



Axio Power Canada Inc./
SunEdison Canada

Noise Study Report

For

Norfolk Bloomsburg TS
Solar Energy Project

H335467

Rev. 0

November 25, 2011

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Project Report

November 25, 2011

Axio Power Canada Inc./SunEdison Canada Norfolk Bloomsburg TS 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 (“Axio/SunEdison”) is proposing to develop a 10-Megawatt (MW) solar photovoltaic (PV) project Norfolk Bloomsburg TS Solar Energy Project (the “Project”). The Project is located on 29 hectares (ha) on Part of Lots 3 and 4, Concession 12, County of Norfolk (single tier municipality).

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 (POR¹) 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 (45-dBA for day time and 40-dBA for night time). 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. Any noise issues that might arise during commissioning will be manageable and will be resolved by implementing typical remediation measures as described in this report. It is our intention to verify by field measurements taken on completion of installation and during commissioning that the noise levels at the POR resulting from the Project’s operation are within the limits set by the MOE (45-dBA for day time and 40-dBA for night time).

¹ “Point of reception” in the context of this study is equivalent to “noise receptor” as defined in Ontario Regulation 521/10.

1. Introduction

1.1 Project Description

Axio Power Canada Inc./SunEdison Canada (“Axio/SunEdison”) is proposing to develop a 10-megawatt (MW) solar photovoltaic (PV) project titled Norfolk Bloomsburg TS Solar Energy Project (the “Project”). The Project Location² is situated on approximately 29 hectares (ha) of land on Part of Lots 3 and 4, Concession 12, Norfolk County (single tier municipality).

The Project is proposed to be constructed on privately owned land currently used for agricultural crops. The Project Site is located about 1-km south of the Village of Bloomsburg and about 4-km northeast of the Town of Simcoe. Local roads include Stone Quarry Road (Concession 13 Townsend Road) and Cloet Road immediately south and west of the site, respectively. Major roads include Highway 24 (Norfolk Street) to the west and north of the site.

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 prior to being connected 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, sources and points of reception (POR¹), assessment of compliance, as well as all the supporting information relevant to the Project.

² “Project Location” means, when used in relation to a renewable energy project, 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 and any air space in which a person is engaging in or proposed to engage in the project” (Ontario Regulation 359/09, s. 1 (1)).

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.

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. The 27.6-kV power from the inverter units will be sent directly to the 27.6-kV local transmission line. A main step-up transformer (substation transformer) is not needed in such case.

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.

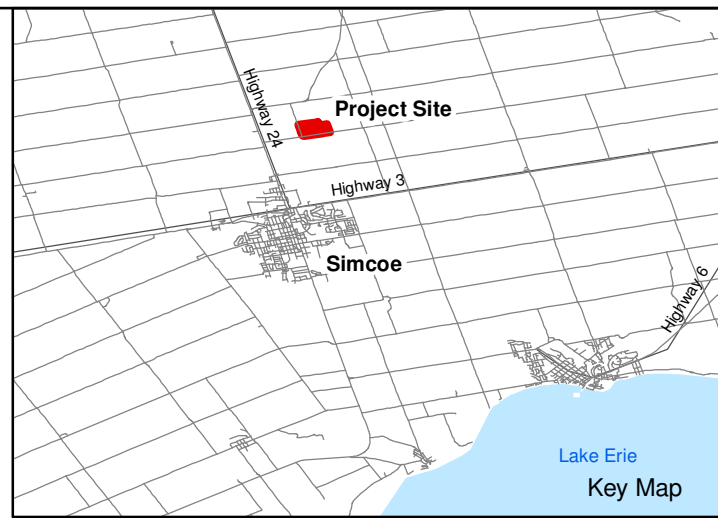
Project Description	Ground-mounted Solar PV, Class 3
System Nameplate Capacity	10-MW AC
Local Distribution Company	Norfolk Power Inc.

2.1 Project Location

The Project Location consists of agricultural land totalling approximately 29 hectares, located about 4 km north of Simcoe, Norfolk County. 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. 187 points of reception are located within 1.2-km from the Project Site³ boundary.

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

³ Project Site is the complete area owned by the Project but not necessary occupied by the Project infrastructure.



- LEGEND**
- Existing Features**
- Rogers Cell Tower (328 m)
 - Road
 - Topographic Contour (5 m interval)
 - Transmission Line
 - - - Bell Cable (To be Relocated)
 - Hydro Line (To be Relocated)
 - Watercourse
 - Lot
 - ▭ Project Location
 - ▭ Project Site
- Natural Features**
- ▨ Tall Grass Prairie
 - ▭ Woodland
- Proposed Project Components**
- ⊕ Inv# Inverter Unit
 - # Noise Receptor
 - # Representative Noise Receptor
 - Panel Layout
 - Access Roads
 - Transmission Line
 - ▭ Laydown Area
 - ⊙ Switch House
 - ⊙ Connection Point

Notes:
 1. OBM and NRVIS data downloaded from LIO, with permission.
 2. Spatial Referencing UTM NAD 83, August 2010
 3. Satellite imagery from Google Earth Pro, April 2009.

0 50 100 200 Metres
 Scale 1:5,000

NORTH

Figure 2.1
 Axio Power Canada Inc./SunEdison Canada
Norfolk Bloomsburg TS - Solar Energy Project Site Layout Plan



2.2 Acoustical Environment

The Project will be surrounded mainly by farmland and some patches of woodland. Background sound levels are typical of rural areas, classified as a Class 3 based on Publication NPC-232 by the MOE (MOE, 1995), and were confirmed by spot measurements around the Project Site. Low traffic flow was observed on Concession 13 Rd while at site. However, traffic noise from Blueline Rd could be heard in the area near Cloet Rd. Highway 3 is located approximately 3 km south of the site.

There is one heliport at the Norfolk General Hospital (about 3-km south-west) but no airports within 5 km of the Project area. The towns of Simcoe and Bloomsburg are located at less than 3-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 agreements are not extended), the Project will be decommissioned or refurbished depending on market conditions and/or technological changes.

2.4 Operating Hours

Solar PV facilities produce electricity during the day 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).

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. 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. The height contours for the site were taken from the Ontario Base Maps (OBM).

3. Noise Source Summary

The main sources of noise from the Project will be 10 inverter units, each one containing two inverters and one medium-voltage transformer. Axio/SunEdison 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.

The existing distribution infrastructure does not require a main step up transformer for this solar project. As such, the building, known as a switching station, that would normally house a main step-up transformer will contain only switchgear used to disconnect the facility from the grid and a small step-down transformer used for lighting. Such a station does not emit any significant noise and consequently has not been considered as a source of noise.

3.1 Inverter Units

At this stage of the Project, the specific make and model of the inverters, medium voltage transformers and enclosures has not been finalized and the SMA Sunny Central 1000MV unit has been selected as a representative inverter unit for the purposes of initial design and noise modeling. Each Sunny Central 1000MV 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 Sunny Central 1000MV unit, as specified in Appendix B, will be modified, if required according the CADNA-A model, to have the following features: 1) all external walls will be soundproof (i.e. no sound escape through the walls); 2) all ventilation openings will be equipped with acoustical louvers (silencers).

The installed capacity of each inverter unit is 1-MW. SMA provided third-octave noise data for the Sunny Central 1000MV unit, which takes into account combined noise emission 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.1 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 Sunny Central 1000MV units is shown in Table B.2, Appendix B.

Note also that at night time the facility will not operate. Under these conditions the inverters do not produce noise. The medium-voltage transformers are energized and make some magnetostrictive noise at a reduced level, but no cooling fans are in operation. However, the noise data provided by SMA combines the inverter and transformer contributions. Consequently, the noise model assumed that the SC1000MV units would be operating 24 hours.

3.2 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
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).

4. Point of Reception Summary

The POR used in this study were initially identified from the OBM 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 187 (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. These three receptors were the closest to the Project Location and had the highest modeled noise level among the POR located at the given side of the Project they represent. The complete set of results for all 187 noise receptors is provided in Appendix C, including a noise map from CADNA-A. For this study, the POR elevation above ground is 4.5-m.

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

Source ID	POR 1		POR 6		POR 10	
	Distance (m)	Leq Sound Level (dBA)	Distance (m)	Leq Sound Level (dBA)	Distance (m)	Leq Sound Level (dBA)
Inv1	190	30.6	694	14.8	710	14.1
Inv2	275	26.4	677	15.6	732	13.9
Inv3	370	22.7	457	19.1	577	16.0
Inv4	238	27.7	468	19.3	515	17.4
Inv5	474	19.6	313	23.2	488	17.8
Inv6	346	23.0	330	24.0	411	19.9
Inv7	270	26.1	374	21.3	363	21.4
Inv8	139	33.3	510	17.8	487	17.9
Inv9	432	20.1	264	26.8	175	30.9
Inv10	457	20.1	196	29.8	221	28.6

5. Mitigation Measures

Mitigation for operation of the solar facility has been modeled and shown to be feasible in the form of soundproof enclosures with acoustical louvers for all inverter units. The proposed considerations for these devices must be revised when the specific dimensions and configuration of the enclosure are made available. 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.

While analysis indicates that no additional mitigation will be required, the noise levels will be verified at the closest POR after the Project goes into service. If measurements indicate a need to further reduce sound levels to satisfy MOE criteria, additional mitigation measures will be taken at the sources.

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, having little or no traffic, such as an agricultural area.

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 day light hours, that is, before 19:00 during most days of the year. However, in the summer months the sun may shine until past 21:00, although the inverters will be below 100% loading conditions. As such, during the summer the facility will be operating at the time 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 noise model assumes that the inverter units 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 representative POR. The complete set of results is included in Appendix C. Appendix D includes a detailed calculation log of the representative POR with the highest Sound Pressure Level.

Table 6.2 Acoustic Assessment Summary (Day and Night Time).

POR ID	POR Description	Total Sound Level at POR (L_{eq}) (dBA)	Verified by Acoustic Audit (Yes/No)	Performance Limit (L_{eq}) Day / Night (dBA)	Compliance With Performance Limit (Yes/No)
1	Existing house southeast	37.3	No	45.0/40.0	Yes
6	Existing house west	33.7	No	45.0/40.0	Yes
10	Existing house southwest	33.9	No	45.0/40.0	Yes

In order to account for the potential noise impacts to vacant lots surrounding the Project Location (i.e., those that could have an inhabited building constructed on the lot at a future date), a comparison was made between the Zoning Designation (Figure A.1 in Appendix A) and the noise receptors, land parcels surrounding the Project Location and the noise contours shown in Figure C.1 in Appendix C. The results from the comparison are summarized in Table 6.3 below and show that the 40-dBA noise contour partially encroaches onto the edges of three parcels surrounding the Project Location.

Table 6.3 Parcels partially affected by the Project's noise emission.

Parcels ID	PIN	Zoning	Description
PR01	502850272	Agricultural	Vacant lot
PR02	502850348	Agricultural	Contains existing noise receptor(s)
PR03	502850258	Agricultural	Contains existing noise receptor(s)

All noise receptors located on parcels PR02 and PR03 were included in the CADNA-A model and determined to be compliant with the MOE performance limits.

As described in 1.(4)4. of Ontario Regulation 521/10, a noise receptor on a vacant lot (where no building permit has been issued) is considered to be the location ". . . at which a building would reasonably be expected to be located, having regard to the existing zoning by-law and the typical building pattern in the area . . .". For parcel PR01, a building would reasonably be expected to be located adjacent to Cloet Road, approximately 350 metres from the 40-dBA contour line encroachment. Hence, there is sufficient room on the unaffected property for a future dwelling (i.e., noise receptor) to be built on the property, be below the 40-dBA and, thus, be compliant with the MOE performance limits. Hatch also contacted Norfolk County who confirmed on May 18, 2011, that they had not recently issued a building permit, or received an application for a building permit, for this lot.

Based on the above, the results show that all POR are compliant with MOE guidelines based on the performance limits.

7. Conclusions and Recommendations

For the Norfolk Bloomsburg TS Solar Energy Project, the sound pressure levels at the POR have been estimated using the CADNA-A model, based on ISO 9613-2. The performance limits used for comparison correspond to Class 3 areas, with 45-dBA during day time (7:00 a.m. to 7:00 p.m.) and 40-dBA during night time. Mitigation for operation of the Project has been modeled and shown to be feasible.

Based on the results obtained in this study, it is concluded that the sound pressure levels at the POR will be below MOE requirements for Class 3 areas at night time (40-dBA) and day time (45-dBA).

Report prepared by: _____



Oleg Belashov, M.A.Sc., P.Eng.

Date: NOV 25, 2011

8. References

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Ministry of the Environment (MOE). 1997. Noise Assessment Criteria in Land Use Planning. Publication LU-131. Ontario Ministry of the Environment. 12 pp + Annex.

MOE. 1995. Sound Level Limits for Stationary Sources in Class 1 & 2 Areas (Urban). Publication NPC-205. Ontario Ministry of the Environment. 6 pp + Annex.

MOE. 1995. Sound Level Limits for Stationary Sources in Class 3 Areas (Rural). Publication NPC-232. Ontario Ministry of the Environment. 8 pp + Annex.

