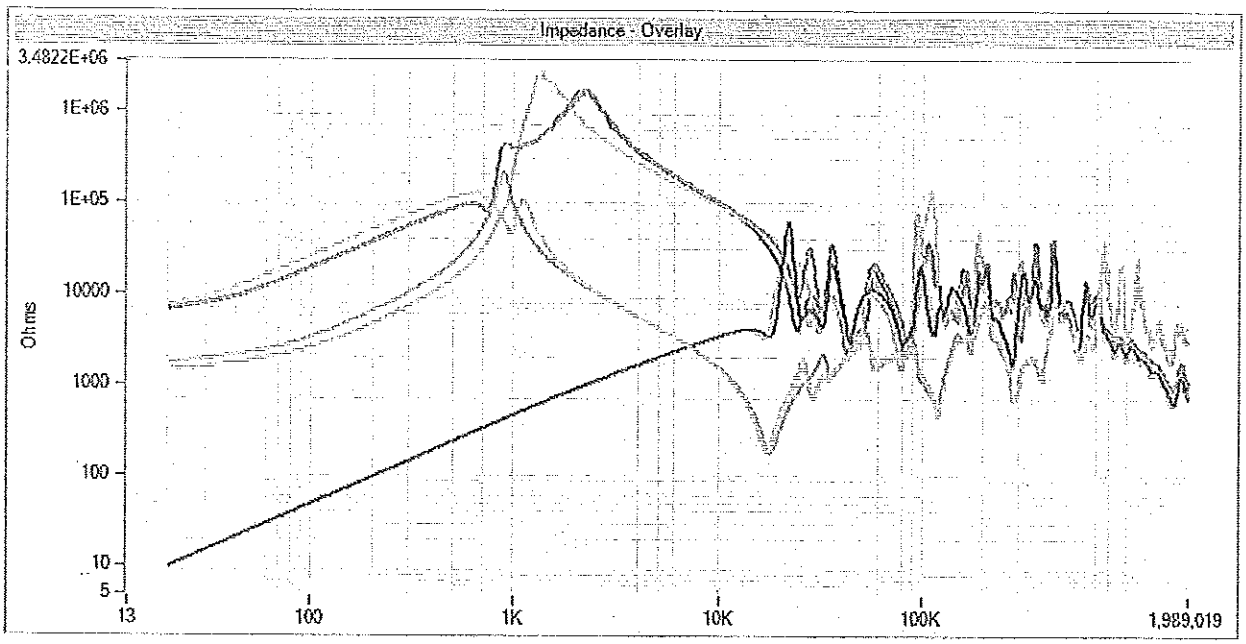
H1-H3_2013-10-04_19-09-55 - Manufacturer Virginia TransformerSerial Number 477500A176-C028ADate: 10/4/2013 7:09:55 PM
LTC: NADETC: 3MVA Maximum: 0

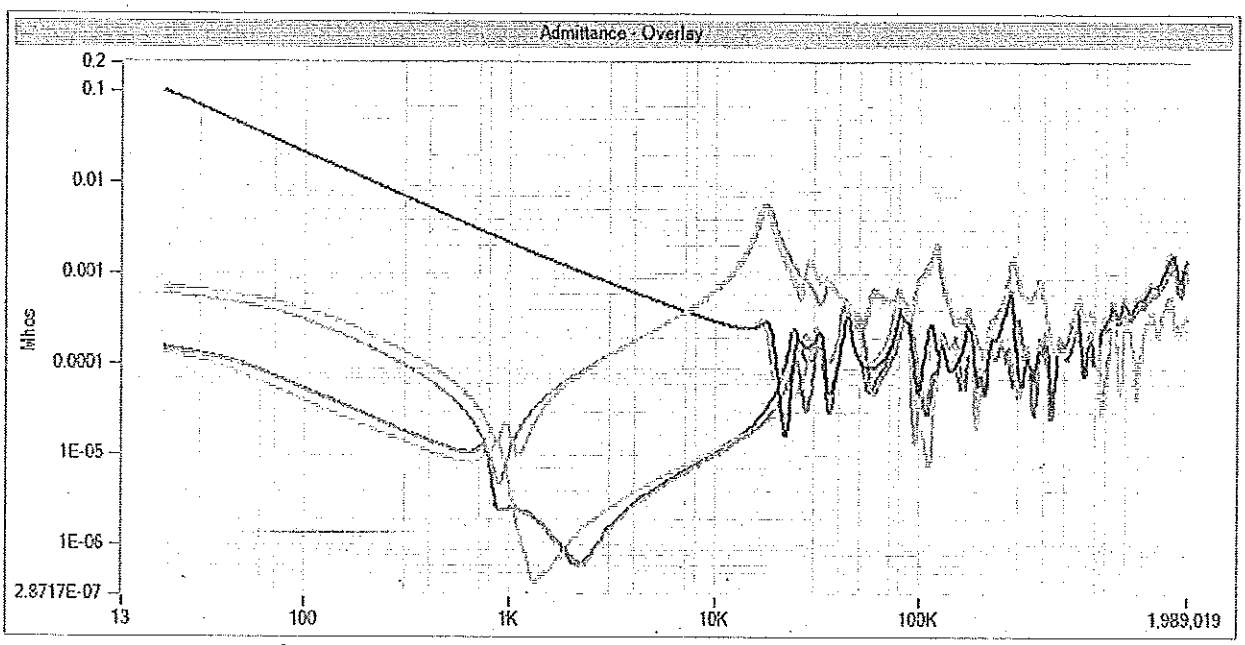
X1-X0_2013-10-04_19-15-38 - Manufacturer Virginia TransformerSerial Number 477500A176-C028ADate: 10/4/2013 7:15:38 PM
LTC: NADETC: 3MVA Maximum: 0

X2-X0_2013-10-04_19-18-46 - Manufacturer Virginia TransformerSerial Number 477500A176-C028ADate: 10/4/2013 7:18:46 PM
LTC: NADETC: 3MVA Maximum: 0

X3-X0_2013-10-04_19-21-46 - Manufacturer Virginia TransformerSerial Number 477500A176-C028ADate: 10/4/2013 7:21:46 PM
LTC: NADETC: 3MVA Maximum: 0


Phase - Overlay
205
150
100
50
0
-50
-100
-150
-185
dB
13
100
1K
10K
100K
1M
Frequency, Hz


Impedance - Overlay
3.4822E+06
1E+06
1E+05
10000
1000
100
10
5
Ohms
13
100
1K
10K
100K
1,989,019


Admittance - Overlay
0.2
0.1
0.01
0.001
0.0001
1E-05
1E-06
2.8717E-07
Mhos
13
100
1K
10K
100K
1,989,019

# WEIDMANN

WEIDMANN DIAGNOSTIC SOLUTIONS
5305 COMMERCE SQUARE DRIVE + INDIANAPOLIS, IN + 46237
317 888 7288 + 317 888 2577
WWW.WEIDMANN-DIAGNOSTICS.COM

TEST REPORT
01-6591116-428891-00


| | | | |
|---|---|---|---|
| Virginia Transformer Corporation | Serial#: C028A | Mfr: | Control#: 6591116 |
| | Location: BEFORE TEST | kV: | Order#: 428891 |
| | Equipment: TRANSFORMER | kVA: | Account: 1069 |
| ROANOKE, VA 24012 US | Compartment: MAIN(BOTTOM) | Year Mf'd: | Received: 10/08/2013 |
| ATTN: KIM FINK | Breathing: SEAL | Syringe ID: A942 | Reported: 10/09/2013 |
| PO#: DAVE BISHOP | Bank: Phase: | Bottle ID: | |
| Project ID: | Fluid: MIN | Sampled By: | |
| Customer ID: | | | |

| | | |
|---|---|---|
| | Lab Control Number: | 6591116 |
| | Date Sampled: | 10/04/2013 |
| | Order Number: | 428891 |
| | Oil Temp: | |
| Dissolved Gas Analysis (DGA) | Hydrogen (H2) (ppm): | 2 |
| ASTM | Methane (CH4) (ppm): | 1 |
| D-3612[1] | Ethane (C2H6) (ppm): | <1 |
| | Ethylene (C2H4) (ppm): | <1 |
| | Acetylene (C2H2) (ppm): | <1 |
| | Carbon Monoxide (CO) (ppm): | 1 |
| | Carbon Dioxide (CO2) (ppm): | 28 |
| | Nitrogen (N2) (ppm): | 3567 |
| | Oxygen (O2) (ppm): | 1443 |
| | Total Dissolved Gas (TDG) (ppm): | 5042 |
| | Total Dissolved Combustible Gas (TDCG) (ppm): | 4 |
| | Equivalent TCG (%): | 0.1015 |
| DGA Diagnostics | DGA Keys Gas / Interpretive Method: PER IEEE C57.104-2008 (most recent sample) | Hydrogen within condition 1 limits (100 ppm).<br>Methane within condition 1 limits (120 ppm).<br>Ethane within condition 1 limits (65 ppm).<br>Ethylene within condition 1 limits (50 ppm).<br>Acetylene within condition 1 limits (1 ppm).<br>Carbon Monoxide within condition 1 limits (350 ppm).<br>Carbon Dioxide within condition 1 limits (2500 ppm).<br>TDCG within condition 1 limits (720 ppm). |
| | DGA TDCG Rate Interpretive Method: PER IEEE C57.104-2008 (two most recent sample) | No previous sample available. |
| | DGA Cellulose (Paper) Insulation: | CO2/CO Ratio not applicable - neither gas exceeds its limit. |
| | WDS DGA Condition Code: | NORMAL |
| | WDS Recommended Action: | Continue normal operation. Resample for testing within one year. |
| Comment: | | |

## End of Test Report

Authorized By: _____
JAMES F. NEAL
SUPERVISING CHEMIST

Notations: 1. Analysis is ISO/IEC 17025:2005 accredited, L-A-B Accredited Certificate Number L2303.05 2. This test is conducted by a subcontracted laboratory. 3. Subcontracted laboratory has received ISO Standard 17025 accreditation for this test. 5. This test is conducted by Weidmann Laboratory other than Primary Lab. 6. Weidmann Laboratory has received ISO Standard 17025 accreditation for this test. 7. Imported Sample: WEIDMANN Diagnostic Solutions accepts no responsibility for these results; accreditation status does not apply to these results. 8. Imported Equipment

# WEIDMANN

WEIDMANN DIAGNOSTIC SOLUTIONS
5305 COMMERCE SQUARE DRIVE + INDIANAPOLIS, IN + 46237
317 888 7288 + 317 888 2577
WWW.WEIDMANN-DIAGNOSTICS.COM

TEST REPORT
01-6591121-428891-00


| | | | |
|---|---|---|---|
| Virginia Transformer Corporation | Serial#: C028A | Mfr: | Control#: 6591121 |
| | Location: AFTER TEST | kV: | Order#: 428891 |
| | Equipment: TRANSFORMER | kVA: | Account: 1069 |
| ROANOKE, VA 24012 US | Compartment: MAIN(BOTTOM) | Year Mf'd: | Received: 10/08/2013 |
| ATTN: KIM FINK | Breathing: SEAL | Syringe ID: 52002339 | Reported: 10/09/2013 |
| PO#: DAVE BISHOP | Bank: Phase: | Bottle ID: | |
| Project ID: | Fluid: MIN | Sampled By: | |
| Customer ID: | | | |

| | | |
|---|---|---|
| | Lab Control Number: | 6591121 |
| | Date Sampled: | 10/04/2013 |
| | Order Number: | 428891 |
| | Oil Temp: | |
| Dissolved Gas Analysis (DGA) | Hydrogen (H2) (ppm): | 4 |
| ASTM | Methane (CH4) (ppm): | <1 |
| D-3612[1] | Ethane (C2H6) (ppm): | <1 |
| | Ethylene (C2H4) (ppm): | <1 |
| | Acetylene (C2H2) (ppm): | <1 |
| | Carbon Monoxide (CO) (ppm): | 1 |
| | Carbon Dioxide (CO2) (ppm): | 26 |
| | Nitrogen (N2) (ppm): | 3374 |
| | Oxygen (O2) (ppm): | 1487 |
| | Total Dissolved Gas (TDG) (ppm): | 4892 |
| | Total Dissolved Combustible Gas (TDCG) (ppm): | 5 |
| | Equivalent TCG (%): | 0.1831 |
| DGA Diagnostics | DGA Keys Gas / Interpretive Method: PER IEEE C57.104-2008 (most recent sample) | Hydrogen within condition 1 limits (100 ppm).<br>Methane within condition 1 limits (120 ppm).<br>Ethane within condition 1 limits (65 ppm).<br>Ethylene within condition 1 limits (50 ppm).<br>Acetylene within condition 1 limits (1 ppm).<br>Carbon Monoxide within condition 1 limits (350 ppm).<br>Carbon Dioxide within condition 1 limits (2500 ppm).<br>TDCG within condition 1 limits (720 ppm). |
| | DGA TDCG Rate Interpretive Method: PER IEEE C57.104-2008 (two most recent sample) | No previous sample available. |
| | DGA Cellulose (Paper) Insulation: | CO2/CO Ratio not applicable - neither gas exceeds its limit. |
| | WDS DGA Condition Code: | NORMAL |
| | WDS Recommended Action: | Continue normal operation. Resample for testing within one year. |
| Comment: | | |

## End of Test Report

Authorized By: _____

JAMES F. NEAL
SUPERVISING CHEMIST

Notations: 1. Analysis is ISO/IEC 17025:2005 accredited, L-A-B Accredited Certificate Number L2303.05 2. This test is conducted by a subcontracted laboratory. 3. Subcontracted laboratory has received ISO Standard 17025 accreditation for this test. 5. This test is conducted by Weidmann Laboratory other than Primary Lab. 6. Weidmann Laboratory has received ISO Standard 17025 accreditation for this test. 7. Imported Sample: WEIDMANN Diagnostic Solutions accepts no responsibility for these results; accreditation status does not apply to these results. 8. Imported Equipment

# WEIDMANN

WEIDMANN DIAGNOSTIC SOLUTIONS
5305 COMMERCE SQUARE DRIVE + INDIANAPOLIS, IN + 46237
317 888 7288 + 317 888 2577
WWW.WEIDMANN-DIAGNOSTICS.COM

TEST REPORT
01-6593607-429474-00


| | | | |
|---|---|---|---|
| Virginia Transformer Corporation | Serial#: C028A | Mfr: | Control#: 6593607 |
| | Location: BEFORE TEST (HR) | kV: | Order#: 429474 |
| | Equipment: TRANSFORMER | kVA: | Account: 1069 |
| ROANOKE, VA 24012 US | Compartment: MAIN(BOTTOM) | Year Mf'd: | Received: 10/16/2013 |
| ATTN: KIM FINK | Breathing: SEAL | Syringe ID: 52003597 | Reported: 10/17/2013 |
| PO#: DAVE BISHOP | Bank: Phase: | Bottle ID: | |
| Project ID: | Fluid: MIN | Sampled By: | |
| Customer ID: | | | |

| | | |
|---|---|---|
| | Lab Control Number: | 6593607 |
| | Date Sampled: | 10/14/2013 |
| | Order Number: | 429474 |
| | Oil Temp: | |
| Dissolved Gas Analysis (DGA) | Hydrogen (H2) (ppm): | <2 |
| ASTM | Methane (CH4) (ppm): | 1 |
| D-3612[1] | Ethane (C2H6) (ppm): | <1 |
| | Ethylene (C2H4) (ppm): | <1 |
| | Acetylene (C2H2) (ppm): | <1 |
| | Carbon Monoxide (CO) (ppm): | 3 |
| | Carbon Dioxide (CO2) (ppm): | 46 |
| | Nitrogen (N2) (ppm): | 8391 |
| | Oxygen (O2) (ppm): | 3765 |
| | Total Dissolved Gas (TDG) (ppm): | 12206 |
| | Total Dissolved Combustible Gas (TDCG) (ppm): | 4 |
| | Equivalent TCG (%): | 0.023 |
| DGA Diagnostics | DGA Keys Gas / Interpretive Method: PER IEEE C57.104-2008 (most recent sample) | Hydrogen within condition 1 limits (100 ppm).<br>Methane within condition 1 limits (120 ppm).<br>Ethane within condition 1 limits (65 ppm).<br>Ethylene within condition 1 limits (50 ppm).<br>Acetylene within condition 1 limits (1 ppm).<br>Carbon Monoxide within condition 1 limits (350 ppm).<br>Carbon Dioxide within condition 1 limits (2500 ppm).<br>TDCG within condition 1 limits (720 ppm). |
| | DGA TDCG Rate Interpretive Method: PER IEEE C57.104-2008 (two most recent sample) | No previous sample available. |
| | DGA Cellulose (Paper) Insulation: | CO2/CO Ratio not applicable - neither gas exceeds its limit. |
| | WDS DGA Condition Code: | NORMAL |
| | WDS Recommended Action: | Continue normal operation. Resample for testing within one year. |
| Comment: | | |

## End of Test Report

Authorized By: _____
JAMES F. NEAL
SUPERVISING CHEMIST

Notations: 1. Analysis is ISO/IEC 17025:2005 accredited, L-A-B Accredited Certificate Number L2303.05 2. This test is conducted by a subcontracted laboratory. 3. Subcontracted laboratory has received ISO Standard 17025 accreditation for this test. 5. This test is conducted by Weidmann Laboratory other than Primary Lab. 6. Weidmann Laboratory has received ISO Standard 17025 accreditation for this test 7. Imported Sample: WEIDMANN Diagnostic Solutions accepts no responsibility for these results; accreditation status does not apply to these results. 8. Imported Equipment

# WEIDMANN

WEIDMANN DIAGNOSTIC SOLUTIONS
5305 COMMERCE SQUARE DRIVE + INDIANAPOLIS, IN + 46237
317 888 7288 + 317 888 2577
WWW.WEIDMANN-DIAGNOSTICS.COM

TEST REPORT
01-6594064-429560-00


Virginia Transformer Corporation

ROANOKE, VA 24012 US
ATTN: KIM FINK
PO#: DAVE BISHOP
Project ID:
Customer ID:

| | | | |
|---|---|---|---|
| Serial#: C028A | Mfr: | Control#: 6594064 |
| Location: AFTER HR | kV: | Order#: 429560 |
| Equipment: TRANSFORMER | kVA: | Account: 1069 |
| Compartment: MAIN(BOTTOM) | Year Mf'd: | Received: 10/17/2013 |
| Breathing: SEAL | Syringe ID: 52003520 | Reported: 10/18/2013 |
| Bank: Phase: | Bottle ID: | |
| Fluid: MIN | Sampled By: | |

| | | |
|---|---|---|
| | Lab Control Number: | 6594064 |
| | Date Sampled: | 10/15/2013 |
| | Order Number: | 429560 |
| | Oil Temp: | |
| Dissolved Gas Analysis (DGA) ASTM D-3612[1] | Hydrogen (H2) (ppm): | <2 |
| | Methane (CH4) (ppm): | 2 |
| | Ethane (C2H6) (ppm): | <1 |
| | Ethylene (C2H4) (ppm): | <1 |
| | Acetylene (C2H2) (ppm): | <1 |
| | Carbon Monoxide (CO) (ppm): | 8 |
| | Carbon Dioxide (CO2) (ppm): | 114 |
| | Nitrogen (N2) (ppm): | 15350 |
| | Oxygen (O2) (ppm): | 7353 |
| | Total Dissolved Gas (TDG) (ppm): | 22828 |
| | Total Dissolved Combustible Gas (TDCG) (ppm): | 11 |
| | Equivalent TCG (%): | 0.0413 |
| DGA Diagnostics | DGA Keys Gas / Interpretive Method: PER IEEE C57.104-2008 (most recent sample) | Hydrogen within condition 1 limits (100 ppm).<br>Methane within condition 1 limits (120 ppm).<br>Ethane within condition 1 limits (65 ppm).<br>Ethylene within condition 1 limits (50 ppm).<br>Acetylene within condition 1 limits (1 ppm).<br>Carbon Monoxide within condition 1 limits (350 ppm).<br>Carbon Dioxide within condition 1 limits (2500 ppm).<br>TDCG within condition 1 limits (720 ppm). |
| | DGA TDCG Rate Interpretive Method: PER IEEE C57.104-2008 (two most recent sample) | No previous sample available. |
| | DGA Cellulose (Paper) Insulation: | CO2/CO Ratio not applicable - neither gas exceeds its limit. |
| | WDS DGA Condition Code: | NORMAL |
| | WDS Recommended Action: | Continue normal operation. Resample for testing within one year. |
| Comment: | | |

## End of Test Report

Authorized By: _____
JAMES F. NEAL
SUPERVISING CHEMIST

Notations: 1. Analysis is ISO/IEC 17025:2005 accredited, L-A-B Accredited Certificate Number L2303.05 2. This test is conducted by a subcontracted laboratory. 3. Subcontracted laboratory has received ISO Standard 17025 accreditation for this test. 5. This test is conducted by Weidmann Laboratory other than Primary Lab. 6. Weidmann Laboratory has received ISO Standard 17025 accreditation for this test. 7. Imported Sample: WEIDMANN Diagnostic Solutions accepts no responsibility for these results; accreditation status does not apply to these results. 8. Imported Equipment

**10 MVA Substation Transformer - Sound Power Calc. based on Manufacturer-specified rating of 69 dB (ONAF)**

| | | |
|---|---|---|
| Tranformer Length | 148.0 | in. |
| Transformer Width | 128.0 | in. |
| Transformer Height | 110.0 | in. |
| Horizontal surface area (transformer top + 0.3m) | 26022 | $in.^2$ |
| Vertical Surface area (+ 0.3m in each direction) | 71114 | $in.^2$ |
| | 675 | $ft^2$ |
| Total Surface area | 62.7 | $m^2$ |

**Lw = Lp + 10 x log (S)**

| | | |
|---|---|---|
| Lp | 69 | dB |
| Lw | 86.97 | dB |

| Centre Frequency | Corr1 | Corr2 | PWL | add 5 dB | A-weighted correction |
|---|---|---|---|---|---|
| 31.5 | -1 | -2.4 | 83.57 | 88.57 | -39.4 |
| 63 | 5 | -2.4 | 89.57 | 94.57 | -26.2 |
| 125 | 7 | -2.4 | 91.57 | 96.57 | -16.1 |
| 250 | 2 | -2.4 | 86.57 | 91.57 | -8.6 |
| 500 | 2 | -2.4 | 86.57 | 91.57 | -3.2 |
| 1000 | -4 | -2.4 | 80.57 | 85.57 | 0 |
| 2000 | -9 | -2.4 | 75.57 | 80.57 | 1.2 |
| 4000 | -14 | -2.4 | 70.57 | 75.57 | 1 |
| 8000 | -21 | -2.4 | 63.57 | 68.57 | -1.1 |
| **Overall:** | | | **95.6** | **100.6** | |

Lp: Sound pressure level
Lw: Sound Power Level

## Tranformer Noise Calculation

| | | | |
|---|---|---|---|
| L = | 1.8 | 2.4039 | (add 0.6m) |
| W = | 1.9 | 2.4979 | (add 0.6m) |
| H = | 1.8 | 2.1293 | (add 0.3m) |
| **S.A. =** | **26.879** | **$m^2$** | |

Transformer Maximum Rating (MVA) = **1.6** MVA

Total Surface Area (m2) = **26.8787** $m^2$

**NEMA Calculation:**

PWL1 = 55 + 12log (MVA)……..(dBA)

**Area factor Correction:**

PWL2 = 10log (S.A.)……..…… (dBA)

**Overall PWL**

PWL(overall) = PWL1 + PWL2……..(dBA)

| | 31.5 Hz | 63 Hz | 125 Hz | 250 Hz | 500 Hz | 1000 Hz | 2000 Hz | 4000 Hz | 8000 Hz |
|---|---|---|---|---|---|---|---|---|---|
| Octave band Adjustments → | -3 | 3 | 5 | 0 | 0 | -6 | -11 | -16 | -23 |
| Converstion from linear to A-weighted → | -39.4 | -26.2 | -16.1 | -8.6 | -3.2 | 0 | 1.2 | 1 | -1.1 |
| Resulting PWL Octave Band (A-weighted)...(dBA) | **68.7** | **74.7** | **76.7** | **71.7** | **71.7** | **65.7** | **60.7** | **55.7** | **48.7** |
| PWL + 5 dB tonal penalty……..…(dBA) | **73.7** | **79.7** | **81.7** | **76.7** | **76.7** | **70.7** | **65.7** | **60.7** | **53.7** |
| PWL + 5 dB tonal penalty……..…(dB) | **113.1** | **105.9** | **97.8** | **85.3** | **79.9** | **70.7** | **64.5** | **59.7** | **54.8** |

# Acoustic Environmental Test

## SC 800CP-US central inverter

(Extract of Test report SC800CP-US-91:LE1613)

# 1 Overview

| | |
|---|---|
| Project title: | SC800CP-US |
| Type of test / thresholds and requirements: | Sound level measurement according to DIN EN ISO 3744:2011-02 and DIN EN ISO 9614-2:2010-11 of sinusoidal, irregularly shaped, transient signals. Classification of ambient conditions in compliance with the German Noise Control Guidelines (TA Lärm). (according to Section 2) |
| Type of device: | e.g. solar central inverter for large-scale PV power plants |
| Type designation: | SC800CP-US |
| Test specification: | Level of emissions according to the German Noise Control Guidelines and acoustic power |

## 2 Results

| The EN 3744:04/2005 and German Noise Control Guidelines form the testing specification for the thresholds and requirements | Requirement | | Results [dBA]/ without fan (distance 1m) | Results [dBA]/ with fan (distance 1m) |
|---|---|---|---|---|
| | **Standard** (Germany) | **SMA** | | |
| EN 3744:2011-02 typical value; LAeq averaged [1)] | - | - | - | 78,74 |
| **§48 of the German Federal Emission Control ACT (BImSchG): 09-2002 German Noise Control Guidelines; $L_{pa}$** [2)] | - | - | - | 77,81 |
| EN 9614-2 sound power $L_{WA}$ [3)] | - | - | - | 92,30 |
| Sound pressure level in 10m $L_{xpA}$ [4)] | - | - | - | 64,31 |
| Sound pressure level in 50m $L_{xpA}$ [4)] | - | - | - | 50,32 |
| Overall result (if applicable) | | | *Standard requirments: - passed | |

* Dependent on the local conditions at the mounting location (distance of 10m standard)

# 3 Operating States

The following states and configurations have been defined as operating conditions:

- Operation of the inverter.
- Operating conditions: UDC =820 V; 800 kW
- The device fans must be running.
- The unit under test must have reached its operating temperature.
- The unit under test must have reached an operating temperature of 25°C.

