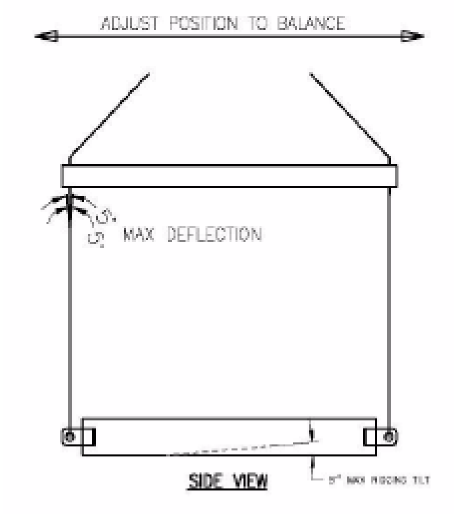
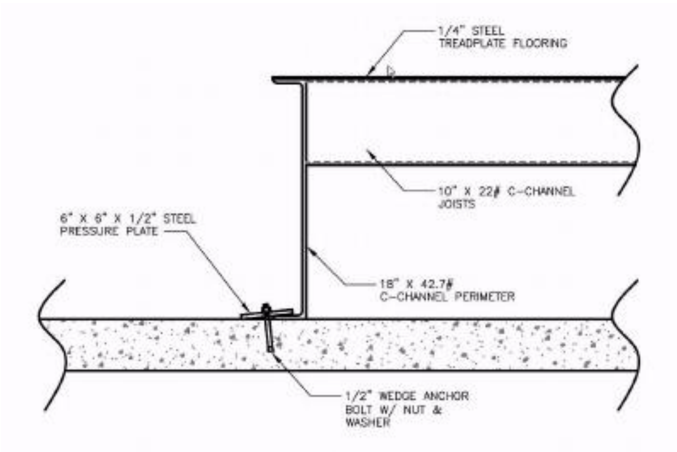
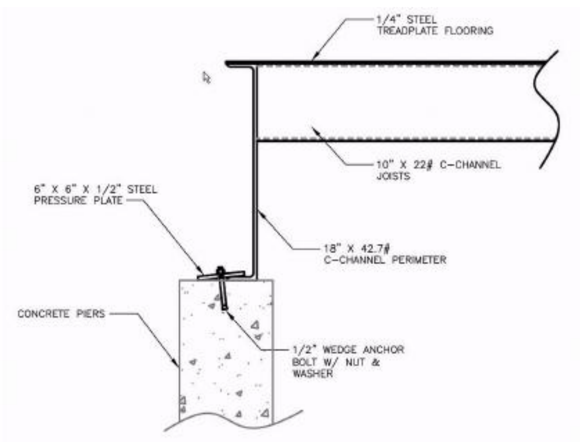


1.3.2 Installation:

Mechanical:

- Soil must be suitable and hard enough to carry the weight of the MVPP
- Typical mounting is done on concrete piers od a concrete pad, regards ACI-guidelines and regulations for concrete basement design