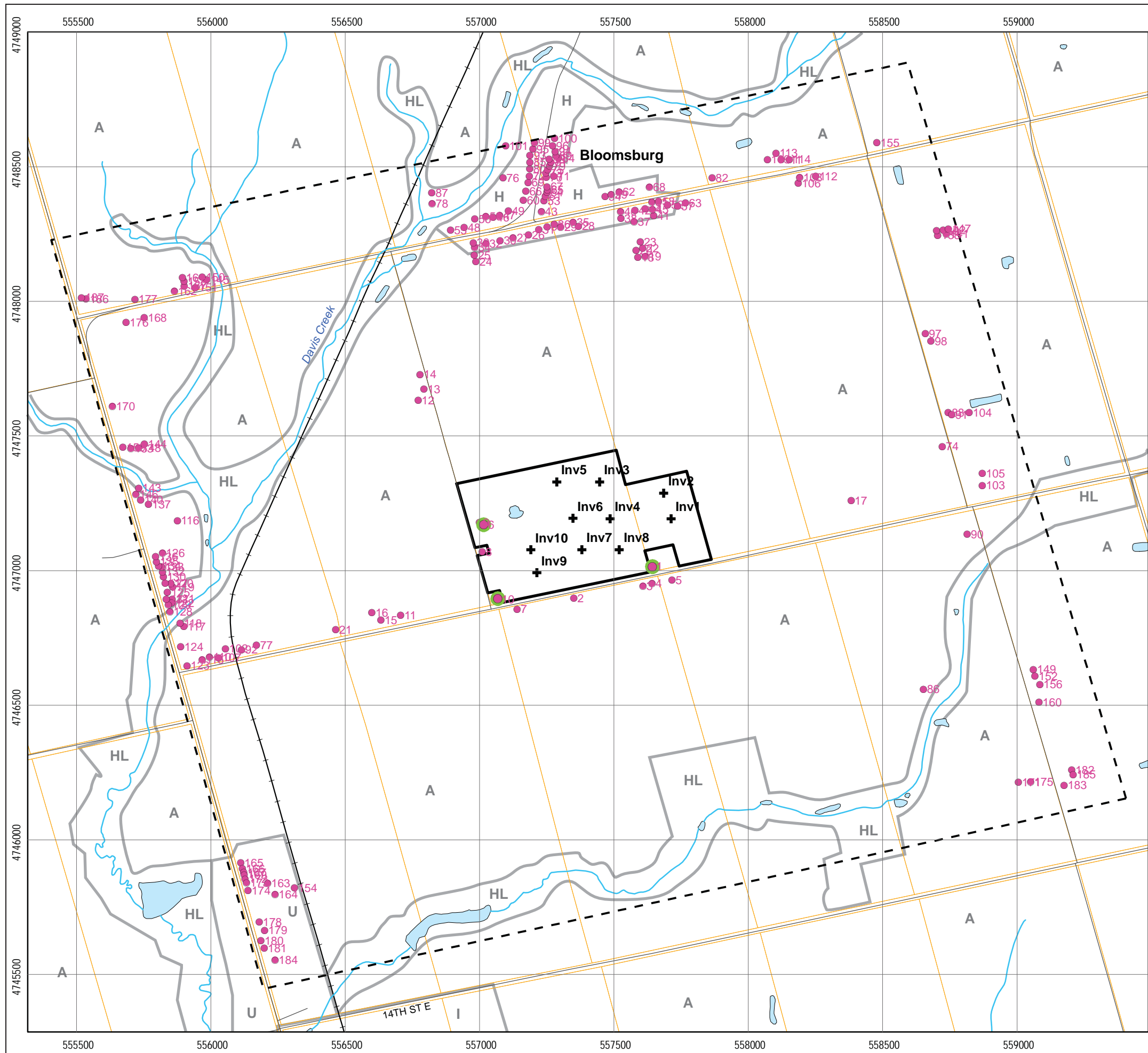
NEMA. 2000. Standards Publication No. TR 1-1993 (R2000): Transformers, Regulators and Reactors. National Electrical Manufacturers Association. 31 pp. (This reference probably not needed now).

International Organization for Standardization (ISO). Standard 1996-1: Description, Measurement and Assessment of Environmental Noise – Part 1: Basic Quantities and Assessment Procedures.

International Organization for Standardization (ISO). Standard 1913-2:Acoustics – Attenuation of sound during propagation outdoors – Part 2: General Method of Calculation.

Appendix A

**Land-Use Zoning Designation Plan,
Area Location Plan**



Legend

- Inv#
- + Inverter Unit
- # Noise Receptor
- # Representative Noise Receptor
- Railway
- Road
- Watercourse
- ▭ Project Site
- ▭ Lot
- ▭ Waterbody (OBM Mapping)
- - - 1200 m Envelope

Zones

- A Agriculture
- HL Hazard Lands
- H Hamlet
- U Urban Residential
- I Industrial/Business Park

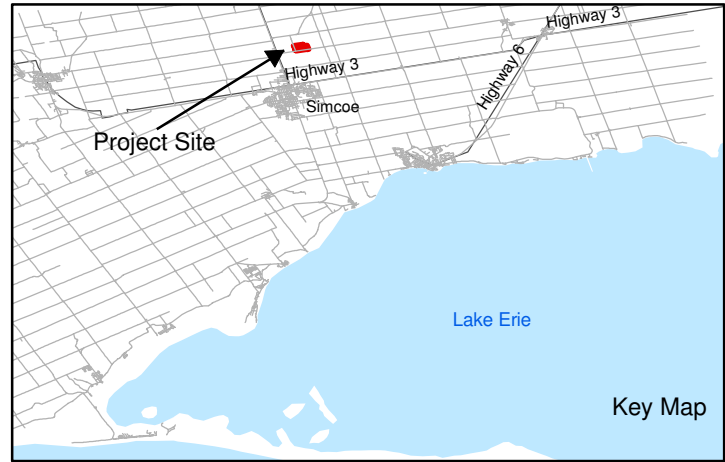
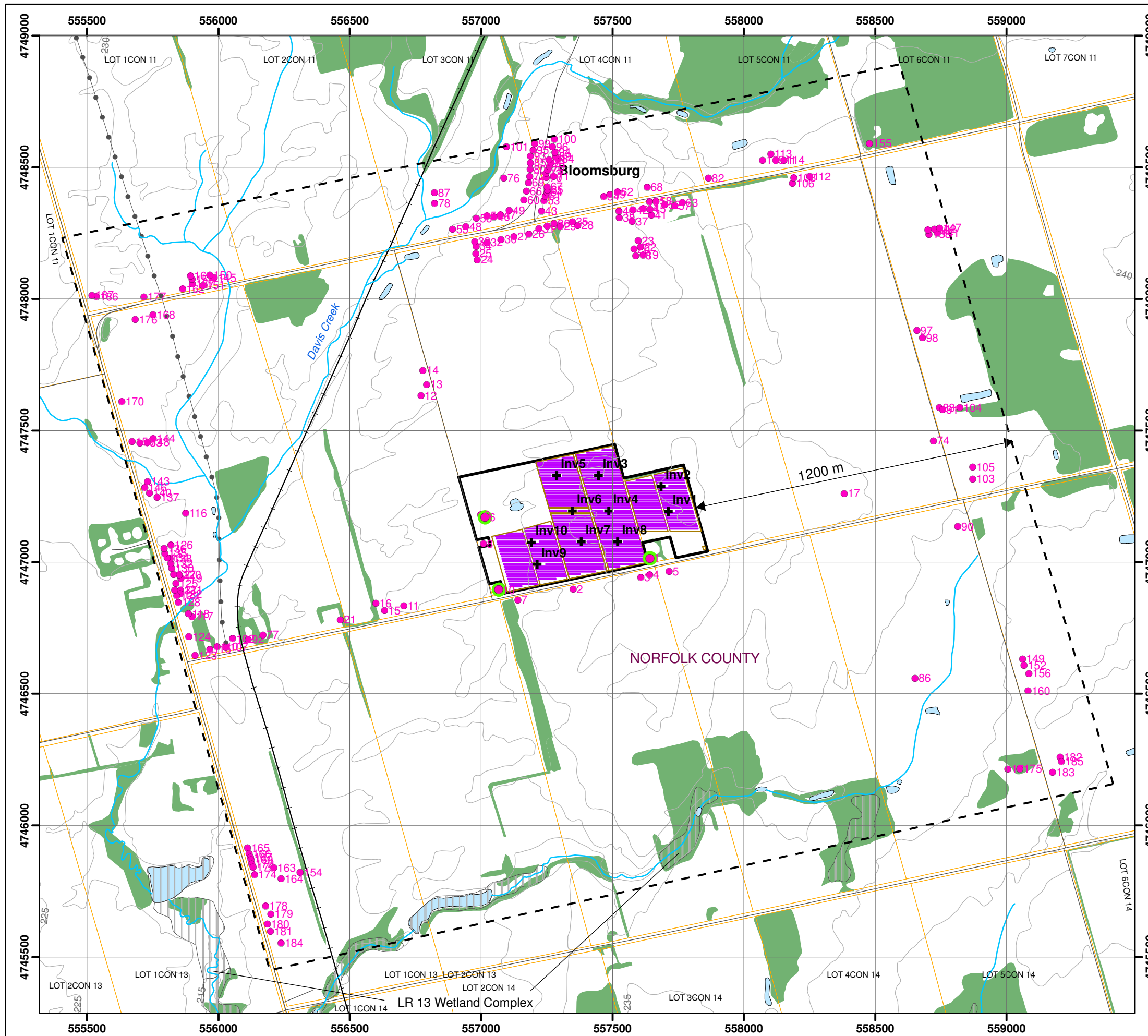


Source: Norfolk County Official Plan, Schedule B-6

Axio Power Canada Inc./SunEdison Canada
 Norfolk Bloomsburg TS -
 Solar Energy Project
**Land Use
 Zoning Designation Plan**



Figure A.1



LEGEND

- Inv#
- + Inverter Unit
- # Noise Receptor
- Representative Noise Receptor
- Railway
- Road
- Topographic Contour (5 m interval)
- Transmission Line
- Watercourse
- ▭ Project Site
- ▭ Lot
- Woodland
- Waterbody (OBM Mapping)
- ▨ Provincially Significant Wetland (PSW)
- - - 1200 m Envelope

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

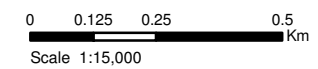


Figure A.2
 Axiom Power Canada Inc./SunEdison Canada
 Norfolk Bloomburg TS Solar Energy Project

Appendix B

Noise Sources

Table B.1 Point Sources Used in CADNA-A, Includes Tonality Penalty of 5.0-dBA.

Source ID	Description	Spectra ID	Total Sound Power Level - 24 Hours (dBA)	Correction - 24 Hours (dBA)	Height (m)	Coordinates (m)		
						X	Y	Z
Inv1	Sunny Central 1000MV inverter unit	SC1000MV	102.2	5.0	3.5	557712	4747194	248.2
Inv2	Sunny Central 1000MV inverter unit	SC1000MV	102.2	5.0	3.5	557685	4747289	248.5
Inv3	Sunny Central 1000MV inverter unit	SC1000MV	102.2	5.0	3.5	557447	4747330	243.5
Inv4	Sunny Central 1000MV inverter unit	SC1000MV	102.2	5.0	3.5	557486	4747195	244.4
Inv5	Sunny Central 1000MV inverter unit	SC1000MV	102.2	5.0	3.5	557287	4747330	241.4
Inv6	Sunny Central 1000MV inverter unit	SC1000MV	102.2	5.0	3.5	557347	4747195	242.3
Inv7	Sunny Central 1000MV inverter unit	SC1000MV	102.2	5.0	3.5	557381	4747079	243.5
Inv8	Sunny Central 1000MV inverter unit	SC1000MV	102.2	5.0	3.5	557519	4747078	245.3
Inv9	Sunny Central 1000MV inverter unit	SC1000MV	102.2	5.0	3.5	557213	4746992	241.0
Inv10	Sunny Central 1000MV inverter unit	SC1000MV	102.2	5.0	3.5	557191	4747077	241.0

Table B.2 Frequency Spectra Used for Modelling the Noise Sources, Not Including Tonality Penalty.

Spectra ID	Octave Spectrum (dBA)										
	31.5	63	125	250	500	1000	2000	4000	8000	A	lin
SC1000MV		64.8	78.9	93.0	91.6	90.1	87.6	79.9	65.4	97.2	103.7

Table B.3 Noise Reduction and Sound Transmission Characteristics of the Acoustical Louvers.

Name	Octave Spectrum (dBA)								
	31.5	63	125	250	500	1000	2000	4000	8000
Greenheck Louver	0	10	10	12	16	23	18	0	0



Efficient

- Without low-voltage transformer: greater plant efficiency due to direct connection to the medium-voltage grid

Turnkey Delivery

- With medium-voltage transformer and concrete substation for outdoor installation

Optional

- Medium-voltage switchgear systems for a flexible structure of large solar parks
- AC transfer station with measurement

- Medium-voltage transformers for other grid voltages (deviating from 20 kV)

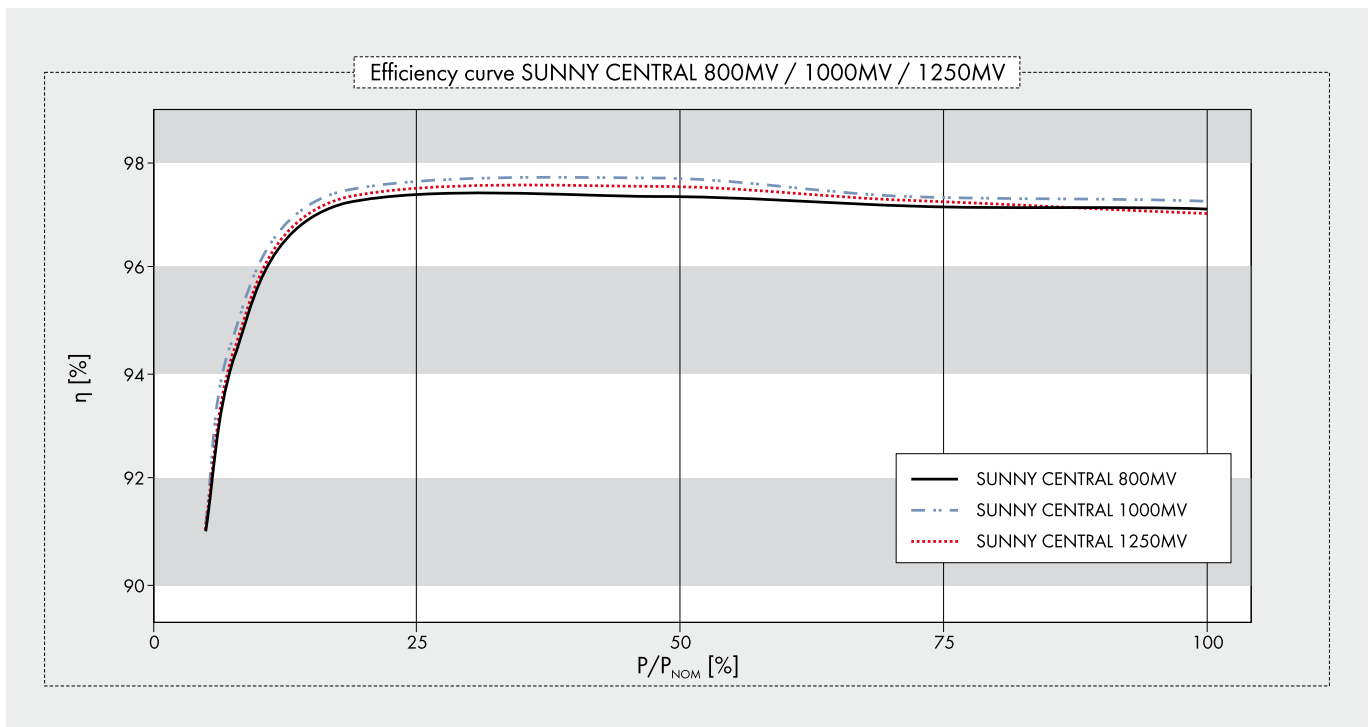
SUNNY CENTRAL for Direct medium-voltage feed-in 800MV / 1000MV / 1250MV

High-performance medium-voltage station

For even more power: Two powerful Sunny Central HE inverters are components of a medium-voltage station (MV) which feeds directly into a shared medium-voltage transformer. In this way, for example, two Sunny Central 630HE inverters are combined into a powerful Sunny Central 1250MV station. The advantage: By removing the need for the low-voltage transformer, the plant operator realizes greater yields and at the same time lower inverter costs. The Sunny Central MV is delivered as a "turnkey" concrete substation for outside installation. On top of that, the Sunny Central MV actively participates in grid management, and thereby fulfils all requirements of the Medium-Voltage Directive valid as of July 2010.

