SunEdison Oro 4 Line Solar Farm

Acoustic Assessment Report

November 29, 2012

Prepared for:
SunEdison Canada, LLC
595 Adelaide Street East, Suite 400
Toronto, ON M5A 1N8

Prepared by:
GENIVAR Inc.
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Markham, Ontario L3R 5K3

Project No. 101-17803-01

GENIVAR

Project No. 101-17803-01

November 29, 2012

Simon Gill
595 Adelaide Street East, Suite 400
Toronto, ON, Canada M5A 1N8

Re: **SunEdison Oro4 Solar Farm**
Acoustic Assessment Report

Dear Mr. Gill:

Please find, attached, a copy of Acoustic Assessment Report carried out for the SunEdison Oro 4 Line Solar Farm to be located in the area of Edgar, Township of Oro Medonte, Simcoe County, Ontario.

If you have any question, please, feel free to call me at 905-475-7270 ext. 18384 or email me at bhuwan.prasad@genivar.com.

Yours truly,
GENIVAR Inc.

Bhuwan M. Prasad, P. Eng.
Environmental Engineer

/bp

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Executive Summary

GENIVAR Inc. (GENIVAR) was retained by SunEdison to prepare an acoustic assessment report for the SunEdison Oro 4 Line Solar Farm with an installed capacity of up to 10 MW (AC) to be located in the area of Edgar, Township of Oro Medonte, Simcoe County, Ontario in support of the Renewable Energy Approval (REA) application under Ontario Regulation 359/09 (O.Reg.359/09) of the Environmental Protection Act.

According to the project classification scheme outlined in Part II (Classes of Renewable Energy Generation Facilities), Section 4 of O. Reg. 359/09, the SunEdison Oro 4 Line solar farm is categorized as a Class 3 solar facility. This acoustic assessment report has been prepared in accordance with Appendix A of the publication of the Ontario Ministry of the Environment entitled, "Basic Comprehensive Certificates of Approval (Air) – User Guide", dated April 2004 and subsequent amendments.

The noise analysis was conducted using the CadnaA (Computer Aided Noise Abatement) 3-D acoustical modelling software V4.3 to predict the noise levels at the points of reception, within one (1) km distance around the site boundary in each direction, with all noise sources operating at full load simultaneously. CadnaA is based on ISO Standard 9613-2 "*Acoustics - Attenuation of Sound During Propagation Outdoors – Part 2: General Method of Calculation*". The applicable sound level limits for this Facility are considered to be the exclusionary minimum sound levels for Class 3 areas (45 dBA for daytime and 40 dBA for evening & nighttime).

Based on the results obtained in this noise study, the environmental noise produced by the proposed SunEdison Oro 4 Line Solar Farm would be well below the applicable MOE noise guidelines at all Points of Reception.

Table of Contents

List of Figures

List of Tables

Appendices

1. Introduction

SunEdison Canada (SunEdison) is proposing a single Class 3 Solar Facility with a nameplate capacity of up to 10 MW (AC) in the area of Edgar, Township of Oro Medonte, Simcoe County, Ontario. If approved, this facility will convert solar energy into electricity to be fed into the Hydro One distribution grid. The defined study area is presented as Figure 1 in Appendix A, covering approximately 51 hectares (ha). Noise sources include inverters and transformers, with 94 Points of Reception identified as sensitive receptors within one km distance around the site boundary in each direction, for assessment.

SunEdison is a global leader in solar energy generation with a current operating portfolio of more than 350 facilities generating over a combined 120 Megawatts (MW) of solar power across the globe. Active Ontario solar farms currently owned and operated by SunEdison include First Light 1 (9.1 MW) located in Stone Mills, north of Napanee, Norfolk I and II (18 MW combined) located in Norfolk County and Erie Ridge (9.3 MW) in Ridgetown, Chatham-Kent.

Subject to receiving all approvals, the preliminary schedule anticipates that full commercial operation of the SunEdison Oro 4 Line Solar Farm will be achieved by the end of 2013. The project has received a 20-year FIT contract from the Ontario Power Authority to sell the generated electricity to the Ontario electricity grid. As such, the project is anticipated to operate until at least 2033, at which time it may continue to generate electricity or the site may be decommissioned and the land returned to its former use.

The facility nameplate capacity is the aggregate gross electricity power output during a peak sunny day, when output from the facility is at its maximum.

1.1 Report Objectives

GENIVAR Inc. (GENIVAR) was retained by SunEdison to prepare this acoustic assessment report in support of the Renewable Energy Approval (REA) application for the SunEdison Oro 4 Line Solar Farm in the area of Edgar, Township of Oro Medonte, Simcoe County, Ontario.

Ontario Regulation 359/09 (O. Reg. 359/09) of the Environmental Protection Act received Royal Assent on September 24, 2009 and was filed and came into force on October 1, 2009. O. Reg. 359/09 contains the current requirements for approval of a renewable energy project under the REA process. According to the project classification scheme outlined in Part II (Classes of Renewable Energy Generation Facilities); Section 4 of O. Reg. 359/09, the SunEdison Oro 4 Line solar farm is categorized as a Class 3 solar facility. A Class 3 solar facility is defined as a facility of solar panels situated at any location other than mounted on the roof or wall of a building with a name plate capacity greater than 12 kW.

As required by O. Reg. 359/09 for a Class 3 solar facility, this noise study report has been prepared in accordance with Appendix A of the publication of the Ministry of the Environment entitled, “Basic Comprehensive Certificates of Approval (Air) – User Guide”, dated April 2004 and subsequent amendments.

1.2 Project Location

The project is located on the 4th Line N, near Edgar, in Simcoe County. The area is located south of Old Barrie Road W and is generally bounded by 5th Line North to the east and 4th Line North to the west.

The solar farm will be located on privately owned land. The project’s electrical substation will also be located on site. The proposed point of connection is on 4th Line North just to the north of Highway 11 and one overhead electrical connection line would run from the project location along 4th Line North to the point of connection as shown in Figure 2.

1.3 Land Ownership and Parcel Description

The table below lists the legal description of the parcels which will be used for the proposed Perpetual Energy Oro 4 Line Solar Farm.

Ownership (Public or Private)	Parcel Description
Private	Concession 5 (1441 4 Line N), Part Lot 12
Property Located in Simcoe County	

2. Facility Description

The Facility will consist of solar modules or panels, inverters, transformers and other ancillary equipment to convert solar energy into electricity (equipment list provided in Appendix C). The modules will be held by a single-axis tracking system which is supported off the ground by vertical posts. The major components of the proposed project are as follows:

- Approximately 32,570 polycrystalline solar modules (each generating 300 Wdc at peak);
- 44 kV Substation including pole-top motor-operated disconnect; 44 kV switchgear; revenue grade PT's, CT's and metering; 10 MVA oil filled pad-mount transformer; interrupter switches, communication equipment, etc.
- Up to 10 inverter huts, each inverter hut consisting of two 500-kW inverters within an enclosure and one corresponding 1000 kVA step-up transformer;
- AC &DC collector cables (arrangement may vary depending on geotechnical conditions);
- Gravel access roadway;
- Temporary staging areas for construction activities.

2.1 Solar Photovoltaic Modules

The proposed solar PV technology to be used on this project will be MEMC polycrystalline 300-Watt modules. There will be a total of approximately 32,570 modules, each approximately 2 m long by 1 m wide. The modules will be held by a fixed system or a single axis tracking system, which are supported off the ground by vertical posts. All components are certified for application in solar farm projects.

2.2 Electrical System

The solar photovoltaic panels will capture the incident solar energy and produce direct current (DC) electrical energy, typically with voltages lower than 600V; this DC output will be converted into 480 V alternating current (AC) electrical energy by inverters. The voltage of AC power produced by the inverters will then be increased to intermediate voltage (13.8 or 27.6 kV) by a step-up transformer located at each inverter hut. Finally, the AC power will be brought to a main power transformer at the substation, where the voltage is further increased to 44kV for export to the Hydro One grid.

An overhead line will transfer the 44-kV power to the point of common coupling located on Regional Rd 11 (Old Barrie Rd).

The project is to be designed, constructed and operated in full conformance with all applicable codes and regulation.

2.3 Access Roads

Gravel access roads within the project site will be constructed to provide access to the inverter huts and substation over the project's 20-year minimum life.

2.4 Communications and SCADA

It is proposed to provide Supervisory Control and Data Acquisition (SCADA) functions for remote supervisory monitoring and control. This system allows data on performance of the arrays, inverters, substation and weather conditions to be recorded and displayed at a control station, and also provides warnings if there are abnormal conditions. If required, a single 30-m tall communications tower will be constructed to facilitate communications.

2.5 Hours of Operation

The solar generating facility will generate power whenever solar energy is available and stay in stand-by mode for the rest of the time..

In the absence of sunlight, no electricity generation will take place. This scenario is found at nighttime after sunset, and under these conditions the inverters are not operating and therefore not producing any noise.

In normal conditions, the step-up and main power transformers are always energized, either from the inverters or the grid, and therefore constantly generate some magnetostrictive noise at reduced levels. If needed, cooling fans may be installed and will operate only during electricity generation, i.e. daylight hours.

3. Noise Source Summary

The main sources of noise associated with the facility will be the inverter huts (each hut containing two inverters and one step-up transformer) and the substation containing the main power transformer installed on a concrete pad.

Switch gear and a small auxiliary transformer meant for lighting within the substation are insignificant sources of noise in comparison to the above noted sources.

The trackers operate using small slow-moving motors and only emit noise when moving the shafts. This noise is insignificant and the motors have not been considered as sources of noise.

3.1 Inverter Huts

The facility will have up to ten (10) inverter huts. Based on the reference inverter design (Appendix C), each inverter hut has been considered to have two noise components:

a) two (2) 500 kW inverters in an enclosure; and

b) 1 MVA step-up transformer located outside of the inverter enclosure.

The inverters and associated transformer in each hut are identified by unique identification numbers. For example, H1T is the transformer of Hut 1, while H1|1 and H1|2 are inverter 1 and inverter 2 respectively for Hut 1; H2T is the transformer of Hut 2, while H2|1 and H2|2 are inverter 1 and inverter 2 respectively for Hut 2; etc. The complete list of inverters and associated transformers can be found in Table 2.

3.1.1 Inverters

The third-octave spectrum noise data, provided for the Solaron 500 unit, Configuration 2 (details in Appendix D), was converted into a full octave spectrum for modeling purposes.

The sound power levels include a 5 dB tonal penalty per MOE publication NPC-104 as the MOE considers these sources to be tonal.

As the two inverters for each hut are within an enclosure, on the advice of the MOE, inverter enclosure attenuation has been applied to the overall sound power levels as per the values provided in Table 1.

3.1.2 Transformers

The sound power levels for the 1 MVA step-up transformers were calculated in the same manner as for the main substation transformer, details of which are given in Section 3.2 Substation Transformer below. The sound power levels include a 5 dB tonal penalty per MOE publication NPC-104 as the MOE considers these sources to be tonal.

3.2 Substation Transformer

The octave band sound power levels of the transformers are calculated using Equation 7-23 in the "*Noise Control for Building and Manufacturing Plants*" report (provided in Appendix E; Reference 1) and National Electrical Manufacturers Association (NEMA) sound data for the transformers (Appendix E):

$$L_w = \text{NEMA Rating} + 10 \log A + C$$

Where, NEMA Rating = the A weighted sound level of the transformer
A = the total surface area of the sidewall of the transformer in ft^2
C = octave band correction (Appendix C, Reference 1, Table 7-30)

The sound power levels include a 5 dB tonal penalty per MOE publication NPC-104 as the MOE considers these sources to be tonal.

An overall list of all noise sources of the Facility is shown in Table 2: Noise Source Summary Table, along with the corresponding coordinates as shown on Figure 1 (Appendix A). The height of the substation transformer and the height of the inverters are modeled as 2.5 metres whereas the height of the inverter transformers is modeled as 1.8 metres above the ground so as to model them as point sources.

Two different scenarios have been modeled as per the details given below:

Daytime Scenario: When all the above equipment is in operation.

Nighttime Scenario: When all equipment is in operation except inverters (i.e. only hut transformers and the substation transformer being in operation).

4. Points of Reception Summary

Ninety four (94) Points of Reception (PORs) within a one (1) km distance around the site boundary in each direction were identified for this acoustic assessment as shown on Figure 1 (Appendix A).

With a recent aerial photo, land information and site shape files loaded into the GIS program, ArcMap, the noise receptors and vacant lots were determined by visual review of the composite map. Then, these receptors were verified by actual field visit/ground truthing. Structures that were identified as potential occupied buildings/houses were plotted on the map as noise receptors. This data was stored and saved into the shapefile entitled, *Noise Receptors*.

The daytime POR noise impact for each receptor from each individual noise source is shown in Table 3 and includes the distance in metres from each source to each receptor and the sound level at each receptor (Leq in dBA). The nighttime POR noise impact from each individual noise source is not presented since the nighttime noise impacts follow the same trend but with a lower magnitude.

To simulate a worst-case scenario, each receptor was set to a height of 4.5 m above ground representing an upper storey window of a two-storey structure. A receptor at this height is more exposed to the elevated sources (substation transformer and inverters) at the subject site and benefit least from the absorption of sound into the ground.

5. Assessment Criteria (Performance Limits)

The solar farm will be located on privately owned land which is zoned A2 agricultural. Therefore, all PORs have been considered to be located in Class 3 rural areas to reflect the rural nature of the area.

In predicting the sound level at each POR due to the proposed solar farm, MOE publication NPC-232 requires the application of the principle of “predictable worst case” noise impact. The predictable worst case impact is defined as the largest noise excess produced by the facility over the applicable limit.

The background sound level is considered to be traffic noise and other sounds in the area excluding the sound from the facility under assessment. The sound level limit for the residential receptors in a Class 3 area can be described as follows:

> *The energy averaged sound level (Leq) produced by a source at a receptor location in any one hour period should not exceed the greater of: the energy averaged background sound level in the same hour period, or 45 dBA in the daytime of 07:00 – 19:00, or 40 dBA in the evening period of 19:00 – 23:00 and 40 dBA in the nighttime period of 23:00 – 07:00.*

The applicable sound level limits for this Facility are considered to be the exclusionary minimum sound levels for Class 3 areas as follows:

Time Period	**Sound Level Limit for POR in Class 3 Area**
Daytime (07:00 – 19:00)	45 dBA
Evening (19:00 – 23:00)	40 dBA
Nighttime (23:00 – 07:00)	40 dBA

6. Impact Assessment

The noise analysis was conducted using the CadnaA (Computer Aided Noise Abatement) 3-D acoustical modelling software V4.3 to predict the noise levels at the Points of Reception with all noise sources operating at full load simultaneously and each noise source modelled as a point source. CadnaA is based on ISO Standard 9613-2 “*Acoustics - Attenuation of Sound During Propagation Outdoors – Part 2: General Method of Calculation*”. The CadnaA configuration settings are summarized in Appendix F.

The attenuation due to atmospheric absorption was based on the atmospheric coefficients for 10 °C temperature and 70% relative humidity. The Ground Attenuation value (G) was calculated using the “General” method in standard ISO 9613-2 (included in the CadnaA software), with a global value ground factor of G = 0.7 being used (this is based on MOE wind farm guidelines for rural areas). G = 1 was used to model the porous soil nearby where the sound energy would be completely absorbed and G = 0 to model for hard surfaces such as paved hard roads where sound energy would be reflected totally.

The predicted sound levels at the receptors for both daytime and nighttime scenarios are provided in Table 4: Acoustic Assessment Summary Table which indicates that the predicted noise levels for all identified PORs are in compliance with the respective performance limits. As a result, no mitigation is required.

Due to the nature of the noise sources, a vibration assessment is not required. The CadnaA noise modelling graphic output for the SunEdison Oro 4 Line Solar Farm for daytime and nighttime scenarios are shown below on Figure 1 and Figure 2 respectively.

It should be noted that the acoustic assessment carried out for this project is conservative since the Sound Power Level used for the inverters (as obtained from Advanced Energy Industries) is the greatest of all inverter options.