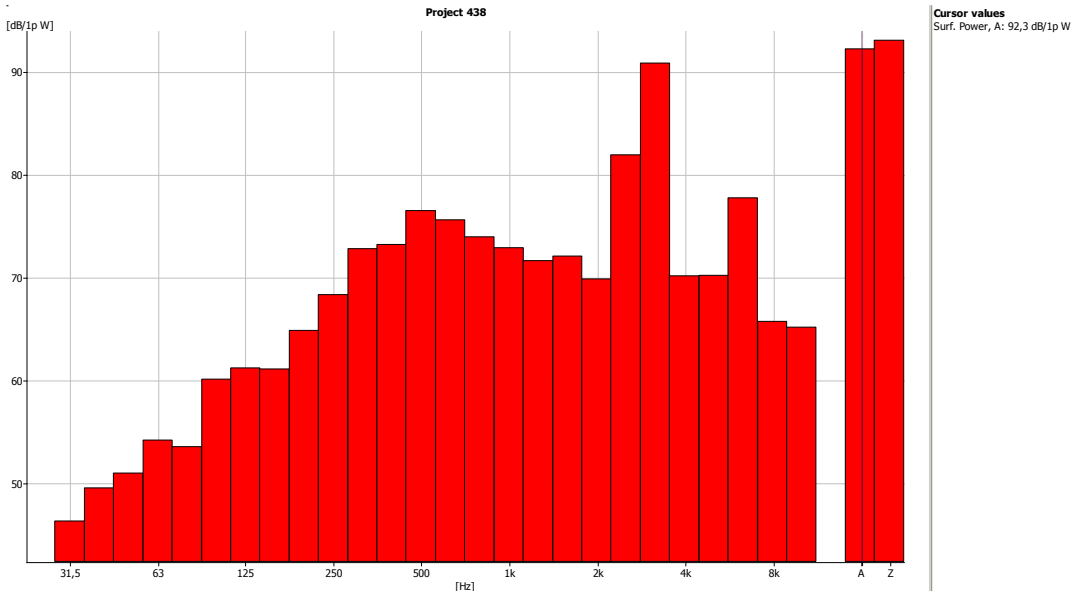
# 4 Calculating the Acoustic Power

| | | |
|---|---|---|
| $L_{pA}$ = | average sound pressure level on the measurement surface [$dB_A$] * | 77.81 |
| S = | overall measurement surface [$m^2$] | 28.09 |
| $S_0$ = | 1 [$m^2$] | |

* This specified spatially/temporally averaged sound pressure level was determined using the calcu-lated acoustic power level.
$L_{PA} = L_{WA} - 10\log (S/S_0)$

Acoustic power of $L_{WA}$= 92,3 dBA/W results for the measurement.

## Acoustic Power Levels of the Third Octave Band Frequencies According to EN ISO 9614-2




A-rated sound power = 92.3 $dB_{A/W}$

Z-rated sound power = 93.1 $dB_{A/W}$

A-rated acoustic power – based on physiologic human hearing

Z-rated acoustic power – technically linear measured value

# 5 Overview of the Acoustic Power

| Third octave band center frequency [Hz] | Acoustic power- level LwA [dBA/pW] 880 kW | Acoustic power- level LwZ [dBA/pW] 880 kW |
|---|---|---|
| 25 Hz | 42,33 | – |
| 31.5 Hz | 46,34 | – |
| 40 Hz | 49,56 | – |
| 50 Hz | 51 | – |
| 63 Hz | 54,21 | – |
| 80 Hz | 53,57 | – |
| 100 Hz | 60,14 | – |
| 125 Hz | 61,23 | – |
| 160 Hz | 61,13 | – |
| 200 Hz | 64,88 | – |
| 250 Hz | 68,36 | – |
| 315 Hz | 72,83 | – |
| 400 Hz | 73,24 | – |
| 500 Hz | 76,54 | – |
| 630 Hz | 75,64 | – |
| 800 Hz | 73,99 | – |
| 1 kHz | 72,93 | – |
| 1.25 kHz | 71,67 | – |
| 1.6 kHz | 72,11 | – |
| 2 kHz | 69,89 | – |
| 2.5 kHz | 81,96 | – |
| 3.15 kHz | 90,89 | – |
| 4 kHz | 70,19 | – |
| 5 kHz | 70,24 | – |
| 6.3 kHz | 77,78 | – |
| 8 kHz | 65,76 | – |
| 10 kHz | 65,2 | – |
| **Acoustic power above the surface** | A-rated | Z-rated |
| | 92,3 | 93.1 |

# 6 Deriving the Emission Sound Pressure Level at a Distance

The calculated acoustic power can be used to derive an A-rated sound pressure level $L_{xpA}$ for undirected sources at any distance x.

$$LxpA = LwA + Ko - 10 \cdot \log\left(4 \cdot \pi \cdot \frac{X^2}{So}\right)$$

$K_0$ = solid angle index on the floor 3 [dB]
X = distance from the source [m]
$S_0$ = 1 m

| Device | Distance X [m] | Sound pressure level LxpA [dBA] without fan | Sound pressure level LxpA [dBA] with fan |
|---|---|---|---|
| SC800CP-US | 10 | – | 64,30 |
| | 50 | – | 50.33 |

# 7 Appendix - Calculations

deriving sound pressure level at a distance

LxpA = LWA + K0 - 10log (4*PI*($x^2$/S0))

LWA 92,3dB
K0 3dB
x 10m
S0 1m

**LxpA 64,31dBA**


**Economical**

- Savings in balance of system costs due to 1,000 V operating voltage
- Outdoor enclosure allows for direct field deployment
- Small footprint and light weight for easy shipping and installation

**Efficient**

- Highest efficiency in its power class
- Full nominal power at ambient temperatures up to 50 °C
- 10% additional power for continuous operation at ambient temperatures up to 25 °C

**Flexible**

- Configurable DC voltage range
- Integrated AC disconnect for NEC 2011 compliance
- Optional DC disconnects

**Reliable**

- Easy and safe installation and with large, separate connection area
- Powerful grid management functions (incl. Low Voltage Ride Through)
- Full UL1741 and IEEE 1547 compliance

# SUNNY CENTRAL 500CP-CA / 630CP-CA / 720CP-CA / 750CP-CA / 800CP-CA / 850CP-CA / 900CP-CA

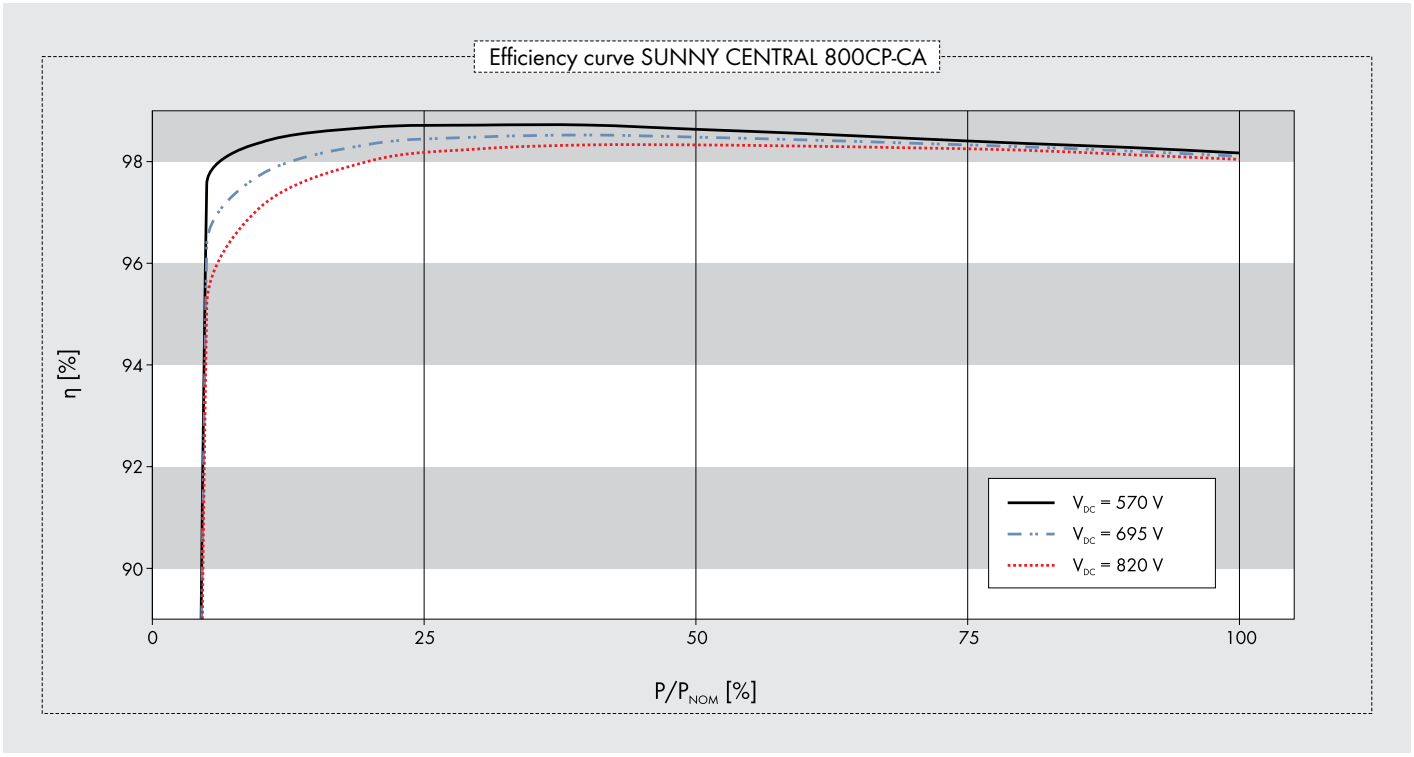
## UL listed for commercial and utility-scale projects

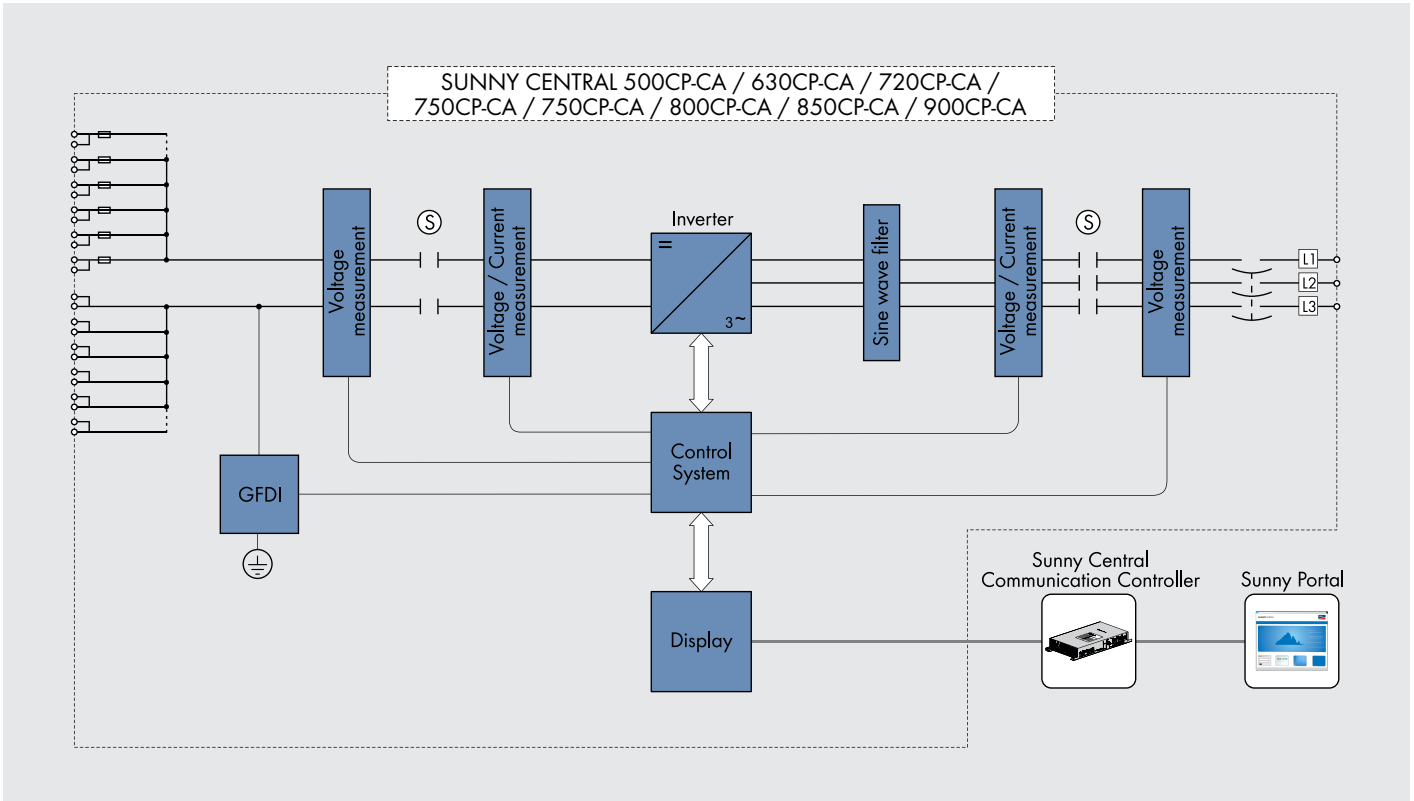
The Sunny Central CP-CA series delivers outstanding performance. In combination with an external transformer, the Sunny Central CP-CA can be connected to any utility grid or three-phase commercial service while directly providing grid management functions. The CP-CA family is UL listed at 1,000 V DC and features an integrated AC disconnect in accordance with NEC 2011 requirements. Both the outdoor enclosure with the OptiCool™ cooling concept and the separate connection area ensures simple installation while maximizing returns. With a peak efficiency of 98.7 percent, it outperforms all other inverters in its class. The Sunny Central CP-CA can also be integrated with the Power Plant Controller as well as the Medium-voltage Power Platform for utility-scale applications.

| Technical data | Sunny Central 500CP-CA | Sunny Central 630CP-CA | Sunny Central 720CP-CA |
|---|---|---|---|
| **Input (DC)** | | | |
| Max. DC power (@ cos φ = 1) | 560 kW | 713 kW | 808 kW |
| Max. input voltage [1] | 1000 V | 1000 V | 1000 V |
| MPP voltage range (@ 25 °C / @ 50 °C at 60 Hz) | 430 V – 820 V / 430 V – 820 V [1] [2] | 500 V – 820 V / 500 V – 820 V [1] [2] | 525 V – 820 V / 525 V – 820 V [1] [2] |
| Rated input voltage | 480 V | 550 V | 565 V |
| Max. input current | 1250 A | 1350 A | 1600 A |
| Min. input voltage / $V_{MPP\_min}$ at $I_{MPP} < I_{DCmax}$ | 429 V | 498 V | 515 V |
| Number of independent MPP inputs | 1 | 1 | 1 |
| Number of DC inputs: busbar / fuses | Busbar / 6 – 9 | Busbar / 6 – 9 | Busbar / 6 – 9 |
| **Output (AC)** | | | |
| Rated power (@ 25 °C) / nominal AC power (@ 50 °C) | 550 kVA / 500 kVA | 700 kVA / 630 kVA | 792 kVA / 720 kVA |
| Rated grid voltage / nominal AC voltage range | 270 V / 243 V – 297 V | 315 V / 284 V – 347 V | 324 V / 292 V – 356 V |
| AC power frequency / range | 50 Hz, 60 Hz / 47 Hz ... 63 Hz | 50 Hz, 60 Hz / 47 Hz ... 63 Hz | 50 Hz, 60 Hz / 47 Hz ... 63 Hz |
| Rated power frequency / rated grid voltage | 50 Hz, 60 Hz / 270 V | 50 Hz, 60 Hz / 315 V | 50 Hz, 60 Hz / 324 V |
| Max. output current | 1176 A | 1283 A | 1411 A |
| Max. total harmonic factor | < 3 % | < 3 % | < 3 % |
| Power factor at rated power / displacement power factor adjustable | 1 / 0.8 leading ... 0.8 lagging | | |
| Feed-in phases / connection phases | 3 / 3 | 3 / 3 | 3 / 3 |
| **Efficiency [3]** | | | |
| Max. efficiency / European weighted efficiency / CEC efficiency | 98.5 % / 98.3 % / 98.0 % | 98.5 % / 98.3 % / 98.0 % | 98.6 % / 98.4 % / 98.0 % |
| **Protective devices** | | | |
| DC disconnect device | DC contactor | | |
| AC disconnect device | AC circuit breaker | | |
| DC overvoltage protection | Surge Arrester Type II | | |
| Grid monitoring | ● | ● | ● |
| Ground-fault monitoring | ○ | ○ | ○ |
| Ungrounded PV array [4] | ○ | ○ | ○ |
| Lightning protection | Lightning protection level III | Lightning protection level III | Lightning protection level III |
| Insulation monitoring | ○ | ○ | ○ |
| Surge arresters for auxiliary power supply | ● | ● | ● |
| Protection class / overvoltage category | I / IV | I / IV | I / IV |
| **General data** | | | |
| Dimensions (W / H / D) | 2562 / 2272 / 956 mm (101 / 90 / 38 inches) | | |
| Weight | < 1870 kg (4123 lb) | < 1870 kg (4123 lb) | < 1870 kg (4123 lb) |
| Operating temperature range | -25 °C ... +50 °C / -13 °F ... +122 °F | -25 °C ... +50 °C / -13 °F ... +122 °F | -25 °C ... +50 °C / -13 °F ... +122 °F |
| Noise emission [5] | 60 db(A) | 60 db(A) | 60 db(A) |
| Max. self-consumption (in operation) [7] / self-consumption (at night) [6] | < 1800 W / < 150 W | < 1800 W / < 150 W | < 1800 W / < 150 W |
| Auxiliary power supply via external 208 V / external 400 V / external 480 V / integrated green power | ○ / ○ / ○ / ○ | ○ / ○ / ○ / ○ | ○ / ○ / ○ / ○ |
| Cooling concept | OptiCool | OptiCool | OptiCool |
| Degree of protection: electronics / connection area | NEMA 3R / NEMA 3R | NEMA 3R / NEMA 3R | NEMA 3R / NEMA 3R |
| Degree of protection | 4C2, 4S2 | 4C2, 4S2 | 4C2, 4S2 |
| Application | In unprotected outdoor environments | In unprotected outdoor environments | In unprotected outdoor environments |
| Max. permissible value for relative humidity (non-condensing) | 15 % ... 95 % | 15 % ... 95 % | 15 % ... 95 % |
| Max. operating altitude above mean sea level | 2000 m | 2000 m | 2000 m |
| Fresh-air consumption (inverter) | 3000 m³/h | 3000 m³/h | 3000 m³/h |
| **Features** | | | |
| DC connection | Ring terminal lug | Ring terminal lug | Ring terminal lug |
| AC connection | Ring terminal lug | Ring terminal lug | Ring terminal lug |
| HMI touchscreen | ● | ● | ● |
| Communication / protocols | Ethernet (optical fiber optional), Modbus | Ethernet (optical fiber optional), Modbus | Ethernet (optical fiber optional), Modbus |
| Communication with Sunny String-Monitor | RS485 | RS485 | RS485 |
| SC-COM | ● | ● | ● |
| Color of enclosure, door, base, roof | RAL 9016 / 9016 / 7004 / 7004 | | |
| Warranty: 5 / 10 / 15 / 20 / 25 years | ● / ○ / ○ / ○ / ○ | ● / ○ / ○ / ○ / ○ | ● / ○ / ○ / ○ / ○ |
| Certificates and approvals (more available on request) | EMC conformity according to FCC, Part 15, Class A, UL 1741, UL 1998, IEEE 1547 | | |
| ● Standard equipment ○ Optional features – Not available | | | |
| | | | |
| Type designation | SC 500CP-CA-10 | SC 630CP-CA-10 | SC 720CP-CA-10 |

| Sunny Central 750CP-CA | Sunny Central 800CP-CA | Sunny Central 850CP-CA | Sunny Central 900CP-CA |
|---|---|---|---|
| 853 kW | 898 kW | 954 kW | 1010 kW |
| 1000 V | 1000 V | 1000 V | 1000 V |
| 545 V – 820 V / 545 V – 820 V [1] [2] | 570 V – 820 V / 570 V – 820 V [1] [2] | 620 V – 820 V / 620 V – 820 V [1] [2] | 655 V – 820 V / 655 V – 820 V [1] [2] |
| 595 V | 620 V | 620 V | 620 V |
| 1600 A | 1600 A | 1600 A | 1600 A |
| 545 V | 568 V | 568 V | 568 V |
| 1 | 1 | 1 | 1 |
| Busbar / 6 – 9 | Busbar / 6 – 9 | Busbar / 6 – 9 | Busbar / 6 – 9 |
| | | | |
| 825 kVA / 750 kVA | 880 kVA / 800 kVA | 850 kVA / 935 kVA | 900 kVA / 990 kVA |
| 342 V / 308 V – 376 V | 360 V / 324 V – 396 V | 386 V / 347 V – 425 V | 405 V / 364 V – 446 V |
| 50 Hz, 60 Hz / 47 Hz ... 63 Hz | 50 Hz, 60 Hz / 47 Hz ... 63 Hz | 50 Hz, 60 Hz / 47 Hz ... 63 Hz | 50 Hz, 60 Hz / 47 Hz ... 63 Hz |
| 50 Hz, 60 Hz / 342 V | 50 Hz, 60 Hz / 360 V | 50 Hz, 60 Hz / 360 V | 50 Hz, 60 Hz / 360 V |
| 1411 A | 1411 A | 1411 A | 1411 A |
| < 3 % | < 3 % | < 3 % | < 3 % |
| 1 / 0.8 leading ... 0.8 lagging | | | |
| 3 / 3 | 3 / 3 | 3 / 3 | 3 / 3 |
| | | | |
| 98.6 % / 98.4 % / 98.0 % | 98.7 % / 98.4 % / 98.5 % | 98.7 % / 98.4 % / 98.5 % | 98.7 % / 98.4 % / 98.5 % |
| | | | |
| DC contactor | | | |
| AC circuit breaker | | | |
| Surge Arrester Type II | | | |
| ● | ● | ● | ● |
| ○ | ○ | ○ | ○ |
| ○ | ○ | ○ | ○ |
| Lightning protection level III | Lightning protection level III | Lightning protection level III | Lightning protection level III |
| ○ | ○ | ○ | ○ |
| ● | ● | ● | ● |
| I / IV | I / IV | I / IV | I / IV |
| | | | |
| 2562 / 2272 / 956 mm (101 / 90 / 38 inches) | | | |
| < 1870 kg (4123 lb) | < 1870 kg (4123 lb) | < 1870 kg (4123 lb) | < 1870 kg (4123 lb) |
| -25 °C ... +50 °C / -13 °F ... +122 °F | -25 °C ... +50 °C / -13 °F ... +122 °F | -25 °C ... +50 °C / -13 °F ... +122 °F | -25 °C ... +50 °C / -13 °F ... +122 °F |
| 60 db(A) | 63 db(A) | 63 db(A) | 63 db(A) |
| < 1800 W / < 150 W | < 1800 W / < 150 W | < 1800 W / < 150 W | < 1800 W / < 150 W |
| ○ / ○ / ○ / ○ | ○ / ○ / ○ / ○ | ○ / ○ / ○ / ○ | ○ / ○ / ○ / ○ |
| OptiCool | OptiCool | OptiCool | OptiCool |
| NEMA 3R / NEMA 3R | NEMA 3R / NEMA 3R | NEMA 3R / NEMA 3R | NEMA 3R / NEMA 3R |
| 4C2, 4S2 | 4C2, 4S2 | 4C2, 4S2 | 4C2, 4S2 |
| In unprotected outdoor environments | In unprotected outdoor environments | In unprotected outdoor environments | In unprotected outdoor environments |
| 15 % ... 95 % | 15 % ... 95 % | 15 % ... 95 % | 15 % ... 95 % |
| 2000 m | 2000 m | 2000 m | 2000 m |
| 3000 m³/h | 3000 m³/h | 3000 m³/h | 3000 m³/h |
| | | | |
| Ring terminal lug | Ring terminal lug | Ring terminal lug | Ring terminal lug |
| Ring terminal lug | Ring terminal lug | Ring terminal lug | Ring terminal lug |
| ● | ● | ● | ● |
| Ethernet (optical fiber optional), Modbus | Ethernet (optical fiber optional), Modbus | Ethernet (optical fiber optional), Modbus | Ethernet (optical fiber optional), Modbus |
| RS485 | RS485 | RS485 | RS485 |
| ● | ● | ● | ● |
| RAL 9016 / 9016 / 7004 / 7004 | | | |
| ● / ○ / ○ / ○ / ○ | ● / ○ / ○ / ○ / ○ | ● / ○ / ○ / ○ / ○ | ● / ○ / ○ / ○ / ○ |
| EMC conformity according to FCC, Part 15, Class A, UL 1741, UL 1998, IEEE 1547 | | | |
| | | | |
| | | | |
| SC 750CP-CA-10 | SC 800CP-CA-10 | SC 850CP-CA-10 | SC 900CP-CA-10 |