SUNNY CENTRAL 800MV / 1000MV / 1250MV

Technical data	Sunny Central 800MV	Sunny Central 1000MV	Sunny Central 1250MV
Input data			
Nominal DC power	816 kW	1018 kW	1284 kW
Max. DC power	900 kW ¹⁾	1120 kW ¹⁾	1410 kW ¹⁾
MPP voltage range	450 V - 820 V ⁵⁾	450 V - 820 V ⁵⁾	500 V - 820 V ^{5) 7)}
Max. DC voltage	1000 V	1000 V	1000 V
Max. DC current	1986 A	2484 A	2844 A
Number of DC inputs	(16 + 16) + 4 DCHV	(16 + 16) + 4 DCHV	(16 + 16) + 4 DCHV
Output data			
Nominal AC power @ 45 °C	800 kVA	1000 kVA	1250 kVA
Continuous AC power @ 25 °C	880 kVA	1100 kVA	1400 kVA
Nominal AC voltage	20000 V	20000 V	20000 V
Nominal AC current	23.2 A	28.8 A	36.1 A
AC grid frequency 50 Hz	●	●	●
AC grid frequency 60 Hz	●	●	●
Power factor (cos φ)	0.9 leading ... 0.9 lagging		
Max. THD	< 3 %	< 3 %	< 3 %
Power consumption			
Internal consumption in operation	< 3000 W ⁴⁾	< 3000 W ⁴⁾	< 3000 W ⁴⁾
Standby consumption	< 180 W + 1100 W	< 180 W + 1100 W	< 180 W + 1350 W
External auxiliary supply voltage	3 x 230 V, 50/60 Hz	3 x 230 V, 50/60 Hz	3 x 230 V, 50/60 Hz
External back-up fuse for auxiliary supply	B 20 A, 3-pole	B 20 A, 3-pole	B 20 A, 3-pole
Dimensions and weight			
Height	3620 mm	3620 mm	3620 mm
Width	5400 mm	5400 mm	5400 mm
Depth	3000 mm	3000 mm	3000 mm
Weight	35000 kg	35000 kg	35000 kg
Efficiency²⁾			
Max. efficiency	97.7 %	97.9 %	97.8 %
Euro-eta	97.3 %	97.5 %	97.4 %
Protection rating and ambient conditions			
Protection rating (as per EN 60529)	IP54	IP54	IP54
Operating temperature range	-20 °C ... +45 °C	-20 °C ... +45 °C	-20 °C ... +45 °C
Rel. humidity	15 % ... 95 %	15 % ... 95 %	15 % ... 95 %
Fresh air consumption	12400 m ³ /h	12400 m ³ /h	12400 m ³ /h
Max. altitude (above sea level)	1000 m	1000 m	1000 m



	Sunny Central 800MV	Sunny Central 1000MV	Sunny Central 1250MV
Features			
Display: text line / graphic	●/–	●/–	●/–
Ground fault monitoring	●	●	●
Heating	●	●	●
Emergency stop	●	●	●
Circuit breaker AC side	SI load disconnection switch	SI load disconnection switch	SI load disconnection switch
Circuit breaker DC side	Switch-disconnector with motor	Switch-disconnector with motor	Switch-disconnector with motor
Monitored overvoltage protectors AC / DC	●/●	●/●	●/●
Monitored overvoltage protectors for auxiliary supply	●	●	●
SCC (Sunny Central Control) interfaces			
Communication (NET Piggy-Back, optional)	analog, ISDN, Ethernet	analog, ISDN, Ethernet	analog, ISDN, Ethernet
Analog inputs	10 x A _m ³⁾	10 x A _m ³⁾	10 x A _m ³⁾
Overvoltage protection for analog inputs	○	○	○
Sunny String-Monitor connection (COM1)	RS485	RS485	RS485
PC connection (COM3)	RS232	RS232	RS232
Electrically separated relay (ext. alert signal)	2	2	2
Certificates / listings			
EMC	EN 61000-6-2 EN 61000-6-4		
CE conformity	●	●	●
BDEW-MSRL / FGW / TR8 ⁶⁾	●	●	●
RD 1633 / 2000	●	●	●
Arrêté du 23/04/08	●	●	●
● standard features ○ optional features – not available			
Type designation	SC 800MV-11	SC 1000MV-11	SC 1250MV-11

HE: High Efficiency, inverter without galvanic isolation for connection to a medium-voltage transformer (taking into account the SMA specification for the transformer)

1) Specifications apply to irradiation values below STC

2) Efficiency measured without an internal power supply at $U_{DC} = 500\text{ V}$

3) 2x inputs for the external nominal value specification for active power and reactive power, 1x external alarm input, 1x irradiation sensor, 1x pyranometer

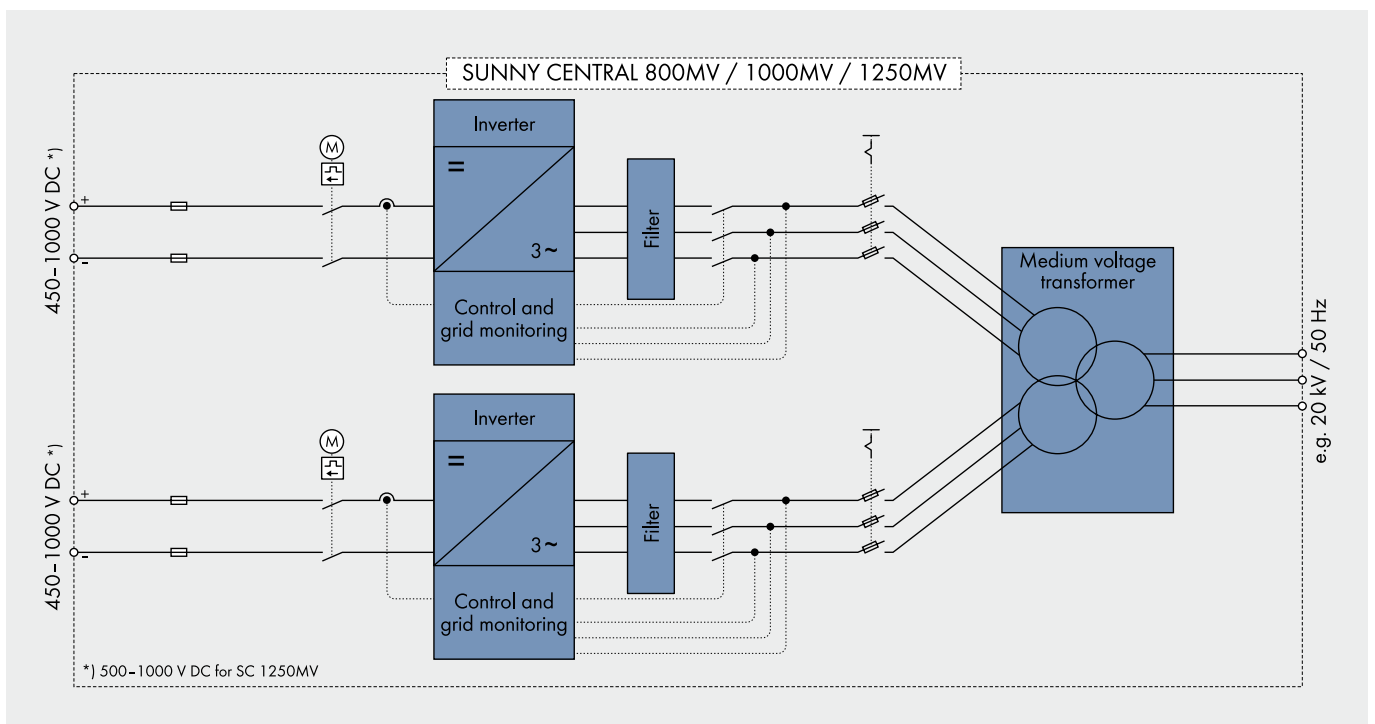
4) Internal consumption at nominal power

5) At $1.05 U_{AC, nom}$ and $\cos \varphi = 1$

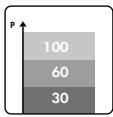
6) With limited dynamic grid support

7) At $f_{grid} = 60\text{ Hz}$: 510 V - 820 V

Please note: in certain countries the substations may differ from the substations shown in the images

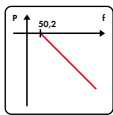


POWERFUL GRID MANAGEMENT FUNCTIONS



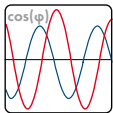
Remote controlled power reduction in case of grid overload

In order to avoid short-term grid overload, the grid operator presets a nominal active power value which the inverter will implement within 60 seconds. The nominal value is transmitted to the inverters via a ripple control receiver in combination with the SMA Power Reducer Box. Typical limit values are 100, 60, 30 or 0 per cent of the nominal power.



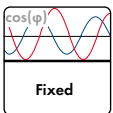
Frequency-dependent control of active power

As of a grid frequency of 50.2 Hz, the inverter automatically reduces the fed-in of active power according to a definable characteristic curve which thereby contributes to the stabilization of the grid frequency.



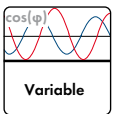
Static voltage support based on reactive power

To stabilize the grid voltage, SMA inverters feed reactive power (leading or lagging) into the grid. Three different modes are available:



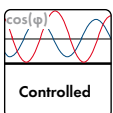
a) Fixed definition of the reactive power by the grid operator

The grid operator defines a fixed reactive power value or a fixed displacement factor between $\cos(\varphi)_{\text{leading}} = 0.90$ and $\cos(\varphi)_{\text{lagging}} = 0.90$.



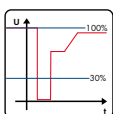
b) Definition of a dynamic setpoint of the reactive power by the utility operator

The grid operator defines a dynamic displacement factor - any value between $\cos(\varphi)_{\text{leading}} = 0.90$ und $\cos(\varphi)_{\text{lagging}} = 0.90$. It is transmitted either through a communication unit the evaluation can e.g. be evaluated and processed by the SMA Power Reducer Box.



c) Control of the reactive power over a characteristic curve

The reactive power or the phase shift is controlled by a pre-defined characteristic curve - depending on the active power fed into the grid or the grid voltage.



Limited Dynamic Grid Support

The inverter continues to feed to the grid after short term voltage drops - as long as the grid voltage is within a defined voltage window.

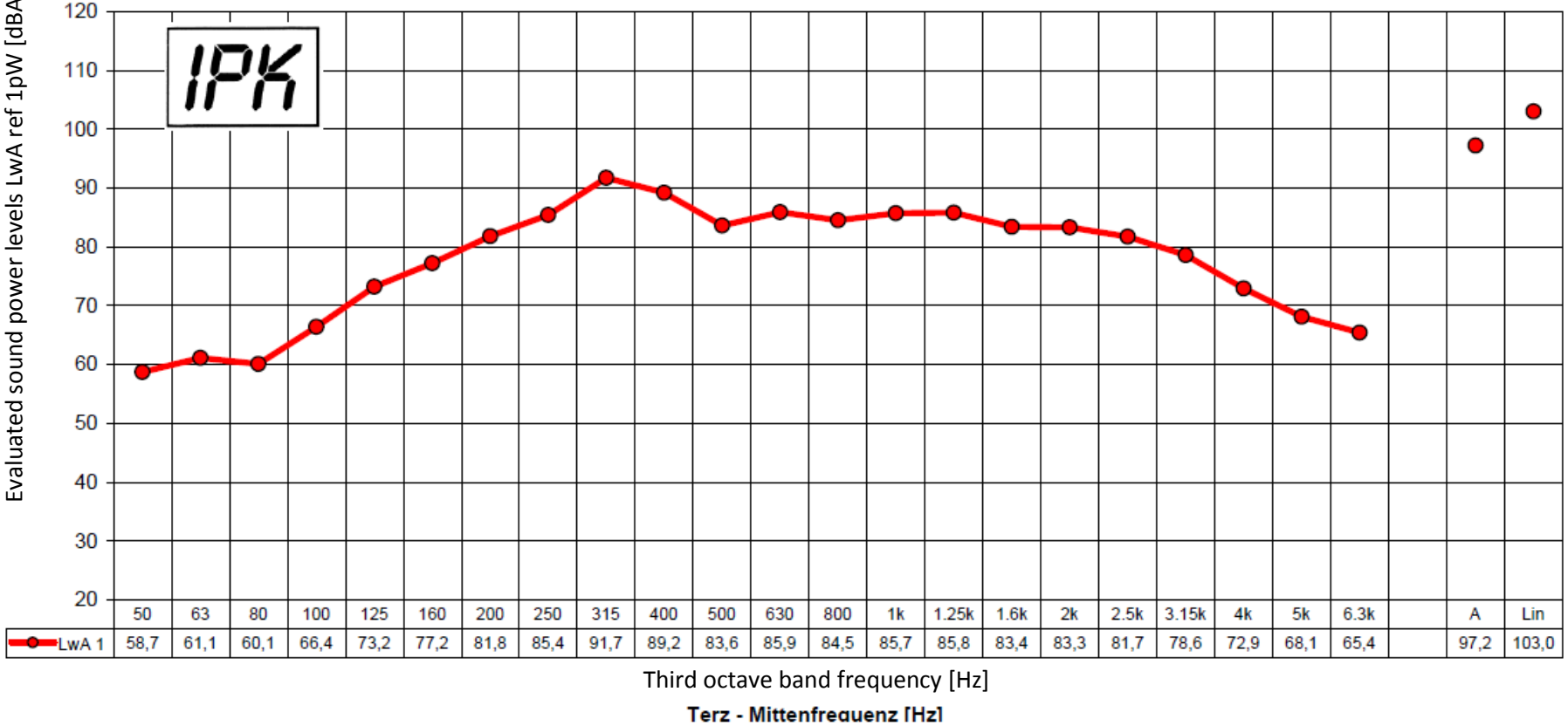
SMA Solar Technologie Umrichteranlage Sunny Central SC 1000MV
 Betrieb bei Nennleistung und 50 Hz; 1000 KW