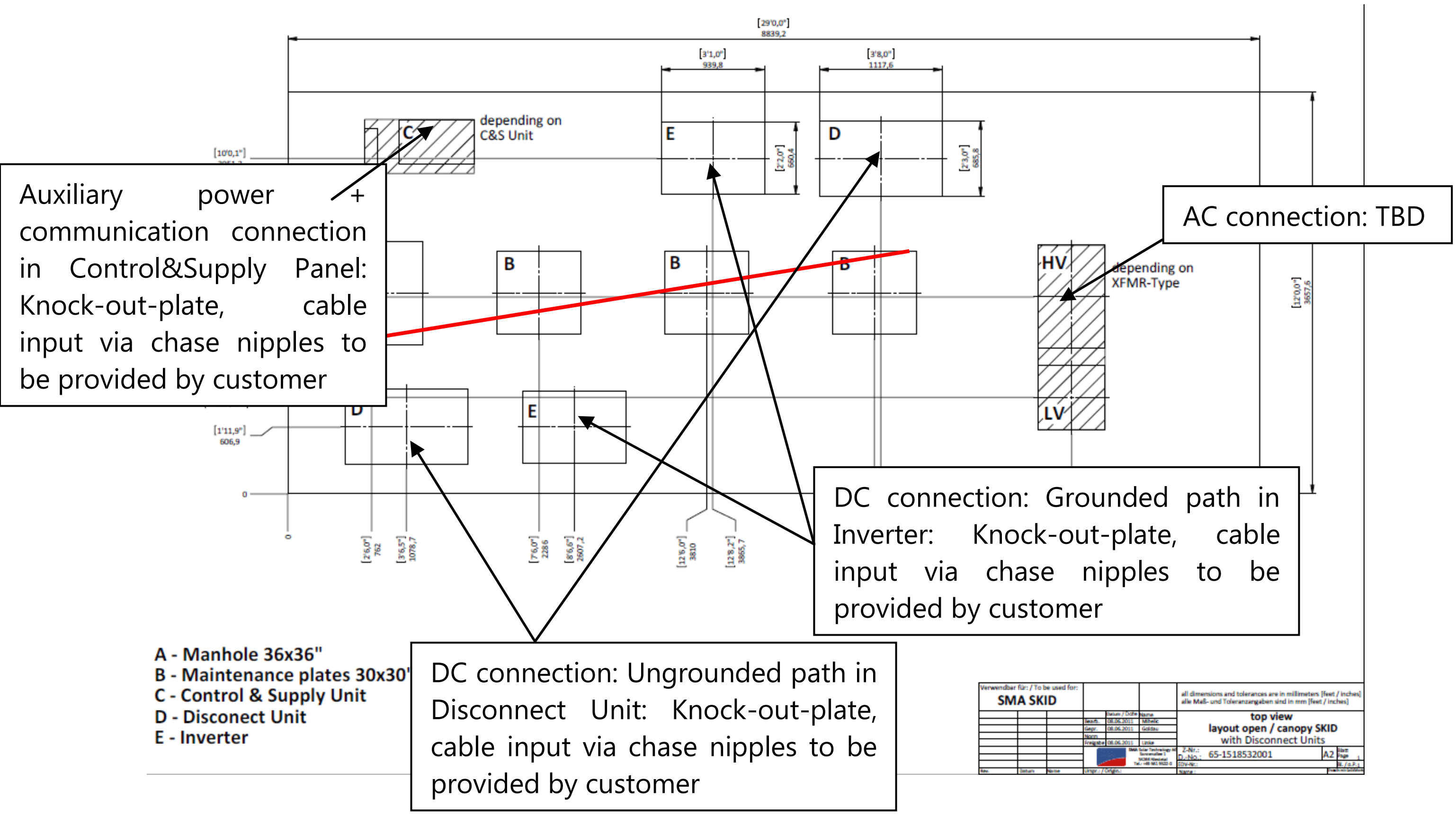


- MVPP frame has to be connected via wedge anchors and pressure plates. Both are included upon delivery
- Maximum pier height is 3′ to ensure seismic zone 4 rating of whole system assembly (MVPP including mounting)
(DANGER and details from inst. Requ.)

Electrical connection:

- Pad mounting: All cables to be conducted through pad, appropriate sealing to be applied by customer.
- Pier mounting: All cables to be lead to the platform bottm via metal conduits. Refer to NFPA 70 for details. Conduit length has to include pier height + 15" power platform frame height.

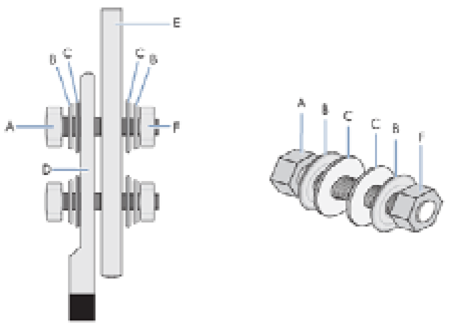
With Disconnect Unit



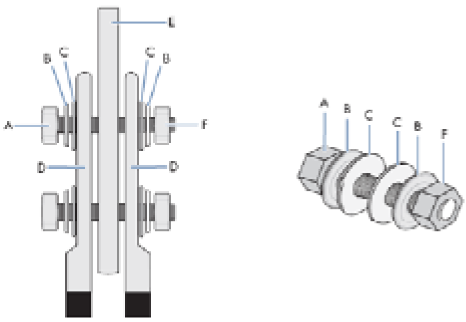
Without Disconnect Unit

(new drawing: same as above without Disconnect Unit openings, DC connection all in inverter)

- The DC connection has to be done in accordance to the installation manual of the Disconnect Unit and the inverter. Connection can be done via cable lugs only. The screws and washers are included upon delivery, ths customer has to provide appropriate cabel lugs. See installation manual of inverters for details.



Position	Description
A	Screw head - size: M 12
B	Belleville / Conical Washer
C	Washer
D	Cable lug
E	Busbar
F	Nut - size: M 12



Position	Description
A	Screw head - size: M 12
B	Belleville / Conical Washer
C	Washer
D	Cable lug
E	Busbar
F	Nut - size: M 12

- The auxiliary power and communication cable connection has to be done in accordance to the MVPP installation manual. Refer to this manul for details.TBD
- The AC connection to the MV transformer has to be done in accordance to the MVPP installation manual. Refer to this manual for details. TBD

3.2.2 Additional Mechanical Requirements for Option "Enclosure"

Item	Description	Specification	Comment
1	Dimensions of MV-PP with enclosure	Compliance with drawings	See drawing 65-1518502002 65-1518507002 65-1518505002 65-1518513002 65-1518517002 65-1518515002
2	Enclosure design	The enclosure comprises a weather-tight structure of steel walls and roof. The interior walls are sheathed. The enclosure is permanently connected to the main steel frame. The roof pitch is 2°.	See drawing 65-1518507002 65-1518517002
3	Material	Enclosure framework: Painted steel Indoor wall panels: Galvanized sheet Outdoor wall panels: Galvanized and painted steel Roof panels: Galvanized and painted steel Louvers: Aluminum	
4	Insulation	The walls and the roof of the enclosure are to be insulated by mineral wool or fiber glass batting to reduce external heating and noise pollution. Thermal performance: R-value: 6 Thickness: 51 mm (2 inch) Low flammability Non containing asbestos Non-wicking	
5	Entrance and exit	The enclosure has two doors with left hinge to open outwards: On the short side of the enclo-	See drawing 65-1518505002