[1] At 1.00 $U_{AC, nom}$ and cos φ = 1
[2] The inverter will track MPP to 850V before self-protecting
[3] Measured efficiency includes all auxiliary power
[4] Included in the inverter's UL listing
[5] Sound pressure level at a distance of 10 m
[6] Self-consumption at rated operation
[7] By external 400 V auxiliary power supply






**Toll Free +1 877 506 1756**
**www.SMA-Canada.ca**

**SMA Canada, Inc.**

# Appendix B

## CADNA NOISE MODELLING AND CALCULATIONS

Receiver: Existing Potential Noise Receptor
ID: R1
X: 659281
Y: 4930970
Z: 4.5
Ground: 0

| ISO | ID | X | Y | Z | Ground | ReflOrd | LxT | LxN | L/A | Dist. | hm | Freq | Adiv | K0b | Agr | Abar | z | Aatm | Afol | Ahous | Cmet | CmetN | Dc | RL | LtotT | LtotN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INV6 | 659098 | 4930479 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 524 | 3.25 | 0 | 65.39 | 0 | -0.53 | 0 | 0 | 8.71 | 0 | 0 | 0 | 0 | 0 | 0 | 26.75 | 26.75 |
| | INV4 | 659257 | 4930326 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 644.5 | 3.25 | 0 | 67.18 | 0 | -0.45 | 0 | 0 | 9.45 | 0 | 0 | 0 | 0 | 0 | 0 | 24.12 | 24.12 |
| | INV5 | 659066 | 4930348 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 658.1 | 3.25 | 0 | 67.37 | 0 | -0.44 | 0 | 0 | 9.53 | 0 | 0 | 0 | 0 | 0 | 0 | 23.86 | 23.86 |
| | TRS | 659620 | 4930668 | 2.5 | 0 | 0 | 92 | 92 | 1 | 454 | 3.5 | 0 | 64.14 | 0 | -0.37 | 0 | 0 | 1.32 | 0 | 0 | 0 | 0 | 0 | 0 | 26.88 | 26.88 |
| | INV7 | 659398 | 4930640 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 350.1 | 3.25 | 0 | 61.88 | 0 | 0.41 | 0 | 0 | 4.46 | 0 | 0 | 0 | 0 | 0 | 0 | 22.3 | 22.3 |
| | INVTR7 | 659392 | 4930640 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 348.2 | 3.25 | 0 | 61.84 | 0 | -1.19 | 0 | 0 | 0.27 | 0 | 0 | 0 | 0 | 0 | 0 | 24.83 | 24.83 |
| | INV2 | 659724 | 4930601 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 576.6 | 3.25 | 0 | 66.22 | 0 | 0.57 | 0 | 0 | 5.39 | 0 | 0 | 0 | 0 | 0 | 0 | 16.89 | 16.89 |
| | INV3 | 659441 | 4930371 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 620 | 3.25 | 0 | 66.85 | 0 | 0.58 | 0 | 0 | 5.5 | 0 | 0 | 0 | 0 | 0 | 0 | 16.12 | 16.12 |
| | INV1 | 659934 | 4930708 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 703.6 | 3.25 | 0 | 67.95 | 0 | 0.61 | 0 | 0 | 5.71 | 0 | 0 | 0 | 0 | 0 | 0 | 14.79 | 14.79 |
| | INVTR6 | 659105 | 4930479 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 521.6 | 3.25 | 0 | 65.35 | 0 | -1.54 | 0 | 0 | 0.39 | 0 | 0 | 0 | 0 | 0 | 0 | 21.55 | 21.55 |
| | INVTR2 | 659731 | 4930601 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 582 | 3.25 | 0 | 66.3 | 0 | -1.61 | 0 | 0 | 0.42 | 0 | 0 | 0 | 0 | 0 | 0 | 20.63 | 20.63 |
| | INVTR3 | 659447 | 4930371 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 621.6 | 3.25 | 0 | 66.87 | 0 | -1.65 | 0 | 0 | 0.45 | 0 | 0 | 0 | 0 | 0 | 0 | 20.07 | 20.07 |
| | INVTR4 | 659264 | 4930326 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 644.2 | 3.25 | 0 | 67.18 | 0 | -1.67 | 0 | 0 | 0.46 | 0 | 0 | 0 | 0 | 0 | 0 | 19.77 | 19.77 |
| | INVTR5 | 659072 | 4930348 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 656.2 | 3.25 | 0 | 67.34 | 0 | -1.68 | 0 | 0 | 0.47 | 0 | 0 | 0 | 0 | 0 | 0 | 19.61 | 19.61 |
| | INVTR1 | 659941 | 4930708 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 710.1 | 3.25 | 0 | 68.03 | 0 | -1.73 | 0 | 0 | 0.51 | 0 | 0 | 0 | 0 | 0 | 0 | 18.94 | 18.94 |

Value D/N: 0 0
Level D/N: 34.2836 34.2836

Receiver: Existing Potential Noise Receptor
ID: R2
X: 659364
Y: 4931059
Z: 4.5
Ground: 0

| ISO | ID | X | Y | Z | Ground | ReflOrd | LxT | LxN | L/A | Dist. | hm | Freq | Adiv | K0b | Agr | Abar | z | Aatm | Afol | Ahous | Cmet | CmetN | Dc | RL | LtotT | LtotN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INV6 | 659098 | 4930479 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 638.1 | 3.25 | 0 | 67.1 | 0 | -0.45 | 0 | 0 | 9.42 | 0 | 0 | 0 | 0 | 0 | 0 | 24.25 | 24.25 |
| | INV4 | 659257 | 4930326 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 740.8 | 3.25 | 0 | 68.39 | 0 | -0.39 | 0 | 0 | 9.93 | 0 | 0 | 0 | 0 | 0 | 0 | 22.38 | 22.38 |
| | INV5 | 659066 | 4930348 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 770.9 | 3.25 | 0 | 68.74 | 0 | -0.37 | 0 | 0 | 10.06 | 0 | 0 | 0 | 0 | 0 | 0 | 21.88 | 21.88 |
| | TRS | 659620 | 4930668 | 2.5 | 0 | 0 | 92 | 92 | 1 | 467.4 | 3.5 | 0 | 64.39 | 0 | -0.37 | 0 | 0 | 1.35 | 0 | 0 | 0 | 0 | 0 | 0 | 26.61 | 26.61 |
| | INV7 | 659398 | 4930640 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 420.4 | 3.25 | 0 | 63.47 | 0 | 0.47 | 0 | 0 | 4.83 | 0 | 0 | 0 | 0 | 0 | 0 | 20.29 | 20.29 |
| | INV2 | 659724 | 4930601 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 582.6 | 3.25 | 0 | 66.31 | 0 | 0.57 | 0 | 0 | 5.4 | 0 | 0 | 0 | 0 | 0 | 0 | 16.78 | 16.78 |
| | INVTR7 | 659392 | 4930640 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 419.9 | 3.25 | 0 | 63.46 | 0 | -1.37 | 0 | 0 | 0.32 | 0 | 0 | 0 | 0 | 0 | 0 | 23.33 | 23.33 |
| | INV1 | 659934 | 4930708 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 669.4 | 3.25 | 0 | 67.51 | 0 | 0.6 | 0 | 0 | 5.63 | 0 | 0 | 0 | 0 | 0 | 0 | 15.31 | 15.31 |
| | INV3 | 659441 | 4930371 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 692.3 | 3.25 | 0 | 67.81 | 0 | 0.61 | 0 | 0 | 5.68 | 0 | 0 | 0 | 0 | 0 | 0 | 14.96 | 14.96 |
| | INVTR2 | 659731 | 4930601 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 586.9 | 3.25 | 0 | 66.37 | 0 | -1.62 | 0 | 0 | 0.43 | 0 | 0 | 0 | 0 | 0 | 0 | 20.56 | 20.56 |
| | INVTR6 | 659105 | 4930479 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 635.2 | 3.25 | 0 | 67.06 | 0 | -1.66 | 0 | 0 | 0.46 | 0 | 0 | 0 | 0 | 0 | 0 | 19.89 | 19.89 |
| | INVTR1 | 659941 | 4930708 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 675.4 | 3.25 | 0 | 67.59 | 0 | -1.7 | 0 | 0 | 0.48 | 0 | 0 | 0 | 0 | 0 | 0 | 19.37 | 19.37 |

| | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INVTR3 | 659447 | 4930371 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 693 | 3.25 | 0 | 67.81 | 0 | -1.72 | 0 | 0 | 0.49 | 0 | 0 | 0 | 0 | 0 | 0 | 19.15 | 19.15 |
| | INVTR4 | 659264 | 4930326 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 739.8 | 3.25 | 0 | 68.38 | 0 | -1.75 | 0 | 0 | 0.52 | 0 | 0 | 0 | 0 | 0 | 0 | 18.59 | 18.59 |
| | INVTR5 | 659072 | 4930348 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 768.6 | 3.25 | 0 | 68.71 | 0 | -1.78 | 0 | 0 | 0.54 | 0 | 0 | 0 | 0 | 0 | 0 | 18.26 | 18.26 |
| Value D/N: | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Level D/N: | 33.0209 | 33.0209 | | | | | | | | | | | | | | | | | | | | | | | | |

Receiver: Existing Potential Noise Receptor
ID: R3
X: 660338
Y: 4931230
Z: 4.5
Ground: 0

| ISO | ID | X | Y | Z | Ground | ReflOrd | LxT | LxN | L/A | Dist. | hm | Freq | Adiv | K0b | Agr | Abar | z | Aatm | Afol | Ahous | Cmet | CmetN | Dc | RL | LtotT | LtotN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INV4 | 659257 | 4930326 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1409 | 3.25 | 0 | 73.98 | 0 | -0.07 | 0 | 0 | 12.09 | 0 | 0 | 0 | 0 | 0 | 0 | 14.31 | 14.31 |
| | INV6 | 659098 | 4930479 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1450 | 3.25 | 0 | 74.23 | 0 | -0.05 | 0 | 0 | 12.2 | 0 | 0 | 0 | 0 | 0 | 0 | 13.94 | 13.94 |
| | INV5 | 659066 | 4930348 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1548 | 3.25 | 0 | 74.79 | 0 | -0.02 | 0 | 0 | 12.44 | 0 | 0 | 0 | 0 | 0 | 0 | 13.09 | 13.09 |
| | TRS | 659620 | 4930668 | 2.5 | 0 | 0 | 92 | 92 | 1 | 911.8 | 3.5 | 0 | 70.2 | 0 | -0.38 | 0 | 0 | 2.34 | 0 | 0 | 0 | 0 | 0 | 0 | 19.82 | 19.82 |
| | INV1 | 659934 | 4930708 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 660.1 | 3.25 | 0 | 67.39 | 0 | 0.6 | 0 | 0 | 5.61 | 0 | 0 | 0 | 0 | 0 | 0 | 15.46 | 15.46 |
| | INV2 | 659724 | 4930601 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 879 | 3.25 | 0 | 69.88 | 0 | 0.66 | 0 | 0 | 6.08 | 0 | 0 | 0 | 0 | 0 | 0 | 12.44 | 12.44 |
| | INVTR1 | 659941 | 4930708 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 655.8 | 3.25 | 0 | 67.34 | 0 | -1.68 | 0 | 0 | 0.47 | 0 | 0 | 0 | 0 | 0 | 0 | 19.62 | 19.62 |
| | INV7 | 659398 | 4930640 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1110 | 3.25 | 0 | 71.91 | 0 | 0.71 | 0 | 0 | 6.52 | 0 | 0 | 0 | 0 | 0 | 0 | 9.93 | 9.93 |
| | INV3 | 659441 | 4930371 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1242 | 3.25 | 0 | 72.88 | 0 | 0.74 | 0 | 0 | 6.76 | 0 | 0 | 0 | 0 | 0 | 0 | 8.68 | 8.68 |
| | INVTR2 | 659731 | 4930601 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 874.1 | 3.25 | 0 | 69.83 | 0 | -1.85 | 0 | 0 | 0.6 | 0 | 0 | 0 | 0 | 0 | 0 | 17.16 | 17.16 |
| | INVTR7 | 659392 | 4930640 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1115 | 3.25 | 0 | 71.94 | 0 | -2 | 0 | 0 | 0.74 | 0 | 0 | 0 | 0 | 0 | 0 | 15.05 | 15.05 |
| | INVTR3 | 659447 | 4930371 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1238 | 3.25 | 0 | 72.85 | 0 | -2.07 | 0 | 0 | 0.81 | 0 | 0 | 0 | 0 | 0 | 0 | 14.15 | 14.15 |
| | INVTR4 | 659264 | 4930326 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1404 | 3.25 | 0 | 73.95 | 0 | -2.16 | 0 | 0 | 0.9 | 0 | 0 | 0 | 0 | 0 | 0 | 13.05 | 13.05 |
| | INVTR6 | 659105 | 4930479 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1444 | 3.25 | 0 | 74.19 | 0 | -2.18 | 0 | 0 | 0.92 | 0 | 0 | 0 | 0 | 0 | 0 | 12.8 | 12.8 |
| | INVTR5 | 659072 | 4930348 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1543 | 3.25 | 0 | 74.77 | 0 | -2.22 | 0 | 0 | 0.98 | 0 | 0 | 0 | 0 | 0 | 0 | 12.22 | 12.22 |
| Value D/N: | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Level D/N: | 26.9501 | 26.9501 | | | | | | | | | | | | | | | | | | | | | | | | |

Receiver: Existing Potential Noise Receptor
ID: R4
X: 660664
Y: 4931264
Z: 4.5
Ground: 0

| ISO | ID | X | Y | Z | Ground | ReflOrd | LxT | LxN | L/A | Dist. | hm | Freq | Adiv | K0b | Agr | Abar | z | Aatm | Afol | Ahous | Cmet | CmetN | Dc | RL | LtotT | LtotN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INV4 | 659257 | 4930326 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1691 | 3.25 | 0 | 75.56 | 0 | 0.03 | 0 | 0 | 12.78 | 0 | 0 | 0 | 0 | 0 | 0 | 11.93 | 11.93 |
| | INV6 | 659098 | 4930479 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1752 | 3.25 | 0 | 75.87 | 0 | 0.05 | 0 | 0 | 12.92 | 0 | 0 | 0 | 0 | 0 | 0 | 11.47 | 11.47 |
| | INV5 | 659066 | 4930348 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1842 | 3.25 | 0 | 76.31 | 0 | 0.08 | 0 | 0 | 13.12 | 0 | 0 | 0 | 0 | 0 | 0 | 10.8 | 10.8 |
| | TRS | 659620 | 4930668 | 2.5 | 0 | 0 | 92 | 92 | 1 | 1202 | 3.5 | 0 | 72.6 | 0 | -0.34 | 0 | 0 | 2.92 | 0 | 0 | 0 | 0 | 0 | 0 | 16.79 | 16.79 |
| | INV1 | 659934 | 4930708 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 917.6 | 3.25 | 0 | 70.25 | 0 | 0.67 | 0 | 0 | 6.16 | 0 | 0 | 0 | 0 | 0 | 0 | 11.98 | 11.98 |
| | INV2 | 659724 | 4930601 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1150 | 3.25 | 0 | 72.22 | 0 | 0.72 | 0 | 0 | 6.59 | 0 | 0 | 0 | 0 | 0 | 0 | 9.53 | 9.53 |
| | INVTR1 | 659941 | 4930708 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 912.1 | 3.25 | 0 | 70.2 | 0 | -1.88 | 0 | 0 | 0.63 | 0 | 0 | 0 | 0 | 0 | 0 | 16.79 | 16.79 |

| | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INV7 | 659398 | 4930640 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1411 | 3.25 | 0 | 73.99 | 0 | 0.77 | 0 | 0 | 7.06 | 0 | 0 | 0 | 0 | 0 | 0 | 7.24 | 7.24 |
| | INV3 | 659441 | 4930371 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1514 | 3.25 | 0 | 74.6 | 0 | 0.8 | 0 | 0 | 7.23 | 0 | 0 | 0 | 0 | 0 | 0 | 6.43 | 6.43 |
| | INVTR2 | 659731 | 4930601 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1145 | 3.25 | 0 | 72.17 | 0 | -2.02 | 0 | 0 | 0.76 | 0 | 0 | 0 | 0 | 0 | 0 | 14.83 | 14.83 |
| | INVTR7 | 659392 | 4930640 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1417 | 3.25 | 0 | 74.03 | 0 | -2.16 | 0 | 0 | 0.91 | 0 | 0 | 0 | 0 | 0 | 0 | 12.97 | 12.97 |
| | INVTR3 | 659447 | 4930371 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1509 | 3.25 | 0 | 74.58 | 0 | -2.21 | 0 | 0 | 0.96 | 0 | 0 | 0 | 0 | 0 | 0 | 12.41 | 12.41 |
| | INVTR4 | 659264 | 4930326 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1685 | 3.25 | 0 | 75.53 | 0 | -2.28 | 0 | 0 | 1.05 | 0 | 0 | 0 | 0 | 0 | 0 | 11.44 | 11.44 |
| | INVTR6 | 659105 | 4930479 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1745 | 3.25 | 0 | 75.84 | 0 | -2.31 | 0 | 0 | 1.08 | 0 | 0 | 0 | 0 | 0 | 0 | 11.13 | 11.13 |
| | INVTR5 | 659072 | 4930348 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1837 | 3.25 | 0 | 76.28 | 0 | -2.34 | 0 | 0 | 1.13 | 0 | 0 | 0 | 0 | 0 | 0 | 10.68 | 10.68 |
| Value D/N: | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Level D/N: | 24.4381 | 24.4381 | | | | | | | | | | | | | | | | | | | | | | | | |

Receiver: Existing Potential Noise Receptor
ID: R5
X: 659683
Y: 4930452
Z: 4.5
Ground: 0

| ISO | ID | X | Y | Z | Ground | ReflOrd | LxT | LxN | L/A | Dist. | hm | Freq | Adiv | K0b | Agr | Abar | z | Aatm | Afol | Ahous | Cmet | CmetN | Dc | RL | LtotT | LtotN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INV4 | 659257 | 4930326 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 444.3 | 3.25 | 0 | 63.95 | 0 | -0.59 | 0 | 0 | 8.06 | 0 | 0 | 0 | 0 | 0 | 0 | 28.89 | 28.89 |
| | INV2 | 659724 | 4930601 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 154.6 | 3.25 | 0 | 54.78 | 0 | 0.19 | 0 | 0 | 2.67 | 0 | 0 | 0 | 0 | 0 | 0 | 31.42 | 31.42 |
| | INV6 | 659098 | 4930479 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 585.6 | 3.25 | 0 | 66.35 | 0 | -0.49 | 0 | 0 | 9.12 | 0 | 0 | 0 | 0 | 0 | 0 | 25.33 | 25.33 |
| | TRS | 659620 | 4930668 | 2.5 | 0 | 0 | 92 | 92 | 1 | 225 | 3.5 | 0 | 58.04 | 0 | -0.06 | 0 | 0 | 0.73 | 0 | 0 | 0 | 0 | 0 | 0 | 33.26 | 33.26 |
| | INV5 | 659066 | 4930348 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 625.7 | 3.25 | 0 | 66.93 | 0 | -0.46 | 0 | 0 | 9.35 | 0 | 0 | 0 | 0 | 0 | 0 | 24.49 | 24.49 |
| | INVTR2 | 659731 | 4930601 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 156.6 | 3.25 | 0 | 54.89 | 0 | -0.38 | 0 | 0 | 0.13 | 0 | 0 | 0 | 0 | 0 | 0 | 31.09 | 31.09 |
| | INV3 | 659441 | 4930371 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 255.2 | 3.25 | 0 | 59.14 | 0 | 0.34 | 0 | 0 | 3.77 | 0 | 0 | 0 | 0 | 0 | 0 | 25.81 | 25.81 |
| | INV7 | 659398 | 4930640 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 341.4 | 3.25 | 0 | 61.67 | 0 | 0.41 | 0 | 0 | 4.41 | 0 | 0 | 0 | 0 | 0 | 0 | 22.58 | 22.58 |
| | INV1 | 659934 | 4930708 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 358.5 | 3.25 | 0 | 62.09 | 0 | 0.42 | 0 | 0 | 4.51 | 0 | 0 | 0 | 0 | 0 | 0 | 22.04 | 22.04 |
| | INVTR3 | 659447 | 4930371 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 249.5 | 3.25 | 0 | 58.94 | 0 | -0.76 | 0 | 0 | 0.2 | 0 | 0 | 0 | 0 | 0 | 0 | 27.36 | 27.36 |
| | INVTR7 | 659392 | 4930640 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 346.5 | 3.25 | 0 | 61.79 | 0 | -1.19 | 0 | 0 | 0.27 | 0 | 0 | 0 | 0 | 0 | 0 | 24.87 | 24.87 |
| | INVTR1 | 659941 | 4930708 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 363.5 | 3.25 | 0 | 62.21 | 0 | -1.24 | 0 | 0 | 0.28 | 0 | 0 | 0 | 0 | 0 | 0 | 24.49 | 24.49 |
| | INVTR4 | 659264 | 4930326 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 437.5 | 3.25 | 0 | 63.82 | 0 | -1.41 | 0 | 0 | 0.33 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 23 |
| | INVTR6 | 659105 | 4930479 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 578.6 | 3.25 | 0 | 66.25 | 0 | -1.61 | 0 | 0 | 0.42 | 0 | 0 | 0 | 0 | 0 | 0 | 20.68 | 20.68 |
| | INVTR5 | 659072 | 4930348 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 619.8 | 3.25 | 0 | 66.84 | 0 | -1.65 | 0 | 0 | 0.45 | 0 | 0 | 0 | 0 | 0 | 0 | 20.1 | 20.1 |
| Value D/N: | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Level D/N: | 39.2753 | 39.2753 | | | | | | | | | | | | | | | | | | | | | | | | |