SMA Solar Technologies Inverter Unit Sunny Central SC 1000MV
 Name Plate Capacity 1000 kW at 50 Hz

A - bewerteter Schalleistungspegel LwA re 1 pW [dB(A)]

Evaluated sound power levels LwA ref 1pW [dBA]

IPK



Third octave, as provided		
Freq #	Freq (Hz)	LwA (dBA)
1	25	
2	31.5	
3	40	
4	50	58.7
5	63	61.1
6	80	60.1
7	100	66.4
8	125	73.2
9	160	77.2
10	200	81.8
11	250	85.4
12	315	91.7
13	400	89.2
14	500	83.6
15	630	85.9
16	800	84.5
17	1000	85.7
18	1250	85.8
19	1600	83.4
20	2000	83.3
21	2500	81.7
22	3150	78.6
23	4000	72.9
24	5000	68.1
25	6300	65.4
26	8000	
27	10000	
Total LwA		97.2

Full octave, as used in CADNA-A model		
Freq #	Freq (Hz)	LwA (dBA)
	31.5	
5	63	64.8
8	125	78.9
11	250	93.0
14	500	91.6
17	1000	90.1
20	2000	87.6
23	4000	79.9
26	8000	65.4
Total LwA		97.2

$$\rightarrow 10\log\left(10^{\frac{58.7}{10}} + 10^{\frac{61.1}{10}} + 10^{\frac{60.1}{10}}\right) = 64.8\text{dBA}$$

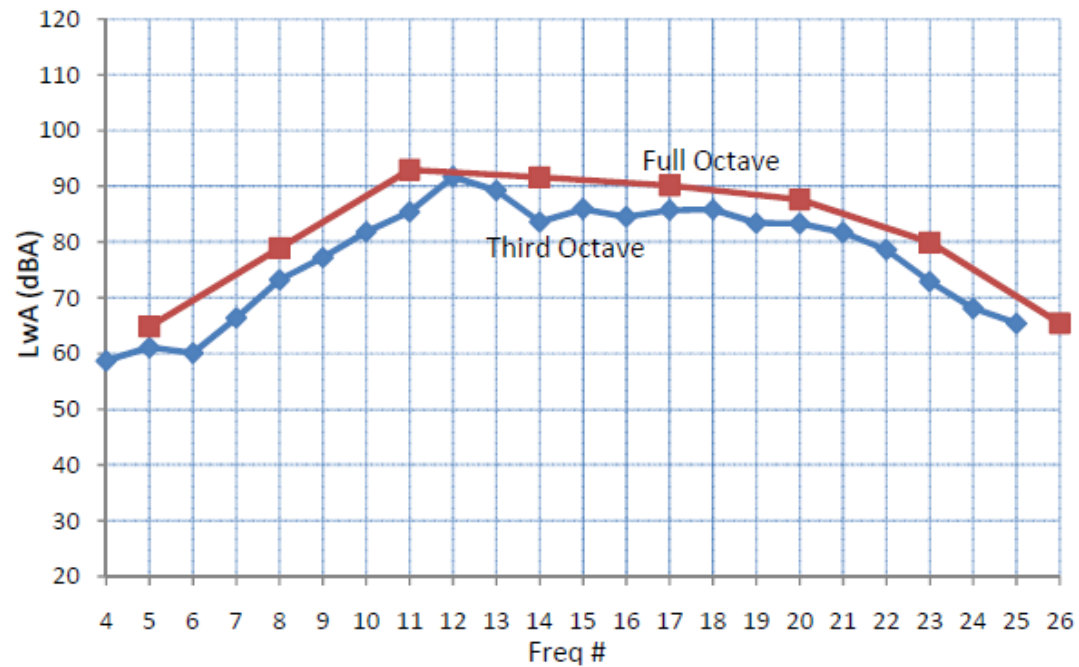


Figure B.1 Sound Power Level Calculation for SMA Sunny Central 1000MV, 100% LOAD.

Acoustical Louver J Blade

Application and Design

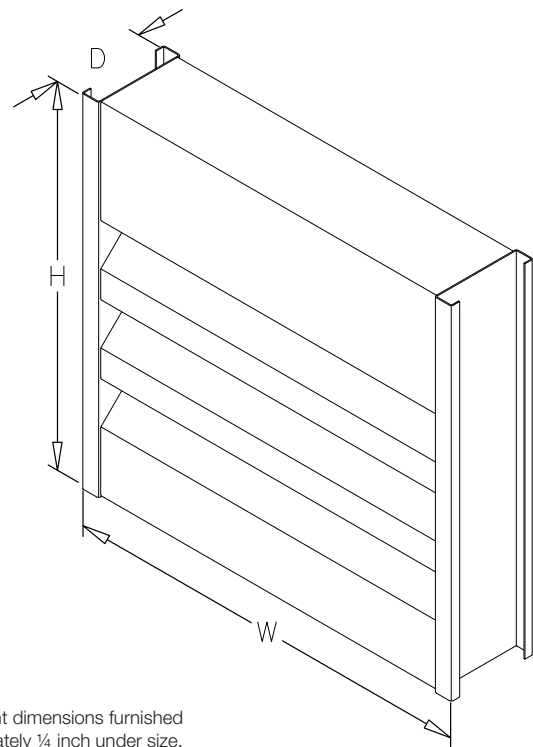
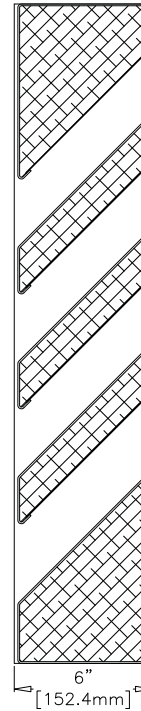
AFJ-601 is an acoustical weather louver designed to protect air intake and exhaust openings in building exterior walls. Design incorporates J style insulated acoustical blades and high free area to provide maximum resistance to sound transmission, rain and weather while providing minimum resistance to airflow. The AFJ-601 is an extremely efficient louver with **AMCA LICENSED PERFORMANCE DATA** enabling designers to select and apply with confidence.

Standard Construction

- Frame** Heavy gauge formed aluminum,
6 in. x 0.080 in. nominal wall thickness
- Blades** J style, heavy gauge formed aluminum,
0.080 in. nominal wall thickness, positioned
at 45° on approximately 5 in. centers
- Construction** . . . Mechanically fastened
- Acoustical
Insulation** Fiberglass Insulation
- Birdscreen** 3/4 in. x 0.051 flattened expanded aluminum in
removable frame, inside mount (rear)
- Finish** Mill
- Minimum Size** . . 12 in. W x 15 in. H
- Maximum Single
Section Size** . . . 60 in. W x 120 in. H

Options (at additional cost)

- A variety of bird and insect screens
- Blank off panels
- Clip angles
- Extended sill
- Filter racks
- Flanged frame
- Galvanized steel frame and blade
- Security bars
- A variety of architectural finishes including:
 - Clear anodize
 - Integral color anodize
 - Baked enamel paint
 - Kynar paint



*Width and height dimensions furnished approximately 1/4 inch under size.

PERFORMANCE DATA

AFJ-601

Free Area Chart (Sq. ft.)

J Blade Acoustical Louver Formed Aluminum

Louver Height Inches	Louver Width Inches								
	12	18	24	30	36	42	48	54	60
15	0.12	0.21	0.29	0.37	0.45	0.53	0.61	0.69	0.77
18	0.25	0.41	0.57	0.74	0.90	1.06	1.22	1.38	1.55
24	0.37	0.62	0.86	1.10	1.35	1.59	1.83	2.08	2.32
30	0.50	0.82	1.15	1.47	1.80	2.12	2.44	2.77	3.09
36	0.62	1.03	1.43	1.84	2.24	2.65	3.05	3.46	3.86
42	0.75	1.24	1.72	2.21	2.69	3.18	3.67	4.15	4.64
48	1.00	1.65	2.30	2.94	3.59	4.24	4.89	5.54	6.18
54	1.12	1.85	2.58	3.31	4.04	4.77	5.50	6.23	6.96
60	1.25	2.06	2.87	3.68	4.49	5.30	6.11	6.92	7.73
66	1.37	2.26	3.16	4.05	4.94	5.83	6.72	7.61	8.50
72	1.50	2.47	3.44	4.41	5.39	6.36	7.33	8.30	9.27
78	1.75	2.88	4.02	5.15	6.28	7.42	8.55	9.69	10.82
84	1.87	3.09	4.30	5.52	6.73	7.95	9.16	10.38	11.59
90	2.00	3.29	4.59	5.89	7.18	8.48	9.77	11.07	12.37
96	2.12	3.50	4.88	6.25	7.63	9.01	10.38	11.76	13.14
102	2.25	3.71	5.16	6.62	8.08	9.54	11.00	12.45	13.91
108	2.50	4.12	5.74	7.36	8.98	10.60	12.22	13.84	15.46
114	2.62	4.32	6.02	7.73	9.43	11.13	12.83	14.53	16.23
120	2.75	4.53	6.31	8.09	9.88	11.66	13.44	15.22	17.00



Greenheck Fan Corporation certifies that the AFJ-601 louvers shown herein are licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Program. The AMCA Certified Ratings Seal applies to water penetration, air performance and sound ratings.

Sound Transmission Class

The Sound Transmission Class (STC) is a rating of the effectiveness of an assembly in isolating or reducing airborne sound transmission. STC is a single number that summarizes airborne sound transmission loss data. Assemblies with higher STC ratings are more efficient at reducing sound transmission. STC is determined in accordance with ASTM E413-04.

Transmission Loss

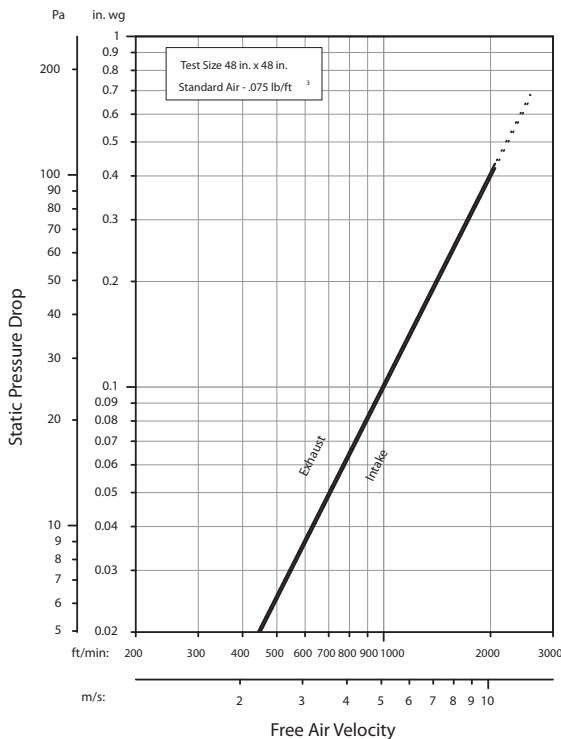
Transmission loss (TL) is a measurement of the reduction of sound power transmission (dB) through an assembly at a given frequency. The more sound power that is reduced, the greater the TL. TL is tested in accordance with ASTM E90-04.

Free Field Noise Reduction in Decibels

Free Field Noise Reduction is determined by adding 6 dB to the Transmission Loss.

Octave Band	2	3	4	5	6	7	STC
Frequency (Hz)	63	125	250	500	1000	2000	10
Transmission Loss (dB)	4	4	6	10	17	12	
Free Field Noise Reduction (dB)	10	10	12	16	23	18	

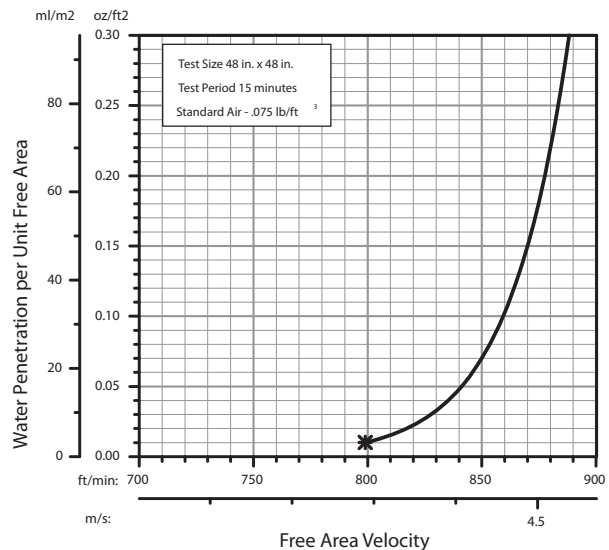
Airflow Resistance (Standard Air - .075 lb/ft³)



Model AFJ-601 resistance to airflow (pressure drop) varies depending on louver application (air intake or air exhaust). Free area velocities (shown) are higher than average velocity through the overall louver size. See louver selection information.

Water Penetration (Standard Air - .075 lb/ft³)

Test size 48 in. x 48 in. Test duration of 15 min.



The AMCA Water Penetration Test provides a method for comparing various louver models and designs as to their efficiency in resisting the penetration of rainfall under specific laboratory test conditions. The beginning point of water penetration is defined as that velocity where the water penetration curve projects through .01 oz. of water (penetration) per sq. ft. of louver free area. ***The beginning point of water penetration for Model AFJ-601 is 799 fpm free area velocity.** These performance ratings do not guarantee a louver to be weatherproof or stormproof and should be used in combination with other factors including good engineering judgement in selecting louvers.