ABB

Transformer Performance Specification

For: Amec Date: 8/24/2011
Quote: 10Q1325733 Item: 10 Spec:

Rating								
Type	Substation Non-Auto	Class	H Winding		X Winding		Y Winding	
Phase	3		240	kV	34.5	kV	-	
Hertz	60	ONAN	65000	KVA	65000	KVA	-	KVA
Temp Rise	65 C	ONAF	85000	KVA	85000	KVA	-	KVA
Insulating Type	Mineral Oil	ONAF	110000	KVA	110000	KVA	-	KVA

Additional Tap Voltages	
H Winding (kV)	+16 , -16 x 1.25%, OLTC Full Capacity Below Nominal
X Winding (kV)	No Taps
Y Winding ()	-

Connections for Operation									
Transformers in Bank	To Transform from	Phase	Connected	To Transform from	Phase	Connected	To Transform To	Phase	Connected
1	240 kV	3	Wye	34.5 kV	3	Delta	-	3	-

Dielectric Tests			
Applied Voltage (To other windings and ground)	H Winding	95	kV
	X Winding	95	kV
	Y Winding	-	kV
Induced Voltage	Enhancement level / 7200 Cycle (L-G)	360	kV
	One hour level (L-G)	315	kV

Insulation Levels	
ITEMS	Basic Lightning Impulse Insulation Level (BIL kV)
H line	900
H neutral	250
X line	250
X neutral	-
Y line	-

Loss Data based on	NL @ 20C, LL @ 85C					
Based on loading at	240 kV	To	34.5 kV			
Winding Load KVA	H	110000	X	110000	Y	
No Load Loss	60 kW		Load Losses	116.3 kW		
			Total Loss	333 kW		

Regulation at		
240 kV	/	34.5 kV
110000		KVA
Power Factor	% Reg	% Load
1.0	1.03	100
0.8	7.69	100

Auxiliary Losses (Not included in above)	Percent Exciting Current	
	100% V	110% V
4.5 kW	0.08	0.20

Average Sound Level	
dB(A)	Class
81	ONAN
83	ONAF
84	ONAF

Percent Impedance Voltage		
% IZ	Between Windings	At KVA
7	HV-LV	65000

Mechanical Data Not for Construction Purposes		
Drawing		
Height	(A)	336 in
Length	(B)	388 in
Width	(C)	228 in
Height over Cover	(D)	187 in
Untanking (Plus Slings)	(E)	331 in
Shipping Height		189 in
Shipping Width		124 in
Shipping Length		292 in
Oil Preservation		Cops
Weights (approximate) (lbs)		
Core and Coils		167924 lbs
Tank and Fittings		63094 lbs
Fluid	14952 gal	112140 lbs
Total Weight		343179 lbs
Untanking Weight		167924 lbs
Shipping Weight		205407 lbs
Shipped in		Dry Air

APPENDIX E

NOISE CALCULATIONS

CONVERSION OF SOUND PRESSURE LEVELS TO SOUND POWER LEVELS

Project Name: Sol-Luce Kingston PV Energy Project
Project Number: TC111406
Location: Kingston ON

A-WEIGHTING (dB) - Applied to total PWL							
-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1

1/4 WAVELENGTH CRITERION (m)							
1.361	0.686	0.343	0.172	0.086	0.043	0.021	0.011

Source ID	Source Description	Calc Type [1] (A, C, or S)	SPL Ref Distance [2] (S or C) (m)	Length [3] (C only) (m)	Area (A only) (m^2)	Partition Coefficient (S or C) (%)	Net Surface Area [6] (m^2)	Spectral Weighting (A or Flat)	Octave Band Sound Pressure Level Data (dB) [5] 63	125	250	500	1000	2000	4000	8000	Total (dBA)	Sound Power Level Adjustment (dB)	Purpose	Octave Band Sound Power Level Data (dB) 63	125	250	500	1000	2000	4000	8000	Total (dBA)
Sub_Transf	Substation Transformer	A			162.2		162.2	Flat	86.6	88.6	83.6	83.6	77.6	72.6	67.6	60.6	84.0			108.7	110.7	105.7	105.7	99.7	94.7	89.7	82.7	106.1

Notes:
1. Calc Type of C, A, or S refer to the source geometry, and represent Cylindrical, Area, or Spherical sources, respectively.
2. SPL Ref Distance refers to the radial distance from the microphone to the acoustic centre of a spherical source or the symmetrical axis of a cylindrical source.
3. Length refers to the length of a cylindrical source or line source. A length of 1.0 m may be used to define a PWL per metre.
4. Net surface area refers to surface area corrected for partition coefficient. Partition coefficient applies only to spherical and cylindrical geometries. Sound power level is estimated using an area correction 10 log A.
5. Tansformer Spectral Shape for 84 dBA overal.

