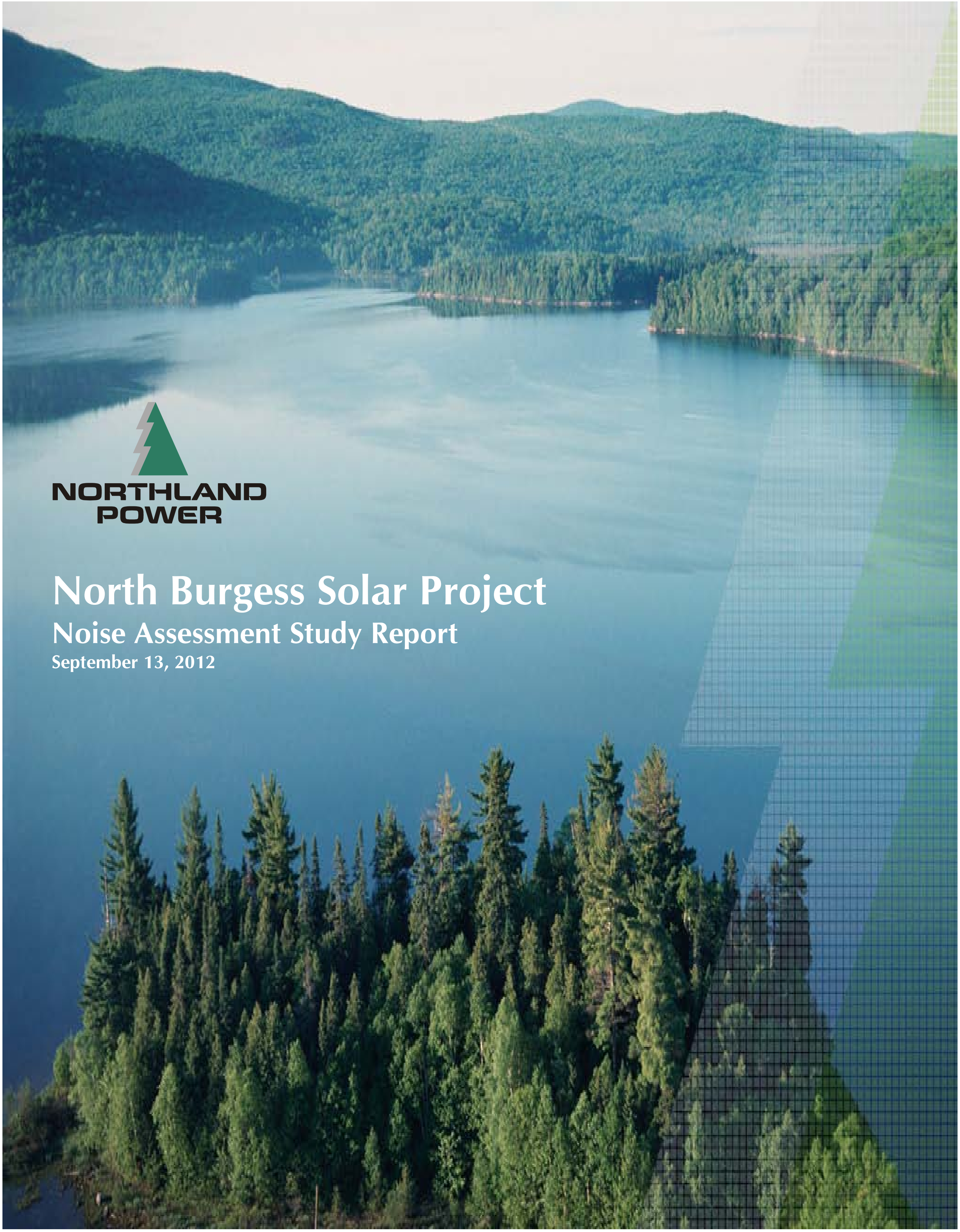

NORTHLAND POWER

# North Burgess Solar Project

## Noise Assessment Study Report

September 13, 2012

Northland Power Inc.
on behalf of
Northland Power Solar
North Burgess Solar Project L.P.
Toronto, Ontario

# Noise Assessment Study Report

# North Burgess Solar Project

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Rev. 3
September 13, 2012

# Executive Summary

This report presents the results of the Noise Assessment Study required for Solar Facilities under Ontario Regulation (O. Reg.) 359/09 and 521/10, as part of the Renewable Energy Approval (REA) Process. Northland Power Solar North Burgess L.P. ("Northland") is proposing to develop a 10-Megawatt (MW) solar photovoltaic (PV) project titled North Burgess Solar Project (the "Project"). The Project will be located on approximately 40 hectares (ha) of land near Narrow Locks Road in the Township of Tay Valley within the Lanark County, Ontario.