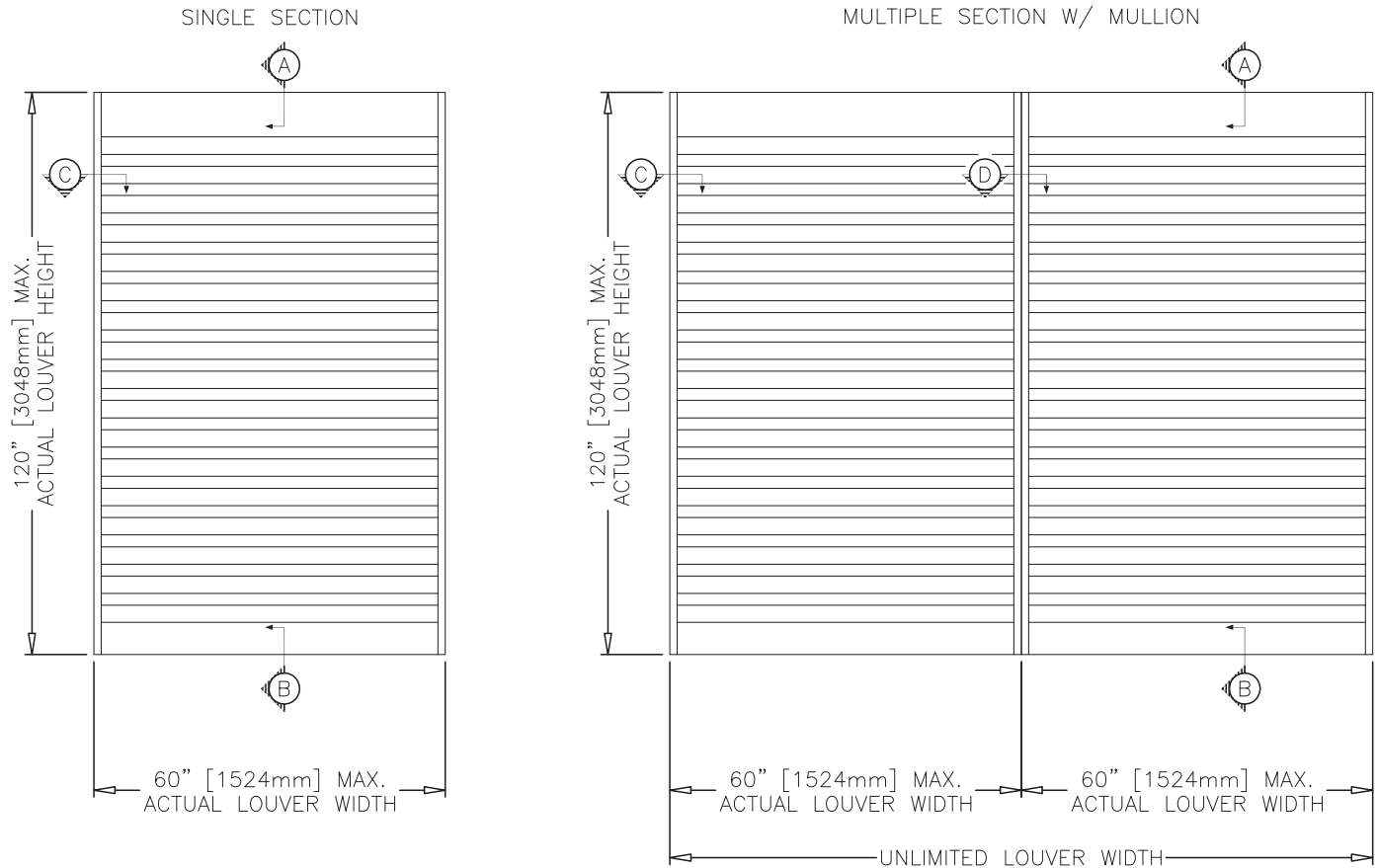
INSTALLATION DETAILS

AFJ-601

Maximum Size and Installation Information

J Blade Acoustical Louver
Formed Aluminum

Maximum single section size for model AFJ-601 is 60 in. W x 120 in. H. Larger openings require field assembly of multiple louver panels to make up the overall opening size. Individual louver panels are designed to withstand a 25 PSF wind-load (please consult Greenheck if the louvers must withstand higher wind-loads). Structural reinforcing members may be required to adequately support and install multiple louver panels within a large opening. Structural reinforcing members along with any associated installation hardware is not provided by Greenheck unless indicated otherwise by Greenheck. Additional information on louver installation may be found in AMCA Publication #501, Louver Application Manual.



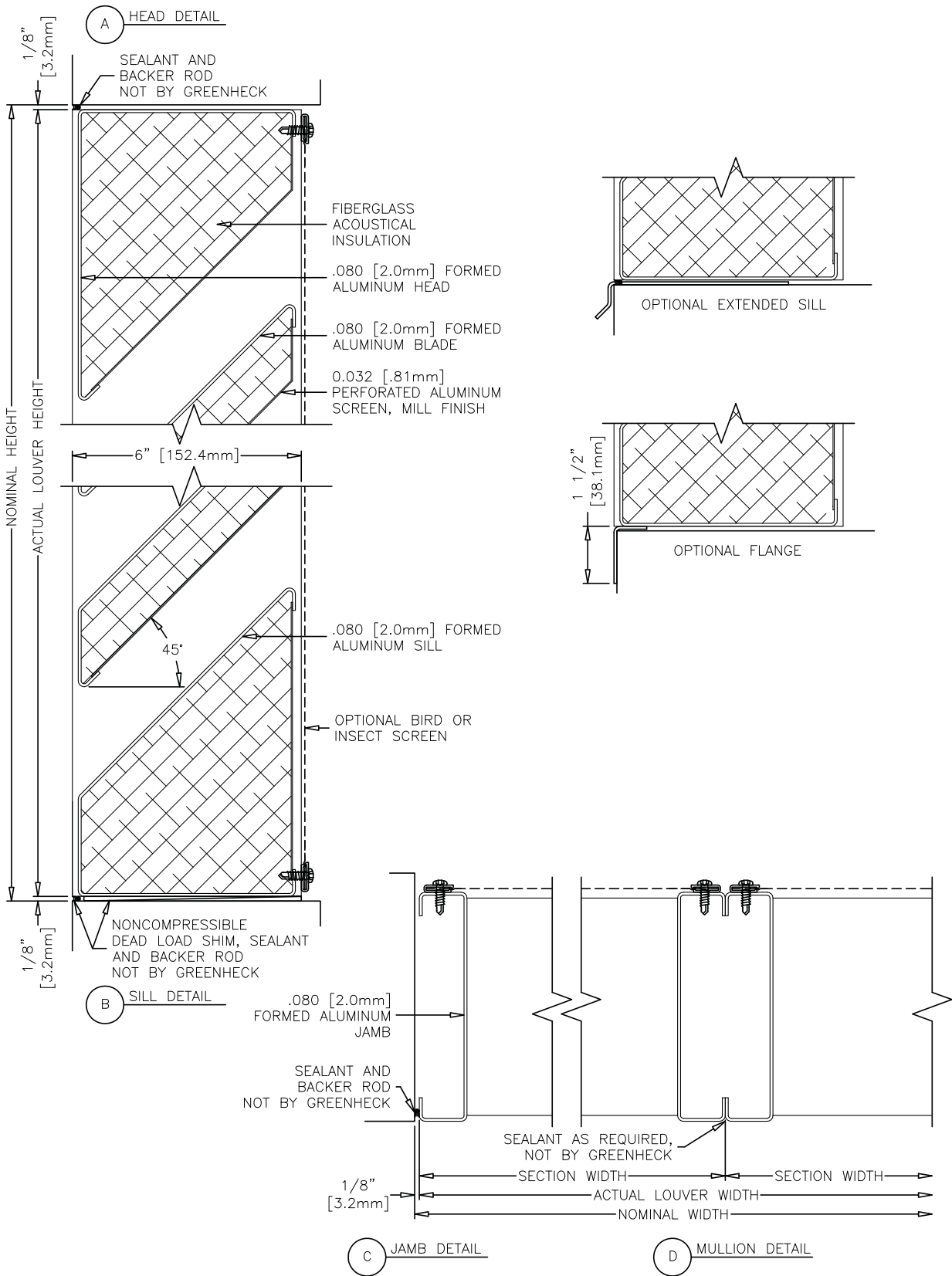
Minimum Single Section Size
12 in. W x 15 in. H

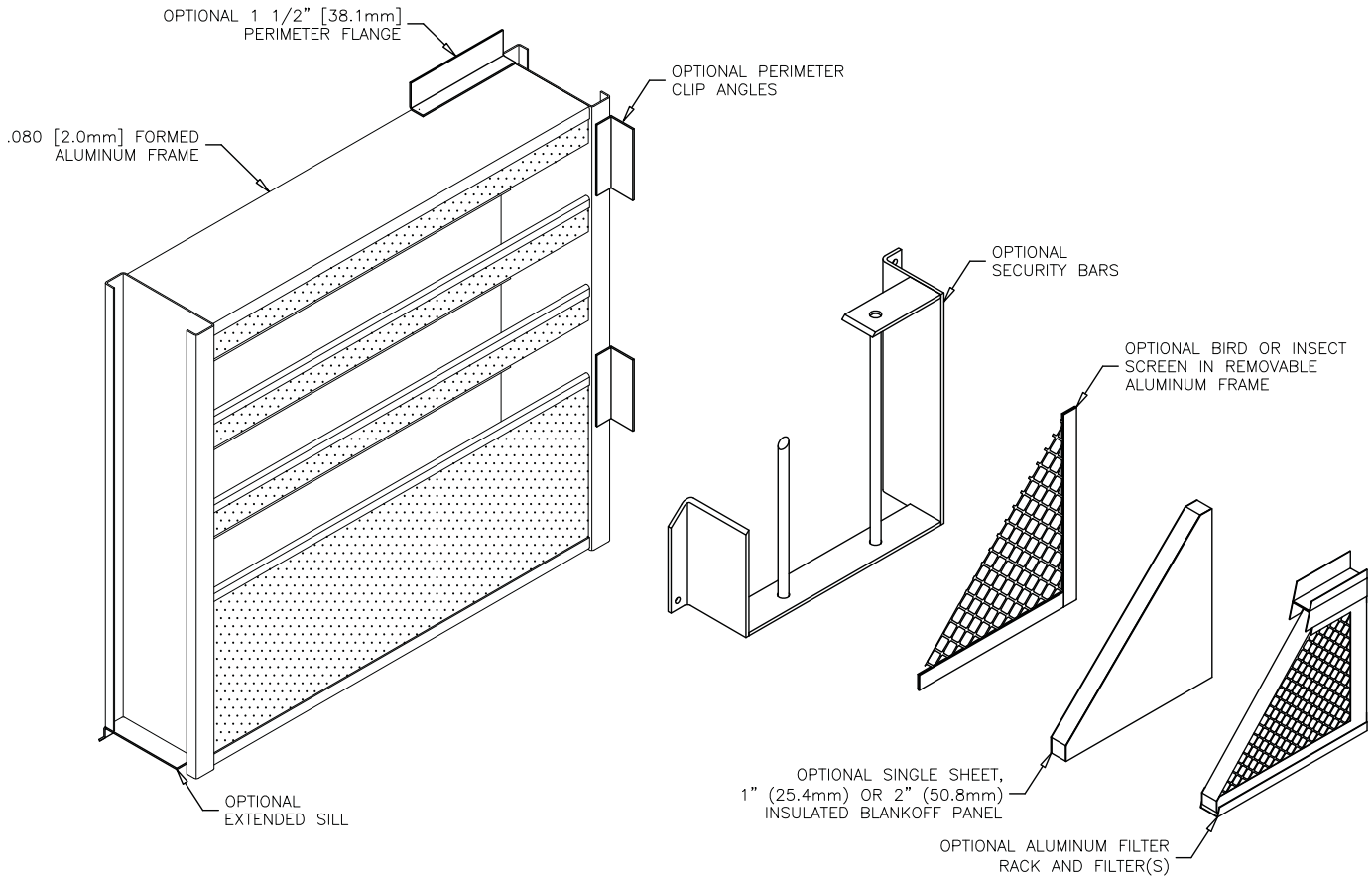
Maximum Single Section Size
60 in. W x 120 in. H

PRODUCT DETAILS

AFJ-601

J Blade Acoustical Louver
Formed Aluminum





FINISHES

Finish Type	Description/Application	Color Selection	Standard Warranty (Aluminum)
2-coat 70% KYNAR 500®/HYLAR 5000® AAMA 2605 – Dry film thickness 1.2 mil. (AKA: Duranar®, Fluoropon®, Trinar®, Flouropolymer, Polyvinylidene Fluoride, PVDF2)	“Best.” The premier finish for extruded aluminum. Tough, long-lasting coating has superior color retention and abrasive properties. Resists chalking, fading, chemical abrasion and weathering.	Standard Colors: Any of the 24 standard colors shown can be furnished in 70% or 50% KYNAR 500®/HYLAR 5000® or Baked Enamel. 2-Coat Mica: Greenheck offers 9 standard 2-coat Mica colors. Other colors are available. Consult Greenheck for possible extra cost when selecting non-standard colors or special finishes.	10 Years (Consult Greenheck for availability of extended warranty)
2-coat 50% KYNAR 500®/HYLAR 5000® AAMA 2604 – Dry film thickness 1.2 mil. (AKA: Acroflur®, Acrynar®)	“Better.” Tough, long-lasting coating has excellent color retention and abrasive properties. Resists chalking, fading, chemical abrasion and weathering.		5 Years
Baked Enamel AAMA 2603 – Dry film thickness 0.8 mil. (AKA: Acrabond Plus®, Duracron®)	“Good.” Provides good adhesion and resistance to weathering, corrosion and chemical stain.		1 Year
Integral Color Anodize AA-M10C22A42 (>0.7 mil)	“Two-step” anodizing is produced by following the normal anodizing step with a second, colorfast process.	Light, Medium or Dark Bronze; Champagne; Black	5 years
Clear Anodize 215 R-1 AA-M10C22A41 (>0.7 mil)	Clear, colorless and hard oxide aluminum coating that resists weathering and chemical attack.	Clear	5 years
Clear Anodize 204 R-1 AA-M10C22A31 (0.4-0.7 mil)	Clear, colorless and hard oxide aluminum coating that resists weathering and chemical attack.	Clear	1 Year
Industrial coatings	Greenheck offers a number of industrial coatings such as Hi-Pro Polyester, Epoxy, and Permator®. Consult a Greenheck Product Specialist for complete color and application information.		Consult Greenheck
Mill	Materials may be supplied in natural aluminum or galvanized steel finish when normal weathering is acceptable and there is no concern for color or color change.		n/a

Finishes meet or exceed AAMA 2605, AAMA 2604, and AAMA 2603 requirements. Please consult www.greenheck.com for complete information on standard and extended paint warranties. Paint finish warranties are not applicable to steel products.



Appendix C

Sound Pressure Levels for Points of Reception, Noise Map from CADNA-A

Table C.1 Calculated Sound Pressure Levels at POR (shaded rows correspond to representative POR). Existing = Existing dwelling, Vacant lot = non existing future dwelling.