CONVERSION OF SOUND PRESSURE LEVELS TO SOUND POWER LEVELS (MVPP TRANSFORMER)

Project Name: Sol-Luce Kingston PV Energy Project
Project Number: TC111406
Location: Kingston ON

A-WEIGHTING (dB) - Applied to total PWL							
-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1

1/4 WAVELENGTH CRITERION (m)							
1.361	0.686	0.343	0.172	0.086	0.043	0.021	0.011

Source ID	Source Description	Calc Type [1] (A, C, or S)	SPL Ref Distance [2] (S or C) (m)	Length [3] (C only) (m)	Area (A only) (m^2)	Partition Coefficient (S or C) (%)	Net Surface Area [6] (m^2)	Spectral Weighting (A or Flat)	Octave Band Sound Pressure Level Data (dB) [5] 63	125	250	500	1000	2000	4000	8000	Total (dBA)	Sound Power Level Adjustment (dB)	Purpose	Octave Band Sound Power Level Data (dB) 63	125	250	500	1000	2000	4000	8000	Total (dBA)
MVPP_Trans	Inverter Transformers	A			45.3		45.3	Flat	60.6	62.6	57.6	57.6	51.6	46.6	41.6	34.6	58.0			77.2	79.2	74.2	74.2	68.2	63.2	58.2	51.2	74.6

Notes:
1. Calc Type of C, A, or S refer to the source geometry, and represent Cylindrical, Area, or Spherical sources, respectively.
2. SPL Ref Distance refers to the radial distance from the microphone to the acoustic centre of a spherical source or the symmetrical axis of a cylindrical source.
3. Length refers to the length of a cylindrical source or line source. A length of 1.0 m may be used to define a PWL per metre.
4. Net surface area refers to surface area corrected for partition coefficient. Partition coefficient applies only to spherical and cylindrical geometries. Sound power level is estimated using an area correction 10 log A.
5. Tansformer Spectral Shape for 58 dBA overal.

UNMITIGATED MVPP SOUND POWER LEVELS

Project Name:	Sol-Luce Kingston PV Energy Project
Project Number:	TC111406
Location:	Kingston ON

Source Description	Octave Band Sound Pressure Level Data (dB)								Total (dBA)	Data Source
	63	125	250	500	1000	2000	4000	8000		
Inverter Sound Power Levels	107.0	95.0	93.0	87.0	78.0	70.0	61.0	68.0	89.0	HGC Report
Tranformer Sound Power Levels	77.2	79.2	74.2	74.2	68.2	63.2	58.2	51.2	74.6	CSA C227.4
Combined Sound Power Levels	107.0	95.1	93.1	87.2	78.4	70.8	62.8	68.1	89.2	Used in Cadna

MITIGATED MVPP SOUND POWER LEVELS

Project Name: Sol-Luce Kingston PV Energy Project
Project Number: TC111406
Location: Kingston ON

Source Description	Octave Band Sound Pressure Level Data (dB)								Total (dBA)	Data Source
	63	125	250	500	1000	2000	4000	8000		
Inverter Sound Power Levels	102.0	87.0	80.0	69.0	60.0	52.0	43.0	50.0	78.4	HGC Report
Tranformer Sound Power Levels	77.2	79.2	74.2	74.2	68.2	63.2	58.2	51.2	74.6	CSA C227.4
Combined Sound Power Levels	102.0	87.7	81.0	75.3	68.8	63.5	58.3	53.6	79.9	Used in Cadna

APPENDIX F

NEIGHBOURING SOLAR PROJECT NOISE REPORTS

Axio Power Canada Inc./
SunEdison Canada

Noise Study Report

For

Kingston Gardiner Hwy 2 South Solar Energy Project

H335467
Rev. 0
January 26, 2012

Report Disclaimer

This report has been prepared by Hatch Ltd. for the sole and exclusive use of Axio Power Canada Inc./ SunEdison Canada (the “Client”) for the purpose of assisting the management of the Client in making decisions with respect to the development of a proposed solar photovoltaic project and shall not be (a) used for any other purpose, or (b) provided to, relied upon or used by any third party.

This report contains opinions, conclusions and recommendations made by Hatch Ltd. (Hatch), using its professional judgment and reasonable care. Any use of or reliance upon this report by the Client is subject to the following conditions:

- the report being read in the context of and subject to the terms of the agreement between Hatch, the Client including any methodologies, procedures, techniques, assumptions and other relevant terms or conditions that were specified or agreed therein;
- the report being read as a whole, with sections or parts hereof read or relied upon in context;
- the conditions of the site may change over time (or may have already changed) due to natural forces or human intervention, and Hatch takes no responsibility for the impact that such changes may have on the accuracy or validity of the observations, conclusions and recommendations set out in this report; and
- the report is based on information made available to Hatch by the Client or by certain third parties; and unless stated otherwise in the Agreement, Hatch has not verified the accuracy, completeness or validity of such information, makes no representation regarding its accuracy and hereby disclaims any liability in connection therewith.

Project Report

January 26, 2012

Axio Power Canada Inc./SunEdison Canada
Kingston Gardiner Hwy 2 South Solar Energy Project

Noise Study Report

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Executive Summary

This report presents the results of the noise assessment study required for Solar Facilities under Ontario Regulation 359/09 and 521/10, as part of the Renewable Energy Approval (REA) Process.