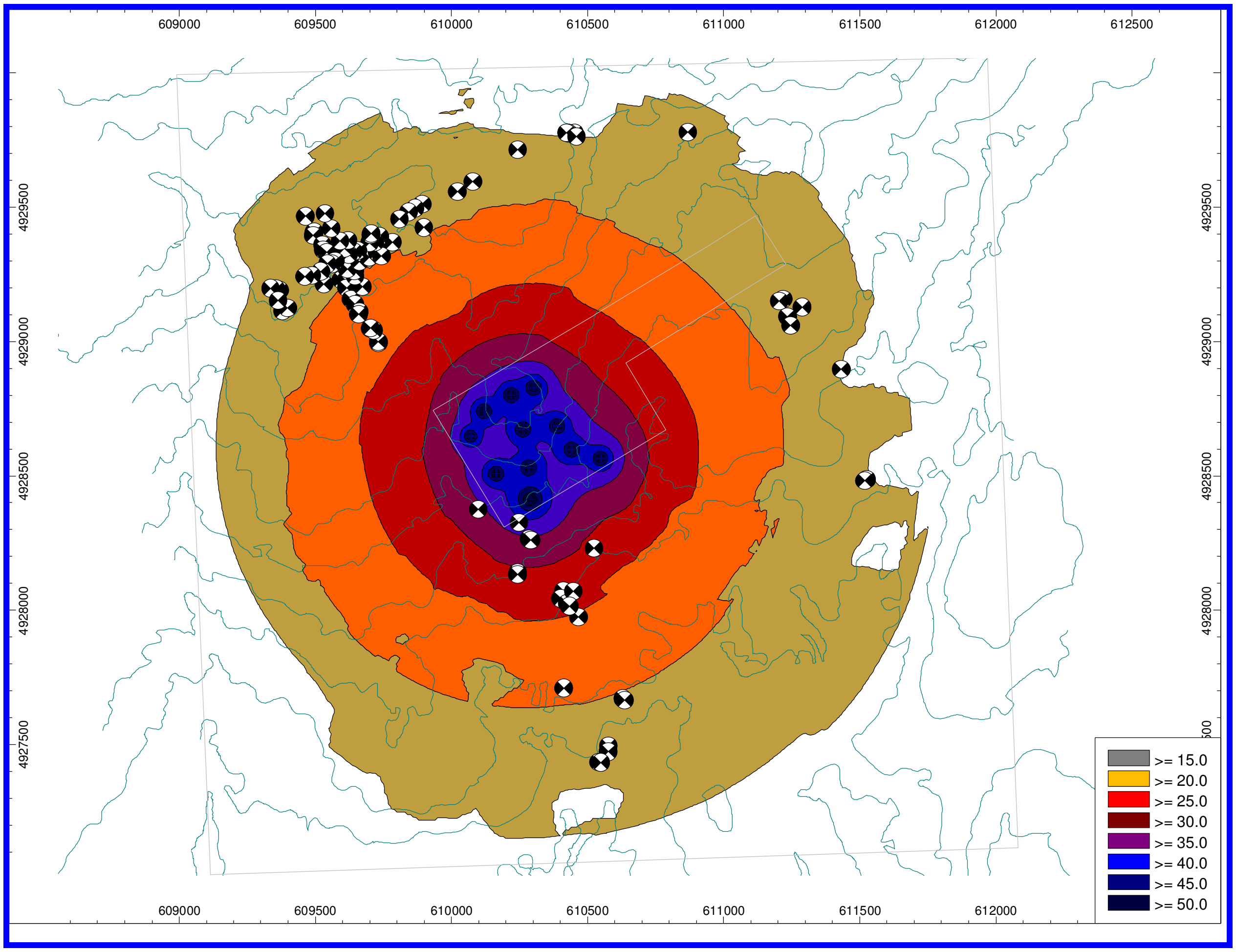


Figure 1 Oro 4 Line Solar Farm Noise Impact Graphic in dBA for Daytime Scenario

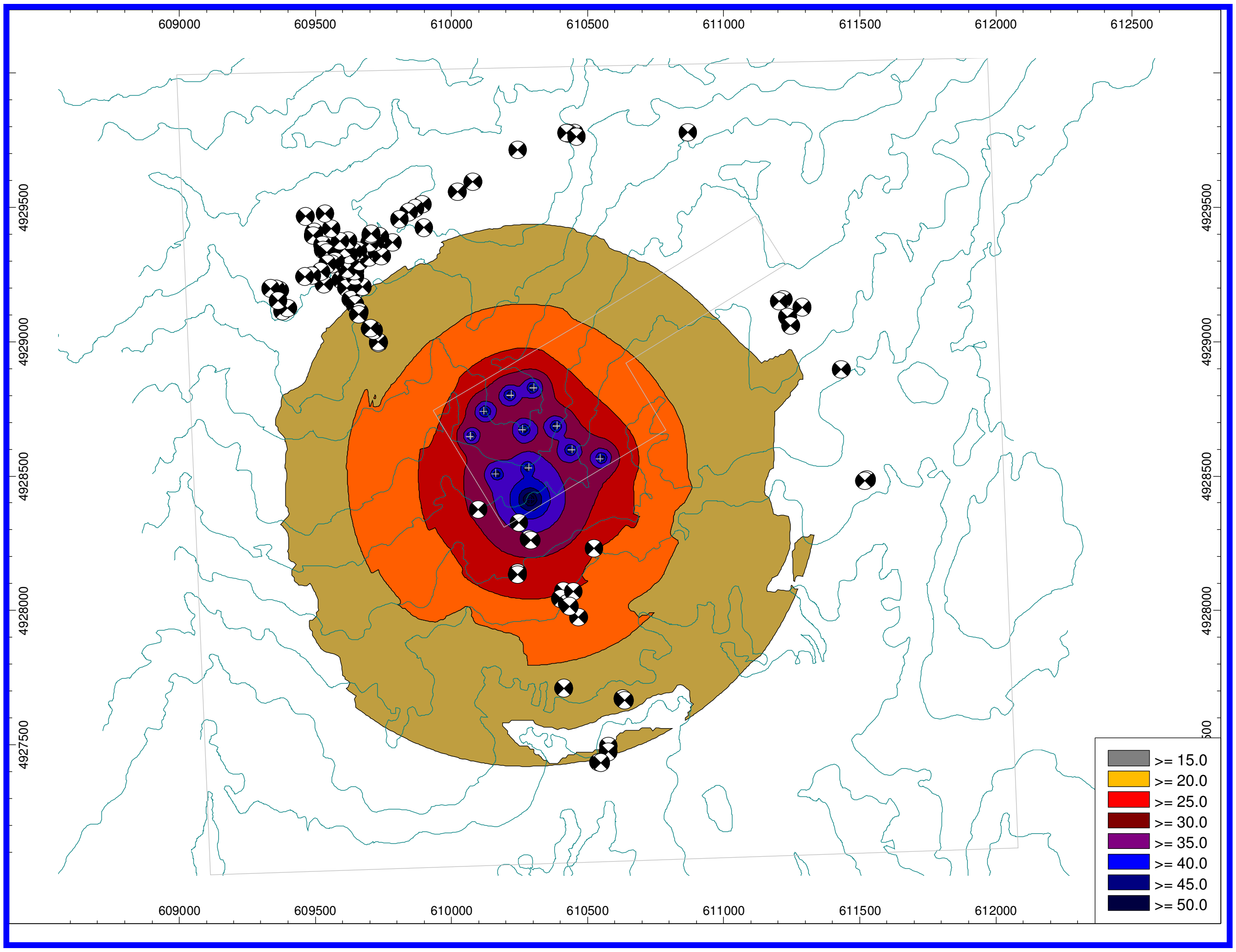


Figure 2 Oro 4 Line Solar Farm Noise Impact Graphic in dBA for Nighttime Scenario

7. Conclusions

For the proposed SunEdison Oro 4 Line Solar Farm to be located in the area of Edgar, Township of Oro Medonte, Simcoe County, Ontario, a noise impact study has been carried out by GENIVAR. The study was carried out using CadnaA V4.3 to predict the noise levels at the Points of Reception (PORs), within a one (1) km distance around the site boundary in each direction, with all noise sources operating at full load simultaneously during the daytime scenario and only transformers (without inverters) operating at full load during the nighttime scenario. The applicable sound level limits for this Facility are considered to be the exclusionary minimum sound levels for Class 3 areas (45 dBA for daytime and 40 dBA for evening & nighttime). Based on the results presented in this report, it is concluded that the environmental noise produced by the proposed SunEdison Oro 4 Line Solar Farm would be well below the applicable MOE noise guidelines at all PORs.

Tables

Table 1: Solar Power Inverter and Transformer Sound Levels
SunE Oro 4 Line Solar Farm, Ontario

Inverter - AEI Solaron 500 - based on April 2010 test report (see Appendix D)										
	Octave Band Centre Frequency (Hz)									
Sound Description	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**Sum**	**Description**
AEI Solaron 500 PWL (dB)*	83.4	89.6	81.8	81.0	78.0	73.1	70.3	75.2	**91.9**	Appendix D, Table 1, Configuration 2
AEI Solaron 500 SPL (dB)	75.4	81.6	73.8	73.0	70.0	65.1	62.3	67.2	**83.9**	at 1 m
AEI Solaron 500 PWL (dBA)	57.2	73.5	73.2	77.8	78.0	74.3	71.3	74.1	**83.7**	less than 84 dBA from report
AEI Solaron 500 SPL (dBA)	49.2	65.5	65.2	69.8	70.0	66.3	63.3	66.1	**75.7**	at 1 m - close to other vendors
Tonal Penalty (dB)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		as per NPC-104
Inverter Total PWL (dB)	88.4	94.6	86.8	86.0	83.0	78.1	75.3	80.2	**96.9**	including Tonal Penalty
Inverters Enclosures Attenuation	5.0	6.0	7.0	7.0	8.0	8.0	7.0	7.0		
* Each Octave band is normalised with its adjacent 1/3 octave sound power levels, for example, PWL for 63 Hz is log sum of PWLs of 50, 63 & 80 Hz										

Inverter transformer NEMA rating (dBA)	58	(CSA C227.4-06, Table 5, 1,000 kVA)								
Area of four sides (ft²)	175	Based on Solaron Dimensions*								
	Octave Band Centre Frequency (Hz)									
Sound Description	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**Sum**	**Description**
Inverter Transformer PWL (dB) 1,000 kVA	75.4	77.4	72.4	72.4	66.4	61.4	56.4	49.4	**81.2**	Ref. 1, Eq. 7-23 and Table 7-30, C_1 octave band corrections
PWL (dBA)	49.2	61.3	63.8	69.2	66.4	62.6	57.4	48.3	**72.8**	
SPL (dBA) at 1 m	41.2	53.3	55.8	61.2	58.4	54.6	49.4	40.3	**64.8**	
Transformer Total PWL (dB)	80.4	82.4	77.4	77.4	71.4	66.4	61.4	54.4	**86.2**	including Tonal Penalty

* Taken somewhat higher value to be conservative

Substation transformer NEMA rating (dBA)	68	(CSA-C88-M90, Table 8, 10 MVA)								
Area of four sides (ft²)	251	Estimated based on similar project								
	Octave Band Centre Frequency (Hz)									
Sound Description	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**Sum**	**Description**
Substation Transformer PWL (dB) 10,000 kVA	87.0	89.0	84.0	84.0	78.0	73.0	68.0	61.0	**92.8**	Ref. 1, Eq. 7-23 and Table 7-30, C_3 octave band corrections
PWL (dBA)	60.8	72.9	75.4	80.8	78.0	74.2	69.0	59.9	**84.4**	
SPL (dBA) at 1 m	52.8	64.9	67.4	72.8	70.0	66.2	61.0	51.9	**76.4**	
Transformer Total PWL (dB)	92.0	94.0	89.0	89.0	83.0	78.0	73.0	66.0	**97.8**	including Tonal Penalty

Reference 1: Noise Control for Buildings, Manufacturing Plants, Equipment and Products (19th printing, 2005)

Table 2: Noise Source Summary Table
SunE Oro 4 Line Solar Farm, Ontario

Source ID	Source Description	Sound Power Level	Coordinates		Height	Daytime Source	Nighttime Source	Source Location	Source Characteristics	Noise Control Measures
		(dBA)	X m)	Y (m)	(m)	Yes or No	Yes or No	(1)	(2)	(3)
H1T	Hut 1 Transformer	72.8	610167.1	4928508.0	1.8	Y	Y	O	S, T	U
H1I1	Hut 1 Inverter 1	83.7	610162.5	4928508.8	2.5	Y	N	O	S, T	E
H1I2	Hut 1 Inverter 2	83.7	610162.5	4928507.1	2.5	Y	N	O	S, T	E
H2T	Hut 2 Transformer	72.8	610073.9	4928649.4	1.8	Y	Y	O	S, T	U
H2I1	Hut 2 Inverter 1	83.7	610069.2	4928646.9	2.5	Y	N	O	S, T	E
H2I2	Hut 2 Inverter 2	83.7	610070.3	4928645.6	2.5	Y	N	O	S, T	E
H3T	Hut 3 Transformer	72.8	610123.6	4928740.5	1.8	Y	Y	O	S, T	U
H3I1	Hut 3 Inverter 1	83.7	610118.3	4928741.4	2.5	Y	N	O	S, T	E
H3I2	Hut 3 Inverter 2	83.7	610118.4	4928739.7	2.5	Y	N	O	S, T	E
H4T	Hut 4 Transformer	72.8	610279.5	4928530.4	1.8	Y	Y	O	S, T	U
H4I1	Hut 4 Inverter 1	83.7	610284.5	4928529.5	2.5	Y	N	O	S, T	E
H4I2	Hut 4 Inverter 2	83.7	610284.5	4928531.2	2.5	Y	N	O	S, T	E
H5T	Hut 5 Transformer	72.8	610267.0	4928672.7	1.8	Y	Y	O	S, T	U
H5I1	Hut 5 Inverter 1	83.7	610261.8	4928671.8	2.5	Y	N	O	S, T	E
H5I2	Hut 5 Inverter 2	83.7	610261.8	4928673.4	2.5	Y	N	O	S, T	E
H6T	Hut 6 Transformer	72.8	610214.6	4928801.0	1.8	Y	Y	O	S, T	U
H6I1	Hut 6 Inverter 1	83.7	610219.5	4928800.2	2.5	Y	N	O	S, T	E
H6I2	Hut 6 Inverter 2	83.7	610219.4	4928801.8	2.5	Y	N	O	S, T	E
H7T	Hut 7 Transformer	72.8	610298.1	4928828.2	1.8	Y	Y	O	S, T	U
H7I1	Hut 7 Inverter 1	83.7	610302.7	4928827.4	2.5	Y	N	O	S, T	E
H7I2	Hut 7 Inverter 2	83.7	610302.6	4928829.1	2.5	Y	N	O	S, T	E
H8T	Hut 8 Transformer	72.8	610383.9	4928685.6	1.8	Y	Y	O	S, T	U
H8I1	Hut 8 Inverter 1	83.7	610389.1	4928684.7	2.5	Y	N	O	S, T	E
H8I2	Hut 8 Inverter 2	83.7	610389.0	4928686.5	2.5	Y	N	O	S, T	E
H9T	Hut 9 Transformer	72.8	610437.6	4928597.0	1.8	Y	Y	O	S, T	U
H9I1	Hut 9 Inverter 1	83.7	610442.8	4928596.2	2.5	Y	N	O	S, T	E
H9I2	Hut 9 Inverter 2	83.7	610442.8	4928597.9	2.5	Y	N	O	S, T	E
H10T	Hut 10 Transformer	72.8	610551.2	4928566.9	1.8	Y	Y	O	S, T	U
H10I1	Hut 10 Inverter 1	83.7	610546.3	4928564.8	2.5	Y	N	O	S, T	E
H10I2	Hut 10 Inverter 2	83.7	610547.3	4928563.4	2.5	Y	N	O	S, T	E
ST	Substation Transformer	84.4	610289.0	4928413.0	2.5	Y	Y	O	S, T	U

Notes:

(1) Source Location:
O - located/installed outside the building, including on the roof
I - located/installed inside the building

(2) Sound Characteristics:
S - Steady
Q - Quasi Steady Impulsive
I - Impulsive
B - Buzzing
T - Tonal
C - Cyclic

(3) Noise Control Measures:
S - silencer, acoustic louvre, muffler
A - acoustic lining, plenum
B - barrier, berm, screening
L - lagging
E - acoustic enclosure
O - other
U - uncontrolled

Table 3: Point of Reception Noise Impact
SunE Oro 4 Line Solar Farm, Ontario

Noise Source ID	Point of Reception R11		Point of Reception R65		Point of Reception R91		Point of Reception R94	
	Distance to R11	Sound Level at R11 (Leq)	Distance to R65	Sound Level at R65 (Leq)	Distance to R90	Sound Level at R90 (Leq)	Distance to R94	Sound Level at R94 (Leq)
	(m)	(dBA)	(m)	(dBA)	(m)	(dBA)	(m)	(dBA)
H1T	654	4.9	199	17.8	1220	-3.5	149	20.6
H1I1	650	9.2	201	21.7	1224	-0.7	148	24.7
H1I2	651	9.2	200	21.8	1224	-0.7	146	24.8
H2T	487	4.4	367	6.2	1237	-7.6	274	10.6
H2I1	485	8.2	367	10.1	1242	-4.1	272	14.6
H2I2	487	8.2	365	10.2	1241	-4.1	271	14.7
H3T	468	9.4	432	8.5	1156	-2.8	365	11.8
H3I1	463	13.5	435	12.2	1161	0	366	15.6
H3I2	464	13.5	433	12.3	1161	0	364	15.9
H4T	719	2.7	207	17.5	1113	-1.5	238	16.1
H4I1	723	5.8	206	21.5	1110	2.6	242	20
H4I2	722	5.9	208	21.4	1109	2.7	243	19.9
H5T	625	6.2	347	12.4	1052	0.4	341	12.6
H5I1	621	10.3	346	16.5	1057	4.4	338	16.7
H5I2	620	10.3	347	16.4	1056	4.4	340	16.6
H6T	521	8.3	476	6.6	1050	-1.4	441	7.4
H6I1	526	12.2	475	9.6	1045	2.2	441	10.4
H6I2	525	12.2	476	9.6	1045	2.3	443	10.4
H7T	591	7	504	6	962	1.5	495	6.2
H7I1	596	10.9	504	9	958	5.6	496	9.2
H7I2	595	10.9	506	8.9	957	5.6	497	9.1
H8T	722	2.3	384	9.1	943	1.9	421	8
H8I1	727	5.1	385	12.6	939	5.9	424	11.1
H8I2	727	5.1	387	12.5	938	5.9	426	11
H9T	811	1	331	10.4	946	1.9	405	8.2
H9I1	816	3.8	333	13.9	942	5.9	409	11.2
H9I2	815	3.8	334	13.8	941	5.9	410	11.1
H10T	806	-0.4	96	8.8	1175	2.7	195	6.3
H10I1	922	2.5	382	12.7	881	6.6	486	9.5
H10I2	923	2.5	382	12.7	881	6.6	487	9.5
ST	806	13.3	96	37.4	1175	9.4	195	30.8

Table 4: Acoustic Assessment Summary Table
SunE Oro 4 Line Solar Farm, Ontario

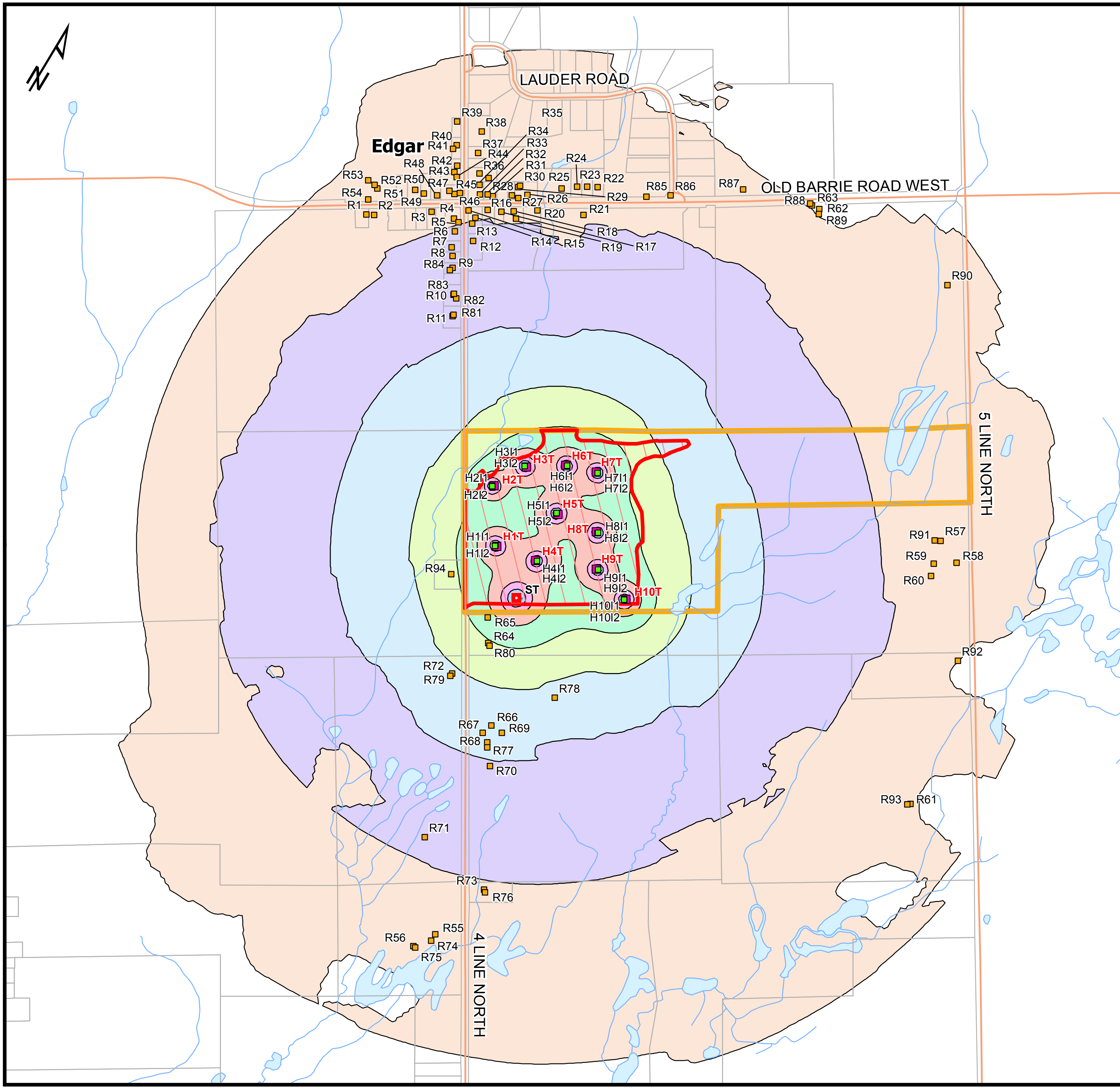
Point of Reception ID	Coordinates (height 4.5 m) X (m)	Y (m)	Daytime Sound Level at Point of Reception (Leq, dBA)	Verified by Acoustic Audit (Yes/No)	Performance Limit (Leq) (dBA)	Compliance with Performance Limit (Yes/No)	Nithtime Sound Level at Point of Reception (Leq, dBA)	Verified by Acoustic Audit (Yes/No)	Performance Limit (Leq) (dBA)	Compliance with Performance Limit (Yes/No)
R1	609379.4	4929114.4	18.7	No	45/40	Yes	13	No	40	Yes
R2	609398.4	4929124.4	18.8	No	45/40	Yes	13.1	No	40	Yes
R3	609531.4	4929214.4	19.3	No	45/40	Yes	13.3	No	40	Yes
R4	609594.4	4929230.4	19.8	No	45/40	Yes	13.7	No	40	Yes
R5	609611.4	4929227.4	20	No	45/40	Yes	13.8	No	40	Yes
R6	609614.4	4929200.4	20.3	No	45/40	Yes	14.1	No	40	Yes
R7	609630.4	4929158.4	20.8	No	45/40	Yes	14.6	No	40	Yes
R8	609645.4	4929138.4	21.1	No	45/40	Yes	14.9	No	40	Yes
R9	609661.4	4929110.4	21.6	No	45/40	Yes	15.3	No	40	Yes
R10	609702.4	4929047.4	22.7	No	45/40	Yes	16.4	No	40	Yes
R11	609731.4	4928995.4	23.7	No	45/40	Yes	17.3	No	40	Yes
R12	609672.4	4929204.4	20.8	No	45/40	Yes	14.5	No	40	Yes
R13	609645.4	4929243.4	20.2	No	45/40	Yes	13.9	No	40	Yes
R14	609644.4	4929263.4	20	No	45/40	Yes	13.8	No	40	Yes
R15	609617.4	4929270.4	19.7	No	45/40	Yes	13.5	No	40	Yes
R16	609662.4	4929298.4	19.7	No	45/40	Yes	13.6	No	40	Yes
R17	609698.4	4929314.4	19.9	No	45/40	Yes	13.7	No	40	Yes
R18	609726.4	4929333.4	19.9	No	45/40	Yes	13.7	No	40	Yes
R19	609742.4	4929318.4	19.9	No	45/40	Yes	14	No	40	Yes
R20	609782.4	4929369.4	19.6	No	45/40	Yes	13.5	No	40	Yes
R21	609898.4	4929424.4	19.7	No	45/40	Yes	13.6	No	40	Yes
R22	609892.4	4929511.4	18.2	No	45/40	Yes	12.4	No	40	Yes
R23	609866.4	4929496.4	18.2	No	45/40	Yes	12.4	No	40	Yes
R24	609842.4	4929482.4	18.2	No	45/40	Yes	12.5	No	40	Yes
R25	609808.4	4929456.4	18.4	No	45/40	Yes	12.6	No	40	Yes
R26	609735.4	4929391.4	19	No	45/40	Yes	13	No	40	Yes
R27	609718.4	4929370.4	19.2	No	45/40	Yes	13.3	No	40	Yes
R28	609699.4	4929368.4	19.1	No	45/40	Yes	13.2	No	40	Yes
R29	609703.4	4929397.4	18.7	No	45/40	Yes	12.7	No	40	Yes
R30	609705.4	4929402.4	18.7	No	45/40	Yes	12.7	No	40	Yes
R31	609655.4	4929338.4	19.3	No	45/40	Yes	13.2	No	40	Yes
R32	609640.4	4929335.4	19.2	No	45/40	Yes	13.1	No	40	Yes
R33	609622.4	4929324.4	19.2	No	45/40	Yes	13	No	40	Yes
R34	609607.4	4929347.4	18.8	No	45/40	Yes	12.7	No	40	Yes
R35	609619.4	4929376.4	18.6	No	45/40	Yes	12.6	No	40	Yes
R36	609590.4	4929374.4	18.4	No	45/40	Yes	12.4	No	40	Yes
R37	609558.4	4929421.4	17.8	No	45/40	Yes	11.8	No	40	Yes
R38	609535.4	4929477.4	16.9	No	45/40	Yes	11.2	No	40	Yes
R39	609463.4	4929466.4	16.8	No	45/40	Yes	10.8	No	40	Yes
R40	609495.4	4929408.4	17.5	No	45/40	Yes	11.5	No	40	Yes
R41	609492.4	4929395.4	17.6	No	45/40	Yes	11.5	No	40	Yes
R42	609526.4	4929360.4	18.1	No	45/40	Yes	12.1	No	40	Yes
R43	609528.4	4929341.4	18.3	No	45/40	Yes	12.2	No	40	Yes
R44	609541.4	4929332.4	18.5	No	45/40	Yes	12.4	No	40	Yes
R45	609572.4	4929299.4	19	No	45/40	Yes	12.9	No	40	Yes