ID	Description	Total Sound Pressure Level		Performance Limit		Height (m)	Coordinates			Min dist to source (m)
		Day (dBA)	Night (dBA)	Day (dBA)	Night (dBA)		X (m)	Y (m)	Z (m)	
1	Existing	37.3	37.3	45.0	40.0	4.5	557644	4747017	247.2	139
2	Existing	36.8	36.8	45.0	40.0	4.5	557351	4746897	242.0	168
3	Existing	35.7	35.7	45.0	40.0	4.5	557608	4746942	246.9	162
4	Existing	35.2	35.2	45.0	40.0	4.5	557642	4746952	247.0	175
5	Existing	33.8	33.8	45.0	40.0	4.5	557716	4746965	247.0	227
6	Existing	33.7	33.7	45.0	40.0	4.5	557018	4747170	237.0	196
7	Existing	34.7	34.7	45.0	40.0	4.5	557140	4746857	237.0	154
8	Existing	34.0	34.0	45.0	40.0	4.5	557009	4747070	236.1	182
9	Existing	33.0	33.0	45.0	40.0	4.5	556999	4747180	237.0	217
10	Existing	33.9	33.9	45.0	40.0	4.5	557069	4746893	236.3	175
11	Existing	26.3	26.3	45.0	40.0	4.5	556706	4746834	234.5	531
12	Existing	25.6	25.6	45.0	40.0	4.5	556771	4747633	235.4	599
13	Existing	25.8	25.8	45.0	40.0	4.5	556793	4747674	236.7	602
14	Existing	25.5	25.5	45.0	40.0	4.5	556778	4747729	237.0	647
15	Existing	25.4	25.4	45.0	40.0	4.5	556633	4746816	234.0	606
16	Existing	25.1	25.1	45.0	40.0	4.5	556599	4746844	233.3	631
17	Existing	21.8	21.8	45.0	40.0	4.5	558383	4747261	244.5	674
18	Existing	23.3	23.3	45.0	40.0	4.5	557589	4748164	244.5	847
19	Existing	22.6	22.6	45.0	40.0	4.5	557616	4748167	244.5	855
20	Existing	23.0	23.0	45.0	40.0	4.5	557582	4748189	244.5	870
21	Existing	23.4	23.4	45.0	40.0	4.5	556464	4746781	232.0	778
22	Existing	22.9	22.9	45.0	40.0	4.5	557607	4748197	244.5	882
23	Existing	22.7	22.7	45.0	40.0	4.5	557598	4748221	244.5	904
24	Existing	21.4	21.4	45.0	40.0	4.5	556986	4748148	237.0	872
25	Existing	21.2	21.2	45.0	40.0	4.5	556980	4748172	237.0	897
26	Vacant lot	21.6	21.6	45.0	40.0	4.5	557182	4748247	239.5	923
27	Vacant lot	21.6	21.6	45.0	40.0	4.5	557125	4748236	238.5	921
28	Existing	21.5	21.5	45.0	40.0	4.5	557368	4748279	242.4	953
29	Vacant lot	21.2	21.2	45.0	40.0	4.5	557302	4748276	240.9	947
30	Vacant lot	20.7	20.7	45.0	40.0	4.5	557076	4748226	237.2	921
31	Existing	21.2	21.2	45.0	40.0	4.5	557221	4748267	239.5	939
32	Existing	20.6	20.6	45.0	40.0	4.5	557023	4748214	237.0	923
33	Existing	20.6	20.6	45.0	40.0	4.5	557252	4748277	239.5	948
34	Existing	20.9	20.9	45.0	40.0	4.5	556981	4748200	237.0	923
35	Existing	22.1	22.1	45.0	40.0	4.5	557348	4748293	242.2	966
36	Existing	20.4	20.4	45.0	40.0	4.5	557278	4748286	240.4	957
37	Existing	21.5	21.5	45.0	40.0	4.5	557575	4748295	244.4	974
38	Existing	21.4	21.4	45.0	40.0	4.5	557526	4748308	244.0	982
39	Existing	20.9	20.9	45.0	40.0	4.5	556976	4748218	237.0	942
40	Existing	21.2	21.2	45.0	40.0	4.5	557525	4748333	244.0	1007

ID	Description	Total Sound Pressure Level		Performance Limit		Height (m)	Coordinates			Min dist to source (m)
		Day (dBA)	Night (dBA)	Day (dBA)	Night (dBA)		X (m)	Y (m)	Z (m)	
41	Existing	21.1	21.1	45.0	40.0	4.5	557648	4748318	244.5	1009
42	Existing	21.1	21.1	45.0	40.0	4.5	557578	4748338	244.5	1017
43	Existing	20.2	20.2	45.0	40.0	4.5	557230	4748334	239.5	1006
44	Vacant lot	20.9	20.9	45.0	40.0	4.5	557616	4748344	244.5	1028
45	Existing	20.7	20.7	45.0	40.0	4.5	557643	4748341	244.5	1031
46	Existing	20.1	20.1	45.0	40.0	4.5	557050	4748312	237.0	1010
47	Existing	20.1	20.1	45.0	40.0	4.5	557074	4748320	237.1	1013
48	Existing	20.8	20.8	45.0	40.0	4.5	556942	4748274	236.7	1006
49	Existing	20.6	20.6	45.0	40.0	4.5	557107	4748336	237.7	1022
50	Existing	20.0	20.0	45.0	40.0	4.5	557023	4748316	237.0	1021
51	Existing	20.6	20.6	45.0	40.0	4.5	557641	4748369	244.5	1058
52	Vacant lot	20.3	20.3	45.0	40.0	4.5	557700	4748358	244.5	1059
53	Existing	19.8	19.8	45.0	40.0	4.5	557240	4748373	239.7	1045
54	Existing	20.8	20.8	45.0	40.0	4.5	557467	4748389	243.7	1060
55	Existing	19.4	19.4	45.0	40.0	4.5	556892	4748265	235.0	1016
56	Existing	19.5	19.5	45.0	40.0	4.5	556982	4748306	236.1	1023
57	Existing	19.6	19.6	45.0	40.0	4.5	557737	4748354	244.5	1065
58	Existing	20.3	20.3	45.0	40.0	4.5	557666	4748371	244.5	1065
59	Existing	20.9	20.9	45.0	40.0	4.5	557490	4748397	243.9	1069
60	Existing	19.7	19.7	45.0	40.0	4.5	557163	4748376	238.3	1054
61	Existing	19.7	19.7	45.0	40.0	4.5	557245	4748391	239.8	1063
62	Existing	20.6	20.6	45.0	40.0	4.5	557519	4748407	244.3	1080
63	Existing	18.9	18.9	45.0	40.0	4.5	557766	4748366	244.5	1081
64	Existing	19.7	19.7	45.0	40.0	4.5	557251	4748405	240.2	1076
65	Existing	19.6	19.6	45.0	40.0	4.5	557253	4748414	240.1	1085
66	Existing	19.5	19.5	45.0	40.0	4.5	557172	4748410	238.3	1087
67	Existing	19.3	19.3	45.0	40.0	4.5	557251	4748426	239.8	1097
68	Existing	20.2	20.2	45.0	40.0	4.5	557632	4748425	244.5	1111
69	Existing	19.1	19.1	45.0	40.0	4.5	557180	4748442	238.2	1118
70	Existing	18.9	18.9	45.0	40.0	4.5	557248	4748461	239.2	1132
71	Existing	19.0	19.0	45.0	40.0	4.5	557276	4748465	240.3	1136
72	Existing	18.4	18.4	45.0	40.0	4.5	557185	4748465	237.9	1140
73	Existing	18.3	18.3	45.0	40.0	4.5	557247	4748477	239.1	1148
74	Existing	18.2	18.2	45.0	40.0	4.5	558722	4747461	242.0	1045
75	Existing	18.1	18.1	45.0	40.0	4.5	557254	4748489	239.2	1160
76	Existing	17.8	17.8	45.0	40.0	4.5	557087	4748459	235.2	1147
77	Existing	20.7	20.7	45.0	40.0	4.5	556170	4746723	229.5	1077
78	Existing	17.7	17.7	45.0	40.0	4.5	556823	4748363	232.0	1133
79	Existing	18.1	18.1	45.0	40.0	4.5	557260	4748503	239.4	1174
80	Existing	18.1	18.1	45.0	40.0	4.5	557187	4748493	237.6	1168
81	Existing	18.8	18.8	45.0	40.0	4.5	557266	4748517	240.1	1188
82	Existing	17.6	17.6	45.0	40.0	4.5	557865	4748459	242.2	1184
83	Existing	18.5	18.5	45.0	40.0	4.5	557259	4748528	239.8	1199
84	Existing	20.1	20.1	45.0	40.0	4.5	557294	4748532	242.0	1203

ID	Description	Total Sound Pressure Level		Performance Limit		Height (m)	Coordinates			Min dist to source (m)
		Day (dBA)	Night (dBA)	Day (dBA)	Night (dBA)		X (m)	Y (m)	Z (m)	
85	Existing	18.4	18.4	45.0	40.0	4.5	557188	4748518	237.9	1192
86	Existing	17.5	17.5	45.0	40.0	4.5	558652	4746559	237.2	1134
87	Existing	17.4	17.4	45.0	40.0	4.5	556822	4748403	232.0	1170
88	Existing	17.7	17.7	45.0	40.0	4.5	558744	4747587	242.0	1100
89	Existing	20.0	20.0	45.0	40.0	4.5	557284	4748541	242.0	1212
90	Vacant lot	17.5	17.5	45.0	40.0	4.5	558815	4747135	239.5	1104
91	Existing	17.6	17.6	45.0	40.0	4.5	558757	4747579	242.0	1111
92	Existing	20.2	20.2	45.0	40.0	4.5	556114	4746706	229.5	1135
93	Existing	17.6	17.6	45.0	40.0	4.5	557188	4748542	237.7	1217
94	Existing	19.9	19.9	45.0	40.0	4.5	557281	4748557	241.8	1228
95	Existing	17.9	17.9	45.0	40.0	4.5	557198	4748566	237.8	1239
96	Existing	17.4	17.4	45.0	40.0	4.5	557272	4748578	239.5	1249
97	Existing	17.4	17.4	45.0	40.0	4.5	558659	4747881	242.0	1140
98	Existing	17.3	17.3	45.0	40.0	4.5	558680	4747853	242.0	1144
99	Existing	17.2	17.2	45.0	40.0	4.5	557205	4748589	237.6	1263
100	Existing	17.3	17.3	45.0	40.0	4.5	557279	4748606	240.0	1277
101	Existing	16.8	16.8	45.0	40.0	4.5	557097	4748578	233.1	1263
102	Existing	19.8	19.8	45.0	40.0	4.5	556054	4746710	229.4	1193
103	Existing	17.2	17.2	45.0	40.0	4.5	558871	4747316	242.0	1165
104	Existing	17.2	17.2	45.0	40.0	4.5	558822	4747587	242.0	1176
105	Existing	17.2	17.2	45.0	40.0	4.5	558871	4747361	242.0	1171
106	Existing	16.7	16.7	45.0	40.0	4.5	558185	4748439	242.7	1255
107	Existing	19.6	19.6	45.0	40.0	4.5	556029	4746676	229.2	1225
108	Existing	16.6	16.6	45.0	40.0	4.5	558191	4748460	242.5	1276
109	Existing	16.5	16.5	45.0	40.0	4.5	558071	4748527	242.2	1297
110	Existing	19.4	19.4	45.0	40.0	4.5	555995	4746679	228.6	1257
111	Existing	16.4	16.4	45.0	40.0	4.5	558122	4748526	242.2	1313
112	Existing	16.3	16.3	45.0	40.0	4.5	558251	4748465	242.2	1306
113	Existing	16.3	16.3	45.0	40.0	4.5	558103	4748551	242.0	1330
114	Existing	16.3	16.3	45.0	40.0	4.5	558152	4748527	242.2	1324
115	Existing	19.2	19.2	45.0	40.0	4.5	555968	4746669	228.3	1286
116	Existing	19.4	19.4	45.0	40.0	4.5	555876	4747186	229.4	1319
117	Existing	18.9	18.9	45.0	40.0	4.5	555900	4746793	227.0	1322
118	Existing	18.8	18.8	45.0	40.0	4.5	555886	4746804	227.0	1333
119	Existing	19.1	19.1	45.0	40.0	4.5	555858	4746939	227.8	1340
120	Existing	19.1	19.1	45.0	40.0	4.5	555851	4746952	228.1	1346
121	Existing	19.0	19.0	45.0	40.0	4.5	555856	4746894	227.3	1347
122	Existing	19.0	19.0	45.0	40.0	4.5	555854	4746879	227.1	1351
123	Existing	18.7	18.7	45.0	40.0	4.5	555911	4746646	228.0	1347
124	Existing	18.7	18.7	45.0	40.0	4.5	555888	4746717	227.3	1352
125	Existing	18.9	18.9	45.0	40.0	4.5	555838	4746919	228.0	1362
126	Existing	19.0	19.0	45.0	40.0	4.5	555819	4747065	229.5	1372
127	Existing	19.0	19.0	45.0	40.0	4.5	555830	4746953	228.5	1366
128	Existing	18.9	18.9	45.0	40.0	4.5	555848	4746847	227.0	1362