Receiver: Existing Potential Noise Receptor
ID: R6
X: 658293
Y: 4931075
Z: 4.5
Ground: 0

| ISO | ID | X | Y | Z | Ground | ReflOrd | LxT | LxN | L/A | Dist. | hm | Freq | Adiv | K0b | Agr | Abar | z | Aatm | Afol | Ahous | Cmet | CmetN | Dc | RL | LtotT | LtotN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INV6 | 659098 | 4930479 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1002 | 3.25 | 0 | 71.01 | 0 | -0.25 | 0 | 0 | 10.92 | 0 | 0 | 0 | 0 | 0 | 0 | 18.63 | 18.63 |
| | INV5 | 659066 | 4930348 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1061 | 3.25 | 0 | 71.52 | 0 | -0.22 | 0 | 0 | 11.11 | 0 | 0 | 0 | 0 | 0 | 0 | 17.91 | 17.91 |

| | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INV4 | 659257 | 4930326 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1221 | 3.25 | 0 | 72.73 | 0 | -0.15 | 0 | 0 | 11.58 | 0 | 0 | 0 | 0 | 0 | 0 | 16.14 | 16.14 |
| | TRS | 659620 | 4930668 | 2.5 | 0 | 0 | 92 | 92 | 1 | 1388 | 3.5 | 0 | 73.85 | 0 | -0.3 | 0 | 0 | 3.28 | 0 | 0 | 0 | 0 | 0 | 0 | 15.15 | 15.15 |
| | INV7 | 659398 | 4930640 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1188 | 3.25 | 0 | 72.49 | 0 | 0.72 | 0 | 0 | 6.66 | 0 | 0 | 0 | 0 | 0 | 0 | 9.18 | 9.18 |
| | INV3 | 659441 | 4930371 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1347 | 3.25 | 0 | 73.59 | 0 | 0.76 | 0 | 0 | 6.94 | 0 | 0 | 0 | 0 | 0 | 0 | 7.77 | 7.77 |
| | INVTR6 | 659105 | 4930479 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1007 | 3.25 | 0 | 71.06 | 0 | -1.94 | 0 | 0 | 0.68 | 0 | 0 | 0 | 0 | 0 | 0 | 15.93 | 15.93 |
| | INV2 | 659724 | 4930601 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1507 | 3.25 | 0 | 74.56 | 0 | 0.79 | 0 | 0 | 7.22 | 0 | 0 | 0 | 0 | 0 | 0 | 6.48 | 6.48 |
| | INVTR5 | 659072 | 4930348 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1066 | 3.25 | 0 | 71.55 | 0 | -1.97 | 0 | 0 | 0.72 | 0 | 0 | 0 | 0 | 0 | 0 | 15.45 | 15.45 |
| | INV1 | 659934 | 4930708 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1682 | 3.25 | 0 | 75.51 | 0 | 0.83 | 0 | 0 | 7.52 | 0 | 0 | 0 | 0 | 0 | 0 | 5.19 | 5.19 |
| | INVTR7 | 659392 | 4930640 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1182 | 3.25 | 0 | 72.45 | 0 | -2.04 | 0 | 0 | 0.78 | 0 | 0 | 0 | 0 | 0 | 0 | 14.55 | 14.55 |
| | INVTR4 | 659264 | 4930326 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1226 | 3.25 | 0 | 72.77 | 0 | -2.07 | 0 | 0 | 0.81 | 0 | 0 | 0 | 0 | 0 | 0 | 14.23 | 14.23 |
| | INVTR3 | 659447 | 4930371 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1352 | 3.25 | 0 | 73.62 | 0 | -2.13 | 0 | 0 | 0.88 | 0 | 0 | 0 | 0 | 0 | 0 | 13.38 | 13.38 |
| | INVTR2 | 659731 | 4930601 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1514 | 3.25 | 0 | 74.6 | 0 | -2.21 | 0 | 0 | 0.96 | 0 | 0 | 0 | 0 | 0 | 0 | 12.39 | 12.39 |
| | INVTR1 | 659941 | 4930708 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1688 | 3.25 | 0 | 75.55 | 0 | -2.28 | 0 | 0 | 1.05 | 0 | 0 | 0 | 0 | 0 | 0 | 11.43 | 11.43 |
| Value D/N: | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Level D/N: | 26.1564 | 26.1564 | | | | | | | | | | | | | | | | | | | | | | | | |

Receiver: Existing Potential Noise Receptor
ID: R7
X: 657949
Y: 4930383
Z: 4.5
Ground: 0

| ISO | ID | X | Y | Z | Ground | ReflOrd | LxT | LxN | L/A | Dist. | hm | Freq | Adiv | K0b | Agr | Abar | z | Aatm | Afol | Ahous | Cmet | CmetN | Dc | RL | LtotT | LtotN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INV5 | 659066 | 4930348 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1118 | 3.25 | 0 | 71.97 | 0 | -0.19 | 0 | 0 | 11.28 | 0 | 0 | 0 | 0 | 0 | 0 | 17.26 | 17.26 |
| | INV6 | 659098 | 4930479 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1153 | 3.25 | 0 | 72.24 | 0 | -0.17 | 0 | 0 | 11.39 | 0 | 0 | 0 | 0 | 0 | 0 | 16.86 | 16.86 |
| | INV4 | 659257 | 4930326 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1309 | 3.25 | 0 | 73.34 | 0 | -0.11 | 0 | 0 | 11.83 | 0 | 0 | 0 | 0 | 0 | 0 | 15.25 | 15.25 |
| | TRS | 659620 | 4930668 | 2.5 | 0 | 0 | 92 | 92 | 1 | 1695 | 3.5 | 0 | 75.58 | 0 | -0.24 | 0 | 0 | 3.84 | 0 | 0 | 0 | 0 | 0 | 0 | 12.79 | 12.79 |
| | INV7 | 659398 | 4930640 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1472 | 3.25 | 0 | 74.36 | 0 | 0.79 | 0 | 0 | 7.16 | 0 | 0 | 0 | 0 | 0 | 0 | 6.76 | 6.76 |
| | INV3 | 659441 | 4930371 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1492 | 3.25 | 0 | 74.48 | 0 | 0.79 | 0 | 0 | 7.19 | 0 | 0 | 0 | 0 | 0 | 0 | 6.6 | 6.6 |
| | INVTR5 | 659072 | 4930348 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1124 | 3.25 | 0 | 72.01 | 0 | -2.01 | 0 | 0 | 0.75 | 0 | 0 | 0 | 0 | 0 | 0 | 14.99 | 14.99 |
| | INVTR6 | 659105 | 4930479 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1160 | 3.25 | 0 | 72.29 | 0 | -2.03 | 0 | 0 | 0.77 | 0 | 0 | 0 | 0 | 0 | 0 | 14.71 | 14.71 |
| | INV2 | 659724 | 4930601 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1788 | 3.25 | 0 | 76.05 | 0 | 0.86 | 0 | 0 | 7.7 | 0 | 0 | 0 | 0 | 0 | 0 | 4.46 | 4.46 |
| | INVTR4 | 659264 | 4930326 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1316 | 3.25 | 0 | 73.39 | 0 | -2.11 | 0 | 0 | 0.86 | 0 | 0 | 0 | 0 | 0 | 0 | 13.61 | 13.61 |
| | INVTR7 | 659392 | 4930640 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1466 | 3.25 | 0 | 74.32 | 0 | -2.19 | 0 | 0 | 0.94 | 0 | 0 | 0 | 0 | 0 | 0 | 12.67 | 12.67 |
| | INVTR3 | 659447 | 4930371 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1498 | 3.25 | 0 | 74.51 | 0 | -2.2 | 0 | 0 | 0.95 | 0 | 0 | 0 | 0 | 0 | 0 | 12.48 | 12.48 |
| | INVTR2 | 659731 | 4930601 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1795 | 3.25 | 0 | 76.08 | 0 | -2.33 | 0 | 0 | 1.11 | 0 | 0 | 0 | 0 | 0 | 0 | 10.88 | 10.88 |
| Value D/N: | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Level D/N: | 24.7543 | 24.7543 | | | | | | | | | | | | | | | | | | | | | | | | |

Receiver: Existing Potential Noise Receptor
ID: R8
X: 657992
Y: 4930405
Z: 4.5
Ground: 0

| ISO | ID | X | Y | Z | Ground | ReflOrd | LxT | LxN | L/A | Dist. | hm | Freq | Adiv | K0b | Agr | Abar | z | Aatm | Afol | Ahous | Cmet | CmetN | Dc | RL | LtotT | LtotN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INV5 | 659066 | 4930348 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1076 | 3.25 | 0 | 71.63 | 0 | -0.21 | 0 | 0 | 11.15 | 0 | 0 | 0 | 0 | 0 | 0 | 17.74 | 17.74 |
| | INV6 | 659098 | 4930479 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1108 | 3.25 | 0 | 71.89 | 0 | -0.19 | 0 | 0 | 11.25 | 0 | 0 | 0 | 0 | 0 | 0 | 17.36 | 17.36 |
| | INV4 | 659257 | 4930326 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1267 | 3.25 | 0 | 73.06 | 0 | -0.13 | 0 | 0 | 11.72 | 0 | 0 | 0 | 0 | 0 | 0 | 15.66 | 15.66 |
| | TRS | 659620 | 4930668 | 2.5 | 0 | 0 | 92 | 92 | 1 | 1649 | 3.5 | 0 | 75.34 | 0 | -0.25 | 0 | 0 | 3.75 | 0 | 0 | 0 | 0 | 0 | 0 | 13.12 | 13.12 |
| | INV7 | 659398 | 4930640 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1426 | 3.25 | 0 | 74.08 | 0 | 0.78 | 0 | 0 | 7.08 | 0 | 0 | 0 | 0 | 0 | 0 | 7.12 | 7.12 |
| | INV3 | 659441 | 4930371 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1449 | 3.25 | 0 | 74.22 | 0 | 0.78 | 0 | 0 | 7.12 | 0 | 0 | 0 | 0 | 0 | 0 | 6.93 | 6.93 |
| | INVTR5 | 659072 | 4930348 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1082 | 3.25 | 0 | 71.68 | 0 | -1.98 | 0 | 0 | 0.73 | 0 | 0 | 0 | 0 | 0 | 0 | 15.32 | 15.32 |
| | INVTR6 | 659105 | 4930479 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1115 | 3.25 | 0 | 71.95 | 0 | -2 | 0 | 0 | 0.74 | 0 | 0 | 0 | 0 | 0 | 0 | 15.05 | 15.05 |
| | INV2 | 659724 | 4930601 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1743 | 3.25 | 0 | 75.83 | 0 | 0.85 | 0 | 0 | 7.62 | 0 | 0 | 0 | 0 | 0 | 0 | 4.76 | 4.76 |
| | INVTR4 | 659264 | 4930326 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1274 | 3.25 | 0 | 73.11 | 0 | -2.09 | 0 | 0 | 0.83 | 0 | 0 | 0 | 0 | 0 | 0 | 13.89 | 13.89 |
| | INV1 | 659934 | 4930708 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1966 | 3.25 | 0 | 76.87 | 0 | 0.9 | 0 | 0 | 7.99 | 0 | 0 | 0 | 0 | 0 | 0 | 3.3 | 3.3 |
| | INVTR7 | 659392 | 4930640 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1420 | 3.25 | 0 | 74.04 | 0 | -2.16 | 0 | 0 | 0.91 | 0 | 0 | 0 | 0 | 0 | 0 | 12.95 | 12.95 |
| | INVTR3 | 659447 | 4930371 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1455 | 3.25 | 0 | 74.26 | 0 | -2.18 | 0 | 0 | 0.93 | 0 | 0 | 0 | 0 | 0 | 0 | 12.73 | 12.73 |
| | INVTR2 | 659731 | 4930601 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1750 | 3.25 | 0 | 75.86 | 0 | -2.31 | 0 | 0 | 1.08 | 0 | 0 | 0 | 0 | 0 | 0 | 11.11 | 11.11 |
| | INVTR1 | 659941 | 4930708 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1972 | 3.25 | 0 | 76.9 | 0 | -2.39 | 0 | 0 | 1.19 | 0 | 0 | 0 | 0 | 0 | 0 | 10.04 | 10.04 |
| Value D/N: | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Level D/N: | 25.2943 | 25.2943 | | | | | | | | | | | | | | | | | | | | | | | | |

Receiver: Existing Potential Noise Receptor
ID: R9
X: 658014
Y: 4930407
Z: 4.5
Ground: 0

| ISO | ID | X | Y | Z | Ground | ReflOrd | LxT | LxN | L/A | Dist. | hm | Freq | Adiv | K0b | Agr | Abar | z | Aatm | Afol | Ahous | Cmet | CmetN | Dc | RL | LtotT | LtotN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INV5 | 659066 | 4930348 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1054 | 3.25 | 0 | 71.45 | 0 | -0.22 | 0 | 0 | 11.08 | 0 | 0 | 0 | 0 | 0 | 0 | 17.99 | 17.99 |
| | INV6 | 659098 | 4930479 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1086 | 3.25 | 0 | 71.72 | 0 | -0.21 | 0 | 0 | 11.19 | 0 | 0 | 0 | 0 | 0 | 0 | 17.61 | 17.61 |
| | INV4 | 659257 | 4930326 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1246 | 3.25 | 0 | 72.91 | 0 | -0.13 | 0 | 0 | 11.66 | 0 | 0 | 0 | 0 | 0 | 0 | 15.88 | 15.88 |
| | TRS | 659620 | 4930668 | 2.5 | 0 | 0 | 92 | 92 | 1 | 1627 | 3.5 | 0 | 75.23 | 0 | -0.25 | 0 | 0 | 3.71 | 0 | 0 | 0 | 0 | 0 | 0 | 13.28 | 13.28 |
| | INV7 | 659398 | 4930640 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1403 | 3.25 | 0 | 73.94 | 0 | 0.77 | 0 | 0 | 7.04 | 0 | 0 | 0 | 0 | 0 | 0 | 7.3 | 7.3 |
| | INV3 | 659441 | 4930371 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1427 | 3.25 | 0 | 74.09 | 0 | 0.78 | 0 | 0 | 7.08 | 0 | 0 | 0 | 0 | 0 | 0 | 7.11 | 7.11 |
| | INVTR5 | 659072 | 4930348 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1060 | 3.25 | 0 | 71.5 | 0 | -1.97 | 0 | 0 | 0.71 | 0 | 0 | 0 | 0 | 0 | 0 | 15.49 | 15.49 |
| | INVTR6 | 659105 | 4930479 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1093 | 3.25 | 0 | 71.78 | 0 | -1.99 | 0 | 0 | 0.73 | 0 | 0 | 0 | 0 | 0 | 0 | 15.22 | 15.22 |
| | INV2 | 659724 | 4930601 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1721 | 3.25 | 0 | 75.72 | 0 | 0.84 | 0 | 0 | 7.58 | 0 | 0 | 0 | 0 | 0 | 0 | 4.92 | 4.92 |
| | INVTR4 | 659264 | 4930326 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1253 | 3.25 | 0 | 72.96 | 0 | -2.08 | 0 | 0 | 0.82 | 0 | 0 | 0 | 0 | 0 | 0 | 14.04 | 14.04 |
| | INV1 | 659934 | 4930708 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1943 | 3.25 | 0 | 76.77 | 0 | 0.89 | 0 | 0 | 7.95 | 0 | 0 | 0 | 0 | 0 | 0 | 3.44 | 3.44 |
| | INVTR7 | 659392 | 4930640 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1398 | 3.25 | 0 | 73.91 | 0 | -2.15 | 0 | 0 | 0.9 | 0 | 0 | 0 | 0 | 0 | 0 | 13.09 | 13.09 |
| | INVTR3 | 659447 | 4930371 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1433 | 3.25 | 0 | 74.13 | 0 | -2.17 | 0 | 0 | 0.92 | 0 | 0 | 0 | 0 | 0 | 0 | 12.87 | 12.87 |
| | INVTR2 | 659731 | 4930601 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1728 | 3.25 | 0 | 75.75 | 0 | -2.3 | 0 | 0 | 1.07 | 0 | 0 | 0 | 0 | 0 | 0 | 11.22 | 11.22 |
| | INVTR1 | 659941 | 4930708 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1950 | 3.25 | 0 | 76.8 | 0 | -2.39 | 0 | 0 | 1.18 | 0 | 0 | 0 | 0 | 0 | 0 | 10.14 | 10.14 |
| Value D/N: | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Level D/N: | 25.4895 | 25.4895 | | | | | | | | | | | | | | | | | | | | | | | | |

Receiver: Existing Potential Noise Receptor
ID: R10

X: 658523
Y: 4930032
Z: 4.5
Ground: 0

| ISO | ID | X | Y | Z | Ground | ReflOrd | LxT | LxN | L/A | Dist. | hm | Freq | Adiv | K0b | Agr | Abar | z | Aatm | Afol | Ahous | Cmet | CmetN | Dc | RL | LtotT | LtotN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INV5 | 659066 | 4930348 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 628.3 | 3.25 | 0 | 66.96 | 0 | -0.46 | 0 | 0 | 9.37 | 0 | 0 | 0 | 0 | 0 | 0 | 24.44 | 24.44 |
| | INV6 | 659098 | 4930479 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 728.3 | 3.25 | 0 | 68.25 | 0 | -0.39 | 0 | 0 | 9.87 | 0 | 0 | 0 | 0 | 0 | 0 | 22.59 | 22.59 |
| | INV4 | 659257 | 4930326 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 790.7 | 3.25 | 0 | 68.96 | 0 | -0.36 | 0 | 0 | 10.14 | 0 | 0 | 0 | 0 | 0 | 0 | 21.57 | 21.57 |
| | TRS | 659620 | 4930668 | 2.5 | 0 | 0 | 92 | 92 | 1 | 1268 | 3.5 | 0 | 73.06 | 0 | -0.32 | 0 | 0 | 3.05 | 0 | 0 | 0 | 0 | 0 | 0 | 16.19 | 16.19 |
| | INVTR5 | 659072 | 4930348 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 633.5 | 3.25 | 0 | 67.03 | 0 | -1.66 | 0 | 0 | 0.46 | 0 | 0 | 0 | 0 | 0 | 0 | 19.91 | 19.91 |
| | INV3 | 659441 | 4930371 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 978.6 | 3.25 | 0 | 70.81 | 0 | 0.68 | 0 | 0 | 6.27 | 0 | 0 | 0 | 0 | 0 | 0 | 11.29 | 11.29 |
| | INV7 | 659398 | 4930640 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1066 | 3.25 | 0 | 71.55 | 0 | 0.7 | 0 | 0 | 6.44 | 0 | 0 | 0 | 0 | 0 | 0 | 10.37 | 10.37 |
| | INVTR6 | 659105 | 4930479 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 733.9 | 3.25 | 0 | 68.31 | 0 | -1.75 | 0 | 0 | 0.52 | 0 | 0 | 0 | 0 | 0 | 0 | 18.66 | 18.66 |
| | INVTR4 | 659264 | 4930326 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 797.2 | 3.25 | 0 | 69.03 | 0 | -1.8 | 0 | 0 | 0.56 | 0 | 0 | 0 | 0 | 0 | 0 | 17.95 | 17.95 |
| | INV2 | 659724 | 4930601 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1329 | 3.25 | 0 | 73.47 | 0 | 0.75 | 0 | 0 | 6.91 | 0 | 0 | 0 | 0 | 0 | 0 | 7.92 | 7.92 |
| | INVTR3 | 659447 | 4930371 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 984.2 | 3.25 | 0 | 70.86 | 0 | -1.92 | 0 | 0 | 0.67 | 0 | 0 | 0 | 0 | 0 | 0 | 16.13 | 16.13 |
| | INVTR7 | 659392 | 4930640 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1061 | 3.25 | 0 | 71.51 | 0 | -1.97 | 0 | 0 | 0.71 | 0 | 0 | 0 | 0 | 0 | 0 | 15.49 | 15.49 |
| | INV1 | 659934 | 4930708 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1565 | 3.25 | 0 | 74.89 | 0 | 0.81 | 0 | 0 | 7.32 | 0 | 0 | 0 | 0 | 0 | 0 | 6.04 | 6.04 |
| | INVTR2 | 659731 | 4930601 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1335 | 3.25 | 0 | 73.51 | 0 | -2.12 | 0 | 0 | 0.87 | 0 | 0 | 0 | 0 | 0 | 0 | 13.49 | 13.49 |
| | INVTR1 | 659941 | 4930708 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1571 | 3.25 | 0 | 74.92 | 0 | -2.23 | 0 | 0 | 0.99 | 0 | 0 | 0 | 0 | 0 | 0 | 12.06 | 12.06 |
| Value D/N: 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Level D/N: 30.1189 | 30.1189 | | | | | | | | | | | | | | | | | | | | | | | | | |

Receiver: Existing Potential Noise Receptor
ID: R11
X: 658558
Y: 4929295
Z: 4.5
Ground: 0

| ISO | ID | X | Y | Z | Ground | ReflOrd | LxT | LxN | L/A | Dist. | hm | Freq | Adiv | K0b | Agr | Abar | z | Aatm | Afol | Ahous | Cmet | CmetN | Dc | RL | LtotT | LtotN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INV5 | 659066 | 4930348 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1169 | 3.25 | 0 | 72.36 | 0 | -0.17 | 0 | 0 | 11.44 | 0 | 0 | 0 | 0 | 0 | 0 | 16.69 | 16.69 |
| | INV4 | 659257 | 4930326 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1246 | 3.25 | 0 | 72.91 | 0 | -0.13 | 0 | 0 | 11.66 | 0 | 0 | 0 | 0 | 0 | 0 | 15.88 | 15.88 |
| | INV6 | 659098 | 4930479 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1301 | 3.25 | 0 | 73.29 | 0 | -0.11 | 0 | 0 | 11.81 | 0 | 0 | 0 | 0 | 0 | 0 | 15.33 | 15.33 |
| | TRS | 659620 | 4930668 | 2.5 | 0 | 0 | 92 | 92 | 1 | 1736 | 3.5 | 0 | 75.79 | 0 | -0.23 | 0 | 0 | 3.91 | 0 | 0 | 0 | 0 | 0 | 0 | 12.5 | 12.5 |
| | INV3 | 659441 | 4930371 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1392 | 3.25 | 0 | 73.87 | 0 | 0.77 | 0 | 0 | 7.02 | 0 | 0 | 0 | 0 | 0 | 0 | 7.4 | 7.4 |
| | INV7 | 659398 | 4930640 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1586 | 3.25 | 0 | 75 | 0 | 0.81 | 0 | 0 | 7.35 | 0 | 0 | 0 | 0 | 0 | 0 | 5.89 | 5.89 |
| | INVTR5 | 659072 | 4930348 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1172 | 3.25 | 0 | 72.38 | 0 | -2.03 | 0 | 0 | 0.78 | 0 | 0 | 0 | 0 | 0 | 0 | 14.62 | 14.62 |
| | INV2 | 659724 | 4930601 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1751 | 3.25 | 0 | 75.86 | 0 | 0.85 | 0 | 0 | 7.63 | 0 | 0 | 0 | 0 | 0 | 0 | 4.71 | 4.71 |
| | INVTR4 | 659264 | 4930326 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1250 | 3.25 | 0 | 72.94 | 0 | -2.08 | 0 | 0 | 0.82 | 0 | 0 | 0 | 0 | 0 | 0 | 14.06 | 14.06 |
| | INVTR6 | 659105 | 4930479 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1304 | 3.25 | 0 | 73.31 | 0 | -2.11 | 0 | 0 | 0.85 | 0 | 0 | 0 | 0 | 0 | 0 | 13.69 | 13.69 |
| | INV1 | 659934 | 4930708 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1972 | 3.25 | 0 | 76.9 | 0 | 0.9 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 3.26 | 3.26 |
| | INVTR3 | 659447 | 4930371 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1396 | 3.25 | 0 | 73.9 | 0 | -2.15 | 0 | 0 | 0.9 | 0 | 0 | 0 | 0 | 0 | 0 | 13.1 | 13.1 |
| | INVTR7 | 659392 | 4930640 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1583 | 3.25 | 0 | 74.99 | 0 | -2.24 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 12 |
| | INVTR2 | 659731 | 4930601 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1755 | 3.25 | 0 | 75.89 | 0 | -2.31 | 0 | 0 | 1.09 | 0 | 0 | 0 | 0 | 0 | 0 | 11.08 | 11.08 |
| | INVTR1 | 659941 | 4930708 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1977 | 3.25 | 0 | 76.92 | 0 | -2.4 | 0 | 0 | 1.19 | 0 | 0 | 0 | 0 | 0 | 0 | 10.02 | 10.02 |