Table 4: Acoustic Assessment Summary Table
SunE Oro 4 Line Solar Farm, Ontario

Point of	Coordinates		Daytime Sound Level	Verified by	Performance	Compliance with	Nithtime Sound Level	Verified by	Performance	Compliance with
Reception	(height 4.5 m)		at Point of	Acoustic	Limit	Performance	at Point of	Acoustic	Limit	Performance
ID	X	Y	Reception	Audit	(Leq)	Limit	Reception	Audit	(Leq)	Limit
	(m)	(m)	(Leq, dBA)	(Yes/No)	(dBA)	(Yes/No)	(Leq, dBA)	(Yes/No)	(dBA)	(Yes/No)
R46	609560.4	4929289.4	19	No	45/40	Yes	12.9	No	40	Yes
R47	609544.4	4929289.4	18.8	No	45/40	Yes	12.8	No	40	Yes
R48	609520.4	4929261.4	18.9	No	45/40	Yes	12.8	No	40	Yes
R49	609487.4	4929246.4	18.7	No	45/40	Yes	12.7	No	40	Yes
R50	609460.4	4929242.4	18.5	No	45/40	Yes	12.5	No	40	Yes
R51	609368.4	4929191.4	18	No	45/40	Yes	12.2	No	40	Yes
R52	609356.4	4929196.4	17.7	No	45/40	Yes	12	No	40	Yes
R53	609335.4	4929198.4	17.4	No	45/40	Yes	11.8	No	40	Yes
R54	609362.4	4929152.4	18.2	No	45/40	Yes	12.5	No	40	Yes
R55	610576.4	4927494.3	18	No	45/40	Yes	15.3	No	40	Yes
R56	610541.4	4927434.3	17.5	No	45/40	Yes	14.8	No	40	Yes
R57	611218.4	4929158.4	18.2	No	45/40	Yes	12.1	No	40	Yes
R58	611288.4	4929128.4	17.8	No	45/40	Yes	11.9	No	40	Yes
R59	611234.4	4929093.4	18.5	No	45/40	Yes	12.4	No	40	Yes
R60	611246.4	4929060.4	18.5	No	45/40	Yes	12.6	No	40	Yes
R61	611524.5	4928486.4	16.7	No	45/40	Yes	11.2	No	40	Yes
R62	610452.4	4929776.4	14.9	No	45/40	Yes	9.9	No	40	Yes
R63	610430.4	4929775.4	15.1	No	45/40	Yes	9.9	No	40	Yes
R64	610285.4	4928265.4	34.5	No	45/40	Yes	33.6	No	40	Yes
R65	610247.4	4928326.4	38.2	No	45/40	Yes	37.5	No	40	Yes
R66	610411.4	4928072.4	26.9	No	45/40	Yes	25.2	No	40	Yes
R67	610400.4	4928043.4	26.5	No	45/40	Yes	24.6	No	40	Yes
R68	610425.4	4928026.4	26	No	45/40	Yes	24	No	40	Yes
R69	610447.4	4928070.4	26.7	No	45/40	Yes	24.8	No	40	Yes
R70	610466.4	4927974.4	24.8	No	45/40	Yes	22.7	No	40	Yes
R71	610412.4	4927710.4	20.9	No	45/40	Yes	18.5	No	40	Yes
R72	610243.4	4928140.4	29.4	No	45/40	Yes	27.8	No	40	Yes
R73	610629.6	4927671.0	19.7	No	45/40	Yes	17.1	No	40	Yes
R74	610576.0	4927473.1	17.8	No	45/40	Yes	15.1	No	40	Yes
R75	610548.6	4927433.2	17.5	No	45/40	Yes	14.8	No	40	Yes
R76	610635.8	4927664.9	19.6	No	45/40	Yes	17	No	40	Yes
R77	610432.6	4928015.1	25.7	No	45/40	Yes	23.7	No	40	Yes
R78	610523.2	4928230.2	28.3	No	45/40	Yes	26.1	No	40	Yes
R79	610242.4	4928132.7	29.1	No	45/40	Yes	27.5	No	40	Yes
R80	610292.4	4928261.2	34.3	No	45/40	Yes	33.3	No	40	Yes
R81	609731.5	4928999.1	23.7	No	45/40	Yes	17.3	No	40	Yes
R82	609714.6	4929042.4	23	No	45/40	Yes	16.6	No	40	Yes
R83	609702.2	4929049.6	22.7	No	45/40	Yes	16.4	No	40	Yes
R84	609658.6	4929101.1	21.7	No	45/40	Yes	15.4	No	40	Yes
R85	610022.3	4929558.0	17.5	No	45/40	Yes	12.4	No	40	Yes
R86	610078.6	4929595.6	17.7	No	45/40	Yes	12.5	No	40	Yes
R87	610243.5	4929714.0	16.3	No	45/40	Yes	11	No	40	Yes
R88	610423.1	4929777.0	15	No	45/40	Yes	9.9	No	40	Yes
R89	610459.3	4929763.5	15.1	No	45/40	Yes	10	No	40	Yes
R90	610868.0	4929779.3	16	No	45/40	Yes	9.7	No	40	Yes
R91	611204.4	4929150.3	18.3	No	45/40	Yes	12.2	No	40	Yes
R92	611431.4	4928896.5	15.3	No	45/40	Yes	10.7	No	40	Yes
R93	611517.6	4928481.3	16.8	No	45/40	Yes	11.3	No	40	Yes
R94	610098.0	4928376.0	34.1	No	45/40	Yes	31.5	No	40	Yes

Appendix A

Site Location Map



Legend

- Transformer
- Inverter
- Substation
- Noise Receptor
- Road
- Watercourse
- Waterbody
- Lot
- Property Area
- Project Location

Hourly Sound Exposure

- 15 - 20 dBA
- 20 - 25 dBA
- 25 - 30 dBA
- 30 - 35 dBA
- 35 - 40 dBA
- 40 - 45 dBA
- 45 - 50 dBA
- 50 - 55 dBA
- 55 - 60 dBA
- 60 - 65 dBA
- 65 - 70 dBA

SunEdison simplifying solar | GENIVAR

Scale:
0 100 200 300 400 500 m
1:15,000

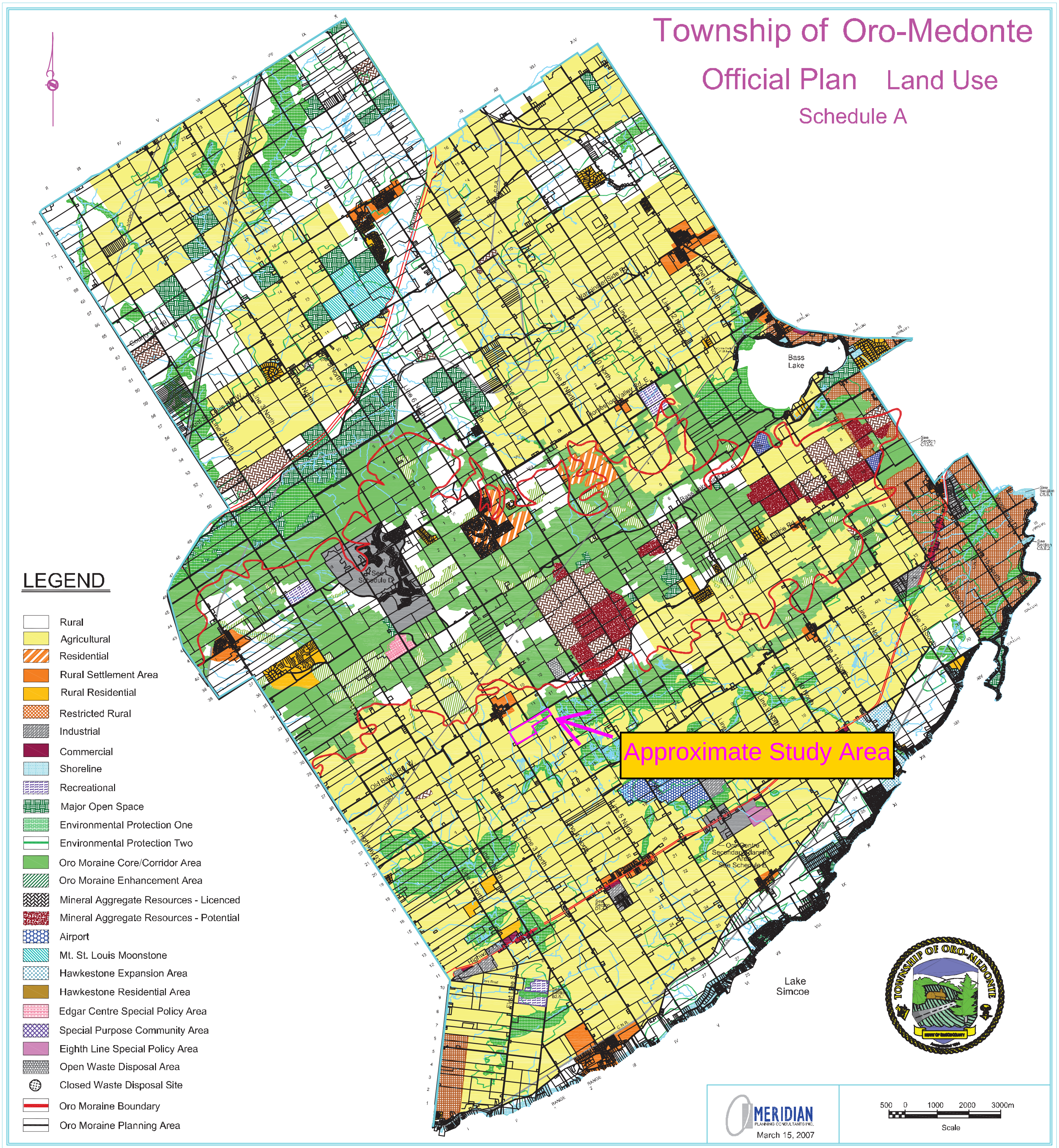
Project:
Oro 4 Line Solar Farm

Title:
Noise Analysis

Project No.:	Date:
101-17803-01	November 13, 2012

Appendix B

Zoning / Land-Use Information



Township of Oro-Medonte
Official Plan Land Use
Schedule A
Approximate Study Area
LEGEND
Rural
Agricultural
Residential
Rural Settlement Area
Rural Residential
Restricted Rural
Industrial
Commercial
Shoreline
Recreational
Major Open Space
Environmental Protection One
Environmental Protection Two
Oro Moraine Core/Corridor Area
Oro Moraine Enhancement Area
Mineral Aggregate Resources - Licenced
Mineral Aggregate Resources - Potential
Airport
Mt. St. Louis Moonstone
Hawkestone Expansion Area
Hawkestone Residential Area
Edgar Centre Special Policy Area
Special Purpose Community Area
Eighth Line Special Policy Area
Open Waste Disposal Area
Closed Waste Disposal Site
Oro Moraine Boundary
Oro Moraine Planning Area
Bass Lake
Lake Simcoe
See Schedule D
Oro Centre Secondary Planning Area See Schedule E
MERIDIAN PLANNING CONSULTANTS INC.
March 15, 2007
500 0 1000 2000 3000m
Scale
TOWNSHIP OF ORO-MEDONTE

Appendix C

Solaron 500 kW Inverter Datasheets

ADVANCED ENERGY®

PVPowered™ solaron® siteguard®

Solaron 500 HE PV Inverter

500 kW PV inverter with record breaking high efficiency has the industry's best LCOE for utility-scale, grid-tied photovoltaic installations

With the best in power-class 98% CEC efficiency rating, Advanced Energy s Solaron 500 HE inverter generates more value for project developers, owners and financiers, and drives the industry s best levelized cost of energy (LCOE). The stable, high-voltage, transformerless engine inside this robust, 500 kW inverter allows many units to be wired in parallel into a single medium voltage transformer making it ideal for utility-scale PV installations. With true 98% average efficiency without carve-outs for auxiliary power or other adjustments, the Solaron 500 HE enables higher, faster PV system ROI and better balance of system (BoS) optimization. An optional Remote PV Tie (RPT) accessory can further reduce BoS costs. AE s SiteGuard solutions simplify operation and maintenance (O&M) on the entire PV site.

Achieve best LCOE with highest efficiency and lower BoS and O&M Costs

The Solaron 500 HE PV inverter is ideally suited for utility-scale or large commercial PV installations. Higher power and industry-leading 98% CEC efficiency leads to additional kilowatt-hours of energy produced, resulting in more cash and RECs generated from a solar PV system. By improving peak energy efficiency to 98.7% and weighted efficiency to 98%, which is one to three percentage points higher than comparable commercial and utility-scale solar PV inverters, Advanced Energy's Solaron 500 HE inverter can generate more value for project developers, owners and financiers, and drive an industry-best levelized cost of energy (LCOE)

Benefits

Achieve the lowest levelized cost of energy (LCOE)

Increase higher energy harvests

Reduce balance-of-system (BoS) costs

Rely on worldwide service and support

Monitor and control with flexible, integrated communications

Features

98% CEC Efficiency highest in its power class

500 kW, transformerless, bipolar design

Largest core engine in its class with the industry s smallest footprint and lightest weight per kW

Integrated IDS data monitoring and communications

Grid integration controls

Remote PV Tie (RPT) accessory

Three decades of experience in solar PV industry

24/7/365 global service and support

PV Powered and Solaron products built in the U.S. are fully compliant with the Buy American Act and qualify for projects funded by the federal stimulus package.

Cut PV System Wiring Costs with Optional Remote PV Tie (RPT™) Accessory

The AE Solaron Remote PV Tie (RPT™) accessory can further reduce BoS installation costs and achieve even higher system efficiency. The RPT accessory reduces large-diameter copper cables as well as I^2R losses for up to 4% more power output during operation. The RPT also offers flexibility in system design and inverter installation for large, utility-scale solar farms.

Rely on AE Worldwide Service and Support

The Solaron inverter is durable, robust, and reliable for ongoing, low-maintenance operation. If needed, AE's worldwide service organization is available 24/7/365 for support. Extended warranties (up to 20 years) and SiteGuard service programs to help you maximize uptime and power generation are also available. Highly trained specialists can perform routine system queries, remote testing and diagnostics, and annual on-site inspections, all at a nominal cost.

Monitor and Control Your System

A secure, integrated LCD and keypad provide unit operating data and interconnection set points on the front of the inverter cabinet. In addition, the on-board Integrated Data System (IDS™) software—included at no additional charge—provides Internet connectivity and collects and stores a wide range of real-time data, including detailed unit configuration monitoring and control information.

Connect to any Solaron inverter with your web browser to view a suite of built-in graphical representations of minute-by-minute temperature, current, and voltage data—or gather data in Modbus or CSV format to configure your own custom data and analysis reports.

IDS software also provides connectivity to many third-party data services like SEEDS™, Draker Labs, and DECK Monitoring.