ID	Description	Total Sound Pressure Level		Performance Limit		Height (m)	Coordinates			Min dist to source (m)
		Day (dBA)	Night (dBA)	Day (dBA)	Night (dBA)		X (m)	Y (m)	Z (m)	
129	Existing	18.9	18.9	45.0	40.0	4.5	555842	4746873	227.1	1364
130	Existing	19.0	19.0	45.0	40.0	4.5	555823	4746976	228.7	1371
131	Existing	18.9	18.9	45.0	40.0	4.5	555834	4746893	227.6	1369
132	Existing	19.0	19.0	45.0	40.0	4.5	555819	4746995	228.8	1374
133	Existing	19.0	19.0	45.0	40.0	4.5	555816	4747014	229.1	1376
134	Existing	18.9	18.9	45.0	40.0	4.5	555805	4747017	229.3	1387
135	Existing	18.8	18.8	45.0	40.0	4.5	555797	4747033	229.5	1394
136	Existing	18.9	18.9	45.0	40.0	4.5	555794	4747052	229.5	1397
137	Existing	18.9	18.9	45.0	40.0	4.5	555767	4747246	229.5	1434
138	Existing	15.5	15.5	45.0	40.0	4.5	558705	4748245	242.0	1398
139	Existing	15.5	15.5	45.0	40.0	4.5	558701	4748262	242.0	1407
140	Existing	18.7	18.7	45.0	40.0	4.5	555738	4747262	229.5	1464
141	Existing	15.4	15.4	45.0	40.0	4.5	558737	4748250	242.0	1425
142	Existing	15.4	15.4	45.0	40.0	4.5	558725	4748265	242.0	1427
143	Existing	18.6	18.6	45.0	40.0	4.5	555731	4747306	229.5	1478
144	Existing	18.7	18.7	45.0	40.0	4.5	555752	4747470	229.5	1491
145	Existing	18.6	18.6	45.0	40.0	4.5	555984	4748081	232.0	1504
146	Existing	18.6	18.6	45.0	40.0	4.5	555720	4747283	229.5	1485
147	Existing	15.3	15.3	45.0	40.0	4.5	558745	4748269	242.0	1444
148	Existing	18.6	18.6	45.0	40.0	4.5	555730	4747455	229.5	1509
149	Existing	15.3	15.3	45.0	40.0	4.5	559061	4746633	242.2	1461
150	Existing	18.5	18.5	45.0	40.0	4.5	555968	4748091	232.0	1523
151	Vacant lot	18.5	18.5	45.0	40.0	4.5	555942	4748052	232.0	1527
152	Existing	15.2	15.2	45.0	40.0	4.5	559067	4746608	242.2	1476
153	Existing	18.1	18.1	45.0	40.0	4.5	555702	4747453	229.7	1536
154	Existing	15.5	15.5	45.0	40.0	4.5	556311	4745821	227.0	1478
155	Vacant lot	14.5	14.5	45.0	40.0	4.5	558479	4748590	239.8	1524
156	Existing	15.0	15.0	45.0	40.0	4.5	559085	4746577	242.5	1505
157	Existing	18.0	18.0	45.0	40.0	4.5	555901	4748057	232.0	1566
158	Existing	17.9	17.9	45.0	40.0	4.5	555900	4748075	232.0	1575
159	Existing	17.6	17.6	45.0	40.0	4.5	555672	4747458	230.2	1566
160	Existing	14.9	14.9	45.0	40.0	4.5	559082	4746511	241.7	1531
161	Existing	17.9	17.9	45.0	40.0	4.5	555894	4748088	232.0	1586
162	Vacant lot	17.9	17.9	45.0	40.0	4.5	555865	4748038	232.3	1589
163	Existing	14.0	14.0	45.0	40.0	4.5	556211	4745839	227.0	1527
164	Existing	14.7	14.7	45.0	40.0	4.5	556239	4745797	227.0	1542
165	Existing	14.8	14.8	45.0	40.0	4.5	556111	4745914	226.3	1541
166	Existing	14.7	14.7	45.0	40.0	4.5	556117	4745892	226.3	1553
167	Existing	14.7	14.7	45.0	40.0	4.5	556122	4745878	226.4	1559
168	Vacant lot	17.2	17.2	45.0	40.0	4.5	555752	4747940	233.1	1652
169	Existing	13.9	13.9	45.0	40.0	4.5	556124	4745870	226.5	1563
170	Vacant lot	17.2	17.2	45.0	40.0	4.5	555633	4747610	231.6	1646
171	Existing	13.8	13.8	45.0	40.0	4.5	559005	4746214	240.3	1622
172	Existing	13.9	13.9	45.0	40.0	4.5	556127	4745854	226.6	1573

ID	Description	Total Sound Pressure Level		Performance Limit		Height (m)	Coordinates			Min dist to source (m)
		Day (dBA)	Night (dBA)	Day (dBA)	Night (dBA)		X (m)	Y (m)	Z (m)	
173	Existing	13.7	13.7	45.0	40.0	4.5	556132	4745841	226.6	1579
174	Existing	13.8	13.8	45.0	40.0	4.5	556138	4745812	226.3	1596
175	Existing	13.5	13.5	45.0	40.0	4.5	559051	4746215	240.8	1658
176	Vacant lot	16.4	16.4	45.0	40.0	4.5	555684	4747922	233.6	1709
177	Vacant lot	16.4	16.4	45.0	40.0	4.5	555717	4748008	233.9	1711
178	Existing	14.4	14.4	45.0	40.0	4.5	556180	4745694	227.0	1659
179	Existing	14.4	14.4	45.0	40.0	4.5	556200	4745664	227.0	1671
180	Existing	14.0	14.0	45.0	40.0	4.5	556186	4745625	227.0	1710
181	Existing	13.9	13.9	45.0	40.0	4.5	556198	4745597	227.0	1725
182	Existing	11.4	11.4	45.0	40.0	4.5	559204	4746259	242.0	1760
183	Existing	11.4	11.4	45.0	40.0	4.5	559175	4746202	242.0	1767
184	Existing	13.8	13.8	45.0	40.0	4.5	556239	4745553	227.0	1737
185	Existing	10.6	10.6	45.0	40.0	4.5	559209	4746242	242.0	1774
186	Existing	13.5	13.5	45.0	40.0	4.5	555535	4748009	234.5	1879
187	Existing	12.2	12.2	45.0	40.0	4.5	555518	4748014	234.5	1897



- Inv#**
- Inverter Unit
- Noise Receptor
- Representative Noise Receptor
- From 40 to 45 dBA
- From 45 to 50 dBA
- From 50 to 55 dBA
- From 55 to 60 dBA
- Over 60 dBA
- Project Site
- Parcel
- PR# #** Parcel ID

Axio Power
Canada
Inc./SunEdison
Canada

Norfolk Bloomsburg TS
Solar Project – Noise Map
at 4.5m

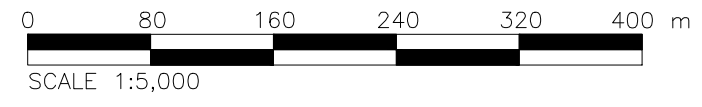


Figure C.1



Appendix D

CADNA-A Sample Calculations

Configuration	
Parameter	Value
General	
Country	(user defined)
Max. Error (dB)	0.00
Max. Search Radius (m)	2000.00
Min. Dist Src to Rcvr	0.00
Partition	
Raster Factor	0.50
Max. Length of Section (m)	1000.00
Min. Length of Section (m)	1.00
Min. Length of Section (%)	0.00
Proj. Line Sources	On
Proj. Area Sources	On
Ref. Time	
Reference Time Day (min)	960.00
Reference Time Night (min)	480.00
Daytime Penalty (dB)	0.00
Recr. Time Penalty (dB)	0.00
Night-time Penalty (dB)	0.00
DTM	
Standard Height (m)	0.00
Model of Terrain	Triangulation
Reflection	
max. Order of Reflection	1
Search Radius Src	100.00
Search Radius Rcvr	100.00
Max. Distance Source - Rcvr	1000.00 1000.00
Min. Distance Rcvr - Reflector	1.00 1.00
Min. Distance Source - Reflector	0.10
Industrial (ISO 9613)	
Lateral Diffraction	some Obj
Obst. within Area Src do not shield	On
Screening	
	Excl. Ground Att. over Barrier
	Dz with limit (20/25)
Barrier Coefficients C1,2,3	3.0 20.0 0.0
Temperature (°C)	10
rel. Humidity (%)	70
Ground Absorption G	0.70
Wind Speed for Dir. (m/s)	3.0
Roads (RLS-90)	
Strictly acc. to RLS-90	
Railways (Schall 03)	
Strictly acc. to Schall 03 / Schall-Transrapid	
Aircraft (???)	
Strictly acc. to AzB	

Receiver

Name: Receptors - Existing

ID: 1.0

X: 557644.09

Y: 4747016.85

Z: 247.16

Point Source, ISO 9613, Name: "Inverter1", ID: "Inverter1"

Nr.	X (m)	Y (m)	Z (m)	Refl.	Freq. (Hz)	LxT dB(A)	LxN dB(A)	K0 (dB)	Dc (dB)	Adiv (dB)	Aatm (dB)	Agr (dB)	Afol (dB)	Ahous (dB)	Abar (dB)	Cmet (dB)	RL (dB)	LrT dB(A)	LrN dB(A)
1	557712.11	4747193.74	248.22	0	32	9.8	9.8	0.0	0.0	56.5	0.0	-3.0	0.0	0.0	0.0	0.0	-0.0	-43.8	-43.8
2	557712.11	4747193.74	248.22	0	63	59.8	59.8	0.0	0.0	56.5	0.0	-3.0	0.0	0.0	0.0	0.0	-0.0	6.2	6.2
3	557712.11	4747193.74	248.22	0	125	73.9	73.9	0.0	0.0	56.5	0.1	2.8	0.0	0.0	0.0	0.0	-0.0	14.4	14.4
4	557712.11	4747193.74	248.22	0	250	86.0	86.0	0.0	0.0	56.5	0.2	2.0	0.0	0.0	0.0	0.0	-0.0	27.2	27.2
5	557712.11	4747193.74	248.22	0	500	80.6	80.6	0.0	0.0	56.5	0.4	-0.9	0.0	0.0	0.0	0.0	-0.0	24.6	24.6
6	557712.11	4747193.74	248.22	0	1000	72.1	72.1	0.0	0.0	56.5	0.7	-0.9	0.0	0.0	0.0	0.0	-0.0	15.8	15.8
7	557712.11	4747193.74	248.22	0	2000	74.6	74.6	0.0	0.0	56.5	1.8	-0.9	0.0	0.0	0.0	0.0	-0.0	17.1	17.1
8	557712.11	4747193.74	248.22	0	4000	84.9	84.9	0.0	0.0	56.5	6.2	-0.9	0.0	0.0	0.0	0.0	-0.0	23.0	23.0
9	557712.11	4747193.74	248.22	0	8000	70.4	70.4	0.0	0.0	56.5	22.2	-0.9	0.0	0.0	0.0	0.0	-0.0	-7.4	-7.4

Point Source, ISO 9613, Name: "Inverter2", ID: "Inverter2"

Nr.	X (m)	Y (m)	Z (m)	Refl.	Freq. (Hz)	LxT dB(A)	LxN dB(A)	K0 (dB)	Dc (dB)	Adiv (dB)	Aatm (dB)	Agr (dB)	Afol (dB)	Ahous (dB)	Abar (dB)	Cmet (dB)	RL (dB)	LrT dB(A)	LrN dB(A)
1	557685.04	4747288.64	248.50	0	32	9.8	9.8	0.0	0.0	59.8	0.0	-3.4	0.0	0.0	7.7	0.0	-0.0	-54.3	-54.3
2	557685.04	4747288.64	248.50	0	63	59.8	59.8	0.0	0.0	59.8	0.0	-3.4	0.0	0.0	7.2	0.0	-0.0	-3.9	-3.9
3	557685.04	4747288.64	248.50	0	125	73.9	73.9	0.0	0.0	59.8	0.1	3.0	0.0	0.0	0.0	0.0	-0.0	11.0	11.0
4	557685.04	4747288.64	248.50	0	250	86.0	86.0	0.0	0.0	59.8	0.3	2.0	0.0	0.0	0.0	0.0	-0.0	24.0	24.0
5	557685.04	4747288.64	248.50	0	500	80.6	80.6	0.0	0.0	59.8	0.5	-1.0	0.0	0.0	1.0	0.0	-0.0	20.3	20.3
6	557685.04	4747288.64	248.50	0	1000	72.1	72.1	0.0	0.0	59.8	1.0	-1.0	0.0	0.0	1.0	0.0	-0.0	11.3	11.3
7	557685.04	4747288.64	248.50	0	2000	74.6	74.6	0.0	0.0	59.8	2.7	-1.0	0.0	0.0	1.0	0.0	-0.0	12.2	12.2
8	557685.04	4747288.64	248.50	0	4000	84.9	84.9	0.0	0.0	59.8	9.0	-1.0	0.0	0.0	1.0	0.0	-0.0	16.1	16.1
9	557685.04	4747288.64	248.50	0	8000	70.4	70.4	0.0	0.0	59.8	32.1	-1.0	0.0	0.0	1.0	0.0	-0.0	-21.5	-21.5

Point Source, ISO 9613, Name: "Inverter3", ID: "Inverter3"

Nr.	X (m)	Y (m)	Z (m)	Refl.	Freq. (Hz)	LxT dB(A)	LxN dB(A)	K0 (dB)	Dc (dB)	Adiv (dB)	Aatm (dB)	Agr (dB)	Afol (dB)	Ahous (dB)	Abar (dB)	Cmet (dB)	RL (dB)	LrT dB(A)	LrN dB(A)
1	557446.83	4747329.57	243.50	0	32	9.8	9.8	0.0	0.0	62.4	0.0	-4.0	0.0	0.0	8.7	0.0	-0.0	-57.2	-57.2
2	557446.83	4747329.57	243.50	0	63	59.8	59.8	0.0	0.0	62.4	0.1	-4.0	0.0	0.0	8.5	0.0	-0.0	-7.0	-7.0
3	557446.83	4747329.57	243.50	0	125	73.9	73.9	0.0	0.0	62.4	0.2	3.0	0.0	0.0	1.0	0.0	-0.0	7.4	7.4
4	557446.83	4747329.57	243.50	0	250	86.0	86.0	0.0	0.0	62.4	0.4	1.8	0.0	0.0	1.4	0.0	-0.0	20.1	20.1
5	557446.83	4747329.57	243.50	0	500	80.6	80.6	0.0	0.0	62.4	0.7	-1.2	0.0	0.0	1.7	0.0	-0.0	17.1	17.1
6	557446.83	4747329.57	243.50	0	1000	72.1	72.1	0.0	0.0	62.4	1.4	-1.2	0.0	0.0	1.2	0.0	-0.0	8.4	8.4
7	557446.83	4747329.57	243.50	0	2000	74.6	74.6	0.0	0.0	62.4	3.6	-1.2	0.0	0.0	1.2	0.0	-0.0	8.7	8.7
8	557446.83	4747329.57	243.50	0	4000	84.9	84.9	0.0	0.0	62.4	12.1	-1.2	0.0	0.0	1.2	0.0	-0.0	10.4	10.4
9	557446.83	4747329.57	243.50	0	8000	70.4	70.4	0.0	0.0	62.4	43.2	-1.2	0.0	0.0	1.2	0.0	-0.0	-35.2	-35.2

Point Source, ISO 9613, Name: "Inverter4", ID: "Inverter4"