Axio Power Canada Inc./SunEdison Canada (the "Client") is proposing to develop a 10-Megawatt (MW) solar photovoltaic (PV) project Kingston Gardiner Hwy 2 South Solar Energy Project (the "Project"). The Project is located on approximately 34 hectares of land on Part of Lot 40, Concession 3, Loyalist Township, County of Lennox and Addington.

This Noise Assessment Report has been prepared based on the document entitled "Basic Comprehensive Certificates of Approval (Air) – User Guide" by the Ontario Ministry of the Environment (MOE, 2004). The sound pressure levels at the points of reception (POR) have been estimated using ISO 9613-2, implemented in the CADNA-A computer code. The performance limits used for verification of compliance correspond to the values for rural areas of 40 dBA. The results presented in this report are based on the best available information at this time. It is the intention that, in the detailed engineering phase of the project, certified noise data based on final plans and designs will confirm the conclusions of this noise study.

The results obtained in this study show that the sound pressure levels at POR will not exceed MOE requirements for rural areas of 40 dBA.

1. Introduction

1.1 Project Description

Axio Power Canada Inc./SunEdison Canada (the "Client") is proposing to develop a 10-Megawatt (MW) solar photovoltaic (PV) project titled Kingston Gardiner Hwy 2 South Solar Energy Project (the "Project"). The Project Location[1] is situated on approximately 34 hectares (ha) of land on Part of Lot 40, Concession 3, Loyalist Township (lower tier municipality), County of Lennox and Addington (upper tier municipality).

The Project is proposed to be constructed on privately owned land that is currently vacant and covered by woodland and seasonal vegetation. The Project is located immediately south of Highway 2 (Regional Road 2) approximately 3.6-km east of the village of Odessa and 5-km west of the City of Kingston.

The proposed Project is a renewable energy generation facility which will use solar photovoltaic technology to generate electricity. Electricity generated by solar photovoltaic panels will be converted from Direct Current (DC) to Alternating Current (AC) by inverter units which will also step-up the voltage to 27.6 kV. A main transformer, located in the substation, will step up the voltage from the inverter units to 44 kV prior to being sent to the existing local distribution line. In order to meet the Ontario Power Authority (OPA)'s Feed-In-Tariff (FIT) Program requirements, a specific percentage of equipment will be manufactured in Ontario.

The construction of the Project will begin once the Renewable Energy Approval (REA) has been obtained and a power purchase agreement is finalized with the OPA. The construction period is estimated to be approximately 6 months. Operationally, the anticipated lifespan of the Project will be 30 years.

1.2 Renewable Energy Approval Legislative Requirements

Ontario Regulation 359/09 and 521/10, made under the Environmental Protection Act identify the Renewable Energy Approval (REA) requirements for green energy projects in Ontario. As per Section 4 of the Ontario Regulation 359/09 and its amendment (Ontario Regulation 521/10), ground mounted solar facilities with a name plate capacity greater than 12 kilowatts (kW) are classified as a Class 3 solar facility, and therefore, require an REA.

Section 13 of the Ontario Regulation 359/09 requires proponents of Class 3 solar facilities to complete a Noise Study Report in accordance with Appendix A of the publication "Basic Comprehensive Certificates of Approval (Air) – User Guide, 2004" by the Ministry of the Environment (MOE, 2004).

The Noise Study Report is to include a general description of the facility, noise sources and points of reception (POR), assessment of compliance, as well as all the supporting information relevant to the Project. A draft of the Noise Study Report must be made available to the public, the local municipality and identified Aboriginal communities, at least 60 days prior to the final public consultation meeting in accordance with Ontario Regulation 359/09 and 521/10.

[1] "Project Location" in the context of this study is an area occupied by the Project infrastructure.

2. Facility Description

The Project will utilize photovoltaic (PV) panels installed on fixed racking structures mounted on the ground. The PV panels generate DC electricity which will be converted to AC electricity by inverter units. The Project layout is based on 10 inverter units (i.e., building enclosures), each one containing two inverters and one medium-voltage transformer, and one 10-MVA/44-kV substation transformer. The 27.6-kV power, collected from the inverter units, will be stepped-up to 44 kV by the substation transformer prior to being sent to the existing local distribution line.

Since the panels will be ground-mounted and the total nameplate capacity is over 12 kW, the Project is considered to be a Class 3 Solar Facility, according to the classification presented in Ontario Regulation 521/10.

Table 2.1 General Project Description

Project Description	Ground-mounted Solar PV, Class 3
System Nameplate Capacity	10 MW AC
Local Distribution Company	Hydro One Networks Inc.

2.1 Project Location

The Project Location consists of undeveloped land totalling approximately 34 hectares, located 3.6 km east of the village of Odessa and 5 km west of the City of Kingston. Figure 2.1 shows the site layout plan while the zoning designation plan (Figure A.1) and area location plan (Figure A.2) drawings are included in Appendix A. 124 points of reception are located within 1.2-km from the Project Site[2] boundary.