Solaron 500 kW Summary Specifications

Physical	
Dimensions	211 cm (H) x 227 cm (W) 102 cm (D)
	83.1 (H) x 89.5 (W) x 40.1 (D)
	Dimensions include cabinet handles and connection box.
Weight	3760 lb (1705.5 kg) unit weight
	4100 lb (1859.7 kg) shipping weight
Enclosure	Outdoor ready cabinet design: Environmental base coating, Electrostatically applied paint, Sturdy corrosion resistance steel construction, Full lift-rated eye bolts
Environmental Rating	NEMA3R
	NEMA 4 (electronics)
Connector and Cable Specifications	
Output Power Connectors	4 x 500 MCM wires (Cu or Al)
Input Power Connectors	4 x 500 MCM wires (Cu or Al)
User Display	Front panel LCD and keypad; security lock-outs; emergency shutdown button
Electrical	
Output Power	
Max Power	500 kW at 480 VAC
Voltage Range	432 to 528 VAC, 3 Φ, 60 Hz, grounded Wye connection
Frequency	60 Hz
Line Power Factor	> 0.99 typical
AC Current Distortion/THD	< 2% typical; <4% max
AC Line Current	600 A typical
	667 A max at 86°F (30°C) and low-line voltage; can be limited with field-adjustable settings
	630 A max at 122°F (50°C)
Peak Efficiency	98.7%
CEC Efficiency	98%
Input Power	
Array Configuration	Separable bipolar using standard PV modules
Voltage	± 330 to ± 600 VDC
MPP DC Current	750 ADC max
Open-Circuit Wake-Up Voltage	± 425 VDC default (configurable)
Standby Tare Losses	< 100 W
MPPT Window	± 330 to ± 550 VDC
Reactive Power Range	± 165kVAR max
Utility Power Capabilities	
Active Power Range	0 kW to 500 kW; remotely adjustable set point
Reactive Power Range	Set point options: Static kVAR, Static Power Factor
	± 165 kVAR max, ± 0.95 max, other ratios adjustable with kW and kVAR set points
Over-Voltage Response	110% ≤ VAC < 120%: 0.16 to 5.0 sec adjustable
Ramp Rate (on)	100kW/s maximum; adjustable
Inverter On/Off	Remotely controllable
Frequency Tolerance	f ≥ 60.5 Hz: adjustable; instantaneous (< 10 cycles)
	f ≤ 59.3 Hz: adjustable; trip delay 0.16 to 540 sec
	f ≤ 57.0 Hz: adjustable; instantaneous (< 10 cycles)
Factory-Installed Communication Interfaces	RS-232, RS-422, and RS-485
	Ethernet, PCMCIA expansion slot
	Modbus/TCP and Modbus/RTU
Data Storage	10 years / 2 GB SD card (upgradeable)
Data Monitoring	AE / SEEDS data monitoring (optional); IDS™ compatible with various 3rd party services
Environmental	
Ambient Operating Temperature	-4°F to 122°F (-20°C to 50°C)
	-31°F to 122° (-35°C to 50°C) Cold weather option
Storage Temperature	-22°F to 158°F (-30°C to 70°C)
Relative Operating Humidity	0% to 95% non-condensing
Atmospheric Pressure	778 to 1060 mbar (78 to 106 kPa)
Elevation	6562' (2000 m) max
Cooling Systems	Combination air and liquid cooling (self-contained system)
Regulatory	
Directives and Standards	NRTL certified to UL 1741-2005 by CSA International
	IEEE 519, 929, 1547/1547.1
	NEC Article 690 (compatible)
	CEC eligible – 98%

Specifications are subject to change without notice.

ADVANCED ENERGY®

Advanced Energy Industries, Inc. • 20720 Brinson Blvd. PO Box 7348 • Bend, OR 97708 U.S.A.
T: 877.312.3832 • sales.support@aei.com • *www.advanced-energy.com/renewables*
Please see www.advanced-energy.com for worldwide contact information.

ENG-Solaron500HE-250-01 0M 5/11

Appendix D

Inverter Sound Level Testing

VACC, INC. DBA
VIBRO-ACOUSTIC CONSULTANTS

490 POST STREET • SUITE • 427
SAN FRANCISCO • CA • 94• 02 • USA
TEL / FAX: (+•) 4• 5-693-0424 / • 398
http://www.va-consult.com

Inverter Sound Power Level Testing

Advanced Energy Industries, Fort Collins, CO

Prepared by: **Tyler Rynberg, PE**

Vibro-Acoustic Consultants

tyler@va-consult.com

Date: **14 April 2010**

Table of Contents

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1. Background

Advanced Energy Industries (AEI) wishes to document the sound power levels generated by the Solaron 500, a 500 kW inverter. AEI has requested that the testing of the fuel cell be performed per the ISO 3744•1994 Standard. We visited the AEI facility on Thursday, 1 April 2010, to perform the testing.

Since sound power is a property of the source being tested (rather than the cumulative result of multiple sources interacting with the environment), these data are applicable to many different installation conditions. In this document, we report the measured sound power levels and sound pressure levels and provide commentary on how we would insert this source into computer•based noise propagation models.

2. Description of Inverter

The device under test was designated as Solaron 500 model number 3159500•0000 A1 (with 3R enclosure), a 500 kW inverter, manufactured by AEI in March 2010. The inverter had a serial number of 750385 F/R A1. The inverter was 1.83m wide x 0.97m deep x 2m high.

The inverter was mounted on a rigid wood platform constructed using 2x4 studs and rigid foam. The platform raised the inverter 0.2m off the floor. The reference box established for the inverter had the following dimensions: L1 = 1.83m, L2 = 0.97m, L3 = 2.21m.

The inverter was supplied DC input voltage by power generation equipment located in an adjacent room.

3. General Methodology

We measured the sound pressure levels generated by the inverter per the ISO 3744•1994 Standard. During the measurements, we collected the overall un•weighted equivalent continuous sound level (L_{EQ}), as well as the un•weighted 1/3•octave band spectra from both the inverter and ambient conditions. The measurement duration at each microphone position was 60 seconds.

To measure the inverter, we established a parallelepiped measurement surface 1 meter from the reference box. The resultant measurement surface had the following dimensions: L1 = 3.83m, L2 = 2.97m, L3 = 3.21m, and totaled 55.01 square meters. We used 9 microphone positions, per Figure C2 of the ISO 3744•1994 Standard. For all 9 positions, the fixed microphone position technique was used.

We tested four operating configurations of the inverter. As an exploratory test, we also measured a fifth configuration at only one microphone position. The tested configurations are shown in the following table:

Configuration	Input Voltage	Output Power	Blower Setting
1	790V	100% (500kW)	Maximum
2	850V	100% (500kW)	Maximum
3	730~745V[1]	100% (500kW)	Maximum
4	790V	50% (250kW)	Maximum
5	850V	50% (250kW)	Maximum

[1]During this measurement, the voltage regulator was not operating properly. The input voltage was observed to oscillate between 730V and 745V.

We understand from our discussions with AEI personnel that the operating conditions tested are representative of a real•world installation.

4. Data Collection

4.1 Measurement System Parameters

We measured the sound power levels using our standard testing suite:

Instrument	Make / Model	Identification
Microphone Calibrator	Bruel & Kjaer 4231	S/N 2292439
Noise Meter	Norsonic N-140	S/N 1403581
Microphone Preamplifier	Norsonic N-1209	S/N 12749
Microphone	Norsonic N-1225	S/N 96063

The noise meter was calibrated to 94 dB at 1 kHz before and after the measurements. The microphone windscreen was used. The Norsonic N•140 has an internal correction filter to correct for the effects of the windscreen.

4.2 Measurement Locations and Site Conditions

We collected data in the Solaron testing lab adjacent to the main fabrication area at the AEI facility in Fort Collins, CO. The testing lab measured approximately 13.41m x 19.51m x 3.35m. The floor is an exposed concrete slab; three of the walls are constructed using vinyl•faced gypsum board on stud•framing; the remaining wall was open to the main fabrication area; the ceiling is a suspended grid containing vinyl•faced gypsum board panels. The testing area contains several workstations and other inverters. The inverter was placed near the center of the testing lab space, at least 5.5m from any of the lab walls. No workstations or other inverters were located within 4m of the inverter. However, the top of the inverter was only 1.14m below the suspended gypsum board ceiling. In an effort to reduce the effects of the ceiling on the measurements, several ceiling tiles above the inverter were removed. This roof deck is approximately 2.8m above the suspended ceiling, providing a vertical clearance of 3.9m.

The temperature in the fabrication area was estimated to be 22°C. The relative humidity was typical of an indoor air•conditioned environment.

4.3 Qualification of Acoustical Environment

Ambient Noise Correction Factor K_1

In the majority of 1/3 octave bands, the ambient noise levels were greater than 6 dB below the test conditions. In the 50~80Hz, 630Hz, and 2~6.3kHz 1/3 octave bands, the ambient noise was frequently only 1~4 dB below the test conditions. Generally, the "middle" four measurement positions had a greater signal•to•noise ratio than the "top" five positions.

Acoustical Correction Factor K_2

The reflecting plane extended a minimum of 4.5m from the measurement surface in all directions, which meets the ISO•3744 Standard for the 50 Hz lower boundary of the presented data. The reflecting plane was concrete slab•on•grade and was estimated to have an absorption coefficient of 0.05 or less in the frequency bands of interest.

The Approximate Method was used to determine the environmental correction factor, K_2. Our calculations show that the highest value for K_2 is 9.6 dB and occurs in the 500Hz octave band. The environment does not meet the ISO•3744 Standard requirement of $K_2 < 2$ dB. The following table presents the calculated octave band K_2 values:

Calculated K_2	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
	5.2 dB	4.6 dB	6.8 dB	9.6 dB	9.3 dB	8.6 dB	7.1 dB	6.2 dB

While the values for K_2 exceed the ISO Standard in all octave bands, the Standard allows for compliance by using a maximum correction factor of 2 dB. Values for which the correction factor is limited to 2 dB therefore represent a "worst•case" or upper boundary for the actual performance of the device under test.

4.4 Data Presentation

Data are presented in Tables 1~7. For each configuration, we present the overall A•weighted (LwA) and the un•weighted 1/3 octave band sound power levels in decibels referenced to $1x10^{-12}$ W. We also present the overall A•weighted (dBA) and the un•weighted 1/3 octave band sound pressure levels in decibels referenced to 20 µPa for each configuration.

5. Discussion

Non•Compliance Sound Pressure Levels

The noise generated in the 50~80Hz, 630Hz, and 2~6.3kHz 1/3 octave bands do not exceed the ambient conditions by the minimum 6 dB required by the ISO•3744 Standard. The published levels in these bands should be considered to be the upper boundary of the exact level – the true level is likely to be lower in level than the calculated values. The overall sound power level, LwA, does meet the requirements of the ISO•3744 Standard, in terms of ambient noise. However, the acoustical environment does not meet the ISO•3744 Standard in any of the 1/3 octave bands. Therefore, the published levels in all of the bands, including the overall LwA, should be considered as the upper boundary of the actual level.

Configurations

There was no significant difference in sound power level between the configurations. The only statistically important variation was the amplitude of a 9kHz tone, which was highest with Configuration 2. This tone could be a sub•harmonic of the switching circuitry, which runs at 18kHz.

Noise Modeling

In all of the configurations tested, the relatively broadband noise from the blower dominated the noise character. There is also significant tonality at the 160 Hz band from the blower. The directionality in the noise generation appears to be modest, with all four sides fitting within a 2 dB window. The relatively uniform directivity is due to the presence of air inlets or outlets on all four sides as well as at the bottom of the inverter. As there are no openings in the top of the inverter, the levels at the top typically measured 7 dB lower than the sides of the unit.

With the configurations tested, we would model the unit as a box with uniform directivity at an elevation of approximately 1m.

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Please feel free to call if you have any questions; we may be reached in our San Francisco office by telephone at (+1) 415•693•0424 or via email at tyler@va consult.com.

Sincerely,

Tyler Rynberg, PE

Vibro Acoustic Consultants

Table 1: AEI Solaron 500 Sound Power Measurements – Calculated Sound Power Levels in dB, re: $1x10^{-12}$ W

Configuration	LwA	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz
1	83.5	77.5	81.0	77.0	80.0	84.0	87.5	79.0	75.5	77.0	76.0	77.5	73.0	74.0	74.0	71.0	70.0	68.0	65.0	64.5	64.5	63.0	58.5	67.5	66.5
2	84.0	77.5	80.5	77.0	80.0	84.0	87.5	78.5	75.5	76.5	76.0	78.0	73.5	74.0	74.0	71.0	70.0	68.0	66.0	66.0	65.5	65.0	62.5	72.0	72.0
3	83.5	77.0	80.5	76.5	80.0	83.5	87.5	78.5	75.5	76.5	77.5	78.0	73.5	74.5	74.0	71.5	72.0	69.5	66.5	65.5	64.5	63.0	58.0	63.0	61.5
4	83.0	77.0	77.0	76.5	80.0	83.5	87.5	78.5	73.5	76.5	76.0	77.5	73.5	74.0	74.0	71.0	70.0	67.5	65.0	64.5	64.5	63.0	58.0	61.5	61.5

*The testing environment did not meet the requirements in the ISO-3744 Standard. The presented data in all 1/3 octave bands should be considered as the upper boundary of the exact sound power levels.

Table 2: AEI Solaron 500 Configuration 1 – Measured Sound Pressure Level at 1m in dB, re: 20μPa

Mic Position	dBA	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz
Front	67.7	61.0	69.0	61.0	63.9	68.4	75.2	61.7	57.2	59.5	58.5	59.7	55.9	58.1	57.7	56.1	54.5	51.3	49.5	49.5	48.9	48.1	43.6	52.2	51.1
Left	66.1	59.0	61.1	61.9	65.0	67.4	66.0	59.1	61.0	60.4	61.5	61.9	57.3	56.7	56.4	53.2	52.5	50.3	47.9	46.6	45.8	42.8	39.3	49.3	48.5
Rear	67.8	61.0	65.5	60.1	62.4	65.9	68.3	64.4	59.9	59.4	59.3	59.9	57.3	58.9	60.1	56.3	55.4	52.2	50.7	49.5	49.6	48.7	44.0	54.3	54.7
Right	67.7	58.2	65.6	57.1	63.1	68.7	75.0	66.6	58.9	63.5	58.2	60.8	57.0	56.7	57.1	54.1	52.6	50.2	47.5	46.9	46.9	47.0	41.5	51.9	51.3
Front Top	64.3	60.6	59.4	59.2	61.2	66.7	67.9	56.7	56.2	56.9	57.7	59.5	54.3	55.3	54.5	51.9	51.2	49.3	46.7	45.8	45.5	43.0	39.1	48.2	43.7
Left Top	63.9	60.7	60.6	59.6	59.8	63.0	62.6	55.7	54.2	58.3	56.9	59.7	55.2	55.8	55.0	52.3	50.4	49.3	46.2	45.1	45.0	42.5	38.0	46.7	42.9
Rear Top	64.8	59.5	60.1	57.4	62.5	65.8	62.5	55.8	56.8	58.9	59.3	60.7	55.9	55.1	56.5	52.7	52.2	50.7	46.6	45.9	46.8	45.1	39.7	47.2	43.3
Right Top	64.9	59.8	60.3	56.9	63.4	67.5	67.5	59.4	54.3	56.8	56.3	60.1	55.0	55.4	56.1	52.7	52.7	51.0	47.9	47.2	47.0	46.1	40.9	45.5	43.8
Top	62.3	60.6	59.6	58.3	60.9	64.3	67.7	59.1	57.5	55.8	56.6	56.4	52.5	52.3	52.3	49.9	48.4	49.5	44.4	43.3	46.3	42.7	35.8	41.3	38.5

*The testing environment did not meet the requirements in the ISO-3744 Standard. The presented data in all 1/3 octave bands should be considered as the upper boundary of the exact sound power levels.

Table 3: AEI Solaron 500 Configuration 2 – Measured Sound Pressure Level at 1m in dB, re: 20µPa

Mic Position	dBA	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz
Front	68.3	60.9	67.3	61.5	64.2	68.2	74.7	61.9	57.4	59.1	58.8	61.4	56.7	58.7	57.8	55.8	54.8	51.6	50.7	50.6	49.8	49.4	47.5	57.4	57.6
Left	66.7	58.7	61.1	62.0	65.0	67.5	65.7	58.8	62.6	59.5	62.1	62.1	56.9	57.3	56.7	53.3	52.3	50.3	48.9	48.4	47.4	45.4	44.6	53.9	48.5
Rear	68.1	61.0	65.1	60.2	62.3	64.7	67.4	63.1	58.2	59.0	59.8	60.1	57.7	59.1	59.9	55.9	55.2	52.1	51.3	51.1	50.3	50.6	48.4	57.1	59.5
Right	68.1	58.3	65.5	57.0	63.0	68.5	74.6	66.5	59.6	63.3	58.2	61.0	56.9	56.6	56.8	54.0	52.6	50.3	49.1	49.2	48.3	48.9	46.6	56.9	57.1
Front Top	64.7	60.8	59.2	58.8	61.2	67.0	68.4	56.6	55.7	56.6	57.7	59.9	53.9	55.4	55.0	52.6	51.3	49.6	47.7	47.4	46.2	44.9	43.0	51.8	49.3
Left Top	64.6	59.9	60.7	59.3	58.8	62.2	65.7	57.4	56.0	57.2	57.4	60.6	56.5	54.7	54.7	52.4	50.4	49.5	47.1	47.5	47.0	45.8	43.3	53.0	50.3
Rear Top	65.1	60.2	59.9	57.2	61.8	65.4	62.0	56.9	56.6	59.2	59.2	60.1	56.1	56.1	55.5	52.9	52.4	50.5	48.0	47.6	47.8	46.8	42.9	50.2	49.8
Right Top	65.1	59.5	59.7	56.8	63.7	67.1	68.1	60.1	54.2	57.3	56.3	59.9	55.2	55.5	55.5	52.7	52.9	50.4	48.5	48.4	47.5	47.3	44.2	51.4	49.2
Top	62.5	60.1	58.8	58.2	61.3	63.9	67.6	59.0	56.3	56.2	56.6	57.0	52.5	51.9	52.5	50.3	48.8	49.3	45.1	44.3	46.4	43.5	38.8	48.2	44.7

*The testing environment did not meet the requirements in the ISO-3744 Standard. The presented data in all 1/3 octave bands should be considered as the upper boundary of the exact sound power levels.

Table 4: AEI Solaron 500 Configuration 3 – Measured Sound Pressure Level at 1m in dB, re: 20µPa

Mic Position	dBA	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz
Front	68.0	60.8	67.6	61.4	64.0	68.3	74.8	62.0	57.2	58.7	58.4	60.9	57.0	58.7	58.1	56.2	57.5	52.4	50.9	50.2	48.9	47.6	43.0	48.6	46.1
Left	67.0	58.5	61.2	61.6	64.7	67.1	66.3	59.0	62.3	60.7	63.9	63.5	56.6	56.5	56.7	53.7	54.8	52.5	49.3	47.6	45.8	42.8	38.7	45.2	43.7
Rear	67.9	61.2	65.8	60.2	62.3	64.4	67.4	63.1	58.7	58.6	60.0	60.4	58.0	60.2	59.9	56.4	56.2	55.3	51.3	50.6	49.5	49.0	43.8	49.4	49.0
Right	67.3	58.6	66.1	57.5	62.3	68.2	74.1	66.2	59.6	62.8	58.7	59.5	57.1	57.1	57.0	54.1	53.7	51.5	50.1	48.4	46.9	47.0	41.5	48.0	47.0
Front Top	65.1	60.2	58.7	59.0	61.5	67.3	68.5	56.6	55.8	57.7	59.4	59.9	55.0	55.5	55.1	53.9	53.6	50.9	48.2	46.5	45.3	43.1	38.2	42.9	39.7
Left Top	64.8	59.7	60.3	58.9	58.1	61.9	65.4	58.0	55.6	58.1	58.5	59.8	55.3	55.9	55.2	53.3	55.4	51.0	47.3	46.1	45.6	42.9	37.5	42.6	39.6
Rear Top	65.5	58.5	58.9	55.3	61.3	64.2	61.1	55.3	58.4	59.0	60.0	61.5	56.6	56.8	56.5	53.3	54.1	51.8	48.3	46.5	47.2	45.5	39.3	42.5	39.3
Right Top	65.6	59.0	60.4	56.6	63.1	66.4	67.6	58.9	52.9	58.4	58.9	61.2	55.2	56.1	56.2	54.3	54.3	52.1	48.8	47.5	47.0	46.1	40.9	43.2	40.1
Top	62.7	59.5	58.5	57.7	61.3	64.6	67.6	58.8	56.1	56.3	56.8	57.2	53.2	52.5	53.1	50.3	49.7	50.1	45.1	43.7	45.7	42.4	35.0	37.1	33.7

*The testing environment did not meet the requirements in the ISO-3744 Standard. The presented data in all 1/3 octave bands should be considered as the upper boundary of the exact sound power levels.