Value D/N: 0 0
Level D/N: 24.6049 24.6049

Receiver: Existing Potential Noise Receptor
ID: R12
X: 658731
Y: 4929267
Z: 4.5
Ground: 0

| ISO | ID | X | Y | Z | Ground | ReflOrd | LxT | LxN | L/A | Dist. | hm | Freq | Adiv | K0b | Agr | Abar | z | Aatm | Afol | Ahous | Cmet | CmetN | Dc | RL | LtotT | LtotN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INV5 | 659066 | 4930348 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1132 | 3.25 | 0 | 72.07 | 0 | -0.18 | 0 | 0 | 11.33 | 0 | 0 | 0 | 0 | 0 | 0 | 17.1 | 17.1 |
| | INV4 | 659257 | 4930326 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1182 | 3.25 | 0 | 72.46 | 0 | -0.16 | 0 | 0 | 11.47 | 0 | 0 | 0 | 0 | 0 | 0 | 16.54 | 16.54 |
| | INV6 | 659098 | 4930479 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1266 | 3.25 | 0 | 73.05 | 0 | -0.13 | 0 | 0 | 11.71 | 0 | 0 | 0 | 0 | 0 | 0 | 15.67 | 15.67 |
| | TRS | 659620 | 4930668 | 2.5 | 0 | 0 | 92 | 92 | 1 | 1659 | 3.5 | 0 | 75.4 | 0 | -0.24 | 0 | 0 | 3.77 | 0 | 0 | 0 | 0 | 0 | 0 | 13.05 | 13.05 |
| | INV3 | 659441 | 4930371 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1313 | 3.25 | 0 | 73.36 | 0 | 0.75 | 0 | 0 | 6.88 | 0 | 0 | 0 | 0 | 0 | 0 | 8.06 | 8.06 |
| | INV7 | 659398 | 4930640 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1526 | 3.25 | 0 | 74.67 | 0 | 0.8 | 0 | 0 | 7.25 | 0 | 0 | 0 | 0 | 0 | 0 | 6.33 | 6.33 |
| | INVTR5 | 659072 | 4930348 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1134 | 3.25 | 0 | 72.09 | 0 | -2.01 | 0 | 0 | 0.75 | 0 | 0 | 0 | 0 | 0 | 0 | 14.91 | 14.91 |
| | INV2 | 659724 | 4930601 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1663 | 3.25 | 0 | 75.42 | 0 | 0.83 | 0 | 0 | 7.49 | 0 | 0 | 0 | 0 | 0 | 0 | 5.33 | 5.33 |
| | INVTR4 | 659264 | 4930326 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1186 | 3.25 | 0 | 72.48 | 0 | -2.04 | 0 | 0 | 0.78 | 0 | 0 | 0 | 0 | 0 | 0 | 14.52 | 14.52 |
| | INVTR6 | 659105 | 4930479 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1268 | 3.25 | 0 | 73.07 | 0 | -2.09 | 0 | 0 | 0.83 | 0 | 0 | 0 | 0 | 0 | 0 | 13.93 | 13.93 |
| | INV1 | 659934 | 4930708 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1877 | 3.25 | 0 | 76.47 | 0 | 0.88 | 0 | 0 | 7.84 | 0 | 0 | 0 | 0 | 0 | 0 | 3.87 | 3.87 |
| | INVTR3 | 659447 | 4930371 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1316 | 3.25 | 0 | 73.38 | 0 | -2.11 | 0 | 0 | 0.86 | 0 | 0 | 0 | 0 | 0 | 0 | 13.61 | 13.61 |
| | INVTR7 | 659392 | 4930640 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1524 | 3.25 | 0 | 74.66 | 0 | -2.21 | 0 | 0 | 0.97 | 0 | 0 | 0 | 0 | 0 | 0 | 12.33 | 12.33 |
| | INVTR2 | 659731 | 4930601 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1667 | 3.25 | 0 | 75.44 | 0 | -2.28 | 0 | 0 | 1.04 | 0 | 0 | 0 | 0 | 0 | 0 | 11.54 | 11.54 |
| | INVTR1 | 659941 | 4930708 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1882 | 3.25 | 0 | 76.49 | 0 | -2.36 | 0 | 0 | 1.15 | 0 | 0 | 0 | 0 | 0 | 0 | 10.46 | 10.46 |

Value D/N: 0 0
Level D/N: 25.0448 25.0448

Receiver: Existing Potential Noise Receptor
ID: R13
X: 658873
Y: 4931135
Z: 4.5
Ground: 0

| ISO | ID | X | Y | Z | Ground | ReflOrd | LxT | LxN | L/A | Dist. | hm | Freq | Adiv | K0b | Agr | Abar | z | Aatm | Afol | Ahous | Cmet | CmetN | Dc | RL | LtotT | LtotN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INV6 | 659098 | 4930479 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 693.5 | 3.25 | 0 | 67.82 | 0 | -0.42 | 0 | 0 | 9.71 | 0 | 0 | 0 | 0 | 0 | 0 | 23.2 | 23.2 |
| | INV5 | 659066 | 4930348 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 810.3 | 3.25 | 0 | 69.17 | 0 | -0.35 | 0 | 0 | 10.22 | 0 | 0 | 0 | 0 | 0 | 0 | 21.26 | 21.26 |
| | INV4 | 659257 | 4930326 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 895.5 | 3.25 | 0 | 70.04 | 0 | -0.3 | 0 | 0 | 10.55 | 0 | 0 | 0 | 0 | 0 | 0 | 20.02 | 20.02 |
| | TRS | 659620 | 4930668 | 2.5 | 0 | 0 | 92 | 92 | 1 | 881 | 3.5 | 0 | 69.9 | 0 | -0.39 | 0 | 0 | 2.27 | 0 | 0 | 0 | 0 | 0 | 0 | 20.19 | 20.19 |
| | INV7 | 659398 | 4930640 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 721.6 | 3.25 | 0 | 68.17 | 0 | 0.62 | 0 | 0 | 5.75 | 0 | 0 | 0 | 0 | 0 | 0 | 14.52 | 14.52 |
| | INV3 | 659441 | 4930371 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 952 | 3.25 | 0 | 70.57 | 0 | 0.67 | 0 | 0 | 6.22 | 0 | 0 | 0 | 0 | 0 | 0 | 11.59 | 11.59 |
| | INV2 | 659724 | 4930601 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1005 | 3.25 | 0 | 71.04 | 0 | 0.69 | 0 | 0 | 6.32 | 0 | 0 | 0 | 0 | 0 | 0 | 11.01 | 11.01 |
| | INVTR6 | 659105 | 4930479 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 695.8 | 3.25 | 0 | 67.85 | 0 | -1.72 | 0 | 0 | 0.5 | 0 | 0 | 0 | 0 | 0 | 0 | 19.11 | 19.11 |
| | INVTR7 | 659392 | 4930640 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 717.2 | 3.25 | 0 | 68.11 | 0 | -1.74 | 0 | 0 | 0.51 | 0 | 0 | 0 | 0 | 0 | 0 | 18.85 | 18.85 |
| | INV1 | 659934 | 4930708 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1144 | 3.25 | 0 | 72.17 | 0 | 0.72 | 0 | 0 | 6.58 | 0 | 0 | 0 | 0 | 0 | 0 | 9.6 | 9.6 |

| | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INVTR5 | 659072 | 4930348 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 811.8 | 3.25 | 0 | 69.19 | 0 | -1.81 | 0 | 0 | 0.57 | 0 | 0 | 0 | 0 | 0 | 0 | 17.79 | 17.79 |
| | INVTR4 | 659264 | 4930326 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 898.5 | 3.25 | 0 | 70.07 | 0 | -1.87 | 0 | 0 | 0.62 | 0 | 0 | 0 | 0 | 0 | 0 | 16.92 | 16.92 |
| | INVTR3 | 659447 | 4930371 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 955.6 | 3.25 | 0 | 70.61 | 0 | -1.9 | 0 | 0 | 0.65 | 0 | 0 | 0 | 0 | 0 | 0 | 16.39 | 16.39 |
| | INVTR2 | 659731 | 4930601 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1011 | 3.25 | 0 | 71.09 | 0 | -1.94 | 0 | 0 | 0.68 | 0 | 0 | 0 | 0 | 0 | 0 | 15.9 | 15.9 |
| | INVTR1 | 659941 | 4930708 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1150 | 3.25 | 0 | 72.22 | 0 | -2.02 | 0 | 0 | 0.76 | 0 | 0 | 0 | 0 | 0 | 0 | 14.78 | 14.78 |
| Value D/N: | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Level D/N: | 29.9665 | 29.9665 | | | | | | | | | | | | | | | | | | | | | | | | |

Receiver: Existing Potential Noise Receptor
ID: R14
X: 659636
Y: 4929927
Z: 4.5
Ground: 0

| ISO | ID | X | Y | Z | Ground | ReflOrd | LxT | LxN | L/A | Dist. | hm | Freq | Adiv | K0b | Agr | Abar | z | Aatm | Afol | Ahous | Cmet | CmetN | Dc | RL | LtotT | LtotN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INV4 | 659257 | 4930326 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 550.3 | 3.25 | 0 | 65.81 | 0 | -0.51 | 0 | 0 | 8.89 | 0 | 0 | 0 | 0 | 0 | 0 | 26.12 | 26.12 |
| | INV5 | 659066 | 4930348 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 708.6 | 3.25 | 0 | 68.01 | 0 | -0.41 | 0 | 0 | 9.78 | 0 | 0 | 0 | 0 | 0 | 0 | 22.93 | 22.93 |
| | INV6 | 659098 | 4930479 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 770.8 | 3.25 | 0 | 68.74 | 0 | -0.37 | 0 | 0 | 10.06 | 0 | 0 | 0 | 0 | 0 | 0 | 21.88 | 21.88 |
| | INV3 | 659441 | 4930371 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 484.9 | 3.25 | 0 | 64.71 | 0 | 0.52 | 0 | 0 | 5.09 | 0 | 0 | 0 | 0 | 0 | 0 | 18.74 | 18.74 |
| | TRS | 659620 | 4930668 | 2.5 | 0 | 0 | 92 | 92 | 1 | 741.2 | 3.5 | 0 | 68.4 | 0 | -0.4 | 0 | 0 | 1.98 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 22 |
| | INV2 | 659724 | 4930601 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 679.7 | 3.25 | 0 | 67.65 | 0 | 0.61 | 0 | 0 | 5.65 | 0 | 0 | 0 | 0 | 0 | 0 | 15.15 | 15.15 |
| | INVTR3 | 659447 | 4930371 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 482.6 | 3.25 | 0 | 64.67 | 0 | -1.48 | 0 | 0 | 0.36 | 0 | 0 | 0 | 0 | 0 | 0 | 22.19 | 22.19 |
| | INV7 | 659398 | 4930640 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 751.7 | 3.25 | 0 | 68.52 | 0 | 0.63 | 0 | 0 | 5.82 | 0 | 0 | 0 | 0 | 0 | 0 | 14.09 | 14.09 |
| | INVTR4 | 659264 | 4930326 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 545.5 | 3.25 | 0 | 65.74 | 0 | -1.57 | 0 | 0 | 0.4 | 0 | 0 | 0 | 0 | 0 | 0 | 21.17 | 21.17 |
| | INV1 | 659934 | 4930708 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 835.9 | 3.25 | 0 | 69.44 | 0 | 0.65 | 0 | 0 | 5.99 | 0 | 0 | 0 | 0 | 0 | 0 | 12.97 | 12.97 |
| | INVTR2 | 659731 | 4930601 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 680.7 | 3.25 | 0 | 67.66 | 0 | -1.7 | 0 | 0 | 0.49 | 0 | 0 | 0 | 0 | 0 | 0 | 19.3 | 19.3 |
| | INVTR5 | 659072 | 4930348 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 703.8 | 3.25 | 0 | 67.95 | 0 | -1.72 | 0 | 0 | 0.5 | 0 | 0 | 0 | 0 | 0 | 0 | 19.02 | 19.02 |
| | INVTR7 | 659392 | 4930640 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 753.6 | 3.25 | 0 | 68.54 | 0 | -1.76 | 0 | 0 | 0.53 | 0 | 0 | 0 | 0 | 0 | 0 | 18.43 | 18.43 |
| | INVTR6 | 659105 | 4930479 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 765.9 | 3.25 | 0 | 68.68 | 0 | -1.77 | 0 | 0 | 0.54 | 0 | 0 | 0 | 0 | 0 | 0 | 18.29 | 18.29 |
| | INVTR1 | 659941 | 4930708 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 838.5 | 3.25 | 0 | 69.47 | 0 | -1.83 | 0 | 0 | 0.58 | 0 | 0 | 0 | 0 | 0 | 0 | 17.51 | 17.51 |
| Value D/N: | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Level D/N: | 32.3733 | 32.3733 | | | | | | | | | | | | | | | | | | | | | | | | |

Receiver: Existing Potential Noise Receptor
ID: R15
X: 659787
Y: 4929742
Z: 4.5
Ground: 0

| ISO | ID | X | Y | Z | Ground | ReflOrd | LxT | LxN | L/A | Dist. | hm | Freq | Adiv | K0b | Agr | Abar | z | Aatm | Afol | Ahous | Cmet | CmetN | Dc | RL | LtotT | LtotN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INV4 | 659257 | 4930326 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 788.7 | 3.25 | 0 | 68.94 | 0 | -0.36 | 0 | 0 | 10.13 | 0 | 0 | 0 | 0 | 0 | 0 | 21.6 | 21.6 |
| | INV5 | 659066 | 4930348 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 941.9 | 3.25 | 0 | 70.48 | 0 | -0.28 | 0 | 0 | 10.71 | 0 | 0 | 0 | 0 | 0 | 0 | 19.39 | 19.39 |
| | INV6 | 659098 | 4930479 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1009 | 3.25 | 0 | 71.08 | 0 | -0.24 | 0 | 0 | 10.94 | 0 | 0 | 0 | 0 | 0 | 0 | 18.54 | 18.54 |
| | TRS | 659620 | 4930668 | 2.5 | 0 | 0 | 92 | 92 | 1 | 940.9 | 3.5 | 0 | 70.47 | 0 | -0.38 | 0 | 0 | 2.4 | 0 | 0 | 0 | 0 | 0 | 0 | 19.49 | 19.49 |
| | INV3 | 659441 | 4930371 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 717.9 | 3.25 | 0 | 68.12 | 0 | 0.62 | 0 | 0 | 5.74 | 0 | 0 | 0 | 0 | 0 | 0 | 14.58 | 14.58 |

| | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INV2 | 659724 | 4930601 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 861.3 | 3.25 | 0 | 69.7 | 0 | 0.65 | 0 | 0 | 6.05 | 0 | 0 | 0 | 0 | 0 | 0 | 12.65 | 12.65 |
| | INV1 | 659934 | 4930708 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 977.1 | 3.25 | 0 | 70.8 | 0 | 0.68 | 0 | 0 | 6.27 | 0 | 0 | 0 | 0 | 0 | 0 | 11.31 | 11.31 |
| | INV7 | 659398 | 4930640 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 978.6 | 3.25 | 0 | 70.81 | 0 | 0.68 | 0 | 0 | 6.27 | 0 | 0 | 0 | 0 | 0 | 0 | 11.29 | 11.29 |
| | INVTR3 | 659447 | 4930371 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 715 | 3.25 | 0 | 68.09 | 0 | -1.73 | 0 | 0 | 0.51 | 0 | 0 | 0 | 0 | 0 | 0 | 18.88 | 18.88 |
| | INVTR4 | 659264 | 4930326 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 784 | 3.25 | 0 | 68.89 | 0 | -1.79 | 0 | 0 | 0.55 | 0 | 0 | 0 | 0 | 0 | 0 | 18.09 | 18.09 |
| | INVTR2 | 659731 | 4930601 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 860.8 | 3.25 | 0 | 69.7 | 0 | -1.84 | 0 | 0 | 0.6 | 0 | 0 | 0 | 0 | 0 | 0 | 17.29 | 17.29 |
| | INVTR5 | 659072 | 4930348 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 937.3 | 3.25 | 0 | 70.44 | 0 | -1.89 | 0 | 0 | 0.64 | 0 | 0 | 0 | 0 | 0 | 0 | 16.55 | 16.55 |
| | INVTR1 | 659941 | 4930708 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 978.2 | 3.25 | 0 | 70.81 | 0 | -1.92 | 0 | 0 | 0.67 | 0 | 0 | 0 | 0 | 0 | 0 | 16.19 | 16.19 |
| | INVTR7 | 659392 | 4930640 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 981 | 3.25 | 0 | 70.83 | 0 | -1.92 | 0 | 0 | 0.67 | 0 | 0 | 0 | 0 | 0 | 0 | 16.16 | 16.16 |
| | INVTR6 | 659105 | 4930479 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1004 | 3.25 | 0 | 71.04 | 0 | -1.94 | 0 | 0 | 0.68 | 0 | 0 | 0 | 0 | 0 | 0 | 15.96 | 15.96 |
| Value D/N: | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Level D/N: | 29.1834 | 29.1834 | | | | | | | | | | | | | | | | | | | | | | | | |

Receiver: Existing Potential Noise Receptor
ID: R16
X: 659880
Y: 4929618
Z: 4.5
Ground: 0

| ISO | ID | X | Y | Z | Ground | ReflOrd | LxT | LxN | L/A | Dist. | hm | Freq | Adiv | K0b | Agr | Abar | z | Aatm | Afol | Ahous | Cmet | CmetN | Dc | RL | LtotT | LtotN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INV4 | 659257 | 4930326 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 943.1 | 3.25 | 0 | 70.49 | 0 | -0.27 | 0 | 0 | 10.72 | 0 | 0 | 0 | 0 | 0 | 0 | 19.38 | 19.38 |
| | INV5 | 659066 | 4930348 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1093 | 3.25 | 0 | 71.78 | 0 | -0.2 | 0 | 0 | 11.21 | 0 | 0 | 0 | 0 | 0 | 0 | 17.53 | 17.53 |
| | INV6 | 659098 | 4930479 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1163 | 3.25 | 0 | 72.31 | 0 | -0.17 | 0 | 0 | 11.42 | 0 | 0 | 0 | 0 | 0 | 0 | 16.75 | 16.75 |
| | TRS | 659620 | 4930668 | 2.5 | 0 | 0 | 92 | 92 | 1 | 1082 | 3.5 | 0 | 71.68 | 0 | -0.36 | 0 | 0 | 2.68 | 0 | 0 | 0 | 0 | 0 | 0 | 17.97 | 17.97 |
| | INV3 | 659441 | 4930371 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 871.6 | 3.25 | 0 | 69.81 | 0 | 0.66 | 0 | 0 | 6.07 | 0 | 0 | 0 | 0 | 0 | 0 | 12.53 | 12.53 |
| | INV2 | 659724 | 4930601 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 995.3 | 3.25 | 0 | 70.96 | 0 | 0.68 | 0 | 0 | 6.31 | 0 | 0 | 0 | 0 | 0 | 0 | 11.11 | 11.11 |
| | INV1 | 659934 | 4930708 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1091 | 3.25 | 0 | 71.76 | 0 | 0.7 | 0 | 0 | 6.48 | 0 | 0 | 0 | 0 | 0 | 0 | 10.11 | 10.11 |
| | INV7 | 659398 | 4930640 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1130 | 3.25 | 0 | 72.06 | 0 | 0.71 | 0 | 0 | 6.56 | 0 | 0 | 0 | 0 | 0 | 0 | 9.73 | 9.73 |
| | INVTR3 | 659447 | 4930371 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 868.6 | 3.25 | 0 | 69.78 | 0 | -1.85 | 0 | 0 | 0.6 | 0 | 0 | 0 | 0 | 0 | 0 | 17.21 | 17.21 |
| | INVTR4 | 659264 | 4930326 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 938.5 | 3.25 | 0 | 70.45 | 0 | -1.89 | 0 | 0 | 0.64 | 0 | 0 | 0 | 0 | 0 | 0 | 16.54 | 16.54 |
| | INVTR2 | 659731 | 4930601 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 994.2 | 3.25 | 0 | 70.95 | 0 | -1.93 | 0 | 0 | 0.68 | 0 | 0 | 0 | 0 | 0 | 0 | 16.05 | 16.05 |
| | INVTR5 | 659072 | 4930348 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1089 | 3.25 | 0 | 71.74 | 0 | -1.99 | 0 | 0 | 0.73 | 0 | 0 | 0 | 0 | 0 | 0 | 15.26 | 15.26 |
| | INVTR1 | 659941 | 4930708 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1092 | 3.25 | 0 | 71.76 | 0 | -1.99 | 0 | 0 | 0.73 | 0 | 0 | 0 | 0 | 0 | 0 | 15.24 | 15.24 |
| | INVTR7 | 659392 | 4930640 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1133 | 3.25 | 0 | 72.08 | 0 | -2.01 | 0 | 0 | 0.75 | 0 | 0 | 0 | 0 | 0 | 0 | 14.92 | 14.92 |
| | INVTR6 | 659105 | 4930479 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1158 | 3.25 | 0 | 72.28 | 0 | -2.03 | 0 | 0 | 0.77 | 0 | 0 | 0 | 0 | 0 | 0 | 14.72 | 14.72 |
| Value D/N: | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Level D/N: | 27.5533 | 27.5533 | | | | | | | | | | | | | | | | | | | | | | | | |