2.2 Acoustical Environment

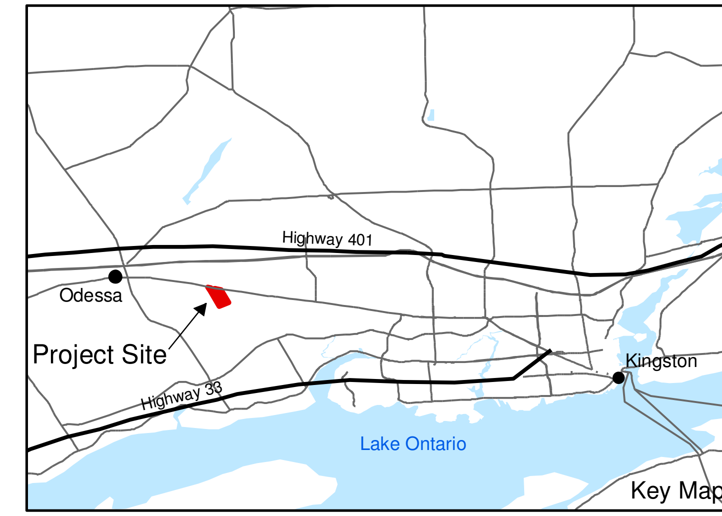
The Project Location is mainly surrounded by farmland, with some wooded areas to the north and south sides. The spot sound measurements taken around the site showed sound pressure levels somewhat above those typical of rural areas (>40 dBA). Traffic noise is perceived from Highway 2 to the north.

No industrial facilities or airports are found within 5-km from the site.

2.3 Life of Project

The expected life of the Project is 30 years. At that time (or earlier if the 20 year power purchase agreement is not extended), the Project will be decommissioned or refurbished depending on market conditions and/or technological changes.

[2] "Project Site" in the context of this study is the complete area designated for the Project but not necessary occupied with the project infrastructure. Project Location is always contained within Project Site.



LEGEND

Existing Features

- Noise Receptor
- Representative Noise Receptor
- Road
- Topographic Contour (5 m interval)
- Watercourse
- Transmission Line
- Parcel

Proposed Project Components

- Communication Tower
- Project Site
- Project Location
- Substation Transformer
- Inverter Unit
- Laydown Area
- Panel Layout
- Access Road
- Transmission Line
- Substation
- Connection Point

0 100 200 400 Metres

NORTH

1:7,500

Notes:
1. OBM and NRVIS data downloaded from LIO, with permission.
2. Spatial Referencing UTM NAD 83.
3. Air photos from CRCA, flown Spring 2008, scale 1:2000.

Figure 2.1
Axio Power Canada Inc./SunEdison Canada
Kingston Gardiner Hwy 2 South
Site Layout Plan

HATCH

2.4 Operating Hours

Solar PV facilities produce electricity during the daytime hours, when the sun's rays are collected by the panels. After sunset, the facility will not receive solar radiation to generate any electricity. Under these conditions the inverters will not produce any noise and the transformers will be energized, but not in operation (no fans in operation).

2.5 Approach to the Study

The sound pressure levels at the POR were predicted using procedures from ISO 9613-2, which is a widely used and generally accepted standard for the evaluation of noise impact in environmental assessments. The sound power level for the inverter units was provided by the manufacturer while the sound power level for the substation transformer was estimated. The software package CADNA-A, which implements ISO-9613-2, was used to predict the noise levels at the closest POR. This numerical modeling software is able to simulate sound sources as well as sound mitigation measures taking into account atmospheric and ground attenuation. Some of the CADNA-A configurations used in the modeling are shown in Figure 2.2.The height contours for the site were taken from the Ontario Base Maps (OBM).

For modeling purposes, the vegetation that blocks some of the POR from the sources has not been incorporated.