Nr.	X (m)	Y (m)	Z (m)	Refl.	Freq. (Hz)	LxT dB(A)	LxN dB(A)	K0 (dB)	Dc (dB)	Adiv (dB)	Aatm (dB)	Agr (dB)	Afol (dB)	Ahous (dB)	Abar (dB)	Cmet (dB)	RL (dB)	LrT dB(A)	LrN dB(A)
1	557485.87	4747194.54	244.37	0	32	9.8	9.8	0.0	0.0	58.5	0.0	-3.0	0.0	0.0	7.5	0.0	-0.0	-53.3	-53.3
2	557485.87	4747194.54	244.37	0	63	59.8	59.8	0.0	0.0	58.5	0.0	-3.0	0.0	0.0	7.3	0.0	-0.0	-3.0	-3.0
3	557485.87	4747194.54	244.37	0	125	73.9	73.9	0.0	0.0	58.5	0.1	3.0	0.0	0.0	0.7	0.0	-0.0	11.6	11.6
4	557485.87	4747194.54	244.37	0	250	86.0	86.0	0.0	0.0	58.5	0.3	2.0	0.0	0.0	0.2	0.0	-0.0	24.9	24.9
5	557485.87	4747194.54	244.37	0	500	80.6	80.6	0.0	0.0	58.5	0.5	-0.9	0.0	0.0	0.9	0.0	-0.0	21.6	21.6
6	557485.87	4747194.54	244.37	0	1000	72.1	72.1	0.0	0.0	58.5	0.9	-0.9	0.0	0.0	0.9	0.0	-0.0	12.7	12.7
7	557485.87	4747194.54	244.37	0	2000	74.6	74.6	0.0	0.0	58.5	2.3	-0.9	0.0	0.0	0.9	0.0	-0.0	13.8	13.8
8	557485.87	4747194.54	244.37	0	4000	84.9	84.9	0.0	0.0	58.5	7.8	-0.9	0.0	0.0	0.9	0.0	-0.0	18.6	18.6
9	557485.87	4747194.54	244.37	0	8000	70.4	70.4	0.0	0.0	58.5	27.8	-0.9	0.0	0.0	0.9	0.0	-0.0	-15.9	-15.9

Point Source, ISO 9613, Name: "Inverter5", ID: "Inverter5"

Nr.	X (m)	Y (m)	Z (m)	Refl.	Freq. (Hz)	LxT dB(A)	LxN dB(A)	K0 (dB)	Dc (dB)	Adiv (dB)	Aatm (dB)	Agr (dB)	Afol (dB)	Ahous (dB)	Abar (dB)	Cmet (dB)	RL (dB)	LrT dB(A)	LrN dB(A)
1	557287.20	4747329.51	241.37	0	32	9.8	9.8	0.0	0.0	64.5	0.0	-4.5	0.0	0.0	9.1	0.0	-0.0	-59.4	-59.4

Point Source, ISO 9613, Name: "Inverter5", ID: "Inverter5"																			
Nr.	X	Y	Z	Ref.	Freq.	LxT	LxN	K0	Dc	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	LrT	LrN
	(m)	(m)	(m)		(Hz)	dB(A)	dB(A)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)	dB(A)
2	557287.20	4747329.51	241.37	0	63	59.8	59.8	0.0	0.0	64.5	0.1	-4.5	0.0	0.0	9.0	0.0	-0.0	-9.3	-9.3
3	557287.20	4747329.51	241.37	0	125	73.9	73.9	0.0	0.0	64.5	0.2	3.2	0.0	0.0	1.0	0.0	-0.0	5.0	5.0
4	557287.20	4747329.51	241.37	0	250	86.0	86.0	0.0	0.0	64.5	0.5	1.6	0.0	0.0	1.9	0.0	-0.0	17.5	17.5
5	557287.20	4747329.51	241.37	0	500	80.6	80.6	0.0	0.0	64.5	0.9	-1.3	0.0	0.0	3.0	0.0	-0.0	13.5	13.5
6	557287.20	4747329.51	241.37	0	1000	72.1	72.1	0.0	0.0	64.5	1.7	-1.3	0.0	0.0	1.3	0.0	-0.0	5.8	5.8
7	557287.20	4747329.51	241.37	0	2000	74.6	74.6	0.0	0.0	64.5	4.6	-1.3	0.0	0.0	1.3	0.0	-0.0	5.5	5.5
8	557287.20	4747329.51	241.37	0	4000	84.9	84.9	0.0	0.0	64.5	15.6	-1.3	0.0	0.0	1.3	0.0	-0.0	4.8	4.8
9	557287.20	4747329.51	241.37	0	8000	70.4	70.4	0.0	0.0	64.5	55.5	-1.3	0.0	0.0	1.3	0.0	-0.0	-49.6	-49.6

Point Source, ISO 9613, Name: "Inverter6", ID: "Inverter6"																			
Nr.	X	Y	Z	Ref.	Freq.	LxT	LxN	K0	Dc	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	LrT	LrN
	(m)	(m)	(m)		(Hz)	dB(A)	dB(A)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)	dB(A)
1	557347.45	4747194.67	242.31	0	32	9.8	9.8	0.0	0.0	61.8	0.0	-3.9	0.0	0.0	8.5	0.0	-0.0	-56.6	-56.6
2	557347.45	4747194.67	242.31	0	63	59.8	59.8	0.0	0.0	61.8	0.0	-3.9	0.0	0.0	8.4	0.0	-0.0	-6.5	-6.5
3	557347.45	4747194.67	242.31	0	125	73.9	73.9	0.0	0.0	61.8	0.1	3.0	0.0	0.0	1.1	0.0	-0.0	7.9	7.9
4	557347.45	4747194.67	242.31	0	250	86.0	86.0	0.0	0.0	61.8	0.4	1.8	0.0	0.0	1.6	0.0	-0.0	20.5	20.5
5	557347.45	4747194.67	242.31	0	500	80.6	80.6	0.0	0.0	61.8	0.7	-1.1	0.0	0.0	2.4	0.0	-0.0	16.9	16.9
6	557347.45	4747194.67	242.31	0	1000	72.1	72.1	0.0	0.0	61.8	1.3	-1.2	0.0	0.0	1.2	0.0	-0.0	9.1	9.1
7	557347.45	4747194.67	242.31	0	2000	74.6	74.6	0.0	0.0	61.8	3.3	-1.2	0.0	0.0	1.2	0.0	-0.0	9.5	9.5
8	557347.45	4747194.67	242.31	0	4000	84.9	84.9	0.0	0.0	61.8	11.3	-1.2	0.0	0.0	1.2	0.0	-0.0	11.8	11.8
9	557347.45	4747194.67	242.31	0	8000	70.4	70.4	0.0	0.0	61.8	40.4	-1.2	0.0	0.0	1.2	0.0	-0.0	-31.8	-31.8

Point Source, ISO 9613, Name: "Inverter7", ID: "Inverter7"																			
Nr.	X	Y	Z	Ref.	Freq.	LxT	LxN	K0	Dc	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	LrT	LrN
	(m)	(m)	(m)		(Hz)	dB(A)	dB(A)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)	dB(A)
1	557380.93	4747078.60	243.48	0	32	9.8	9.8	0.0	0.0	59.6	0.0	-3.3	0.0	0.0	7.9	0.0	-0.0	-54.4	-54.4
2	557380.93	4747078.60	243.48	0	63	59.8	59.8	0.0	0.0	59.6	0.0	-3.3	0.0	0.0	7.7	0.0	-0.0	-4.2	-4.2
3	557380.93	4747078.60	243.48	0	125	73.9	73.9	0.0	0.0	59.6	0.1	3.0	0.0	0.0	0.9	0.0	-0.0	10.2	10.2
4	557380.93	4747078.60	243.48	0	250	86.0	86.0	0.0	0.0	59.6	0.3	2.0	0.0	0.0	0.9	0.0	-0.0	23.2	23.2
5	557380.93	4747078.60	243.48	0	500	80.6	80.6	0.0	0.0	59.6	0.5	-1.0	0.0	0.0	1.0	0.0	-0.0	20.4	20.4
6	557380.93	4747078.60	243.48	0	1000	72.1	72.1	0.0	0.0	59.6	1.0	-1.0	0.0	0.0	1.0	0.0	-0.0	11.5	11.5
7	557380.93	4747078.60	243.48	0	2000	74.6	74.6	0.0	0.0	59.6	2.6	-1.0	0.0	0.0	1.0	0.0	-0.0	12.4	12.4
8	557380.93	4747078.60	243.48	0	4000	84.9	84.9	0.0	0.0	59.6	8.9	-1.0	0.0	0.0	1.0	0.0	-0.0	16.4	16.4
9	557380.93	4747078.60	243.48	0	8000	70.4	70.4	0.0	0.0	59.6	31.6	-1.0	0.0	0.0	1.0	0.0	-0.0	-20.8	-20.8

Point Source, ISO 9613, Name: "Inverter8", ID: "Inverter8"																			
Nr.	X	Y	Z	Ref.	Freq.	LxT	LxN	K0	Dc	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	LrT	LrN
	(m)	(m)	(m)		(Hz)	dB(A)	dB(A)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)	dB(A)
1	557519.36	4747078.37	245.34	0	32	9.8	9.8	0.0	0.0	53.9	0.0	-3.0	0.0	0.0	7.1	0.0	-0.0	-48.2	-48.2
2	557519.36	4747078.37	245.34	0	63	59.8	59.8	0.0	0.0	53.9	0.0	-3.0	0.0	0.0	6.3	0.0	-0.0	2.6	2.6
3	557519.36	4747078.37	245.34	0	125	73.9	73.9	0.0	0.0	53.9	0.1	2.6	0.0	0.0	0.0	0.0	-0.0	17.4	17.4
4	557519.36	4747078.37	245.34	0	250	86.0	86.0	0.0	0.0	53.9	0.2	1.9	0.0	0.0	0.0	0.0	-0.0	30.1	30.1
5	557519.36	4747078.37	245.34	0	500	80.6	80.6	0.0	0.0	53.9	0.3	-0.9	0.0	0.0	0.9	0.0	-0.0	26.5	26.5
6	557519.36	4747078.37	245.34	0	1000	72.1	72.1	0.0	0.0	53.9	0.5	-0.9	0.0	0.0	0.9	0.0	-0.0	17.7	17.7
7	557519.36	4747078.37	245.34	0	2000	74.6	74.6	0.0	0.0	53.9	1.3	-0.9	0.0	0.0	0.9	0.0	-0.0	19.4	19.4
8	557519.36	4747078.37	245.34	0	4000	84.9	84.9	0.0	0.0	53.9	4.6	-0.9	0.0	0.0	0.9	0.0	-0.0	26.5	26.5
9	557519.36	4747078.37	245.34	0	8000	70.4	70.4	0.0	0.0	53.9	16.3	-0.9	0.0	0.0	0.9	0.0	-0.0	0.3	0.3

Point Source, ISO 9613, Name: "Inverter9", ID: "Inverter9"																			
Nr.	X	Y	Z	Ref.	Freq.	LxT	LxN	K0	Dc	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	LrT	LrN
	(m)	(m)	(m)		(Hz)	dB(A)	dB(A)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)	dB(A)
1	557212.94	4746992.13	241.00	0	32	9.8	9.8	0.0	0.0	63.7	0.0	-4.3	0.0	0.0	9.0	0.0	-0.0	-58.6	-58.6
2	557212.94	4746992.13	241.00	0	63	59.8	59.8	0.0	0.0	63.7	0.1	-4.3	0.0	0.0	8.9	0.0	-0.0	-8.5	-8.5
3	557212.94	4746992.13	241.00	0	125	73.9	73.9	0.0	0.0	63.7	0.2	3.1	0.0	0.0	1.2	0.0	-0.0	5.7	5.7
4	557212.94	4746992.13	241.00	0	250	86.0	86.0	0.0	0.0	63.7	0.5	1.7	0.0	0.0	2.2	0.0	-0.0	18.0	18.0
5	557212.94	4746992.13	241.00	0	500	80.6	80.6	0.0	0.0	63.7	0.8	-1.3	0.0	0.0	3.9	0.0	-0.0	13.4	13.4
6	557212.94	4746992.13	241.00	0	1000	72.1	72.1	0.0	0.0	63.7	1.6	-1.3	0.0	0.0	1.3	0.0	-0.0	6.8	6.8
7	557212.94	4746992.13	241.00	0	2000	74.6	74.6	0.0	0.0	63.7	4.2	-1.3	0.0	0.0	1.3	0.0	-0.0	6.7	6.7
8	557212.94	4746992.13	241.00	0	4000	84.9	84.9	0.0	0.0	63.7	14.2	-1.3	0.0	0.0	1.3	0.0	-0.0	7.0	7.0
9	557212.94	4746992.13	241.00	0	8000	70.4	70.4	0.0	0.0	63.7	50.5	-1.3	0.0	0.0	1.3	0.0	-0.0	-43.8	-43.8

Point Source, ISO 9613, Name: "Inverter10", ID: "Inverter10"

Nr.	X	Y	Z	Refl.	Freq.	LxT	LxN	K0	Dc	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	LrT	LrN
	(m)	(m)	(m)		(Hz)	dB(A)	dB(A)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)	dB(A)
1	557190.83	4747077.11	241.00	0	32	9.8	9.8	0.0	0.0	64.2	0.0	-4.4	0.0	0.0	9.1	0.0	-0.0	-59.0	-59.0
2	557190.83	4747077.11	241.00	0	63	59.8	59.8	0.0	0.0	64.2	0.1	-4.4	0.0	0.0	8.9	0.0	-0.0	-8.9	-8.9
3	557190.83	4747077.11	241.00	0	125	73.9	73.9	0.0	0.0	64.2	0.2	3.2	0.0	0.0	1.0	0.0	-0.0	5.3	5.3
4	557190.83	4747077.11	241.00	0	250	86.0	86.0	0.0	0.0	64.2	0.5	1.6	0.0	0.0	1.8	0.0	-0.0	17.9	17.9
5	557190.83	4747077.11	241.00	0	500	80.6	80.6	0.0	0.0	64.2	0.9	-1.3	0.0	0.0	2.8	0.0	-0.0	14.0	14.0
6	557190.83	4747077.11	241.00	0	1000	72.1	72.1	0.0	0.0	64.2	1.7	-1.3	0.0	0.0	1.3	0.0	-0.0	6.2	6.2
7	557190.83	4747077.11	241.00	0	2000	74.6	74.6	0.0	0.0	64.2	4.4	-1.3	0.0	0.0	1.3	0.0	-0.0	6.0	6.0
8	557190.83	4747077.11	241.00	0	4000	84.9	84.9	0.0	0.0	64.2	15.0	-1.3	0.0	0.0	1.3	0.0	-0.0	5.7	5.7
9	557190.83	4747077.11	241.00	0	8000	70.4	70.4	0.0	0.0	64.2	53.4	-1.3	0.0	0.0	1.3	0.0	-0.0	-47.3	-47.3



Suite 500, 4342 Queen Street
Niagara Falls, Ontario, Canada L2E 7J7
Tel 905 374 5200 ♦ Fax 905 374 1157