Receiver: Existing Potential Noise Receptor
ID: R17
X: 660029
Y: 4929526
Z: 4.5
Ground: 0

| ISO | ID | X | Y | Z | Ground | ReflOrd | LxT | LxN | L/A | Dist. | hm | Freq | Adiv | K0b | Agr | Abar | z | Aatm | Afol | Ahous | Cmet | CmetN | Dc | RL | LtotT | LtotN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INV4 | 659257 | 4930326 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1112 | 3.25 | 0 | 71.92 | 0 | -0.19 | 0 | 0 | 11.26 | 0 | 0 | 0 | 0 | 0 | 0 | 17.32 | 17.32 |
| | INV5 | 659066 | 4930348 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1266 | 3.25 | 0 | 73.05 | 0 | -0.13 | 0 | 0 | 11.71 | 0 | 0 | 0 | 0 | 0 | 0 | 15.68 | 15.68 |
| | INV6 | 659098 | 4930479 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1332 | 3.25 | 0 | 73.49 | 0 | -0.1 | 0 | 0 | 11.89 | 0 | 0 | 0 | 0 | 0 | 0 | 15.03 | 15.03 |
| | TRS | 659620 | 4930668 | 2.5 | 0 | 0 | 92 | 92 | 1 | 1213 | 3.5 | 0 | 72.68 | 0 | -0.33 | 0 | 0 | 2.94 | 0 | 0 | 0 | 0 | 0 | 0 | 16.69 | 16.69 |
| | INV3 | 659441 | 4930371 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1029 | 3.25 | 0 | 71.25 | 0 | 0.69 | 0 | 0 | 6.37 | 0 | 0 | 0 | 0 | 0 | 0 | 10.74 | 10.74 |
| | INV2 | 659724 | 4930601 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1117 | 3.25 | 0 | 71.96 | 0 | 0.71 | 0 | 0 | 6.53 | 0 | 0 | 0 | 0 | 0 | 0 | 9.85 | 9.85 |
| | INV1 | 659934 | 4930708 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1186 | 3.25 | 0 | 72.48 | 0 | 0.72 | 0 | 0 | 6.66 | 0 | 0 | 0 | 0 | 0 | 0 | 9.2 | 9.2 |
| | INV7 | 659398 | 4930640 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1280 | 3.25 | 0 | 73.15 | 0 | 0.74 | 0 | 0 | 6.83 | 0 | 0 | 0 | 0 | 0 | 0 | 8.34 | 8.34 |
| | INVTR3 | 659447 | 4930371 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1026 | 3.25 | 0 | 71.22 | 0 | -1.95 | 0 | 0 | 0.69 | 0 | 0 | 0 | 0 | 0 | 0 | 15.77 | 15.77 |
| | INVTR4 | 659264 | 4930326 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1107 | 3.25 | 0 | 71.88 | 0 | -2 | 0 | 0 | 0.74 | 0 | 0 | 0 | 0 | 0 | 0 | 15.12 | 15.12 |
| | INVTR2 | 659731 | 4930601 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1116 | 3.25 | 0 | 71.95 | 0 | -2 | 0 | 0 | 0.74 | 0 | 0 | 0 | 0 | 0 | 0 | 15.05 | 15.05 |
| | INVTR1 | 659941 | 4930708 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1185 | 3.25 | 0 | 72.48 | 0 | -2.04 | 0 | 0 | 0.78 | 0 | 0 | 0 | 0 | 0 | 0 | 14.52 | 14.52 |
| | INVTR5 | 659072 | 4930348 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1262 | 3.25 | 0 | 73.02 | 0 | -2.08 | 0 | 0 | 0.83 | 0 | 0 | 0 | 0 | 0 | 0 | 13.98 | 13.98 |
| | INVTR7 | 659392 | 4930640 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1283 | 3.25 | 0 | 73.17 | 0 | -2.1 | 0 | 0 | 0.84 | 0 | 0 | 0 | 0 | 0 | 0 | 13.83 | 13.83 |
| | INVTR6 | 659105 | 4930479 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1327 | 3.25 | 0 | 73.46 | 0 | -2.12 | 0 | 0 | 0.86 | 0 | 0 | 0 | 0 | 0 | 0 | 13.54 | 13.54 |
| Value D/N: | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Level D/N: | 26.1111 | 26.1111 | | | | | | | | | | | | | | | | | | | | | | | | |

Receiver: Vacant Lot Receptor
ID: VLR1
X: 660680
Y: 4931477
Z: 4.5
Ground: 0

| ISO | ID | X | Y | Z | Ground | ReflOrd | LxT | LxN | L/A | Dist. | hm | Freq | Adiv | K0b | Agr | Abar | z | Aatm | Afol | Ahous | Cmet | CmetN | Dc | RL | LtotT | LtotN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INV4 | 659257 | 4930326 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1830 | 3.25 | 0 | 76.25 | 0 | 0.08 | 0 | 0 | 13.1 | 0 | 0 | 0 | 0 | 0 | 0 | 10.89 | 10.89 |
| | INV6 | 659098 | 4930479 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1870 | 3.25 | 0 | 76.44 | 0 | 0.09 | 0 | 0 | 13.18 | 0 | 0 | 0 | 0 | 0 | 0 | 10.6 | 10.6 |
| | INV5 | 659066 | 4930348 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1970 | 3.25 | 0 | 76.89 | 0 | 0.12 | 0 | 0 | 13.4 | 0 | 0 | 0 | 0 | 0 | 0 | 9.91 | 9.91 |
| | TRS | 659620 | 4930668 | 2.5 | 0 | 0 | 92 | 92 | 1 | 1333 | 3.5 | 0 | 73.5 | 0 | -0.31 | 0 | 0 | 3.17 | 0 | 0 | 0 | 0 | 0 | 0 | 15.62 | 15.62 |
| | INV1 | 659934 | 4930708 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1071 | 3.25 | 0 | 71.6 | 0 | 0.7 | 0 | 0 | 6.45 | 0 | 0 | 0 | 0 | 0 | 0 | 10.31 | 10.31 |
| | INV2 | 659724 | 4930601 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1297 | 3.25 | 0 | 73.26 | 0 | 0.75 | 0 | 0 | 6.85 | 0 | 0 | 0 | 0 | 0 | 0 | 8.2 | 8.2 |
| | INV7 | 659398 | 4930640 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1531 | 3.25 | 0 | 74.7 | 0 | 0.8 | 0 | 0 | 7.26 | 0 | 0 | 0 | 0 | 0 | 0 | 6.3 | 6.3 |
| | INVTR1 | 659941 | 4930708 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1067 | 3.25 | 0 | 71.56 | 0 | -1.97 | 0 | 0 | 0.72 | 0 | 0 | 0 | 0 | 0 | 0 | 15.44 | 15.44 |
| | INV3 | 659441 | 4930371 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1661 | 3.25 | 0 | 75.41 | 0 | 0.83 | 0 | 0 | 7.48 | 0 | 0 | 0 | 0 | 0 | 0 | 5.34 | 5.34 |
| | INVTR2 | 659731 | 4930601 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1292 | 3.25 | 0 | 73.22 | 0 | -2.1 | 0 | 0 | 0.84 | 0 | 0 | 0 | 0 | 0 | 0 | 13.78 | 13.78 |
| | INVTR7 | 659392 | 4930640 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1536 | 3.25 | 0 | 74.73 | 0 | -2.22 | 0 | 0 | 0.97 | 0 | 0 | 0 | 0 | 0 | 0 | 12.26 | 12.26 |
| | INVTR3 | 659447 | 4930371 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1656 | 3.25 | 0 | 75.38 | 0 | -2.27 | 0 | 0 | 1.04 | 0 | 0 | 0 | 0 | 0 | 0 | 11.59 | 11.59 |
| | INVTR4 | 659264 | 4930326 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1825 | 3.25 | 0 | 76.22 | 0 | -2.34 | 0 | 0 | 1.12 | 0 | 0 | 0 | 0 | 0 | 0 | 10.74 | 10.74 |
| | INVTR6 | 659105 | 4930479 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1865 | 3.25 | 0 | 76.41 | 0 | -2.35 | 0 | 0 | 1.14 | 0 | 0 | 0 | 0 | 0 | 0 | 10.54 | 10.54 |
| | INVTR5 | 659072 | 4930348 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1965 | 3.25 | 0 | 76.87 | 0 | -2.39 | 0 | 0 | 1.19 | 0 | 0 | 0 | 0 | 0 | 0 | 10.08 | 10.08 |
| Value D/N: | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Level D/N: | 23.3938 | 23.3938 | | | | | | | | | | | | | | | | | | | | | | | | |

Receiver: Vacant Lot Receptor
ID: VLR2
X: 661045

Y: 4930807
Z: 4.5
Ground: 0

| ISO | ID | X | Y | Z | Ground | ReflOrd | LxT | LxN | L/A | Dist. | hm | Freq | Adiv | K0b | Agr | Abar | z | Aatm | Afol | Ahous | Cmet | CmetN | Dc | RL | LtotT | LtotN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INV4 | 659257 | 4930326 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1852 | 3.25 | 0 | 76.35 | 0 | 0.09 | 0 | 0 | 13.14 | 0 | 0 | 0 | 0 | 0 | 0 | 10.73 | 10.73 |
| | INV6 | 659098 | 4930479 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1974 | 3.25 | 0 | 76.91 | 0 | 0.12 | 0 | 0 | 13.41 | 0 | 0 | 0 | 0 | 0 | 0 | 9.87 | 9.87 |
| | TRS | 659620 | 4930668 | 2.5 | 0 | 0 | 92 | 92 | 1 | 1432 | 3.5 | 0 | 74.12 | 0 | -0.29 | 0 | 0 | 3.36 | 0 | 0 | 0 | 0 | 0 | 0 | 14.79 | 14.79 |
| | INV1 | 659934 | 4930708 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1115 | 3.25 | 0 | 71.95 | 0 | 0.71 | 0 | 0 | 6.53 | 0 | 0 | 0 | 0 | 0 | 0 | 9.87 | 9.87 |
| | INV2 | 659724 | 4930601 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1337 | 3.25 | 0 | 73.52 | 0 | 0.76 | 0 | 0 | 6.93 | 0 | 0 | 0 | 0 | 0 | 0 | 7.85 | 7.85 |
| | INVTR1 | 659941 | 4930708 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1108 | 3.25 | 0 | 71.89 | 0 | -2 | 0 | 0 | 0.74 | 0 | 0 | 0 | 0 | 0 | 0 | 15.1 | 15.1 |
| | INV7 | 659398 | 4930640 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1655 | 3.25 | 0 | 75.38 | 0 | 0.83 | 0 | 0 | 7.47 | 0 | 0 | 0 | 0 | 0 | 0 | 5.38 | 5.38 |
| | INV3 | 659441 | 4930371 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1662 | 3.25 | 0 | 75.41 | 0 | 0.83 | 0 | 0 | 7.48 | 0 | 0 | 0 | 0 | 0 | 0 | 5.33 | 5.33 |
| | INVTR2 | 659731 | 4930601 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1330 | 3.25 | 0 | 73.48 | 0 | -2.12 | 0 | 0 | 0.86 | 0 | 0 | 0 | 0 | 0 | 0 | 13.52 | 13.52 |
| | INVTR3 | 659447 | 4930371 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1656 | 3.25 | 0 | 75.38 | 0 | -2.27 | 0 | 0 | 1.04 | 0 | 0 | 0 | 0 | 0 | 0 | 11.59 | 11.59 |
| | INVTR7 | 659392 | 4930640 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1661 | 3.25 | 0 | 75.41 | 0 | -2.27 | 0 | 0 | 1.04 | 0 | 0 | 0 | 0 | 0 | 0 | 11.57 | 11.57 |
| | INVTR4 | 659264 | 4930326 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1845 | 3.25 | 0 | 76.32 | 0 | -2.35 | 0 | 0 | 1.13 | 0 | 0 | 0 | 0 | 0 | 0 | 10.64 | 10.64 |
| | INVTR6 | 659105 | 4930479 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1968 | 3.25 | 0 | 76.88 | 0 | -2.39 | 0 | 0 | 1.19 | 0 | 0 | 0 | 0 | 0 | 0 | 10.07 | 10.07 |
| Value D/N: | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Level D/N: | 22.5475 | 22.5475 | | | | | | | | | | | | | | | | | | | | | | | | |

Receiver: Vacant Lot Receptor
ID: VLR3
X: 660927
Y: 4930766
Z: 4.5
Ground: 0

| ISO | ID | X | Y | Z | Ground | ReflOrd | LxT | LxN | L/A | Dist. | hm | Freq | Adiv | K0b | Agr | Abar | z | Aatm | Afol | Ahous | Cmet | CmetN | Dc | RL | LtotT | LtotN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INV4 | 659257 | 4930326 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1727 | 3.25 | 0 | 75.75 | 0 | 0.05 | 0 | 0 | 12.86 | 0 | 0 | 0 | 0 | 0 | 0 | 11.66 | 11.66 |
| | INV6 | 659098 | 4930479 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1851 | 3.25 | 0 | 76.35 | 0 | 0.09 | 0 | 0 | 13.14 | 0 | 0 | 0 | 0 | 0 | 0 | 10.73 | 10.73 |
| | INV5 | 659066 | 4930348 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1907 | 3.25 | 0 | 76.61 | 0 | 0.1 | 0 | 0 | 13.26 | 0 | 0 | 0 | 0 | 0 | 0 | 10.34 | 10.34 |
| | TRS | 659620 | 4930668 | 2.5 | 0 | 0 | 92 | 92 | 1 | 1311 | 3.5 | 0 | 73.35 | 0 | -0.32 | 0 | 0 | 3.13 | 0 | 0 | 0 | 0 | 0 | 0 | 15.81 | 15.81 |
| | INV1 | 659934 | 4930708 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 994.7 | 3.25 | 0 | 70.95 | 0 | 0.68 | 0 | 0 | 6.31 | 0 | 0 | 0 | 0 | 0 | 0 | 11.12 | 11.12 |
| | INV2 | 659724 | 4930601 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1214 | 3.25 | 0 | 72.69 | 0 | 0.73 | 0 | 0 | 6.71 | 0 | 0 | 0 | 0 | 0 | 0 | 8.93 | 8.93 |
| | INVTR1 | 659941 | 4930708 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 987.7 | 3.25 | 0 | 70.89 | 0 | -1.93 | 0 | 0 | 0.67 | 0 | 0 | 0 | 0 | 0 | 0 | 16.1 | 16.1 |
| | INV7 | 659398 | 4930640 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1534 | 3.25 | 0 | 74.72 | 0 | 0.8 | 0 | 0 | 7.27 | 0 | 0 | 0 | 0 | 0 | 0 | 6.27 | 6.27 |
| | INV3 | 659441 | 4930371 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1538 | 3.25 | 0 | 74.74 | 0 | 0.8 | 0 | 0 | 7.27 | 0 | 0 | 0 | 0 | 0 | 0 | 6.25 | 6.25 |
| | INVTR2 | 659731 | 4930601 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1207 | 3.25 | 0 | 72.64 | 0 | -2.05 | 0 | 0 | 0.8 | 0 | 0 | 0 | 0 | 0 | 0 | 14.36 | 14.36 |
| | INVTR3 | 659447 | 4930371 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1532 | 3.25 | 0 | 74.7 | 0 | -2.22 | 0 | 0 | 0.97 | 0 | 0 | 0 | 0 | 0 | 0 | 12.28 | 12.28 |
| | INVTR7 | 659392 | 4930640 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1540 | 3.25 | 0 | 74.75 | 0 | -2.22 | 0 | 0 | 0.98 | 0 | 0 | 0 | 0 | 0 | 0 | 12.24 | 12.24 |
| | INVTR4 | 659264 | 4930326 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1720 | 3.25 | 0 | 75.71 | 0 | -2.3 | 0 | 0 | 1.07 | 0 | 0 | 0 | 0 | 0 | 0 | 11.26 | 11.26 |
| | INVTR6 | 659105 | 4930479 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1844 | 3.25 | 0 | 76.32 | 0 | -2.35 | 0 | 0 | 1.13 | 0 | 0 | 0 | 0 | 0 | 0 | 10.64 | 10.64 |
| | INVTR5 | 659072 | 4930348 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1902 | 3.25 | 0 | 76.58 | 0 | -2.37 | 0 | 0 | 1.16 | 0 | 0 | 0 | 0 | 0 | 0 | 10.37 | 10.37 |
| Value D/N: | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Level D/N: | 23.8416 | 23.8416 | | | | | | | | | | | | | | | | | | | | | | | | |

Receiver: Vacant Lot Receptor
ID: VLR4
X: 658273
Y: 4930433
Z: 4.5
Ground: 0

| ISO | ID | X | Y | Z | Ground | ReflOrd | LxT | LxN | L/A | Dist. | hm | Freq | Adiv | K0b | Agr | Abar | z | Aatm | Afol | Ahous | Cmet | CmetN | Dc | RL | LtotT | LtotN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INV5 | 659066 | 4930348 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 797.6 | 3.25 | 0 | 69.04 | 0 | -0.35 | 0 | 0 | 10.17 | 0 | 0 | 0 | 0 | 0 | 0 | 21.46 | 21.46 |
| | INV6 | 659098 | 4930479 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 826.3 | 3.25 | 0 | 69.34 | 0 | -0.34 | 0 | 0 | 10.29 | 0 | 0 | 0 | 0 | 0 | 0 | 21.02 | 21.02 |
| | INV4 | 659257 | 4930326 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 989.8 | 3.25 | 0 | 70.91 | 0 | -0.25 | 0 | 0 | 10.88 | 0 | 0 | 0 | 0 | 0 | 0 | 18.78 | 18.78 |
| | TRS | 659620 | 4930668 | 2.5 | 0 | 0 | 92 | 92 | 1 | 1367 | 3.5 | 0 | 73.72 | 0 | -0.3 | 0 | 0 | 3.24 | 0 | 0 | 0 | 0 | 0 | 0 | 15.33 | 15.33 |
| | INV7 | 659398 | 4930640 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1144 | 3.25 | 0 | 72.17 | 0 | 0.72 | 0 | 0 | 6.58 | 0 | 0 | 0 | 0 | 0 | 0 | 9.59 | 9.59 |
| | INV3 | 659441 | 4930371 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1170 | 3.25 | 0 | 72.36 | 0 | 0.72 | 0 | 0 | 6.63 | 0 | 0 | 0 | 0 | 0 | 0 | 9.35 | 9.35 |
| | INVTR5 | 659072 | 4930348 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 803.5 | 3.25 | 0 | 69.1 | 0 | -1.8 | 0 | 0 | 0.56 | 0 | 0 | 0 | 0 | 0 | 0 | 17.88 | 17.88 |
| | INVTR6 | 659105 | 4930479 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 833.3 | 3.25 | 0 | 69.42 | 0 | -1.82 | 0 | 0 | 0.58 | 0 | 0 | 0 | 0 | 0 | 0 | 17.57 | 17.57 |
| | INVTR4 | 659264 | 4930326 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 996.8 | 3.25 | 0 | 70.97 | 0 | -1.93 | 0 | 0 | 0.68 | 0 | 0 | 0 | 0 | 0 | 0 | 16.02 | 16.02 |
| | INV2 | 659724 | 4930601 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1461 | 3.25 | 0 | 74.29 | 0 | 0.78 | 0 | 0 | 7.14 | 0 | 0 | 0 | 0 | 0 | 0 | 6.84 | 6.84 |
| | INVTR7 | 659392 | 4930640 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1138 | 3.25 | 0 | 72.12 | 0 | -2.02 | 0 | 0 | 0.76 | 0 | 0 | 0 | 0 | 0 | 0 | 14.88 | 14.88 |
| | INV1 | 659934 | 4930708 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1684 | 3.25 | 0 | 75.52 | 0 | 0.83 | 0 | 0 | 7.52 | 0 | 0 | 0 | 0 | 0 | 0 | 5.18 | 5.18 |
| | INVTR3 | 659447 | 4930371 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1176 | 3.25 | 0 | 72.41 | 0 | -2.04 | 0 | 0 | 0.78 | 0 | 0 | 0 | 0 | 0 | 0 | 14.59 | 14.59 |
| | INVTR2 | 659731 | 4930601 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1468 | 3.25 | 0 | 74.33 | 0 | -2.19 | 0 | 0 | 0.94 | 0 | 0 | 0 | 0 | 0 | 0 | 12.66 | 12.66 |
| | INVTR1 | 659941 | 4930708 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1691 | 3.25 | 0 | 75.56 | 0 | -2.29 | 0 | 0 | 1.05 | 0 | 0 | 0 | 0 | 0 | 0 | 11.41 | 11.41 |
| Value D/N: 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Level D/N: 28.1433 | 28.1433 | | | | | | | | | | | | | | | | | | | | | | | | | |

Receiver: Vacant Lot Receptor
ID: VLR5
X: 659702
Y: 4930373
Z: 4.5
Ground: 0

| ISO | ID | X | Y | Z | Ground | ReflOrd | LxT | LxN | L/A | Dist. | hm | Freq | Adiv | K0b | Agr | Abar | z | Aatm | Afol | Ahous | Cmet | CmetN | Dc | RL | LtotT | LtotN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INV4 | 659257 | 4930326 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 447.5 | 3.25 | 0 | 64.02 | 0 | -0.59 | 0 | 0 | 8.08 | 0 | 0 | 0 | 0 | 0 | 0 | 28.8 | 28.8 |
| | INV6 | 659098 | 4930479 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 613.2 | 3.25 | 0 | 66.75 | 0 | -0.47 | 0 | 0 | 9.28 | 0 | 0 | 0 | 0 | 0 | 0 | 24.75 | 24.75 |
| | INV5 | 659066 | 4930348 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 636.5 | 3.25 | 0 | 67.08 | 0 | -0.45 | 0 | 0 | 9.41 | 0 | 0 | 0 | 0 | 0 | 0 | 24.28 | 24.28 |
| | TRS | 659620 | 4930668 | 2.5 | 0 | 0 | 92 | 92 | 1 | 306.2 | 3.5 | 0 | 60.72 | 0 | -0.24 | 0 | 0 | 0.95 | 0 | 0 | 0 | 0 | 0 | 0 | 30.55 | 30.55 |
| | INV2 | 659724 | 4930601 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 229.1 | 3.25 | 0 | 58.2 | 0 | 0.33 | 0 | 0 | 3.53 | 0 | 0 | 0 | 0 | 0 | 0 | 27 | 27 |
| | INV3 | 659441 | 4930371 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 261 | 3.25 | 0 | 59.33 | 0 | 0.34 | 0 | 0 | 3.82 | 0 | 0 | 0 | 0 | 0 | 0 | 25.56 | 25.56 |
| | INVTR2 | 659731 | 4930601 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 229.9 | 3.25 | 0 | 58.23 | 0 | -0.63 | 0 | 0 | 0.18 | 0 | 0 | 0 | 0 | 0 | 0 | 27.96 | 27.96 |
| | INVTR3 | 659447 | 4930371 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 255 | 3.25 | 0 | 59.13 | 0 | -0.79 | 0 | 0 | 0.2 | 0 | 0 | 0 | 0 | 0 | 0 | 27.2 | 27.2 |
| | INV7 | 659398 | 4930640 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 404.6 | 3.25 | 0 | 63.14 | 0 | 0.46 | 0 | 0 | 4.75 | 0 | 0 | 0 | 0 | 0 | 0 | 20.7 | 20.7 |
| | INV1 | 659934 | 4930708 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 407.5 | 3.25 | 0 | 63.2 | 0 | 0.46 | 0 | 0 | 4.77 | 0 | 0 | 0 | 0 | 0 | 0 | 20.63 | 20.63 |
| | INVTR7 | 659392 | 4930640 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 409.1 | 3.25 | 0 | 63.24 | 0 | -1.35 | 0 | 0 | 0.31 | 0 | 0 | 0 | 0 | 0 | 0 | 23.54 | 23.54 |
| | INVTR1 | 659941 | 4930708 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 411.5 | 3.25 | 0 | 63.29 | 0 | -1.36 | 0 | 0 | 0.31 | 0 | 0 | 0 | 0 | 0 | 0 | 23.5 | 23.5 |
| | INVTR4 | 659264 | 4930326 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 440.5 | 3.25 | 0 | 63.88 | 0 | -1.41 | 0 | 0 | 0.33 | 0 | 0 | 0 | 0 | 0 | 0 | 22.94 | 22.94 |

| | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INVTR6 | 659105 | 4930479 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 606.3 | 3.25 | 0 | 66.65 | 0 | -1.64 | 0 | 0 | 0.44 | 0 | 0 | 0 | 0 | 0 | 0 | 20.28 | 20.28 |
| | INVTR5 | 659072 | 4930348 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 630.5 | 3.25 | 0 | 66.99 | 0 | -1.66 | 0 | 0 | 0.46 | 0 | 0 | 0 | 0 | 0 | 0 | 19.95 | 19.95 |
| Value D/N: | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Level D/N: | 37.4465 | 37.4465 | | | | | | | | | | | | | | | | | | | | | | | | |