Table 5: AEI Solaron 500 Configuration 4 – Measured Sound Pressure Level at 1m in dB, re: 20µPa

Mic Position	dBA	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz
Front	67.5	59.6	62.3	61.0	64.0	68.2	75.2	61.9	55.6	58.9	58.2	60.3	56.0	58.0	57.9	55.8	54.7	51.2	49.1	49.2	49.1	47.8	43.1	46.9	47.5
Left	65.6	57.9	59.9	61.9	64.9	67.1	66.3	58.2	56.8	59.4	61.2	61.3	56.9	56.7	56.1	53.2	52.5	50.2	47.5	46.4	45.8	42.4	38.7	45.5	43.8
Rear	67.0	60.3	61.2	60.0	62.0	64.4	67.6	63.8	59.3	58.2	59.1	59.8	56.8	58.8	59.7	55.9	55.0	51.6	50.1	49.4	49.4	48.5	43.5	47.2	48.8
Right	66.8	56.4	59.8	56.6	62.2	67.6	73.8	65.8	57.7	63.7	58.8	58.8	57.1	56.1	57.0	53.8	52.3	49.7	46.7	46.9	46.8	46.6	41.1	46.3	46.2
Front Top	64.1	60.8	58.7	58.7	61.1	65.5	68.1	56.0	54.7	57.0	57.8	59.5	54.8	56.1	54.7	51.8	50.2	49.1	46.1	45.7	45.3	42.7	37.8	41.4	39.5
Left Top	64.0	59.2	58.6	59.1	58.3	62.1	65.6	57.9	55.7	57.6	57.3	60.1	55.5	55.6	54.7	52.1	50.8	49.0	45.7	45.1	45.7	42.9	37.6	42.7	40.0
Rear Top	64.8	59.8	59.0	58.0	63.1	65.3	63.4	56.7	54.3	57.2	58.1	60.8	56.1	55.5	56.8	53.9	51.8	50.2	46.6	45.7	47.0	46.0	39.4	40.5	38.9
Right Top	65.0	59.8	57.9	57.6	64.4	67.4	68.1	60.3	53.4	57.2	55.4	59.9	57.1	55.6	55.9	54.2	52.9	50.2	47.6	47.0	46.8	46.1	40.5	41.7	40.9
Top	62.3	60.3	58.4	58.4	61.1	63.0	67.1	58.7	53.3	56.1	56.8	57.5	53.0	52.8	53.0	49.6	47.6	49.5	44.2	43.0	45.9	42.3	34.9	35.3	34.3

*The testing environment did not meet the requirements in the ISO-3744 Standard. The presented data in all 1/3 octave bands should be considered as the upper boundary of the exact sound power levels.

Table 6: AEI Solaron 500 Configuration 5 – Measured Sound Pressure Level at 1m in dB, re: 20µPa

Mic Position	dBA	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz
Front	67.4	60.5	63.3	61.3	63.9	68.1	74.6	61.9	56.2	58.9	58.5	61.2	56.1	58.2	57.4	55.8	54.8	51.5	49.2	48.8	48.6	47.5	42.6	45.6	45.3

*The testing environment did not meet the requirements in the ISO-3744 Standard. The presented data in all 1/3 octave bands should be considered as the upper boundary of the exact sound power levels.

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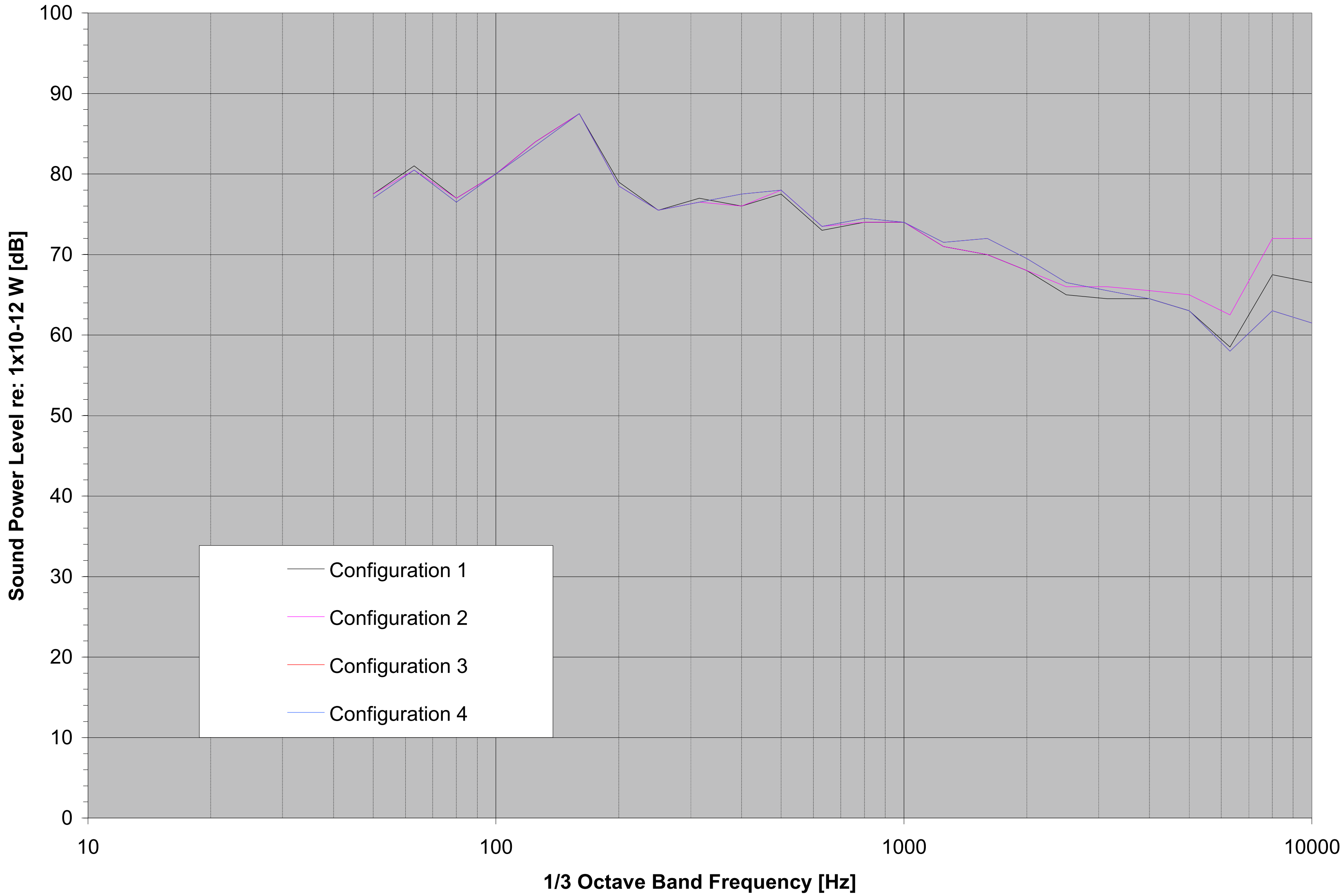
Table 7: AEI Solaron 500 – 1/3 Octave Band Sound Power Levels in dB, re: $1x10^{-12}$ W



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Preliminary Sound Level Measurements PV GEN II
Measuements are in dBA

Model		No Power		Full Power		Date	NOTES
		1 meter	3 meters	1 meter	3 meters		
30kw	Back	55		58.5	57	10/23/08	LOAD IN WAY
	Right Side	55.1		58.7		10/23/08	WATER NOISE
	Front	55.4		58.7	57.6	10/23/08	
	Left Side	55.2		59.5		10/23/08	LOAD IN WAY
50kw COASTAL	Back	55.7		62.5		10/23/08	LOAD IN WAY
	Right Side	55.1		62.6		10/23/08	EQUIPMENT IN WAY
	Front	54.1		67.2	61.6	10/23/08	
	Left Side	53.2		60.2		10/23/08	EQUIPMENT IN WAY
50kw	Back	53.9	52.9	62.4	60.9	10/24/08	
	Right Side	52.6	52	63.2	58.8	10/24/08	
	Front	52.7	52.2	67.6	63.3	10/24/08	
	Left Side	52.1	51.5	61.2	58.7	10/24/08	
75kw	Back	54.6	53	65.5	63.8	10/24/08	
	Right Side	55.8	52.8	66.5	61.9	10/24/08	
	Front	56.4	55.9	73.8	67.1	10/24/08	
	Left Side	56.2	55.9	65.4	63.3	10/24/08	
100kw	Back						use 75 kw
	Right Side						
	Front						
	Left Side						
135kw	Back	58.5		62.7		10/23/08	LOAD IN WAY WATER NOISE
	Right Side	58.6		62.4		10/23/08	WALL IN WAY WATER NOISE
	Front	56.5		63	60.4	10/23/08	
	Left Side	57.5		61	60.4	10/23/08	
250kw	Back						use 375 kw
	Right Side						
	Front						
	Left Side						
375kw	Front DC	53.7	52.4	70.1	65	10/24/08	
	Front IV	53.8	52.7	70	65.4	10/24/08	
	Front AC	53.4	52.6	69.5	65.8	10/24/08	
	Front TRO	53.5	52.9	68.3	65	10/24/08	
500kw	Back	61.1	63.8	72	71.5	10/21/08	
	Right Side	60	57.6	72.5	68.4	10/21/08	
	Front	58.2	56.9	68.7	68	10/21/08	
	Left Side	60.4	59.6	68	69.5	10/21/08	

Appendix E

Transformer Noise NEMA Ratings

10,000 kVA Transformer
Noise Data (10 MVA)

Table 8
Audible Sound Levels for Single- and Three-Phase Transformers and Autotransformers, Equivalent Two-Winding Rating, MV·A(1)

Average sound level, dB A-weighted	High voltage maximum operating kV								
	Up to 72.5			123 and 145			170 and 245		
	a	b	c	a	b	c	a	b	c
60	1.5								
61	2.0								
62	2.5								
63	3.0								
64	4.0								
65	5.0								
66	6.0								
67	7.5								
68	10	7.5							
69	12.5	9.4		7.5					
70	15	12.5		10	7.5		7.5		
71	20	16.7		12.5	9.4		10	7.5	
72	25	20	20.8	15	12.5		12.5	9.4	
73	30	26.7	25	20	16.7		15	12.5	
74	40	33.3	33.3	25	20	20.8	20	16.7	
75	50	40	41.7	30	26.7	25	25	20	20.8
76	60	53.3	50.	40	33.3	33.3	30	26.7	25
77	80	66.7	66.7	50	40	41.7	40	33.3	33.3
78	100	80	83.3	60	53.3	50	50	40	41.7
79	125	107	100	80	66.7	66.7	60	53.3	50
80	150	133	133	100	80	83.3	80	66.7	66.7
81	200	167	167	125	107	100	100	80	83.3
82	250	200	200	150	133	133	125	107	100
83	300	267	250	200	167	167	150	133	133
84	400	333	300	250	200	200	200	167	167
85	500	400	400	300	267	250	250	200	200
86	600	533	500	400	333	300	300	267	250
87		667	600	500	400	400	400	333	300
88		800	800	600	533	500	500	400	400
89			1000		667	600	600	533	500
90					800	800		667	600
91						1000		800	800
92									1000
93									
94									
95									

(Continued)

Table 8 (Concluded)

Average sound level, dB A-weighted	High voltage maximum operating kV								
	300			362			420 to 765		
	a	b	c	a	b	c	a	b	c
60									
61									
62									
63									
64									
65									
66									
67									
68									
69									
70									
71									
72									
73	12.5								
74	15			12.5					
75	20	16.7		15			12.5		
76	25	20	20.8	20	16.7		15		
77	30	26.7	25	25	20	20.8	20	16.7	
78	40	33.3	33.3	30	26.7	25	25	20	20.8
79	50	40	41.7	40	33.3	33.3	30	26.7	25
80	60	53.3	50	50	40	41.7	40	33.3	33.3
81	80	66.7	66.7	60	53.3	50	50	40	41.7
82	100	80	83.3	80	66.7	66.7	60	53.3	50
83	125	107	100	100	80	83.3	80	66.7	66.7
84	150	133	133	125	107	100	100	80	83.3
85	200	167	167	150	133	133	125	107	100
86	250	200	200	200	167	167	150	133	133
87	300	267	250	250	200	200	200	167	167
88	400	333	300	300	267	250	250	200	200
89	500	400	400	400	333	300	300	267	250
90	600	533	500	500	400	400	400	333	300
91		667	600	600	533	500	500	400	400
92		800	800		667	600	600	533	500
93			1000		800	800		667	600
94						1000		800	800
95									1000

Notes:

(1) The equivalent two-winding rating* is one half the sum of the rating of all windings using the principal tap. When a tertiary (stabilizing) winding is present, either with a known rating or "buried", add 17.5% (35% ÷ 2) or half the rating of the tertiary (whichever is larger) to the otherwise calculated equivalent rating of the transformer. For autotransformers use ((N-1) ÷ N) x rated power of the autotransformer for the autoconnected portion (N is the overall ratio of the autotransformer). For intermediate ratings, use the average sound level of the next highest rating.

(2) For ratings less than those shown in Table 8, use the dB A-weighted value for the lowest given rating.

(3) For cooling designations, see Clauses 6.5 and 6.6.

(4) Columns with heading

(a) "a" are applicable to cooling designations: ONAN; ONWF;

(b) "b" are applicable to cooling designations: ONAF; OFAF (first stage of auxiliary cooling); and

(c) "c" are applicable to cooling designations: ONAF; OFAF or ODAF (second stage of auxiliary cooling and single OFAF or ODAF ratings).

(5) For OFWF cooling, use Column "c" minus 1 dB A-weighted.

*The base rating is different from equivalent two-winding rating. Base rating is the equivalent ONAN rating only.

4.4 Loading capabilities

4.4.1
The loading capabilities of transformers shall be in accordance with ANSI/IEEE C57.91.

4.4.2
Leads, terminals, and switches shall not limit the loading capability.

4.5 Off-circuit voltage taps

4.5.1
Transformers without taps are the standard. Taps are included as an option in Clause 10(g).

4.5.2
High-voltage taps, unless otherwise specified, shall be ±2.5% and ±5% of the rated voltage.

4.5.3
When a transformer is connected on a tap below rated voltage, the kV•A capacity shall be reduced in direct proportion to the voltage of the tap. When a transformer is connected on a tap above rated voltage, the capacity shall be the rated kV•A of the transformer.

4.6 Insulation class and preferred voltages

4.6.1 Preferred high-voltage ratings and required BIL ratings
The preferred high-voltage ratings, required BIL ratings, and associated high-voltage terminal components shall be as specified in Table 2.

4.6.2 Preferred low-voltage ratings and required BIL ratings
The preferred low-voltage ratings and the required BIL ratings shall be as specified in Table 3.

4.7 Operating voltage range
Transformers shall be capable of operating continuously at rated kV•A at 10% above or 5% below rated voltage of the connected tap, but not necessarily within the specified performance limits.

4.8 Radio interference
Transformers shall be designed to operate without causing radio interference to exceed the limits set forth in Table 4 when tested in accordance with CAN3-C108.3.1.

4.9 Audible sound
Transformers shall be designed so that the audible sound level, when operated at rated voltage and measured in accordance with ANSI/IEEE C57.12.90, shall not exceed the sound levels specified in Table 5.

4.10 Short-circuit capabilities

4.10.1 General
Transformers shall be built to withstand the mechanical and thermal stresses caused by the short-circuit currents and their corresponding duration as shown in Table 6. Impedance values need not be limited to the minimum values implied by this table except as modified by Clause 4.10.2 when the impedance is over 4%.

Table 5
Audible sound levels
(See Clause 4.9.)

Transformer size, kV•A	Audible sound level, dBA
75	51
150 –300	55
500	56
750 –1000	58
1500	60
2000	61
2500	62
3000	63

Table 6
Short-circuit capability
(See Clauses 4.10.1 and 4.10.2.)

Transformer size, kV•A	Withstand capability per unit of base current (symmetrical)	Duration in cycles
75	40	48
150–300	35	60
500–3000	25	120

Table 7
Minimum transformer impedance
(See Clause 4.11.)

Transformer size, kV•A	Minimum transformer impedance, %
0–150	1.8
225 –300	2.0
500	3.0
750–1000	4.0
>1000	5.0

Table 7-28. Approximate overall PWL in dB of generators, excluding the noise of the driver unit.

Generator Speed, rpm	Overall Sound Power Level, dB Rating of Generator, MW							
	0.2	**0.5**	**1**	**2**	**5**	**10**	**20**	**50**
600	95	99	102	105	109	112	115	119
1200	97	101	104	107	111	114	117	121
1800	98	102	105	108	112	115	118	122
2400	99	103	106	109	113	116	119	123
3600	100	104	107	110	114	117	120	124
4800	101	105	108	111	115	118	121	125

specified positions. The NEMA sound level for a transformer can be provided by the manufacturer. On the basis of field studies of many transformer installations, the PWL in octave bands has been related to the NEMA rating and the area of the four side walls of the unit. This relationship is expressed by Equation 7-23:

$$L_W = \text{NEMA rating} + 10 \log A + C \quad \text{US units}$$
$$L_W = \text{NEMA rating} + 10 \log A + C + 10 \quad \text{SI units} \qquad (7\text{-}23)$$

where "NEMA rating" is the A-weighted sound level of the transformer provided by the manufacturer, obtained in accordance with NEMA Standards Publication No. TR 1-1968, A is the total surface area of the four side walls of the transformer in ft^2 (m^2), and C is an octave band correction that has different values for different uses, as shown in Table 7-30.

If the exact dimensions of the transformer are not known, an approximation will suffice. If in doubt, estimate the area on the high side. An error of 25% in area will produce a change of only 1 dB in the PWL. Select the most nearly applicable C value from Table 7-30. The C_1 value assumes normal radiation of sound. The C_2 value should be used in regular-shaped confined spaces where standing waves will very likely occur, which typically may produce 6 dB higher sound levels at the transformer harmonic frequencies of 120, 240, 360, 480, and 600 Hz (for 60-Hz line frequency; or other sound frequencies for other line frequencies). Actually, the sound power level of the transformer does not increase in this location, but the sound analysis procedure is more readily handled by presuming that the sound power is increased. The C_3 value is an approximation of the noise of a transformer that has grown noisier (by about 10 dB) during its lifetime. This happens occasionally when the laminations or tie-bolts become loose, and the transformer begins to buzz or rattle. In a highly critical location, it might be wise to use this value. All the Table 7-30 values assume that the transformer initially meets the quoted NEMA sound level rating. Field measurements have shown that transformers may actually have A-weighted sound levels that range from a few decibels (2 or 3 dB) above to as much as 5 or 6 dB below the quoted NEMA value. Quieted transformers that contain various forms of noise control treatments can be pur-

Table 7-29. Frequency adjustments in dB for generators, without drive unit: Subtract these values from the overall PWL (Table 7-28) to obtain octave band and A-weighted PWLs.

Octave Frequency Band, Hz	Value to be Subtracted from Overall PWL, dB
31	11
63	8
125	7
250	7
500	7
1000	9
2000	11
4000	14
8000	19
A-weighted (dBA)	4

chased at as much as 15 to 20 dB below normal NEMA ratings. If a quieter transformer is purchased and used, insert in Equation 7-23 the lowered sound level rating in place of the regular NEMA rating, and then select the appropriate corrections from Table 7-30.

Table 7-30. Octave band corrections in dB to be used in Equation 7-23 for obtaining PWL of transformers in different installation conditions. See notes for details.

Octave Frequency Band, Hz	Octave Band Corrections, dB		
	C_1, see Note 1	C_2, see Note 2	C_3, see Note 3
31	-11	-11	-11
63	-5	-2	-2
125	-3	+3	+3
250	-8	-2	+2
500	-8	-2	+2
1000	-14	-11	-4
2000	-19	-19	-9
4000	-24	-24	-14
8000	-31	-31	-21

Note 1. Use C_1 for outdoor location or for indoor location in a large mechanical room (over about 5000 ft^3 or 140 m^3) containing many other pieces of mechanical equipment that serve as obstacles to diffuse sound and breakup standing waves.

Note 2. Use C_2 for indoor locations in transformer vaults or small rooms (under about 5000 ft^3 or 140 m^3) with parallel walls and relatively few other large-size obstacles that can diffuse sound and breakup standing waves.