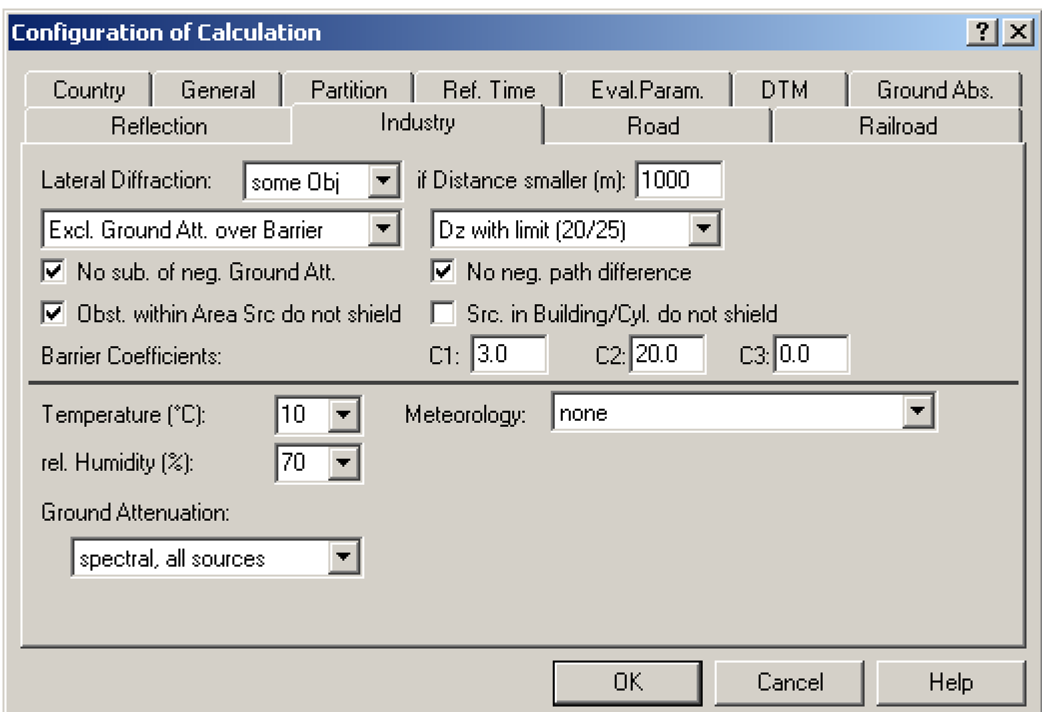


Figure 2.2 CADNA-A Configurations

3. Noise Source

The main sources of noise from the Project will be 10 inverter units, each one containing two inverters and one medium-voltage transformer, and a substation containing the main step up transformer. The Client provided a layout of the solar PV facility (see Figure 2.1). The coordinates of each noise source are presented in Table B.1 of Appendix B.

All noise sources were modeled as non-directional point sources.

Switchgear and a small step-down transformer used for lighting, located at the substation, do not emit any significant noise and consequently have not been considered as sources of noise.

For the purpose of this study it is assumed that all inverters and transformers will be operating 24 hours at full capacity.

3.1 Substation Transformer

A step-up transformer that will step-up the 27.6-kV power to the 44 kV, required by the local distribution company, will be located in the substation. The 27-kV/44-kV/10-MVA transformer will be supplied by Magna Electric Corporation (Figure B.3). The sound power levels resulting from the operation of the transformer were using data from NEMA TRI – 1993 (2000) and 35-m^2 transformer surface area. This standard provides maximum sound level values for transformers, and manufacturers routinely meet this specification. Hence, the results based on NEMA may slightly overestimate the impact on POR since the actual transformer is expected to be quieter.

The NEMA levels were then converted into frequency spectra using empirical correlations for transformer noise (Crocker, 2007). This calculation is available in Figure B.1 of Appendix B.

Power transformers are considered by the MOE to be tonal noise sources. A 5-dB penalty was added to the sound power spectrum, as recommended by Publication NPC-104, "Sound Level Adjustments" for tonality. Table B.2 in Appendix B shows the frequency spectrum used to model the substation transformer. Figure B.3 presents dimensions for this transformer that are expected to be similar to the installed dimensions.

3.2 Inverter Units

The Client will use ten SMA Sunny Central 1000MV (SC1000MV) inverter units in the Project. Each SC1000MV inverter unit comprises of two inverters and one medium voltage transformer contained in an e-house or enclosure (see Appendix B). The main sources of noise are the cooling/ventilation fans, the electrical components of the inverters and the medium-voltage transformer. It is assumed that the current configuration of the SC1000MV unit, as specified in Appendix B, will be modified, where required according to the CADNA-A model, to have the following features: 1) all ventilation openings will be equipped with acoustical louvers (silencers); 2) all external walls will be soundproof (i.e., sound emissions through the walls will be significantly lower than the sound emissions through the louvers).

The installed capacity of each inverter unit is 1 MW. SMA provided third-octave noise data for the SC1000MV unit, which takes into account combined noise emissions from the two inverters and transformer (see Appendix B). The provided third octave spectrum was converted to a full octave spectrum for use with CADNA-A model (calculations are available in Figure B.2 of Appendix B). A

5-dBA penalty was added to the frequency spectrum, as stipulated in Publication NPC-104, "Sound Level Adjustments," to allow for tonality. The frequency spectra used for SC1000MV units is shown in Table B.2, Appendix B.

Although for the modeling purposes it was assumed that the facility will operate 24 hours at full capacity, in reality at night the facility will be idle. Under these conditions the inverters do not produce noise. The transformers (at the substation and clusters) are energized and make some magnetostrictive noise at a reduced level, but no cooling fans are in operation.

3.3 Noise Summary Table

A summary of the sound sources described above, including sound level, characteristics and proposed noise control measures, is presented in Table 3.1.

Table 3.1 Noise Source Summary (Day and Night Time)

Source ID	Description	Total Sound Power Level (dBA)	Source Location	Sound Characteristics	Noise Control Measures
Sub	27-kV/44-kV/10-MVA Substation transformer	90.8	O	S-T	U
Inv1	Sunny Central 1000MV inverter unit	102.2	O	S-T	E-S
Inv2	Sunny Central 1000MV inverter unit	102.2	O	S-T	E-S
Inv3	Sunny Central 1000MV inverter unit	102.2	O	S-T	E-S
Inv4	Sunny Central 1000MV inverter unit	102.2	O	S-T	E-S
Inv5	Sunny Central 1000MV inverter unit	102.2	O	S-T	E-S
Inv6	Sunny Central 1000MV inverter unit	102.2	O	S-T	E-S
Inv7	Sunny Central 1000MV inverter unit	102.2	O	S-T	E-S
Inv8	Sunny Central 1000MV inverter unit	102.2	O	S-T	E-S
Inv9	Sunny Central 1000MV inverter unit	102.2	O	S-T	E-S
Inv10	Sunny Central 1000MV inverter unit	102.2	O	S-T	E-S

Notes:

1. A 5-dBA penalty is included in this table.
2. Location: Inside building (I), Outside building (O).
3. Sound Characteristics: Steady (S), Tonal (T), Impulsive (I), Quasi-Steady Impulsive (QSI).
4. Noise Control: Silencer (S), Acoustic lining (A), Barrier (B), Lagging (L), Enclosure (E), Other (O), Uncontrolled (U).