Receiver: Vacant Lot Receptor
ID: VLR6
X: 658177
Y: 4930391
Z: 4.5
Ground: 0

| ISO | ID | X | Y | Z | Ground | ReflOrd | LxT | LxN | L/A | Dist. | hm | Freq | Adiv | K0b | Agr | Abar | z | Aatm | Afol | Ahous | Cmet | CmetN | Dc | RL | LtotT | LtotN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INV5 | 659066 | 4930348 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 890 | 3.25 | 0 | 69.99 | 0 | -0.3 | 0 | 0 | 10.53 | 0 | 0 | 0 | 0 | 0 | 0 | 20.1 | 20.1 |
| | INV6 | 659098 | 4930479 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 925.2 | 3.25 | 0 | 70.32 | 0 | -0.28 | 0 | 0 | 10.66 | 0 | 0 | 0 | 0 | 0 | 0 | 19.62 | 19.62 |
| | INV4 | 659257 | 4930326 | 2 | 0 | 0 | 100.3 | 100.3 | 1 | 1082 | 3.25 | 0 | 71.68 | 0 | -0.21 | 0 | 0 | 11.17 | 0 | 0 | 0 | 0 | 0 | 0 | 17.66 | 17.66 |
| | TRS | 659620 | 4930668 | 2.5 | 0 | 0 | 92 | 92 | 1 | 1469 | 3.5 | 0 | 74.34 | 0 | -0.28 | 0 | 0 | 3.43 | 0 | 0 | 0 | 0 | 0 | 0 | 14.49 | 14.49 |
| | INV7 | 659398 | 4930640 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1246 | 3.25 | 0 | 72.91 | 0 | 0.74 | 0 | 0 | 6.76 | 0 | 0 | 0 | 0 | 0 | 0 | 8.64 | 8.64 |
| | INV3 | 659441 | 4930371 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1264 | 3.25 | 0 | 73.04 | 0 | 0.74 | 0 | 0 | 6.8 | 0 | 0 | 0 | 0 | 0 | 0 | 8.48 | 8.48 |
| | INVTR5 | 659072 | 4930348 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 896 | 3.25 | 0 | 70.05 | 0 | -1.87 | 0 | 0 | 0.62 | 0 | 0 | 0 | 0 | 0 | 0 | 16.94 | 16.94 |
| | INVTR6 | 659105 | 4930479 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 932.2 | 3.25 | 0 | 70.39 | 0 | -1.89 | 0 | 0 | 0.64 | 0 | 0 | 0 | 0 | 0 | 0 | 16.6 | 16.6 |
| | INV2 | 659724 | 4930601 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1561 | 3.25 | 0 | 74.87 | 0 | 0.81 | 0 | 0 | 7.31 | 0 | 0 | 0 | 0 | 0 | 0 | 6.07 | 6.07 |
| | INVTR4 | 659264 | 4930326 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1089 | 3.25 | 0 | 71.74 | 0 | -1.99 | 0 | 0 | 0.73 | 0 | 0 | 0 | 0 | 0 | 0 | 15.26 | 15.26 |
| | INV1 | 659934 | 4930708 | 2 | 0 | 0 | 89.1 | 89.1 | 1 | 1785 | 3.25 | 0 | 76.03 | 0 | 0.86 | 0 | 0 | 7.69 | 0 | 0 | 0 | 0 | 0 | 0 | 4.48 | 4.48 |
| | INVTR7 | 659392 | 4930640 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1240 | 3.25 | 0 | 72.87 | 0 | -2.07 | 0 | 0 | 0.81 | 0 | 0 | 0 | 0 | 0 | 0 | 14.13 | 14.13 |
| | INVTR3 | 659447 | 4930371 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1270 | 3.25 | 0 | 73.08 | 0 | -2.09 | 0 | 0 | 0.83 | 0 | 0 | 0 | 0 | 0 | 0 | 13.92 | 13.92 |
| | INVTR2 | 659731 | 4930601 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1568 | 3.25 | 0 | 74.91 | 0 | -2.23 | 0 | 0 | 0.99 | 0 | 0 | 0 | 0 | 0 | 0 | 12.08 | 12.08 |
| | INVTR1 | 659941 | 4930708 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 1792 | 3.25 | 0 | 76.07 | 0 | -2.33 | 0 | 0 | 1.1 | 0 | 0 | 0 | 0 | 0 | 0 | 10.9 | 10.9 |
| Value D/N: | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Level D/N: | 27.0691 | 27.0691 | | | | | | | | | | | | | | | | | | | | | | | | |

**Receiver:** Existing Potential Noise Receptor
**ID:** R5
**X:** 659683
**Y:** 4930452
**Z:** 4.5
**Ground:** 0

**Octave Spectra for the most impacted receptor: R5**

| ISO | Description | ID | X | Y | Z | Ground | ReflOrd | LxT | LxN | L/A | Dist. | hm | Freq | Adiv | K0b | Agr | Abar | z | Aatm | Afol | Ahous | Cmet | CmetN | Dc | RL | LtotT | LtotN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | INV4 | 659257 | 4930326 | 2 | 0 | 0 | 59.8 | 59.8 | 1 | 444.3 | 3.25 | 32 | 63.95 | 0 | -4.68 | 0 | 0 | 0.01 | 0 | 0 | 0 | 0 | 0 | 0 | 0.52 | 0.52 |
| | | INV4 | 659257 | 4930326 | 2 | 0 | 0 | 65.9 | 65.9 | 1 | 444.3 | 3.25 | 63 | 63.95 | 0 | -4.68 | 0 | 0 | 0.05 | 0 | 0 | 0 | 0 | 0 | 0 | 6.58 | 6.58 |
| | | INV4 | 659257 | 4930326 | 2 | 0 | 0 | 73.6 | 73.6 | 1 | 444.3 | 3.25 | 125 | 63.95 | 0 | 2.8 | 0 | 0 | 0.18 | 0 | 0 | 0 | 0 | 0 | 0 | 6.66 | 6.66 |
| | | INV4 | 659257 | 4930326 | 2 | 0 | 0 | 82.6 | 82.6 | 1 | 444.3 | 3.25 | 250 | 63.95 | 0 | 3.77 | 0 | 0 | 0.46 | 0 | 0 | 0 | 0 | 0 | 0 | 14.42 | 14.42 |
| | | INV4 | 659257 | 4930326 | 2 | 0 | 0 | 88.1 | 88.1 | 1 | 444.3 | 3.25 | 500 | 63.95 | 0 | 0.15 | 0 | 0 | 0.86 | 0 | 0 | 0 | 0 | 0 | 0 | 23.14 | 23.14 |
| | | INV4 | 659257 | 4930326 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 444.3 | 3.25 | 1000 | 63.95 | 0 | -1.31 | 0 | 0 | 1.62 | 0 | 0 | 0 | 0 | 0 | 0 | 21.43 | 21.43 |
| | | INV4 | 659257 | 4930326 | 2 | 0 | 0 | 90.6 | 90.6 | 1 | 444.3 | 3.25 | 2000 | 63.95 | 0 | -1.4 | 0 | 0 | 4.29 | 0 | 0 | 0 | 0 | 0 | 0 | 23.76 | 23.76 |
| | | INV4 | 659257 | 4930326 | 2 | 0 | 0 | 99 | 99 | 1 | 444.3 | 3.25 | 4000 | 63.95 | 0 | -1.4 | 0 | 0 | 14.56 | 0 | 0 | 0 | 0 | 0 | 0 | 21.89 | 21.89 |
| | | INV4 | 659257 | 4930326 | 2 | 0 | 0 | 86.3 | 86.3 | 1 | 444.3 | 3.25 | 8000 | 63.95 | 0 | -1.4 | 0 | 0 | 51.92 | 0 | 0 | 0 | 0 | 0 | 0 | -28.17 | -28.17 |
| | | INV2 | 659724 | 4930601 | 2 | 0 | 0 | 69.6 | 69.6 | 1 | 154.6 | 3.25 | 125 | 54.78 | 0 | 1.95 | 0 | 0 | 0.06 | 0 | 0 | 0 | 0 | 0 | 0 | 12.81 | 12.81 |
| | | INV2 | 659724 | 4930601 | 2 | 0 | 0 | 78.6 | 78.6 | 1 | 154.6 | 3.25 | 250 | 54.78 | 0 | 4.04 | 0 | 0 | 0.16 | 0 | 0 | 0 | 0 | 0 | 0 | 19.62 | 19.62 |
| | | INV2 | 659724 | 4930601 | 2 | 0 | 0 | 82.1 | 82.1 | 1 | 154.6 | 3.25 | 500 | 54.78 | 0 | 0.59 | 0 | 0 | 0.3 | 0 | 0 | 0 | 0 | 0 | 0 | 26.43 | 26.43 |
| | | INV2 | 659724 | 4930601 | 2 | 0 | 0 | 75.7 | 75.7 | 1 | 154.6 | 3.25 | 1000 | 54.78 | 0 | -0.81 | 0 | 0 | 0.57 | 0 | 0 | 0 | 0 | 0 | 0 | 21.16 | 21.16 |
| | | INV2 | 659724 | 4930601 | 2 | 0 | 0 | 73.6 | 73.6 | 1 | 154.6 | 3.25 | 2000 | 54.78 | 0 | -0.9 | 0 | 0 | 1.49 | 0 | 0 | 0 | 0 | 0 | 0 | 18.22 | 18.22 |
| | | INV2 | 659724 | 4930601 | 2 | 0 | 0 | 87 | 87 | 1 | 154.6 | 3.25 | 4000 | 54.78 | 0 | -0.9 | 0 | 0 | 5.06 | 0 | 0 | 0 | 0 | 0 | 0 | 28.05 | 28.05 |
| | | INV6 | 659098 | 4930479 | 2 | 0 | 0 | 59.8 | 59.8 | 1 | 585.6 | 3.25 | 32 | 66.35 | 0 | -5 | 0 | 0 | 0.02 | 0 | 0 | 0 | 0 | 0 | 0 | -1.57 | -1.57 |
| | | INV6 | 659098 | 4930479 | 2 | 0 | 0 | 65.9 | 65.9 | 1 | 585.6 | 3.25 | 63 | 66.35 | 0 | -5 | 0 | 0 | 0.07 | 0 | 0 | 0 | 0 | 0 | 0 | 4.48 | 4.48 |
| | | INV6 | 659098 | 4930479 | 2 | 0 | 0 | 73.6 | 73.6 | 1 | 585.6 | 3.25 | 125 | 66.35 | 0 | 3.37 | 0 | 0 | 0.24 | 0 | 0 | 0 | 0 | 0 | 0 | 3.64 | 3.64 |
| | | INV6 | 659098 | 4930479 | 2 | 0 | 0 | 82.6 | 82.6 | 1 | 585.6 | 3.25 | 250 | 66.35 | 0 | 3.67 | 0 | 0 | 0.61 | 0 | 0 | 0 | 0 | 0 | 0 | 11.96 | 11.96 |
| | | INV6 | 659098 | 4930479 | 2 | 0 | 0 | 88.1 | 88.1 | 1 | 585.6 | 3.25 | 500 | 66.35 | 0 | 0.06 | 0 | 0 | 1.13 | 0 | 0 | 0 | 0 | 0 | 0 | 20.56 | 20.56 |
| | | INV6 | 659098 | 4930479 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 585.6 | 3.25 | 1000 | 66.35 | 0 | -1.4 | 0 | 0 | 2.14 | 0 | 0 | 0 | 0 | 0 | 0 | 18.61 | 18.61 |
| | | INV6 | 659098 | 4930479 | 2 | 0 | 0 | 90.6 | 90.6 | 1 | 585.6 | 3.25 | 2000 | 66.35 | 0 | -1.5 | 0 | 0 | 5.66 | 0 | 0 | 0 | 0 | 0 | 0 | 20.09 | 20.09 |
| | | INV6 | 659098 | 4930479 | 2 | 0 | 0 | 99 | 99 | 1 | 585.6 | 3.25 | 4000 | 66.35 | 0 | -1.5 | 0 | 0 | 19.19 | 0 | 0 | 0 | 0 | 0 | 0 | 14.96 | 14.96 |
| | | INV6 | 659098 | 4930479 | 2 | 0 | 0 | 86.3 | 86.3 | 1 | 585.6 | 3.25 | 8000 | 66.35 | 0 | -1.5 | 0 | 0 | 68.45 | 0 | 0 | 0 | 0 | 0 | 0 | -47 | -47 |
| | | TRS | 659620 | 4930668 | 2.5 | 0 | 0 | 49.2 | 49.2 | 1 | 225 | 3.5 | 32 | 58.04 | 0 | -3.2 | 0 | 0 | 0.01 | 0 | 0 | 0 | 0 | 0 | 0 | -5.65 | -5.65 |
| | | TRS | 659620 | 4930668 | 2.5 | 0 | 0 | 68.4 | 68.4 | 1 | 225 | 3.5 | 63 | 58.04 | 0 | -3.2 | 0 | 0 | 0.03 | 0 | 0 | 0 | 0 | 0 | 0 | 13.53 | 13.53 |
| | | TRS | 659620 | 4930668 | 2.5 | 0 | 0 | 80.5 | 80.5 | 1 | 225 | 3.5 | 125 | 58.04 | 0 | 2.42 | 0 | 0 | 0.09 | 0 | 0 | 0 | 0 | 0 | 0 | 19.94 | 19.94 |
| | | TRS | 659620 | 4930668 | 2.5 | 0 | 0 | 83 | 83 | 1 | 225 | 3.5 | 250 | 58.04 | 0 | 3.39 | 0 | 0 | 0.23 | 0 | 0 | 0 | 0 | 0 | 0 | 21.33 | 21.33 |
| | | TRS | 659620 | 4930668 | 2.5 | 0 | 0 | 88.4 | 88.4 | 1 | 225 | 3.5 | 500 | 58.04 | 0 | -0.41 | 0 | 0 | 0.43 | 0 | 0 | 0 | 0 | 0 | 0 | 30.33 | 30.33 |
| | | TRS | 659620 | 4930668 | 2.5 | 0 | 0 | 85.6 | 85.6 | 1 | 225 | 3.5 | 1000 | 58.04 | 0 | -0.95 | 0 | 0 | 0.82 | 0 | 0 | 0 | 0 | 0 | 0 | 27.68 | 27.68 |
| | | TRS | 659620 | 4930668 | 2.5 | 0 | 0 | 81.8 | 81.8 | 1 | 225 | 3.5 | 2000 | 58.04 | 0 | -0.96 | 0 | 0 | 2.17 | 0 | 0 | 0 | 0 | 0 | 0 | 22.54 | 22.54 |
| | | TRS | 659620 | 4930668 | 2.5 | 0 | 0 | 76.6 | 76.6 | 1 | 225 | 3.5 | 4000 | 58.04 | 0 | -0.96 | 0 | 0 | 7.37 | 0 | 0 | 0 | 0 | 0 | 0 | 12.14 | 12.14 |
| | | TRS | 659620 | 4930668 | 2.5 | 0 | 0 | 67.5 | 67.5 | 1 | 225 | 3.5 | 8000 | 58.04 | 0 | -0.96 | 0 | 0 | 26.3 | 0 | 0 | 0 | 0 | 0 | 0 | -15.88 | -15.88 |
| | | INV5 | 659066 | 4930348 | 2 | 0 | 0 | 59.8 | 59.8 | 1 | 625.7 | 3.25 | 32 | 66.93 | 0 | -5.07 | 0 | 0 | 0.02 | 0 | 0 | 0 | 0 | 0 | 0 | -2.08 | -2.08 |
| | | INV5 | 659066 | 4930348 | 2 | 0 | 0 | 65.9 | 65.9 | 1 | 625.7 | 3.25 | 63 | 66.93 | 0 | -5.07 | 0 | 0 | 0.08 | 0 | 0 | 0 | 0 | 0 | 0 | 3.96 | 3.96 |
| | | INV5 | 659066 | 4930348 | 2 | 0 | 0 | 73.6 | 73.6 | 1 | 625.7 | 3.25 | 125 | 66.93 | 0 | 3.51 | 0 | 0 | 0.26 | 0 | 0 | 0 | 0 | 0 | 0 | 2.9 | 2.9 |
| | | INV5 | 659066 | 4930348 | 2 | 0 | 0 | 82.6 | 82.6 | 1 | 625.7 | 3.25 | 250 | 66.93 | 0 | 3.65 | 0 | 0 | 0.65 | 0 | 0 | 0 | 0 | 0 | 0 | 11.37 | 11.37 |

| | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INV5 | 659066 | 4930348 | 2 | 0 | 0 | 88.1 | 88.1 | 1 | 625.7 | 3.25 | 500 | 66.93 | 0 | 0.04 | 0 | 0 | 1.21 | 0 | 0 | 0 | 0 | 0 | 0 | 19.93 | 19.93 |
| INV5 | 659066 | 4930348 | 2 | 0 | 0 | 85.7 | 85.7 | 1 | 625.7 | 3.25 | 1000 | 66.93 | 0 | -1.42 | 0 | 0 | 2.29 | 0 | 0 | 0 | 0 | 0 | 0 | 17.91 | 17.91 |
| INV5 | 659066 | 4930348 | 2 | 0 | 0 | 90.6 | 90.6 | 1 | 625.7 | 3.25 | 2000 | 66.93 | 0 | -1.52 | 0 | 0 | 6.05 | 0 | 0 | 0 | 0 | 0 | 0 | 19.15 | 19.15 |
| INV5 | 659066 | 4930348 | 2 | 0 | 0 | 99 | 99 | 1 | 625.7 | 3.25 | 4000 | 66.93 | 0 | -1.52 | 0 | 0 | 20.5 | 0 | 0 | 0 | 0 | 0 | 0 | 13.09 | 13.09 |
| INV5 | 659066 | 4930348 | 2 | 0 | 0 | 86.3 | 86.3 | 1 | 625.7 | 3.25 | 8000 | 66.93 | 0 | -1.52 | 0 | 0 | 73.13 | 0 | 0 | 0 | 0 | 0 | 0 | -52.24 | -52.24 |
| INVTR2 | 659731 | 4930601 | 2 | 0 | 0 | 73.7 | 73.7 | 1 | 156.6 | 3.25 | 32 | 54.89 | 0 | -3 | 0 | 0 | 0.01 | 0 | 0 | 0 | 0 | 0 | 0 | 21.8 | 21.8 |
| INVTR2 | 659731 | 4930601 | 2 | 0 | 0 | 79.7 | 79.7 | 1 | 156.6 | 3.25 | 63 | 54.89 | 0 | -3 | 0 | 0 | 0.02 | 0 | 0 | 0 | 0 | 0 | 0 | 27.79 | 27.79 |
| INVTR2 | 659731 | 4930601 | 2 | 0 | 0 | 81.7 | 81.7 | 1 | 156.6 | 3.25 | 125 | 54.89 | 0 | 1.96 | 0 | 0 | 0.06 | 0 | 0 | 0 | 0 | 0 | 0 | 24.78 | 24.78 |
| INVTR2 | 659731 | 4930601 | 2 | 0 | 0 | 76.7 | 76.7 | 1 | 156.6 | 3.25 | 250 | 54.89 | 0 | 4.05 | 0 | 0 | 0.16 | 0 | 0 | 0 | 0 | 0 | 0 | 17.6 | 17.6 |
| INVTR2 | 659731 | 4930601 | 2 | 0 | 0 | 76.7 | 76.7 | 1 | 156.6 | 3.25 | 500 | 54.89 | 0 | 0.59 | 0 | 0 | 0.3 | 0 | 0 | 0 | 0 | 0 | 0 | 20.92 | 20.92 |
| INVTR2 | 659731 | 4930601 | 2 | 0 | 0 | 70.7 | 70.7 | 1 | 156.6 | 3.25 | 1000 | 54.89 | 0 | -0.81 | 0 | 0 | 0.57 | 0 | 0 | 0 | 0 | 0 | 0 | 16.04 | 16.04 |
| INVTR2 | 659731 | 4930601 | 2 | 0 | 0 | 65.7 | 65.7 | 1 | 156.6 | 3.25 | 2000 | 54.89 | 0 | -0.9 | 0 | 0 | 1.51 | 0 | 0 | 0 | 0 | 0 | 0 | 10.19 | 10.19 |
| INVTR2 | 659731 | 4930601 | 2 | 0 | 0 | 60.7 | 60.7 | 1 | 156.6 | 3.25 | 4000 | 54.89 | 0 | -0.9 | 0 | 0 | 5.13 | 0 | 0 | 0 | 0 | 0 | 0 | 1.58 | 1.58 |
| INVTR2 | 659731 | 4930601 | 2 | 0 | 0 | 53.7 | 53.7 | 1 | 156.6 | 3.25 | 8000 | 54.89 | 0 | -0.9 | 0 | 0 | 18.3 | 0 | 0 | 0 | 0 | 0 | 0 | -18.59 | -18.59 |
| INV3 | 659441 | 4930371 | 2 | 0 | 0 | 69.6 | 69.6 | 1 | 255.2 | 3.25 | 125 | 59.14 | 0 | 2.19 | 0 | 0 | 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 8.16 | 8.16 |
| INV3 | 659441 | 4930371 | 2 | 0 | 0 | 78.6 | 78.6 | 1 | 255.2 | 3.25 | 250 | 59.14 | 0 | 4.03 | 0 | 0 | 0.27 | 0 | 0 | 0 | 0 | 0 | 0 | 15.17 | 15.17 |
| INV3 | 659441 | 4930371 | 2 | 0 | 0 | 82.1 | 82.1 | 1 | 255.2 | 3.25 | 500 | 59.14 | 0 | 0.44 | 0 | 0 | 0.49 | 0 | 0 | 0 | 0 | 0 | 0 | 22.03 | 22.03 |
| INV3 | 659441 | 4930371 | 2 | 0 | 0 | 75.7 | 75.7 | 1 | 255.2 | 3.25 | 1000 | 59.14 | 0 | -1.02 | 0 | 0 | 0.93 | 0 | 0 | 0 | 0 | 0 | 0 | 16.65 | 16.65 |
| INV3 | 659441 | 4930371 | 2 | 0 | 0 | 73.6 | 73.6 | 1 | 255.2 | 3.25 | 2000 | 59.14 | 0 | -1.11 | 0 | 0 | 2.47 | 0 | 0 | 0 | 0 | 0 | 0 | 13.11 | 13.11 |
| INV3 | 659441 | 4930371 | 2 | 0 | 0 | 87 | 87 | 1 | 255.2 | 3.25 | 4000 | 59.14 | 0 | -1.11 | 0 | 0 | 8.36 | 0 | 0 | 0 | 0 | 0 | 0 | 20.61 | 20.61 |
| INV7 | 659398 | 4930640 | 2 | 0 | 0 | 69.6 | 69.6 | 1 | 341.4 | 3.25 | 125 | 61.67 | 0 | 2.42 | 0 | 0 | 0.14 | 0 | 0 | 0 | 0 | 0 | 0 | 5.38 | 5.38 |
| INV7 | 659398 | 4930640 | 2 | 0 | 0 | 78.6 | 78.6 | 1 | 341.4 | 3.25 | 250 | 61.67 | 0 | 3.88 | 0 | 0 | 0.36 | 0 | 0 | 0 | 0 | 0 | 0 | 12.7 | 12.7 |
| INV7 | 659398 | 4930640 | 2 | 0 | 0 | 82.1 | 82.1 | 1 | 341.4 | 3.25 | 500 | 61.67 | 0 | 0.27 | 0 | 0 | 0.66 | 0 | 0 | 0 | 0 | 0 | 0 | 19.51 | 19.51 |
| INV7 | 659398 | 4930640 | 2 | 0 | 0 | 75.7 | 75.7 | 1 | 341.4 | 3.25 | 1000 | 61.67 | 0 | -1.19 | 0 | 0 | 1.25 | 0 | 0 | 0 | 0 | 0 | 0 | 13.98 | 13.98 |
| INV7 | 659398 | 4930640 | 2 | 0 | 0 | 73.6 | 73.6 | 1 | 341.4 | 3.25 | 2000 | 61.67 | 0 | -1.29 | 0 | 0 | 3.3 | 0 | 0 | 0 | 0 | 0 | 0 | 9.92 | 9.92 |
| INV7 | 659398 | 4930640 | 2 | 0 | 0 | 87 | 87 | 1 | 341.4 | 3.25 | 4000 | 61.67 | 0 | -1.29 | 0 | 0 | 11.19 | 0 | 0 | 0 | 0 | 0 | 0 | 15.43 | 15.43 |
| INV1 | 659934 | 4930708 | 2 | 0 | 0 | 69.6 | 69.6 | 1 | 358.5 | 3.25 | 125 | 62.09 | 0 | 2.47 | 0 | 0 | 0.15 | 0 | 0 | 0 | 0 | 0 | 0 | 4.89 | 4.89 |
| INV1 | 659934 | 4930708 | 2 | 0 | 0 | 78.6 | 78.6 | 1 | 358.5 | 3.25 | 250 | 62.09 | 0 | 3.86 | 0 | 0 | 0.37 | 0 | 0 | 0 | 0 | 0 | 0 | 12.28 | 12.28 |
| INV1 | 659934 | 4930708 | 2 | 0 | 0 | 82.1 | 82.1 | 1 | 358.5 | 3.25 | 500 | 62.09 | 0 | 0.25 | 0 | 0 | 0.69 | 0 | 0 | 0 | 0 | 0 | 0 | 19.07 | 19.07 |
| INV1 | 659934 | 4930708 | 2 | 0 | 0 | 75.7 | 75.7 | 1 | 358.5 | 3.25 | 1000 | 62.09 | 0 | -1.21 | 0 | 0 | 1.31 | 0 | 0 | 0 | 0 | 0 | 0 | 13.51 | 13.51 |
| INV1 | 659934 | 4930708 | 2 | 0 | 0 | 73.6 | 73.6 | 1 | 358.5 | 3.25 | 2000 | 62.09 | 0 | -1.31 | 0 | 0 | 3.46 | 0 | 0 | 0 | 0 | 0 | 0 | 9.36 | 9.36 |
| INV1 | 659934 | 4930708 | 2 | 0 | 0 | 87 | 87 | 1 | 358.5 | 3.25 | 4000 | 62.09 | 0 | -1.31 | 0 | 0 | 11.75 | 0 | 0 | 0 | 0 | 0 | 0 | 14.47 | 14.47 |
| INVTR3 | 659447 | 4930371 | 2 | 0 | 0 | 73.7 | 73.7 | 1 | 249.5 | 3.25 | 32 | 58.94 | 0 | -3.66 | 0 | 0 | 0.01 | 0 | 0 | 0 | 0 | 0 | 0 | 18.41 | 18.41 |
| INVTR3 | 659447 | 4930371 | 2 | 0 | 0 | 79.7 | 79.7 | 1 | 249.5 | 3.25 | 63 | 58.94 | 0 | -3.66 | 0 | 0 | 0.03 | 0 | 0 | 0 | 0 | 0 | 0 | 24.38 | 24.38 |
| INVTR3 | 659447 | 4930371 | 2 | 0 | 0 | 81.7 | 81.7 | 1 | 249.5 | 3.25 | 125 | 58.94 | 0 | 2.18 | 0 | 0 | 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 20.47 | 20.47 |
| INVTR3 | 659447 | 4930371 | 2 | 0 | 0 | 76.7 | 76.7 | 1 | 249.5 | 3.25 | 250 | 58.94 | 0 | 4.04 | 0 | 0 | 0.26 | 0 | 0 | 0 | 0 | 0 | 0 | 13.46 | 13.46 |
| INVTR3 | 659447 | 4930371 | 2 | 0 | 0 | 76.7 | 76.7 | 1 | 249.5 | 3.25 | 500 | 58.94 | 0 | 0.45 | 0 | 0 | 0.48 | 0 | 0 | 0 | 0 | 0 | 0 | 16.83 | 16.83 |
| INVTR3 | 659447 | 4930371 | 2 | 0 | 0 | 70.7 | 70.7 | 1 | 249.5 | 3.25 | 1000 | 58.94 | 0 | -1 | 0 | 0 | 0.91 | 0 | 0 | 0 | 0 | 0 | 0 | 11.85 | 11.85 |
| INVTR3 | 659447 | 4930371 | 2 | 0 | 0 | 65.7 | 65.7 | 1 | 249.5 | 3.25 | 2000 | 58.94 | 0 | -1.1 | 0 | 0 | 2.41 | 0 | 0 | 0 | 0 | 0 | 0 | 5.44 | 5.44 |
| INVTR3 | 659447 | 4930371 | 2 | 0 | 0 | 60.7 | 60.7 | 1 | 249.5 | 3.25 | 4000 | 58.94 | 0 | -1.1 | 0 | 0 | 8.18 | 0 | 0 | 0 | 0 | 0 | 0 | -5.32 | -5.32 |
| INVTR3 | 659447 | 4930371 | 2 | 0 | 0 | 53.7 | 53.7 | 1 | 249.5 | 3.25 | 8000 | 58.94 | 0 | -1.1 | 0 | 0 | 29.17 | 0 | 0 | 0 | 0 | 0 | 0 | -33.31 | -33.31 |
| INVTR7 | 659392 | 4930640 | 2 | 0 | 0 | 73.7 | 73.7 | 1 | 346.5 | 3.25 | 32 | 61.79 | 0 | -4.31 | 0 | 0 | 0.01 | 0 | 0 | 0 | 0 | 0 | 0 | 16.21 | 16.21 |
| INVTR7 | 659392 | 4930640 | 2 | 0 | 0 | 79.7 | 79.7 | 1 | 346.5 | 3.25 | 63 | 61.79 | 0 | -4.31 | 0 | 0 | 0.04 | 0 | 0 | 0 | 0 | 0 | 0 | 22.18 | 22.18 |
| INVTR7 | 659392 | 4930640 | 2 | 0 | 0 | 81.7 | 81.7 | 1 | 346.5 | 3.25 | 125 | 61.79 | 0 | 2.43 | 0 | 0 | 0.14 | 0 | 0 | 0 | 0 | 0 | 0 | 17.33 | 17.33 |
| INVTR7 | 659392 | 4930640 | 2 | 0 | 0 | 76.7 | 76.7 | 1 | 346.5 | 3.25 | 250 | 61.79 | 0 | 3.87 | 0 | 0 | 0.36 | 0 | 0 | 0 | 0 | 0 | 0 | 10.67 | 10.67 |
| INVTR7 | 659392 | 4930640 | 2 | 0 | 0 | 76.7 | 76.7 | 1 | 346.5 | 3.25 | 500 | 61.79 | 0 | 0.26 | 0 | 0 | 0.67 | 0 | 0 | 0 | 0 | 0 | 0 | 13.98 | 13.98 |
| INVTR7 | 659392 | 4930640 | 2 | 0 | 0 | 70.7 | 70.7 | 1 | 346.5 | 3.25 | 1000 | 61.79 | 0 | -1.2 | 0 | 0 | 1.27 | 0 | 0 | 0 | 0 | 0 | 0 | 8.84 | 8.84 |

| | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INVTR7 | 659392 | 4930640 | 2 | 0 | 0 | 65.7 | 65.7 | 1 | 346.5 | 3.25 | 2000 | 61.79 | 0 | -1.29 | 0 | 0 | 3.35 | 0 | 0 | 0 | 0 | 0 | 0 | 1.85 | 1.85 |
| INVTR7 | 659392 | 4930640 | 2 | 0 | 0 | 60.7 | 60.7 | 1 | 346.5 | 3.25 | 4000 | 61.79 | 0 | -1.29 | 0 | 0 | 11.35 | 0 | 0 | 0 | 0 | 0 | 0 | -11.15 | -11.15 |
| INVTR7 | 659392 | 4930640 | 2 | 0 | 0 | 53.7 | 53.7 | 1 | 346.5 | 3.25 | 8000 | 61.79 | 0 | -1.29 | 0 | 0 | 40.49 | 0 | 0 | 0 | 0 | 0 | 0 | -47.29 | -47.29 |
| INVTR1 | 659941 | 4930708 | 2 | 0 | 0 | 73.7 | 73.7 | 1 | 363.5 | 3.25 | 32 | 62.21 | 0 | -4.39 | 0 | 0 | 0.01 | 0 | 0 | 0 | 0 | 0 | 0 | 15.87 | 15.87 |
| INVTR1 | 659941 | 4930708 | 2 | 0 | 0 | 79.7 | 79.7 | 1 | 363.5 | 3.25 | 63 | 62.21 | 0 | -4.39 | 0 | 0 | 0.04 | 0 | 0 | 0 | 0 | 0 | 0 | 21.84 | 21.84 |
| INVTR1 | 659941 | 4930708 | 2 | 0 | 0 | 81.7 | 81.7 | 1 | 363.5 | 3.25 | 125 | 62.21 | 0 | 2.49 | 0 | 0 | 0.15 | 0 | 0 | 0 | 0 | 0 | 0 | 16.85 | 16.85 |
| INVTR1 | 659941 | 4930708 | 2 | 0 | 0 | 76.7 | 76.7 | 1 | 363.5 | 3.25 | 250 | 62.21 | 0 | 3.85 | 0 | 0 | 0.38 | 0 | 0 | 0 | 0 | 0 | 0 | 10.26 | 10.26 |
| INVTR1 | 659941 | 4930708 | 2 | 0 | 0 | 76.7 | 76.7 | 1 | 363.5 | 3.25 | 500 | 62.21 | 0 | 0.24 | 0 | 0 | 0.7 | 0 | 0 | 0 | 0 | 0 | 0 | 13.55 | 13.55 |
| INVTR1 | 659941 | 4930708 | 2 | 0 | 0 | 70.7 | 70.7 | 1 | 363.5 | 3.25 | 1000 | 62.21 | 0 | -1.22 | 0 | 0 | 1.33 | 0 | 0 | 0 | 0 | 0 | 0 | 8.38 | 8.38 |
| INVTR1 | 659941 | 4930708 | 2 | 0 | 0 | 65.7 | 65.7 | 1 | 363.5 | 3.25 | 2000 | 62.21 | 0 | -1.32 | 0 | 0 | 3.51 | 0 | 0 | 0 | 0 | 0 | 0 | 1.3 | 1.3 |
| INVTR1 | 659941 | 4930708 | 2 | 0 | 0 | 60.7 | 60.7 | 1 | 363.5 | 3.25 | 4000 | 62.21 | 0 | -1.32 | 0 | 0 | 11.91 | 0 | 0 | 0 | 0 | 0 | 0 | -12.1 | -12.1 |
| INVTR1 | 659941 | 4930708 | 2 | 0 | 0 | 53.7 | 53.7 | 1 | 363.5 | 3.25 | 8000 | 62.21 | 0 | -1.32 | 0 | 0 | 42.48 | 0 | 0 | 0 | 0 | 0 | 0 | -49.67 | -49.67 |
| INVTR4 | 659264 | 4930326 | 2 | 0 | 0 | 73.7 | 73.7 | 1 | 437.5 | 3.25 | 32 | 63.82 | 0 | -4.66 | 0 | 0 | 0.01 | 0 | 0 | 0 | 0 | 0 | 0 | 14.53 | 14.53 |
| INVTR4 | 659264 | 4930326 | 2 | 0 | 0 | 79.7 | 79.7 | 1 | 437.5 | 3.25 | 63 | 63.82 | 0 | -4.66 | 0 | 0 | 0.05 | 0 | 0 | 0 | 0 | 0 | 0 | 20.49 | 20.49 |
| INVTR4 | 659264 | 4930326 | 2 | 0 | 0 | 81.7 | 81.7 | 1 | 437.5 | 3.25 | 125 | 63.82 | 0 | 2.77 | 0 | 0 | 0.18 | 0 | 0 | 0 | 0 | 0 | 0 | 14.93 | 14.93 |
| INVTR4 | 659264 | 4930326 | 2 | 0 | 0 | 76.7 | 76.7 | 1 | 437.5 | 3.25 | 250 | 63.82 | 0 | 3.77 | 0 | 0 | 0.46 | 0 | 0 | 0 | 0 | 0 | 0 | 8.65 | 8.65 |
| INVTR4 | 659264 | 4930326 | 2 | 0 | 0 | 76.7 | 76.7 | 1 | 437.5 | 3.25 | 500 | 63.82 | 0 | 0.16 | 0 | 0 | 0.84 | 0 | 0 | 0 | 0 | 0 | 0 | 11.88 | 11.88 |
| INVTR4 | 659264 | 4930326 | 2 | 0 | 0 | 70.7 | 70.7 | 1 | 437.5 | 3.25 | 1000 | 63.82 | 0 | -1.3 | 0 | 0 | 1.6 | 0 | 0 | 0 | 0 | 0 | 0 | 6.58 | 6.58 |
| INVTR4 | 659264 | 4930326 | 2 | 0 | 0 | 65.7 | 65.7 | 1 | 437.5 | 3.25 | 2000 | 63.82 | 0 | -1.4 | 0 | 0 | 4.23 | 0 | 0 | 0 | 0 | 0 | 0 | -0.95 | -0.95 |
| INVTR4 | 659264 | 4930326 | 2 | 0 | 0 | 60.7 | 60.7 | 1 | 437.5 | 3.25 | 4000 | 63.82 | 0 | -1.4 | 0 | 0 | 14.34 | 0 | 0 | 0 | 0 | 0 | 0 | -16.06 | -16.06 |
| INVTR4 | 659264 | 4930326 | 2 | 0 | 0 | 53.7 | 53.7 | 1 | 437.5 | 3.25 | 8000 | 63.82 | 0 | -1.4 | 0 | 0 | 51.14 | 0 | 0 | 0 | 0 | 0 | 0 | -59.86 | -59.86 |
| INVTR6 | 659105 | 4930479 | 2 | 0 | 0 | 73.7 | 73.7 | 1 | 578.6 | 3.25 | 32 | 66.25 | 0 | -4.99 | 0 | 0 | 0.02 | 0 | 0 | 0 | 0 | 0 | 0 | 12.42 | 12.42 |
| INVTR6 | 659105 | 4930479 | 2 | 0 | 0 | 79.7 | 79.7 | 1 | 578.6 | 3.25 | 63 | 66.25 | 0 | -4.99 | 0 | 0 | 0.07 | 0 | 0 | 0 | 0 | 0 | 0 | 18.37 | 18.37 |
| INVTR6 | 659105 | 4930479 | 2 | 0 | 0 | 81.7 | 81.7 | 1 | 578.6 | 3.25 | 125 | 66.25 | 0 | 3.34 | 0 | 0 | 0.24 | 0 | 0 | 0 | 0 | 0 | 0 | 11.87 | 11.87 |
| INVTR6 | 659105 | 4930479 | 2 | 0 | 0 | 76.7 | 76.7 | 1 | 578.6 | 3.25 | 250 | 66.25 | 0 | 3.68 | 0 | 0 | 0.6 | 0 | 0 | 0 | 0 | 0 | 0 | 6.17 | 6.17 |
| INVTR6 | 659105 | 4930479 | 2 | 0 | 0 | 76.7 | 76.7 | 1 | 578.6 | 3.25 | 500 | 66.25 | 0 | 0.06 | 0 | 0 | 1.12 | 0 | 0 | 0 | 0 | 0 | 0 | 9.28 | 9.28 |
| INVTR6 | 659105 | 4930479 | 2 | 0 | 0 | 70.7 | 70.7 | 1 | 578.6 | 3.25 | 1000 | 66.25 | 0 | -1.4 | 0 | 0 | 2.12 | 0 | 0 | 0 | 0 | 0 | 0 | 3.74 | 3.74 |
| INVTR6 | 659105 | 4930479 | 2 | 0 | 0 | 65.7 | 65.7 | 1 | 578.6 | 3.25 | 2000 | 66.25 | 0 | -1.5 | 0 | 0 | 5.59 | 0 | 0 | 0 | 0 | 0 | 0 | -4.64 | -4.64 |
| INVTR6 | 659105 | 4930479 | 2 | 0 | 0 | 60.7 | 60.7 | 1 | 578.6 | 3.25 | 4000 | 66.25 | 0 | -1.5 | 0 | 0 | 18.96 | 0 | 0 | 0 | 0 | 0 | 0 | -23.01 | -23.01 |
| INVTR6 | 659105 | 4930479 | 2 | 0 | 0 | 53.7 | 53.7 | 1 | 578.6 | 3.25 | 8000 | 66.25 | 0 | -1.5 | 0 | 0 | 67.63 | 0 | 0 | 0 | 0 | 0 | 0 | -78.68 | -78.68 |
| INVTR5 | 659072 | 4930348 | 2 | 0 | 0 | 73.7 | 73.7 | 1 | 619.8 | 3.25 | 32 | 66.84 | 0 | -5.06 | 0 | 0 | 0.02 | 0 | 0 | 0 | 0 | 0 | 0 | 11.89 | 11.89 |
| INVTR5 | 659072 | 4930348 | 2 | 0 | 0 | 79.7 | 79.7 | 1 | 619.8 | 3.25 | 63 | 66.84 | 0 | -5.06 | 0 | 0 | 0.08 | 0 | 0 | 0 | 0 | 0 | 0 | 17.84 | 17.84 |
| INVTR5 | 659072 | 4930348 | 2 | 0 | 0 | 81.7 | 81.7 | 1 | 619.8 | 3.25 | 125 | 66.84 | 0 | 3.49 | 0 | 0 | 0.25 | 0 | 0 | 0 | 0 | 0 | 0 | 11.11 | 11.11 |
| INVTR5 | 659072 | 4930348 | 2 | 0 | 0 | 76.7 | 76.7 | 1 | 619.8 | 3.25 | 250 | 66.84 | 0 | 3.66 | 0 | 0 | 0.65 | 0 | 0 | 0 | 0 | 0 | 0 | 5.55 | 5.55 |
| INVTR5 | 659072 | 4930348 | 2 | 0 | 0 | 76.7 | 76.7 | 1 | 619.8 | 3.25 | 500 | 66.84 | 0 | 0.04 | 0 | 0 | 1.19 | 0 | 0 | 0 | 0 | 0 | 0 | 8.62 | 8.62 |
| INVTR5 | 659072 | 4930348 | 2 | 0 | 0 | 70.7 | 70.7 | 1 | 619.8 | 3.25 | 1000 | 66.84 | 0 | -1.42 | 0 | 0 | 2.27 | 0 | 0 | 0 | 0 | 0 | 0 | 3.01 | 3.01 |
| INVTR5 | 659072 | 4930348 | 2 | 0 | 0 | 65.7 | 65.7 | 1 | 619.8 | 3.25 | 2000 | 66.84 | 0 | -1.52 | 0 | 0 | 5.99 | 0 | 0 | 0 | 0 | 0 | 0 | -5.62 | -5.62 |
| INVTR5 | 659072 | 4930348 | 2 | 0 | 0 | 60.7 | 60.7 | 1 | 619.8 | 3.25 | 4000 | 66.84 | 0 | -1.52 | 0 | 0 | 20.31 | 0 | 0 | 0 | 0 | 0 | 0 | -24.94 | -24.94 |
| INVTR5 | 659072 | 4930348 | 2 | 0 | 0 | 53.7 | 53.7 | 1 | 619.8 | 3.25 | 8000 | 66.84 | 0 | -1.52 | 0 | 0 | 72.44 | 0 | 0 | 0 | 0 | 0 | 0 | -84.07 | -84.07 |
| Value D/N: 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Level D/N: 39.2753 | 39.2753 | | | | | | | | | | | | | | | | | | | | | | | | |

# Appendix H

STAKEHOLDER CONSULTATION

Canadian Solar Solutions Inc.

545 Speedvale Avenue West
Guelph Ontario | Canada N1K 1E6
Phone + 1 519 837 1881
Fax + 1 519 837 2550
inquire.ca@canadiansolar.com
www.canadian-solar.ca

January 8, 2014

**Re: Notice of REA Amendment for GoodLight**

As you are aware, GoodLight LP has received a Renewable Energy Approval (REA) to develop a solar photovoltaic facility which would be located in the City of Kawartha Lakes, Ontario. The renewable energy facility will be known as GoodLight and will have a maximum name plate capacity of approximately 10 megawatts (MW). GoodLight LP and Canadian Solar Solutions Inc. are seeking a technical change amendment to the REA issued for GoodLight (REA #4324-96UL4W).

White Construction Canada Inc. (White) has completed detailed design of the solar facility. Together, GoodLight LP and White have discovered some areas to increase technical efficiency that could only be identified during the detailed design phase of the project. Primarily, the availability of more efficient equipment that allows for the reduction of the number of inverter locations has required a redesign of the overall layout of the project. As such, GoodLight LP in partnership with White, proposed some technical changes to the Renewable Energy Approval for this project. These include:

- A reduction of the project area inside the perimeter fence;
- Change in access road locations;
- Alternate panel module manufacturer and energy output;
- An increase in the temporary construction laydown area;
- Alternate location for the site entrance;
- Alternate location for the communications tower;
- Alternate location for the Point of Common Coupling (PCC);
- Alternate location for the overhead line;
- Revisions to the inverter unit model and locations; and
- A decrease in the total number of inverter units from 10 to 7 resulting in a revised *Noise Study Report*.

The report titled *Modifications Document for GoodLight* describes the amendments made by GoodLight LP. The report concludes that the amendments represent improvements for neighbouring residents and the environment. This report is available for viewing online at www.goodlightsolar.com.

Throughout the REA process, GoodLight LP and Canadian Solar are committed to ongoing consultation. If you have any questions or concerns about the project or the attached notice, please do not hesitate to contact me.

Sincerely,

Canadian Solar Solutions Inc.

545 Speedvale Avenue West
Guelph Ontario | Canada N1K 1E6
Phone + 1 519 837 1881
Fax + 1 519 837 2550
inquire.ca@canadiansolar.com
www.canadian-solar.ca

Grace Pasceri, Permitting Manager
Canadian Solar Solutions Inc.
545 Speedvale Avenue West
Guelph, ON N1K 1E6
Tel: 519-837-1881 ext. 2293
Grace.pasceri@canadiansolar.com

Attachments: Notice of REA Amendment

# NOTICE OF A PROPOSED CHANGE TO AN APPROVED RENEWABLE ENERGY PROJECT (REA No. 4324-96UL4W)

**For GoodLight**
**By Canadian Solar Solutions Inc.**

**Project Name:** GoodLight
**OPA Reference Number: FIT-FW8BXB2**
**Project Location:** 117 and 2002 Sandringham Road, near Woodville, in the City of Kawartha Lakes, Ontario.
**Dated at the City of Kawartha Lakes this 16 day of January, 2014**

Canadian Solar Inc. was issued a Renewable Energy Approval on June 13, 2013 in respect of the GoodLight LP project. Information with respect to the decision on this project can be viewed on the Environmental Registry by searching 011-7807.

GoodLight LP, as a general partner for and on behalf of GoodLight LP (a subsidiary of Canadian Solar Solutions Inc.) is proposing to make a change to the project and the project itself is subject to the provisions of the *Environmental Protection Act (Act)* Part V.0.1 and Ontario Regulation 359/09 (Regulation). This notice must be distributed in accordance with section 32.2 of the Regulation. This notice is being distributed to make the public aware of a **proposed change to the project**.

**Project Description and Proposed Changes:**
Pursuant to the Act and Regulation, the project in respect of which the Renewable Energy Approval was issued, is a Class 3 Solar Facility. An application has been made to the Ministry of the Environment to **change the project** and alter the terms and conditions of the existing Renewable Energy Approval. The proposed changes consist of minor technical changes to the preliminary design, including a reduction of the area inside the perimeter fence, an adjustment to the panel module mix (with fewer total modules to be installed), reconfiguration of internal access roads and construction laydown areas, change to the substation model, change to the site entrance, Point of Common Coupling (PCC), overhead line, and communications tower locations, and a change to the inverter station model and location.

If approved with these changes, the facility would have a total nameplate capacity of 10 MW. The project location, taking the change into account, is described in the map below.

**Documents for Public Inspection:**
GoodLight LP has been required to update the supporting documents that are required to form part of the application or which must be otherwise submitted to the Ministry of the Environment available to the public (entitled *Modifications Document to REA Number 4324-96UL4W*). Written copies of the draft supporting documents will be made available for public inspection on January 12, 2014 on the project website at http://www.goodlightsolar.com.

**Project Contacts and Information:**
To learn more about the project proposal or to communicate concerns, please contact:

Grace Pasceri, Permitting Manager – Solar Farms
Canadian Solar Solutions Inc.
545 Speedvale Avenue West
Guelph, Ontario N1K 1E6
Phone: (519) 837-1881 ext. 2293
Fax: (519) 837-2550
Email: Grace.Pasceri@canadiansolar.com