Note 3. Use C_3 for any location where a serious noise problem would result if the transformer should become noisy above its NEMA rating, following its installation and initial period of use.

7-22. MULTIPLE SOURCES

When an assembly of equipment is built up from components, such as those listed in this chapter, the PWL or the normalized 3-ft (0.9-m) distance SPL values of the component parts can be added together, band by band, by decibel addition to obtain the total sound for the assembly. Examples of such combinations are a motor-pump, a fan housing, and a fan-drive motor, a steam turbine and a centrifugal compressor, etc. If the SPL at 3 ft (0.9 m) is given for one source and the PWL is given for another source, the values should first be converted to similar forms, either SPL or PWL. Conversion from PWL to SPL at the normalized conditions used in the manual [3-ft (0.9-m) distance and 800-ft^2 (74-m^2) Room Constant] is done by using Equation 4-3 and Figure 4-2 or Table 4-4. Conversion from SPL (at the normalized conditions) to PWL uses the same material but in reverse order; that is, the PWL is calculated from given SPL data.

7-23. NOISE SPECIFICATIONS

The noise level estimates given in this manual will probably equal or exceed the actual noise levels of approximately 80 to 90% of all those types of machinery that will be encountered in typical building use. In many cases, actual noise levels may fall 3 to 6 dB (or more) below the estimates. Thus, there appears to be no shortage of available equipment that will fall at or below the estimated noise levels given in the manual, and it would not be discriminatory or unreasonable to specify that purchased equipment for a particular building be required not to exceed the estimated values given here for that equipment. This is especially true if the actual acoustic design of a wall or floor or room treatment is dependent upon one or two particularly noisy pieces of equipment. A noise specification would not be necessary for relatively quiet equipment that does not dictate noise control design for the MER or the building.

A. WAIVER. If a noise level specification is required to be met for a particular piece of equipment, and this becomes a "hardship" on the manufacturer or the owner in terms of costs or availability, the noise specification could be waived, depending on the response of all the bidders. If some bidders agree to meet the specification while others do not, this could be a valid basis for selecting the quieter equipment. If no bidders can meet the specification, the specification can be waived, but it may be necessary to reevaluate the noise control requirements of the equipment room, if this particular equipment is so noisy that it is responsible for the noise design in the first place. Of course, it is the primary purpose of this manual to prevent just such situations as this, as too many waivers would negate the value of the noise evaluation as a part of the design phase of the building. If the equipment measured for this study represents a fair sampling, it is likely that most of the equipment would meet a noise specification.

Appendix F

CadnaA Configuration Settings

Output from Receiver R94

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)	6.00
Night-time Penalty (dB)	10.00
DTM	
Standard Height (m)	0.00
Model of Terrain	Triangulation
Reflection	
max. Order of Reflection	0
Search Radius Src	100.00
Search Radius Rcvr	100.00
Max. Distance Source - Rcvr	1000.00 1000.00
Min. Distance Rvcr - 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 (℃)	10
rel. Humidity (%)	70
Ground Absorption G	1.00
Wind Speed for Dir. (m/s)	3.0
Roads (TNM)	
Railways (???)	
Aircraft (???)	
Strictly acc. to AzB	

Receiver
Name: R94
ID: R94
X: 610098.00
Y: 4928376.00
Z: 314.16

Point Source, ISO 9613, Name: "H1T", ID: "H1T"

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	610167.08	4928508.03	314.88	0	32	-39.4	-39.4	0.0	0.0	54.5	0.0	-3.0	0.0	0.0	0.0	0.0	-0.0	-90.9	-90.9
2	610167.08	4928508.03	314.88	0	63	54.2	54.2	0.0	0.0	54.5	0.0	-3.0	0.0	0.0	0.0	0.0	-0.0	2.7	2.7
3	610167.08	4928508.03	314.88	0	125	66.3	66.3	0.0	0.0	54.5	0.1	3.9	0.0	0.0	0.0	0.0	-0.0	7.9	7.9
4	610167.08	4928508.03	314.88	0	250	68.8	68.8	0.0	0.0	54.5	0.2	7.4	0.0	0.0	0.0	0.0	-0.0	6.8	6.8
5	610167.08	4928508.03	314.88	0	500	74.2	74.2	0.0	0.0	54.5	0.3	3.0	0.0	0.0	0.0	0.0	-0.0	16.4	16.4
6	610167.08	4928508.03	314.88	0	1000	71.4	71.4	0.0	0.0	54.5	0.6	0.3	0.0	0.0	0.0	0.0	-0.0	16.1	16.1
7	610167.08	4928508.03	314.88	0	2000	67.6	67.6	0.0	0.0	54.5	1.4	0.0	0.0	0.0	0.0	0.0	-0.0	11.7	11.7
8	610167.08	4928508.03	314.88	0	4000	62.4	62.4	0.0	0.0	54.5	4.9	0.0	0.0	0.0	0.0	0.0	-0.0	3.0	3.0
9	610167.08	4928508.03	314.88	0	8000	53.3	53.3	0.0	0.0	54.5	17.4	0.0	0.0	0.0	0.0	0.0	-0.0	-18.6	-18.6

Point Source, ISO 9613, Name: "H1I1", ID: "H1I1"

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	610162.46	4928508.83	315.61	0	32	-39.4	-39.4	0.0	0.0	54.4	0.0	-3.0	0.0	0.0	0.0	0.0	-0.0	-90.8	-90.8
2	610162.46	4928508.83	315.61	0	63	57.2	57.2	0.0	0.0	54.4	0.0	-3.0	0.0	0.0	0.0	0.0	-0.0	5.8	5.8
3	610162.46	4928508.83	315.61	0	125	72.5	72.5	0.0	0.0	54.4	0.1	4.3	0.0	0.0	0.0	0.0	-0.0	13.7	13.7
4	610162.46	4928508.83	315.61	0	250	71.2	71.2	0.0	0.0	54.4	0.2	6.0	0.0	0.0	0.0	0.0	-0.0	10.7	10.7
5	610162.46	4928508.83	315.61	0	500	75.8	75.8	0.0	0.0	54.4	0.3	0.8	0.0	0.0	0.0	0.0	-0.0	20.4	20.4
6	610162.46	4928508.83	315.61	0	1000	75.0	75.0	0.0	0.0	54.4	0.5	0.0	0.0	0.0	0.0	0.0	-0.0	20.1	20.1
7	610162.46	4928508.83	315.61	0	2000	71.3	71.3	0.0	0.0	54.4	1.4	0.0	0.0	0.0	0.0	0.0	-0.0	15.5	15.5
8	610162.46	4928508.83	315.61	0	4000	69.3	69.3	0.0	0.0	54.4	4.8	0.0	0.0	0.0	0.0	0.0	-0.0	10.1	10.1
9	610162.46	4928508.83	315.61	0	8000	72.1	72.1	0.0	0.0	54.4	17.3	0.0	0.0	0.0	0.0	0.0	-0.0	0.5	0.5

Point Source, ISO 9613, Name: "H1I2", ID: "H1I2"

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	610162.53	4928507.13	315.55	0	32	-39.4	-39.4	0.0	0.0	54.3	0.0	-3.0	0.0	0.0	0.0	0.0	-0.0	-90.7	-90.7
2	610162.53	4928507.13	315.55	0	63	57.2	57.2	0.0	0.0	54.3	0.0	-3.0	0.0	0.0	0.0	0.0	-0.0	5.9	5.9
3	610162.53	4928507.13	315.55	0	125	72.5	72.5	0.0	0.0	54.3	0.1	4.3	0.0	0.0	0.0	0.0	-0.0	13.8	13.8
4	610162.53	4928507.13	315.55	0	250	71.2	71.2	0.0	0.0	54.3	0.2	6.0	0.0	0.0	0.0	0.0	-0.0	10.8	10.8
5	610162.53	4928507.13	315.55	0	500	75.8	75.8	0.0	0.0	54.3	0.3	0.8	0.0	0.0	0.0	0.0	-0.0	20.5	20.5
6	610162.53	4928507.13	315.55	0	1000	75.0	75.0	0.0	0.0	54.3	0.5	0.0	0.0	0.0	0.0	0.0	-0.0	20.2	20.2
7	610162.53	4928507.13	315.55	0	2000	71.3	71.3	0.0	0.0	54.3	1.4	0.0	0.0	0.0	0.0	0.0	-0.0	15.6	15.6
8	610162.53	4928507.13	315.55	0	4000	69.3	69.3	0.0	0.0	54.3	4.8	0.0	0.0	0.0	0.0	0.0	-0.0	10.2	10.2
9	610162.53	4928507.13	315.55	0	8000	72.1	72.1	0.0	0.0	54.3	17.1	0.0	0.0	0.0	0.0	0.0	-0.0	0.7	0.7

Point Source, ISO 9613, Name: "H2T", ID: "H2T"

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	610073.88	4928649.37	315.98	0	32	-39.4	-39.4	0.0	0.0	59.8	0.0	-4.5	0.0	0.0	0.0	0.0	-0.0	-94.7	-94.7
2	610073.88	4928649.37	315.98	0	63	54.2	54.2	0.0	0.0	59.8	0.0	-4.5	0.0	0.0	0.0	0.0	-0.0	-1.1	-1.1
3	610073.88	4928649.37	315.98	0	125	66.3	66.3	0.0	0.0	59.8	0.1	4.3	0.0	0.0	0.0	0.0	-0.0	2.1	2.1
4	610073.88	4928649.37	315.98	0	250	68.8	68.8	0.0	0.0	59.8	0.3	10.0	0.0	0.0	0.0	0.0	-0.0	-1.2	-1.2
5	610073.88	4928649.37	315.98	0	500	74.2	74.2	0.0	0.0	59.8	0.5	13.9	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0
6	610073.88	4928649.37	315.98	0	1000	71.4	71.4	0.0	0.0	59.8	1.0	5.0	0.0	0.0	0.0	0.0	-0.0	5.6	5.6
7	610073.88	4928649.37	315.98	0	2000	67.6	67.6	0.0	0.0	59.8	2.6	0.0	0.0	0.0	0.0	0.0	-0.0	5.2	5.2
8	610073.88	4928649.37	315.98	0	4000	62.4	62.4	0.0	0.0	59.8	9.0	0.0	0.0	0.0	0.0	0.0	-0.0	-6.4	-6.4
9	610073.88	4928649.37	315.98	0	8000	53.3	53.3	0.0	0.0	59.8	32.1	0.0	0.0	0.0	0.0	0.0	-0.0	-38.5	-38.5

Point Source, ISO 9613, Name: "H2I1", ID: "H2I1"

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	610069.20	4928646.94	315.74	0	32	-39.4	-39.4	0.0	0.0	59.7	0.0	-4.5	0.0	0.0	0.0	0.0	-0.0	-94.6	-94.6

Point Source, ISO 9613, Name: "H2I1", ID: "H2I1"

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)
2	610069.20	4928646.94	315.74	0	63	57.2	57.2	0.0	0.0	59.7	0.0	-4.5	0.0	0.0	0.0	0.0	-0.0	2.0	2.0
3	610069.20	4928646.94	315.74	0	125	72.5	72.5	0.0	0.0	59.7	0.1	4.3	0.0	0.0	0.0	0.0	-0.0	8.4	8.4
4	610069.20	4928646.94	315.74	0	250	71.2	71.2	0.0	0.0	59.7	0.3	10.0	0.0	0.0	0.0	0.0	-0.0	1.3	1.3
5	610069.20	4928646.94	315.74	0	500	75.8	75.8	0.0	0.0	59.7	0.5	13.9	0.0	0.0	0.0	0.0	-0.0	1.6	1.6
6	610069.20	4928646.94	315.74	0	1000	75.0	75.0	0.0	0.0	59.7	1.0	5.0	0.0	0.0	0.0	0.0	-0.0	9.3	9.3
7	610069.20	4928646.94	315.74	0	2000	71.3	71.3	0.0	0.0	59.7	2.6	0.0	0.0	0.0	0.0	0.0	-0.0	9.0	9.0
8	610069.20	4928646.94	315.74	0	4000	69.3	69.3	0.0	0.0	59.7	8.9	0.0	0.0	0.0	0.0	0.0	-0.0	0.7	0.7
9	610069.20	4928646.94	315.74	0	8000	72.1	72.1	0.0	0.0	59.7	31.9	0.0	0.0	0.0	0.0	0.0	-0.0	-19.4	-19.4

Point Source, ISO 9613, Name: "H2I2", ID: "H2I2"

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	610070.26	4928645.63	315.76	0	32	-39.4	-39.4	0.0	0.0	59.7	0.0	-4.5	0.0	0.0	0.0	0.0	-0.0	-94.6	-94.6
2	610070.26	4928645.63	315.76	0	63	57.2	57.2	0.0	0.0	59.7	0.0	-4.5	0.0	0.0	0.0	0.0	-0.0	2.0	2.0
3	610070.26	4928645.63	315.76	0	125	72.5	72.5	0.0	0.0	59.7	0.1	4.3	0.0	0.0	0.0	0.0	-0.0	8.5	8.5
4	610070.26	4928645.63	315.76	0	250	71.2	71.2	0.0	0.0	59.7	0.3	10.0	0.0	0.0	0.0	0.0	-0.0	1.3	1.3
5	610070.26	4928645.63	315.76	0	500	75.8	75.8	0.0	0.0	59.7	0.5	13.9	0.0	0.0	0.0	0.0	-0.0	1.7	1.7
6	610070.26	4928645.63	315.76	0	1000	75.0	75.0	0.0	0.0	59.7	1.0	5.0	0.0	0.0	0.0	0.0	-0.0	9.4	9.4
7	610070.26	4928645.63	315.76	0	2000	71.3	71.3	0.0	0.0	59.7	2.6	0.0	0.0	0.0	0.0	0.0	-0.0	9.0	9.0
8	610070.26	4928645.63	315.76	0	4000	69.3	69.3	0.0	0.0	59.7	8.9	0.0	0.0	0.0	0.0	0.0	-0.0	0.8	0.8
9	610070.26	4928645.63	315.76	0	8000	72.1	72.1	0.0	0.0	59.7	31.7	0.0	0.0	0.0	0.0	0.0	-0.0	-19.2	-19.2

Point Source, ISO 9613, Name: "H3T", ID: "H3T"

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	610123.55	4928740.54	321.58	0	32	-39.4	-39.4	0.0	0.0	62.3	0.0	-4.5	0.0	0.0	8.8	0.0	-0.0	-106.0	-106.0
2	610123.55	4928740.54	321.58	0	63	54.2	54.2	0.0	0.0	62.3	0.0	-4.5	0.0	0.0	8.3	0.0	-0.0	-12.0	-12.0
3	610123.55	4928740.54	321.58	0	125	66.3	66.3	0.0	0.0	62.3	0.2	5.4	0.0	0.0	0.0	0.0	-0.0	-1.5	-1.5
4	610123.55	4928740.54	321.58	0	250	68.8	68.8	0.0	0.0	62.3	0.4	7.8	0.0	0.0	0.0	0.0	-0.0	-1.7	-1.7
5	610123.55	4928740.54	321.58	0	500	74.2	74.2	0.0	0.0	62.3	0.7	3.1	0.0	0.0	0.0	0.0	-0.0	8.1	8.1
6	610123.55	4928740.54	321.58	0	1000	71.4	71.4	0.0	0.0	62.3	1.3	0.3	0.0	0.0	0.0	0.0	-0.0	7.5	7.5
7	610123.55	4928740.54	321.58	0	2000	67.6	67.6	0.0	0.0	62.3	3.5	0.0	0.0	0.0	0.0	0.0	-0.0	1.8	1.8
8	610123.55	4928740.54	321.58	0	4000	62.4	62.4	0.0	0.0	62.3	12.0	0.0	0.0	0.0	0.0	0.0	-0.0	-11.8	-11.8
9	610123.55	4928740.54	321.58	0	8000	53.3	53.3	0.0	0.0	62.3	42.7	0.0	0.0	0.0	0.0	0.0	-0.0	-51.7	-51.7

Point Source, ISO 9613, Name: "H3I1", ID: "H3I1"

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	610118.30	4928741.37	322.05	0	32	-39.4	-39.4	0.0	0.0	62.3	0.0	-4.3	0.0	0.0	8.9	0.0	-0.0	-106.3	-106.3
2	610118.30	4928741.37	322.05	0	63	57.2	57.2	0.0	0.0	62.3	0.0	-4.3	0.0	0.0	8.7	0.0	-0.0	-9.6	-9.6
3	610118.30	4928741.37	322.05	0	125	72.5	72.5	0.0	0.0	62.3	0.2	5.6	0.0	0.0	0.0	0.0	-0.0	4.5	4.5
4	610118.30	4928741.37	322.05	0	250	71.2	71.2	0.0	0.0	62.3	0.4	6.3	0.0	0.0	0.0	0.0	-0.0	2.3	2.3
5	610118.30	4928741.37	322.05	0	500	75.8	75.8	0.0	0.0	62.3	0.7	0.8	0.0	0.0	0.6	0.0	-0.0	11.4	11.4
6	610118.30	4928741.37	322.05	0	1000	75.0	75.0	0.0	0.0	62.3	1.3	0.0	0.0	0.0	0.0	0.0	-0.0	11.4	11.4
7	610118.30	4928741.37	322.05	0	2000	71.3	71.3	0.0	0.0	62.3	3.5	0.0	0.0	0.0	0.0	0.0	-0.0	5.5	5.5
8	610118.30	4928741.37	322.05	0	4000	69.3	69.3	0.0	0.0	62.3	12.0	0.0	0.0	0.0	0.0	0.0	-0.0	-5.0	-5.0
9	610118.30	4928741.37	322.05	0	8000	72.1	72.1	0.0	0.0	62.3	42.8	0.0	0.0	0.0	0.0	0.0	-0.0	-32.9	-32.9

Point Source, ISO 9613, Name: "H3I2", ID: "H3I2"

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	610118.37	4928739.74	322.03	0	32	-39.4	-39.4	0.0	0.0	62.2	0.0	-4.3	0.0	0.0	8.8	0.0	-0.0	-106.2	-106.2
2	610118.37	4928739.74	322.03	0	63	57.2	57.2	0.0	0.0	62.2	0.0	-4.3	0.0	0.0	8.5	0.0	-0.0	-9.3	-9.3
3	610118.37	4928739.74	322.03	0	125	72.5	72.5	0.0	0.0	62.2	0.2	5.6	0.0	0.0	0.0	0.0	-0.0	4.5	4.5
4	610118.37	4928739.74	322.03	0	250	71.2	71.2	0.0	0.0	62.2	0.4	6.3	0.0	0.0	0.0	0.0	-0.0	2.3	2.3
5	610118.37	4928739.74	322.03	0	500	75.8	75.8	0.0	0.0	62.2	0.7	0.8	0.0	0.0	0.0	0.0	-0.0	12.1	12.1
6	610118.37	4928739.74	322.03	0	1000	75.0	75.0	0.0	0.0	62.2	1.3	0.0	0.0	0.0	0.0	0.0	-0.0	11.4	11.4
7	610118.37	4928739.74	322.03	0	2000	71.3	71.3	0.0	0.0	62.2	3.5	0.0	0.0	0.0	0.0	0.0	-0.0	5.5	5.5
8	610118.37	4928739.74	322.03	0	4000	69.3	69.3	0.0	0.0	62.2	11.9	0.0	0.0	0.0	0.0	0.0	-0.0	-4.9	-4.9
9	610118.37	4928739.74	322.03	0	8000	72.1	72.1	0.0	0.0	62.2	42.6	0.0	0.0	0.0	0.0	0.0	-0.0	-32.7	-32.7

Point Source, ISO 9613, Name: "H4T", ID: "H4T"