3.4 Adjacent Solar Projects

To identify the adjacent solar projects Hatch's internal database of solar projects and MOE records available in http://www.ene.gov.on.ca/environment/en/subject/renewable_energy/projects/index.htm were searched (Jan 16, 2011).

There are no POR that are within 1 km of equipment in the Project and any adjacent project. As a result, there are no adjacent projects included in this study.

4. Point of Reception

The POR used in this study were initially identified from the OBM and high resolution aerial photography within 1.2-km distance from the Project Site boundary. Following this, the potential noise receptors located closest to the Project Location were then visually verified during a site visit held in September 2010. Based on this, a number of additional receptors (residential buildings) that were observed at the time of the inspection were added to the model.

The total number of POR considered in this study, within a 1.2-km distance from the Project Site boundary, is 124 (see Figure A.1 and Figure A.2 in Appendix A). Three of these noise receptors, identified in Table 4.1, were chosen as representative receptors for evaluating the noise contribution from each individual source (i.e., the substation and 10 inverters). These three receptors were chosen in order to represent sound pressure level contributions on different areas around the Project Location. The complete set of results for all 124 noise receptors is provided in Table 6.2 with corresponding noise maps from CADNA-A included in Appendix C.

For this study, the elevation above ground used for the POR is 4.5 m. Also, noise compliance was verified within 30-m distance from any given POR located at 1.5 m above the ground level.

Table 4.1 Point of Reception Noise Impact (Day and Night Time)

Source ID	POR 1		POR 7		POR 16	
	Distance (m)	L_{eq} Sound Level (dBA)	Distance (m)	L_{eq} Sound Level (dBA)	Distance (m)	L_{eq} Sound Level (dBA)
Sub	156	35.6	161	35.4	778	20.6
Inv1	264	27.3	202	29.9	581	19.8
Inv2	126	34.7	271	27.0	693	18.1
Inv3	297	26.2	347	24.7	527	20.8
Inv4	219	29.1	407	23.2	658	18.6
Inv5	386	23.7	491	21.4	508	21.1
Inv6	348	24.7	547	20.4	654	18.7
Inv7	502	21.2	635	19.0	531	20.7
Inv8	487	21.5	689	18.2	682	18.3
Inv9	629	19.1	779	17.0	590	19.7
Inv10	628	19.1	833	16.4	737	17.5

5. Mitigation Measures

Mitigation for operation of the solar facility has been modeled and shown to be feasible in the form of soundproof (i.e., sound emissions through the walls will be significantly lower than the sound emissions through the louvers) enclosures with acoustical louvers for all inverter units. The noise reduction and sound transmission characteristics of the acoustical louvers considered in this study are presented in Table B.3 of Appendix B. Technical specifications of the proposed louvers are included in Appendix B as well.

6. Impact Assessment

The purpose of the acoustic assessment report is to demonstrate that the facility is in compliance with the noise performance limits. The Project will be located in a Class 3 Area, based on the classification defined in Publication NPC-232 by the MOE. Class 3 area means a rural area with an acoustical environment that is dominated by natural sounds with little or no traffic noise.

Table 6.1 shows the performance limits set by the MOE for Class 3 Areas, according to Publication NPC-232.

Table 6.1 Performance Limits (One-Hour L_{eq}) by Time of Day for Class 3 Areas

Time of Day	One Hour L_{eq} (dBA) Class 3 Area
07:00 to 19:00	45.0
19:00 to 23:00	40.0
23:00 to 07:00	40.0

The solar facility will be operating during the daylight hours, that is, between 07:00 and 19:00 during most days of the year. However, in the summer months the sun may shine until past 19:00, or before 07:00. As such, during the summer the facility will be operating at the time when the applicable performance limit changes from 45 dBA to 40 dBA. Also, the transformers remain energized at night. In order to account for this the study assumes that the facility will be operating 24 hours and compares the impact from the facility with the 40-dBA limit. In reality, the cooling fans will not be in operation at night.

For this study, the overall ground attenuation coefficient was estimated to be 0.7. Appendix D includes a list of all the parameters used in the CADNA-A model to predict the sound pressure levels at the POR.

The modelling does not consider the effect of the solar panels on the predicted sound pressure levels at the points of reception. The solar panels may act as barriers to further reduce noise at the POR.

6.1 Compliance With Performance Limits

Table 6.2 presents the predicted sound pressure levels for the POR located within 1.2 km from the Project Site. Sound pressure contours at 4.5-m and 1.5-m are available in Figure C.1 and Figure C.2. Appendix D includes a detailed calculation log of the representative POR with the highest sound pressure level.

Effect of the noise emissions at the POR was also accessed by intersecting the 40-dBA sound pressure contours calculated at 1.5 m above ground with 30-m radius circles placed around the POR (Figure C.2). The results show that none of the 30-m radius zones are affected by the noise emissions.