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	610279.49	4928530.39	316.48	0	32	-39.4	-39.4	0.0	0.0	58.5	0.0	-3.6	0.0	0.0	0.0	0.0	-0.0	-94.3	-94.3
2	610279.49	4928530.39	316.48	0	63	54.2	54.2	0.0	0.0	58.5	0.0	-3.6	0.0	0.0	0.0	0.0	-0.0	-0.8	-0.8
3	610279.49	4928530.39	316.48	0	125	66.3	66.3	0.0	0.0	58.5	0.1	4.5	0.0	0.0	0.0	0.0	-0.0	3.1	3.1
4	610279.49	4928530.39	316.48	0	250	68.8	68.8	0.0	0.0	58.5	0.3	7.8	0.0	0.0	0.0	0.0	-0.0	2.3	2.3
5	610279.49	4928530.39	316.48	0	500	74.2	74.2	0.0	0.0	58.5	0.5	3.1	0.0	0.0	0.0	0.0	-0.0	12.1	12.1
6	610279.49	4928530.39	316.48	0	1000	71.4	71.4	0.0	0.0	58.5	0.9	0.3	0.0	0.0	0.0	0.0	-0.0	11.7	11.7
7	610279.49	4928530.39	316.48	0	2000	67.6	67.6	0.0	0.0	58.5	2.3	0.0	0.0	0.0	0.0	0.0	-0.0	6.8	6.8
8	610279.49	4928530.39	316.48	0	4000	62.4	62.4	0.0	0.0	58.5	7.8	0.0	0.0	0.0	0.0	0.0	-0.0	-3.9	-3.9
9	610279.49	4928530.39	316.48	0	8000	53.3	53.3	0.0	0.0	58.5	27.9	0.0	0.0	0.0	0.0	0.0	-0.0	-33.1	-33.1

Point Source, ISO 9613, Name: "H4I1", ID: "H4I1"

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	610284.51	4928529.50	317.08	0	32	-39.4	-39.4	0.0	0.0	58.7	0.0	-3.4	0.0	0.0	0.0	0.0	-0.0	-94.7	-94.7
2	610284.51	4928529.50	317.08	0	63	57.2	57.2	0.0	0.0	58.7	0.0	-3.4	0.0	0.0	0.0	0.0	-0.0	1.9	1.9
3	610284.51	4928529.50	317.08	0	125	72.5	72.5	0.0	0.0	58.7	0.1	4.9	0.0	0.0	0.0	0.0	-0.0	8.8	8.8
4	610284.51	4928529.50	317.08	0	250	71.2	71.2	0.0	0.0	58.7	0.3	6.2	0.0	0.0	0.0	0.0	-0.0	6.0	6.0
5	610284.51	4928529.50	317.08	0	500	75.8	75.8	0.0	0.0	58.7	0.5	0.8	0.0	0.0	0.0	0.0	-0.0	15.9	15.9
6	610284.51	4928529.50	317.08	0	1000	75.0	75.0	0.0	0.0	58.7	0.9	0.0	0.0	0.0	0.0	0.0	-0.0	15.4	15.4
7	610284.51	4928529.50	317.08	0	2000	71.3	71.3	0.0	0.0	58.7	2.3	0.0	0.0	0.0	0.0	0.0	-0.0	10.3	10.3
8	610284.51	4928529.50	317.08	0	4000	69.3	69.3	0.0	0.0	58.7	7.9	0.0	0.0	0.0	0.0	0.0	-0.0	2.7	2.7
9	610284.51	4928529.50	317.08	0	8000	72.1	72.1	0.0	0.0	58.7	28.2	0.0	0.0	0.0	0.0	0.0	-0.0	-14.8	-14.8

Point Source, ISO 9613, Name: "H4I2", ID: "H4I2"

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	610284.51	4928531.18	317.16	0	32	-39.4	-39.4	0.0	0.0	58.7	0.0	-3.4	0.0	0.0	0.0	0.0	-0.0	-94.7	-94.7
2	610284.51	4928531.18	317.16	0	63	57.2	57.2	0.0	0.0	58.7	0.0	-3.4	0.0	0.0	0.0	0.0	-0.0	1.9	1.9
3	610284.51	4928531.18	317.16	0	125	72.5	72.5	0.0	0.0	58.7	0.1	4.9	0.0	0.0	0.0	0.0	-0.0	8.8	8.8
4	610284.51	4928531.18	317.16	0	250	71.2	71.2	0.0	0.0	58.7	0.3	6.2	0.0	0.0	0.0	0.0	-0.0	6.0	6.0
5	610284.51	4928531.18	317.16	0	500	75.8	75.8	0.0	0.0	58.7	0.5	0.8	0.0	0.0	0.0	0.0	-0.0	15.9	15.9
6	610284.51	4928531.18	317.16	0	1000	75.0	75.0	0.0	0.0	58.7	0.9	0.0	0.0	0.0	0.0	0.0	-0.0	15.4	15.4
7	610284.51	4928531.18	317.16	0	2000	71.3	71.3	0.0	0.0	58.7	2.3	0.0	0.0	0.0	0.0	0.0	-0.0	10.3	10.3
8	610284.51	4928531.18	317.16	0	4000	69.3	69.3	0.0	0.0	58.7	8.0	0.0	0.0	0.0	0.0	0.0	-0.0	2.6	2.6
9	610284.51	4928531.18	317.16	0	8000	72.1	72.1	0.0	0.0	58.7	28.4	0.0	0.0	0.0	0.0	0.0	-0.0	-15.0	-15.0

Point Source, ISO 9613, Name: "H5T", ID: "H5T"

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	610266.96	4928672.66	321.35	0	32	-39.4	-39.4	0.0	0.0	61.7	0.0	-4.3	0.0	0.0	0.0	0.0	-0.0	-96.7	-96.7
2	610266.96	4928672.66	321.35	0	63	54.2	54.2	0.0	0.0	61.7	0.0	-4.3	0.0	0.0	0.0	0.0	-0.0	-3.2	-3.2
3	610266.96	4928672.66	321.35	0	125	66.3	66.3	0.0	0.0	61.7	0.1	5.2	0.0	0.0	0.0	0.0	-0.0	-0.7	-0.7
4	610266.96	4928672.66	321.35	0	250	68.8	68.8	0.0	0.0	61.7	0.4	7.8	0.0	0.0	0.0	0.0	-0.0	-1.0	-1.0
5	610266.96	4928672.66	321.35	0	500	74.2	74.2	0.0	0.0	61.7	0.7	3.1	0.0	0.0	0.0	0.0	-0.0	8.7	8.7
6	610266.96	4928672.66	321.35	0	1000	71.4	71.4	0.0	0.0	61.7	1.3	0.3	0.0	0.0	0.0	0.0	-0.0	8.2	8.2
7	610266.96	4928672.66	321.35	0	2000	67.6	67.6	0.0	0.0	61.7	3.3	0.0	0.0	0.0	0.0	0.0	-0.0	2.6	2.6
8	610266.96	4928672.66	321.35	0	4000	62.4	62.4	0.0	0.0	61.7	11.2	0.0	0.0	0.0	0.0	0.0	-0.0	-10.5	-10.5
9	610266.96	4928672.66	321.35	0	8000	53.3	53.3	0.0	0.0	61.7	39.9	0.0	0.0	0.0	0.0	0.0	-0.0	-48.3	-48.3

Point Source, ISO 9613, Name: "H5I1", ID: "H5I1"

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	610261.84	4928671.79	322.10	0	32	-39.4	-39.4	0.0	0.0	61.6	0.0	-4.1	0.0	0.0	0.0	0.0	-0.0	-96.9	-96.9
2	610261.84	4928671.79	322.10	0	63	57.2	57.2	0.0	0.0	61.6	0.0	-4.1	0.0	0.0	0.0	0.0	-0.0	-0.3	-0.3
3	610261.84	4928671.79	322.10	0	125	72.5	72.5	0.0	0.0	61.6	0.1	5.5	0.0	0.0	0.0	0.0	-0.0	5.3	5.3
4	610261.84	4928671.79	322.10	0	250	71.2	71.2	0.0	0.0	61.6	0.4	6.3	0.0	0.0	0.0	0.0	-0.0	3.0	3.0
5	610261.84	4928671.79	322.10	0	500	75.8	75.8	0.0	0.0	61.6	0.7	0.8	0.0	0.0	0.0	0.0	-0.0	12.8	12.8
6	610261.84	4928671.79	322.10	0	1000	75.0	75.0	0.0	0.0	61.6	1.2	0.0	0.0	0.0	0.0	0.0	-0.0	12.2	12.2
7	610261.84	4928671.79	322.10	0	2000	71.3	71.3	0.0	0.0	61.6	3.3	0.0	0.0	0.0	0.0	0.0	-0.0	6.5	6.5
8	610261.84	4928671.79	322.10	0	4000	69.3	69.3	0.0	0.0	61.6	11.1	0.0	0.0	0.0	0.0	0.0	-0.0	-3.4	-3.4
9	610261.84	4928671.79	322.10	0	8000	72.1	72.1	0.0	0.0	61.6	39.5	0.0	0.0	0.0	0.0	0.0	-0.0	-29.0	-29.0

Point Source, ISO 9613, Name: "H5I2", ID: "H5I2"

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	610261.77	4928673.39	322.17	0	32	-39.4	-39.4	0.0	0.0	61.6	0.0	-4.1	0.0	0.0	0.0	0.0	-0.0	-96.9	-96.9
2	610261.77	4928673.39	322.17	0	63	57.2	57.2	0.0	0.0	61.6	0.0	-4.1	0.0	0.0	0.0	0.0	-0.0	-0.3	-0.3
3	610261.77	4928673.39	322.17	0	125	72.5	72.5	0.0	0.0	61.6	0.1	5.5	0.0	0.0	0.0	0.0	-0.0	5.3	5.3
4	610261.77	4928673.39	322.17	0	250	71.2	71.2	0.0	0.0	61.6	0.4	6.3	0.0	0.0	0.0	0.0	-0.0	2.9	2.9
5	610261.77	4928673.39	322.17	0	500	75.8	75.8	0.0	0.0	61.6	0.7	0.8	0.0	0.0	0.0	0.0	-0.0	12.7	12.7
6	610261.77	4928673.39	322.17	0	1000	75.0	75.0	0.0	0.0	61.6	1.2	0.0	0.0	0.0	0.0	0.0	-0.0	12.1	12.1
7	610261.77	4928673.39	322.17	0	2000	71.3	71.3	0.0	0.0	61.6	3.3	0.0	0.0	0.0	0.0	0.0	-0.0	6.4	6.4
8	610261.77	4928673.39	322.17	0	4000	69.3	69.3	0.0	0.0	61.6	11.1	0.0	0.0	0.0	0.0	0.0	-0.0	-3.4	-3.4
9	610261.77	4928673.39	322.17	0	8000	72.1	72.1	0.0	0.0	61.6	39.7	0.0	0.0	0.0	0.0	0.0	-0.0	-29.2	-29.2

Point Source, ISO 9613, Name: "H6T", ID: "H6T"

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	610214.55	4928801.01	321.80	0	32	-39.4	-39.4	0.0	0.0	63.9	0.0	-4.7	0.0	0.0	9.5	0.0	-0.0	-108.1	-108.1
2	610214.55	4928801.01	321.80	0	63	54.2	54.2	0.0	0.0	63.9	0.1	-4.7	0.0	0.0	9.5	0.0	-0.0	-14.5	-14.5
3	610214.55	4928801.01	321.80	0	125	66.3	66.3	0.0	0.0	63.9	0.2	6.0	0.0	0.0	0.0	0.0	-0.0	-3.7	-3.7
4	610214.55	4928801.01	321.80	0	250	68.8	68.8	0.0	0.0	63.9	0.5	7.8	0.0	0.0	0.0	0.0	-0.0	-3.4	-3.4
5	610214.55	4928801.01	321.80	0	500	74.2	74.2	0.0	0.0	63.9	0.9	3.1	0.0	0.0	1.6	0.0	-0.0	4.7	4.7
6	610214.55	4928801.01	321.80	0	1000	71.4	71.4	0.0	0.0	63.9	1.6	0.3	0.0	0.0	4.5	0.0	-0.0	1.1	1.1
7	610214.55	4928801.01	321.80	0	2000	67.6	67.6	0.0	0.0	63.9	4.3	0.0	0.0	0.0	4.8	0.0	-0.0	-5.3	-5.3
8	610214.55	4928801.01	321.80	0	4000	62.4	62.4	0.0	0.0	63.9	14.4	0.0	0.0	0.0	4.8	0.0	-0.0	-20.7	-20.7
9	610214.55	4928801.01	321.80	0	8000	53.3	53.3	0.0	0.0	63.9	51.5	0.0	0.0	0.0	4.8	0.0	-0.0	-66.9	-66.9

Point Source, ISO 9613, Name: "H6I1", ID: "H6I1"

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	610219.48	4928800.21	322.50	0	32	-39.4	-39.4	0.0	0.0	63.9	0.0	-4.6	0.0	0.0	9.3	0.0	-0.0	-108.1	-108.1
2	610219.48	4928800.21	322.50	0	63	57.2	57.2	0.0	0.0	63.9	0.1	-4.6	0.0	0.0	9.3	0.0	-0.0	-11.5	-11.5
3	610219.48	4928800.21	322.50	0	125	72.5	72.5	0.0	0.0	63.9	0.2	6.1	0.0	0.0	0.0	0.0	-0.0	2.3	2.3
4	610219.48	4928800.21	322.50	0	250	71.2	71.2	0.0	0.0	63.9	0.5	6.3	0.0	0.0	0.0	0.0	-0.0	0.6	0.6
5	610219.48	4928800.21	322.50	0	500	75.8	75.8	0.0	0.0	63.9	0.9	0.8	0.0	0.0	3.9	0.0	-0.0	6.3	6.3
6	610219.48	4928800.21	322.50	0	1000	75.0	75.0	0.0	0.0	63.9	1.6	0.0	0.0	0.0	4.7	0.0	-0.0	4.8	4.8
7	610219.48	4928800.21	322.50	0	2000	71.3	71.3	0.0	0.0	63.9	4.3	0.0	0.0	0.0	4.6	0.0	-0.0	-1.5	-1.5
8	610219.48	4928800.21	322.50	0	4000	69.3	69.3	0.0	0.0	63.9	14.5	0.0	0.0	0.0	4.4	0.0	-0.0	-13.5	-13.5
9	610219.48	4928800.21	322.50	0	8000	72.1	72.1	0.0	0.0	63.9	51.6	0.0	0.0	0.0	4.1	0.0	-0.0	-47.5	-47.5

Point Source, ISO 9613, Name: "H6I2", ID: "H6I2"

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	610219.44	4928801.80	322.50	0	32	-39.4	-39.4	0.0	0.0	63.9	0.0	-4.6	0.0	0.0	9.4	0.0	-0.0	-108.1	-108.1
2	610219.44	4928801.80	322.50	0	63	57.2	57.2	0.0	0.0	63.9	0.1	-4.6	0.0	0.0	9.3	0.0	-0.0	-11.6	-11.6
3	610219.44	4928801.80	322.50	0	125	72.5	72.5	0.0	0.0	63.9	0.2	6.1	0.0	0.0	0.0	0.0	-0.0	2.3	2.3
4	610219.44	4928801.80	322.50	0	250	71.2	71.2	0.0	0.0	63.9	0.5	6.3	0.0	0.0	0.0	0.0	-0.0	0.5	0.5
5	610219.44	4928801.80	322.50	0	500	75.8	75.8	0.0	0.0	63.9	0.9	0.8	0.0	0.0	3.9	0.0	-0.0	6.3	6.3
6	610219.44	4928801.80	322.50	0	1000	75.0	75.0	0.0	0.0	63.9	1.6	0.0	0.0	0.0	4.7	0.0	-0.0	4.8	4.8
7	610219.44	4928801.80	322.50	0	2000	71.3	71.3	0.0	0.0	63.9	4.3	0.0	0.0	0.0	4.6	0.0	-0.0	-1.5	-1.5
8	610219.44	4928801.80	322.50	0	4000	69.3	69.3	0.0	0.0	63.9	14.5	0.0	0.0	0.0	4.5	0.0	-0.0	-13.6	-13.6
9	610219.44	4928801.80	322.50	0	8000	72.1	72.1	0.0	0.0	63.9	51.8	0.0	0.0	0.0	4.2	0.0	-0.0	-47.8	-47.8

Point Source, ISO 9613, Name: "H7T", ID: "H7T"

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	610298.09	4928828.24	321.80	0	32	-39.4	-39.4	0.0	0.0	64.9	0.0	-4.8	0.0	0.0	9.6	0.0	-0.0	-109.1	-109.1
2	610298.09	4928828.24	321.80	0	63	54.2	54.2	0.0	0.0	64.9	0.1	-4.8	0.0	0.0	9.6	0.0	-0.0	-15.5	-15.5
3	610298.09	4928828.24	321.80	0	125	66.3	66.3	0.0	0.0	64.9	0.2	6.4	0.0	0.0	0.0	0.0	-0.0	-5.1	-5.1
4	610298.09	4928828.24	321.80	0	250	68.8	68.8	0.0	0.0	64.9	0.5	7.8	0.0	0.0	0.0	0.0	-0.0	-4.4	-4.4
5	610298.09	4928828.24	321.80	0	500	74.2	74.2	0.0	0.0	64.9	1.0	3.2	0.0	0.0	1.6	0.0	-0.0	3.6	3.6
6	610298.09	4928828.24	321.80	0	1000	71.4	71.4	0.0	0.0	64.9	1.8	0.3	0.0	0.0	4.5	0.0	-0.0	-0.1	-0.1
7	610298.09	4928828.24	321.80	0	2000	67.6	67.6	0.0	0.0	64.9	4.8	0.0	0.0	0.0	4.8	0.0	-0.0	-6.8	-6.8
8	610298.09	4928828.24	321.80	0	4000	62.4	62.4	0.0	0.0	64.9	16.2	0.0	0.0	0.0	4.8	0.0	-0.0	-23.5	-23.5
9	610298.09	4928828.24	321.80	0	8000	53.3	53.3	0.0	0.0	64.9	57.8	0.0	0.0	0.0	4.8	0.0	-0.0	-74.2	-74.2

Point Source, ISO 9613, Name: "H7I1", ID: "H7I1"																			
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	610302.73	4928827.36	322.50	0	32	-39.4	-39.4	0.0	0.0	64.9	0.0	-4.7	0.0	0.0	9.5	0.0	-0.0	-109.1	-109.1
2	610302.73	4928827.36	322.50	0	63	57.2	57.2	0.0	0.0	64.9	0.1	-4.7	0.0	0.0	9.5	0.0	-0.0	-12.5	-12.5
3	610302.73	4928827.36	322.50	0	125	72.5	72.5	0.0	0.0	64.9	0.2	6.4	0.0	0.0	0.0	0.0	-0.0	1.0	1.0
4	610302.73	4928827.36	322.50	0	250	71.2	71.2	0.0	0.0	64.9	0.5	6.3	0.0	0.0	0.0	0.0	-0.0	-0.5	-0.5
5	610302.73	4928827.36	322.50	0	500	75.8	75.8	0.0	0.0	64.9	1.0	0.8	0.0	0.0	4.0	0.0	-0.0	5.2	5.2
6	610302.73	4928827.36	322.50	0	1000	75.0	75.0	0.0	0.0	64.9	1.8	0.0	0.0	0.0	4.8	0.0	-0.0	3.5	3.5
7	610302.73	4928827.36	322.50	0	2000	71.3	71.3	0.0	0.0	64.9	4.8	0.0	0.0	0.0	4.8	0.0	-0.0	-3.2	-3.2
8	610302.73	4928827.36	322.50	0	4000	69.3	69.3	0.0	0.0	64.9	16.2	0.0	0.0	0.0	4.8	0.0	-0.0	-16.6	-16.6
9	610302.73	4928827.36	322.50	0	8000	72.1	72.1	0.0	0.0	64.9	57.9	0.0	0.0	0.0	4.8	0.0	-0.0	-55.5	-55.5

Point Source, ISO 9613, Name: "H7I2", ID: "H7I2"																			
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	610302.64	4928829.11	322.50	0	32	-39.4	-39.4	0.0	0.0	64.9	0.0	-4.7	0.0	0.0	9.5	0.0	-0.0	-109.1	-109.1
2	610302.64	4928829.11	322.50	0	63	57.2	57.2	0.0	0.0	64.9	0.1	-4.7	0.0	0.0	9.5	0.0	-0.0	-12.6	-12.6
3	610302.64	4928829.11	322.50	0	125	72.5	72.5	0.0	0.0	64.9	0.2	6.4	0.0	0.0	0.0	0.0	-0.0	1.0	1.0
4	610302.64	4928829.11	322.50	0	250	71.2	71.2	0.0	0.0	64.9	0.5	6.3	0.0	0.0	0.0	0.0	-0.0	-0.5	-0.5
5	610302.64	4928829.11	322.50	0	500	75.8	75.8	0.0	0.0	64.9	1.0	0.8	0.0	0.0	4.0	0.0	-0.0	5.1	5.1
6	610302.64	4928829.11	322.50	0	1000	75.0	75.0	0.0	0.0	64.9	1.8	0.0	0.0	0.0	4.8	0.0	-0.0	3.5	3.5
7	610302.64	4928829.11	322.50	0	2000	71.3	71.3	0.0	0.0	64.9	4.8	0.0	0.0	0.0	4.8	0.0	-0.0	-3.2	-3.2
8	610302.64	4928829.11	322.50	0	4000	69.3	69.3	0.0	0.0	64.9	16.3	0.0	0.0	0.0	4.8	0.0	-0.0	-16.7	-16.7
9	610302.64	4928829.11	322.50	0	8000	72.1	72.1	0.0	0.0	64.9	58.1	0.0	0.0	0.0	4.8	0.0	-0.0	-55.7	-55.7

Point Source, ISO 9613, Name: "H8T", ID: "H8T"																			
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	610383.86	4928685.60	317.31	0	32	-39.4	-39.4	0.0	0.0	63.5	0.0	-4.6	0.0	0.0	9.4	0.0	-0.0	-107.7	-107.7
2	610383.86	4928685.60	317.31	0	63	54.2	54.2	0.0	0.0	63.5	0.1	-4.6	0.0	0.0	9.4	0.0	-0.0	-14.1	-14.1
3	610383.86	4928685.60	317.31	0	125	66.3	66.3	0.0	0.0	63.5	0.2	5.8	0.0	0.0	0.0	0.0	-0.0	-3.2	-3.2
4	610383.86	4928685.60	317.31	0	250	68.8	68.8	0.0	0.0	63.5	0.4	7.8	0.0	0.0	0.0	0.0	-0.0	-2.9	-2.9
5	610383.86	4928685.60	317.31	0	500	74.2	74.2	0.0	0.0	63.5	0.8	3.1	0.0	0.0	1.5	0.0	-0.0	5.2	5.2
6	610383.86	4928685.60	317.31	0	1000	71.4	71.4	0.0	0.0	63.5	1.5	0.3	0.0	0.0	4.3	0.0	-0.0	1.8	1.8
7	610383.86	4928685.60	317.31	0	2000	67.6	67.6	0.0	0.0	63.5	4.1	0.0	0.0	0.0	4.3	0.0	-0.0	-4.3	-4.3
8	610383.86	4928685.60	317.31	0	4000	62.4	62.4	0.0	0.0	63.5	13.8	0.0	0.0	0.0	3.8	0.0	-0.0	-18.7	-18.7
9	610383.86	4928685.60	317.31	0	8000	53.3	53.3	0.0	0.0	63.5	49.3	0.0	0.0	0.0	2.5	0.0	-0.0	-62.0	-62.0

Point Source, ISO 9613, Name: "H8I1", ID: "H8I1"																			
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	610389.05	4928684.67	317.71	0	32	-39.4	-39.4	0.0	0.0	63.5	0.0	-4.5	0.0	0.0	9.3	0.0	-0.0	-107.7	-107.7
2	610389.05	4928684.67	317.71	0	63	57.2	57.2	0.0	0.0	63.5	0.1	-4.5	0.0	0.0	9.3	0.0	-0.0	-11.2	-11.2
3	610389.05	4928684.67	317.71	0	125	72.5	72.5	0.0	0.0	63.5	0.2	6.0	0.0	0.0	0.0	0.0	-0.0	2.8	2.8
4	610389.05	4928684.67	317.71	0	250	71.2	71.2	0.0	0.0	63.5	0.4	6.3	0.0	0.0	0.0	0.0	-0.0	0.9	0.9
5	610389.05	4928684.67	317.71	0	500	75.8	75.8	0.0	0.0	63.5	0.8	0.8	0.0	0.0	3.8	0.0	-0.0	6.9	6.9
6	610389.05	4928684.67	317.71	0	1000	75.0	75.0	0.0	0.0	63.5	1.6	0.0	0.0	0.0	4.3	0.0	-0.0	5.6	5.6
7	610389.05	4928684.67	317.71	0	2000	71.3	71.3	0.0	0.0	63.5	4.1	0.0	0.0	0.0	3.8	0.0	-0.0	-0.2	-0.2
8	610389.05	4928684.67	317.71	0	4000	69.3	69.3	0.0	0.0	63.5	13.9	0.0	0.0	0.0	2.6	0.0	-0.0	-10.7	-10.7
9	610389.05	4928684.67	317.71	0	8000	72.1	72.1	0.0	0.0	63.5	49.6	0.0	0.0	0.0	0.0	0.0	-0.0	-41.0	-41.0

Point Source, ISO 9613, Name: "H8I2", ID: "H8I2"																			
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	610388.98	4928686.47	317.77	0	32	-39.4	-39.4	0.0	0.0	63.6	0.0	-4.5	0.0	0.0	9.3	0.0	-0.0	-107.8	-107.8
2	610388.98	4928686.47	317.77	0	63	57.2	57.2	0.0	0.0	63.6	0.1	-4.5	0.0	0.0	9.3	0.0	-0.0	-11.2	-11.2
3	610388.98	4928686.47	317.77	0	125	72.5	72.5	0.0	0.0	63.6	0.2	6.0	0.0	0.0	0.0	0.0	-0.0	2.8	2.8
4	610388.98	4928686.47	317.77	0	250	71.2	71.2	0.0	0.0	63.6	0.4	6.3	0.0	0.0	0.0	0.0	-0.0	0.9	0.9
5	610388.98	4928686.47	317.77	0	500	75.8	75.8	0.0	0.0	63.6	0.8	0.8	0.0	0.0	3.8	0.0	-0.0	6.9	6.9
6	610388.98	4928686.47	317.77	0	1000	75.0	75.0	0.0	0.0	63.6	1.6	0.0	0.0	0.0	4.3	0.0	-0.0	5.6	5.6
7	610388.98	4928686.47	317.77	0	2000	71.3	71.3	0.0	0.0	63.6	4.1	0.0	0.0	0.0	3.8	0.0	-0.0	-0.2	-0.2
8	610388.98	4928686.47	317.77	0	4000	69.3	69.3	0.0	0.0	63.6	13.9	0.0	0.0	0.0	2.5	0.0	-0.0	-10.7	-10.7
9	610388.98	4928686.47	317.77	0	8000	72.1	72.1	0.0	0.0	63.6	49.7	0.0	0.0	0.0	0.0	0.0	-0.0	-41.2	-41.2

Point Source, ISO 9613, Name: "H9T", ID: "H9T"																			
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	610437.63	4928597.03	313.03	0	32	-39.4	-39.4	0.0	0.0	63.1	0.0	-4.6	0.0	0.0	9.4	0.0	-0.0	-107.3	-107.3
2	610437.63	4928597.03	313.03	0	63	54.2	54.2	0.0	0.0	63.1	0.1	-4.6	0.0	0.0	9.4	0.0	-0.0	-13.8	-13.8
3	610437.63	4928597.03	313.03	0	125	66.3	66.3	0.0	0.0	63.1	0.2	5.7	0.0	0.0	0.0	0.0	-0.0	-2.7	-2.7
4	610437.63	4928597.03	313.03	0	250	68.8	68.8	0.0	0.0	63.1	0.4	7.8	0.0	0.0	0.0	0.0	-0.0	-2.6	-2.6
5	610437.63	4928597.03	313.03	0	500	74.2	74.2	0.0	0.0	63.1	0.8	3.1	0.0	0.0	1.6	0.0	-0.0	5.5	5.5
6	610437.63	4928597.03	313.03	0	1000	71.4	71.4	0.0	0.0	63.1	1.5	0.3	0.0	0.0	4.5	0.0	-0.0	2.0	2.0
7	610437.63	4928597.03	313.03	0	2000	67.6	67.6	0.0	0.0	63.1	3.9	0.0	0.0	0.0	4.8	0.0	-0.0	-4.2	-4.2
8	610437.63	4928597.03	313.03	0	4000	62.4	62.4	0.0	0.0	63.1	13.3	0.0	0.0	0.0	4.8	0.0	-0.0	-18.8	-18.8
9	610437.63	4928597.03	313.03	0	8000	53.3	53.3	0.0	0.0	63.1	47.4	0.0	0.0	0.0	4.8	0.0	-0.0	-62.0	-62.0

Point Source, ISO 9613, Name: "H9I1", ID: "H9I1"																			
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	610442.82	4928596.24	313.45	0	32	-39.4	-39.4	0.0	0.0	63.2	0.0	-4.5	0.0	0.0	9.2	0.0	-0.0	-107.4	-107.4
2	610442.82	4928596.24	313.45	0	63	57.2	57.2	0.0	0.0	63.2	0.1	-4.5	0.0	0.0	9.2	0.0	-0.0	-10.9	-10.9
3	610442.82	4928596.24	313.45	0	125	72.5	72.5	0.0	0.0	63.2	0.2	5.9	0.0	0.0	0.0	0.0	-0.0	3.2	3.2
4	610442.82	4928596.24	313.45	0	250	71.2	71.2	0.0	0.0	63.2	0.4	6.3	0.0	0.0	0.0	0.0	-0.0	1.3	1.3
5	610442.82	4928596.24	313.45	0	500	75.8	75.8	0.0	0.0	63.2	0.8	0.8	0.0	0.0	4.0	0.0	-0.0	7.0	7.0
6	610442.82	4928596.24	313.45	0	1000	75.0	75.0	0.0	0.0	63.2	1.5	0.0	0.0	0.0	4.7	0.0	-0.0	5.5	5.5
7	610442.82	4928596.24	313.45	0	2000	71.3	71.3	0.0	0.0	63.2	3.9	0.0	0.0	0.0	4.7	0.0	-0.0	-0.6	-0.6
8	610442.82	4928596.24	313.45	0	4000	69.3	69.3	0.0	0.0	63.2	13.4	0.0	0.0	0.0	4.6	0.0	-0.0	-12.0	-12.0
9	610442.82	4928596.24	313.45	0	8000	72.1	72.1	0.0	0.0	63.2	47.8	0.0	0.0	0.0	4.5	0.0	-0.0	-43.4	-43.4

Point Source, ISO 9613, Name: "H9I2", ID: "H9I2"																			
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	610442.75	4928597.92	313.45	0	32	-39.4	-39.4	0.0	0.0	63.3	0.0	-4.5	0.0	0.0	9.2	0.0	-0.0	-107.4	-107.4
2	610442.75	4928597.92	313.45	0	63	57.2	57.2	0.0	0.0	63.3	0.1	-4.5	0.0	0.0	9.2	0.0	-0.0	-10.9	-10.9
3	610442.75	4928597.92	313.45	0	125	72.5	72.5	0.0	0.0	63.3	0.2	5.9	0.0	0.0	0.0	0.0	-0.0	3.2	3.2
4	610442.75	4928597.92	313.45	0	250	71.2	71.2	0.0	0.0	63.3	0.4	6.3	0.0	0.0	0.0	0.0	-0.0	1.2	1.2
5	610442.75	4928597.92	313.45	0	500	75.8	75.8	0.0	0.0	63.3	0.8	0.8	0.0	0.0	4.0	0.0	-0.0	7.0	7.0
6	610442.75	4928597.92	313.45	0	1000	75.0	75.0	0.0	0.0	63.3	1.5	0.0	0.0	0.0	4.7	0.0	-0.0	5.5	5.5
7	610442.75	4928597.92	313.45	0	2000	71.3	71.3	0.0	0.0	63.3	4.0	0.0	0.0	0.0	4.7	0.0	-0.0	-0.6	-0.6
8	610442.75	4928597.92	313.45	0	4000	69.3	69.3	0.0	0.0	63.3	13.4	0.0	0.0	0.0	4.7	0.0	-0.0	-12.1	-12.1
9	610442.75	4928597.92	313.45	0	8000	72.1	72.1	0.0	0.0	63.3	47.9	0.0	0.0	0.0	4.6	0.0	-0.0	-43.7	-43.7

Point Source, ISO 9613, Name: "H10T", ID: "H10T"																			
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	610551.15	4928566.89	309.95	0	32	-39.4	-39.4	0.0	0.0	64.8	0.0	-4.8	0.0	0.0	9.6	0.0	-0.0	-109.0	-109.0
2	610551.15	4928566.89	309.95	0	63	54.2	54.2	0.0	0.0	64.8	0.1	-4.8	0.0	0.0	9.6	0.0	-0.0	-15.5	-15.5
3	610551.15	4928566.89	309.95	0	125	66.3	66.3	0.0	0.0	64.8	0.2	6.3	0.0	0.0	0.0	0.0	-0.0	-5.1	-5.1
4	610551.15	4928566.89	309.95	0	250	68.8	68.8	0.0	0.0	64.8	0.5	7.8	0.0	0.0	0.0	0.0	-0.0	-4.4	-4.4
5	610551.15	4928566.89	309.95	0	500	74.2	74.2	0.0	0.0	64.8	1.0	3.2	0.0	0.0	1.6	0.0	-0.0	3.7	3.7
6	610551.15	4928566.89	309.95	0	1000	71.4	71.4	0.0	0.0	64.8	1.8	0.3	0.0	0.0	4.5	0.0	-0.0	0.0	0.0
7	610551.15	4928566.89	309.95	0	2000	67.6	67.6	0.0	0.0	64.8	4.8	0.0	0.0	0.0	4.7	0.0	-0.0	-6.7	-6.7
8	610551.15	4928566.89	309.95	0	4000	62.4	62.4	0.0	0.0	64.8	16.1	0.0	0.0	0.0	4.7	0.0	-0.0	-23.3	-23.3
9	610551.15	4928566.89	309.95	0	8000	53.3	53.3	0.0	0.0	64.8	57.5	0.0	0.0	0.0	4.6	0.0	-0.0	-73.6	-73.6

Point Source, ISO 9613, Name: "H10I1", ID: "H10I1"																			
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	610546.33	4928564.80	310.81	0	32	-39.4	-39.4	0.0	0.0	64.7	0.0	-4.7	0.0	0.0	9.5	0.0	-0.0	-108.9	-108.9
2	610546.33	4928564.80	310.81	0	63	57.2	57.2	0.0	0.0	64.7	0.1	-4.7	0.0	0.0	9.5	0.0	-0.0	-12.4	-12.4
3	610546.33	4928564.80	310.81	0	125	72.5	72.5	0.0	0.0	64.7	0.2	6.3	0.0	0.0	0.0	0.0	-0.0	1.2	1.2
4	610546.33	4928564.80	310.81	0	250	71.2	71.2	0.0	0.0	64.7	0.5	6.3	0.0	0.0	0.0	0.0	-0.0	-0.3	-0.3
5	610546.33	4928564.80	310.81	0	500	75.8	75.8	0.0	0.0	64.7	0.9	0.8	0.0	0.0	3.8	0.0	-0.0	5.5	5.5
6	610546.33	4928564.80	310.81	0	1000	75.0	75.0	0.0	0.0	64.7	1.8	0.0	0.0	0.0	4.5	0.0	-0.0	4.0	4.0
7	610546.33	4928564.80	310.81	0	2000	71.3	71.3	0.0	0.0	64.7	4.7	0.0	0.0	0.0	4.2	0.0	-0.0	-2.4	-2.4
8	610546.33	4928564.80	310.81	0	4000	69.3	69.3	0.0	0.0	64.7	15.9	0.0	0.0	0.0	3.6	0.0	-0.0	-15.0	-15.0
9	610546.33	4928564.80	310.81	0	8000	72.1	72.1	0.0	0.0	64.7	56.9	0.0	0.0	0.0	1.9	0.0	-0.0	-51.4	-51.4

Point Source, ISO 9613, Name: "H10I2", ID: "H10I2"																			
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	610547.28	4928563.42	310.78	0	32	-39.4	-39.4	0.0	0.0	64.8	0.0	-4.7	0.0	0.0	9.5	0.0	-0.0	-108.9	-108.9
2	610547.28	4928563.42	310.78	0	63	57.2	57.2	0.0	0.0	64.8	0.1	-4.7	0.0	0.0	9.5	0.0	-0.0	-12.4	-12.4
3	610547.28	4928563.42	310.78	0	125	72.5	72.5	0.0	0.0	64.8	0.2	6.3	0.0	0.0	0.0	0.0	-0.0	1.2	1.2
4	610547.28	4928563.42	310.78	0	250	71.2	71.2	0.0	0.0	64.8	0.5	6.3	0.0	0.0	0.0	0.0	-0.0	-0.3	-0.3
5	610547.28	4928563.42	310.78	0	500	75.8	75.8	0.0	0.0	64.8	0.9	0.8	0.0	0.0	3.8	0.0	-0.0	5.5	5.5
6	610547.28	4928563.42	310.78	0	1000	75.0	75.0	0.0	0.0	64.8	1.8	0.0	0.0	0.0	4.5	0.0	-0.0	4.0	4.0
7	610547.28	4928563.42	310.78	0	2000	71.3	71.3	0.0	0.0	64.8	4.7	0.0	0.0	0.0	4.2	0.0	-0.0	-2.3	-2.3
8	610547.28	4928563.42	310.78	0	4000	69.3	69.3	0.0	0.0	64.8	16.0	0.0	0.0	0.0	3.5	0.0	-0.0	-14.9	-14.9
9	610547.28	4928563.42	310.78	0	8000	72.1	72.1	0.0	0.0	64.8	56.9	0.0	0.0	0.0	1.7	0.0	-0.0	-51.2	-51.2

Point Source, ISO 9613, Name: "ST", ID: "ST"																			
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	610289.00	4928413.00	312.50	0	32	-39.4	-39.4	0.0	0.0	56.8	0.0	-3.0	0.0	0.0	0.0	0.0	-0.0	-93.2	-93.2
2	610289.00	4928413.00	312.50	0	63	65.8	65.8	0.0	0.0	56.8	0.0	-3.0	0.0	0.0	0.0	0.0	-0.0	12.0	12.0
3	610289.00	4928413.00	312.50	0	125	77.9	77.9	0.0	0.0	56.8	0.1	4.7	0.0	0.0	0.0	0.0	-0.0	16.4	16.4
4	610289.00	4928413.00	312.50	0	250	80.4	80.4	0.0	0.0	56.8	0.2	6.2	0.0	0.0	0.0	0.0	-0.0	17.3	17.3
5	610289.00	4928413.00	312.50	0	500	85.8	85.8	0.0	0.0	56.8	0.4	0.8	0.0	0.0	0.0	0.0	-0.0	27.9	27.9
6	610289.00	4928413.00	312.50	0	1000	83.0	83.0	0.0	0.0	56.8	0.7	0.0	0.0	0.0	0.0	0.0	-0.0	25.5	25.5
7	610289.00	4928413.00	312.50	0	2000	79.2	79.2	0.0	0.0	56.8	1.9	0.0	0.0	0.0	0.0	0.0	-0.0	20.5	20.5
8	610289.00	4928413.00	312.50	0	4000	74.0	74.0	0.0	0.0	56.8	6.4	0.0	0.0	0.0	0.0	0.0	-0.0	10.8	10.8
9	610289.00	4928413.00	312.50	0	8000	64.9	64.9	0.0	0.0	56.8	22.7	0.0	0.0	0.0	0.0	0.0	-0.0	-14.6	-14.6