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

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

Project Report

September 13, 2012

**Northland Power Inc.**
**North Burgess Solar Project**

# Noise Assessment Study Report

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# 1. Introduction

## 1.1 Project Description

Northland Power Solar North Burgess L.P. ("Northland") is proposing to develop a 10-megawatt (MW) solar photovoltaic (PV) project titled North Burgess Solar Project (the "Project"). The Project will be located on approximately 40 ha of land within the Township of Tay Valley, Ontario.

The proposed Project is a renewable energy generation facility which will use solar photovoltaic technology to generate electricity. Electricity generated by solar photovoltaic panels will be converted from Direct Current (DC) to Alternating Current (AC) by inverter clusters which will also step-up the voltage to 27.6 kV. A main transformer, located in the substation, will step up the voltage from the clusters to 44 kV prior to being transmitted to the existing local distribution line. The construction of the Project will begin once the Renewable Energy Approval (REA) has been obtained and a power purchase agreement is finalized with the OPA. The anticipated operational lifespan of the Project is 30 years.

## 1.2 Renewable Energy Approval Legislative Requirements

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

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

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

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# 2. Facility Description

The Project will utilize photovoltaic (PV) panels installed on fixed racking structures mounted on the ground. The PV panels generate DC electricity which will be converted to AC electricity by inverters. The Project layout is based on 7 inverter clusters each one containing two inverters and one medium-voltage (360-V/27.6-kV/1.6-MVA) transformer, and one 27.6-kV/44-kV/10-MVA substation transformer. The 27.6-kV power, collected from the inverter clusters, will be stepped-up to 44 kV by the substation transformer prior to being transmitted to the existing local distribution line.

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

**Table 2.1 General Project Description**

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

## 2.1 Project Location

The Project Location[1] will be sited on privately owned land totalling approximately 40 ha. The Project Location is zoned as rural in accordance to the zoning by-law for the Township of Tay Valley. Figure A.1 in Appendix A shows the zoning designation plan. Also, Figure A.2 presents the Project Area Location Plan.

## 2.2 Acoustical Environment

The Project will be surrounded by farmland, with some forested areas to the west and southwest. The background noise levels are expected to be typical of rural areas, classified as a Class 3 based on Publication NPC-232 by the MOE. Some traffic noise is expected from RR 14 to the east, Stanley Road to the south and from Scotch Line RR-10 to the northwest, mainly during day hours. There are no airports within 5 km of the Project Location. Perth is the nearest urban center and it is located about 10 km northeast of the proposed location. There are no large industrial facilities within 5 km of the Project Location.

## 2.3 Life of Project

The expected life of the Project is 30 years. The manufacturer's warranty on the PV modules is 25 years and the expected life of solar power plants of this type is typically 35 to 40 years. At that time (or earlier if the 20-yr power purchase agreement is not extended), the Project will be decommissioned or refurbished depending on market conditions and/or technological changes.

## 2.4 Operating Hours

Solar PV facilities produce electricity during the day hours, when the sun rays are collected by the panels. After sunset the facility will not receive solar radiation to generate any electricity. Under

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

these conditions the inverters will not produce any noise and the transformers will be energized, but not in operation (no fans in operation).

## 2.5 Approach to the Study

The sound pressure levels at the POR were predicted using procedures from ISO 9613-2, which is a widely used and generally accepted standard for the evaluation of noise impact in environmental assessments.  The sound power level for the inverters was provided by the manufacturer while the sound power level for the transformers was estimated.  The software package CADNA-A, which implements ISO-9613-2, was used to predict the noise levels at the POR.  This numerical modeling software is able to simulate sound sources as well as sound mitigation measures taking into account atmospheric and ground attenuation. Some of the CADNA-A configurations used in the modeling are shown in Figure 2.1.

Elevation contours were not included in the CADNA-A model. This conservative approach was applied in order to avoid including any barrier effects of ground surface obstacles.

Vegetation that blocks some of the POR from the sources has not been incorporated.

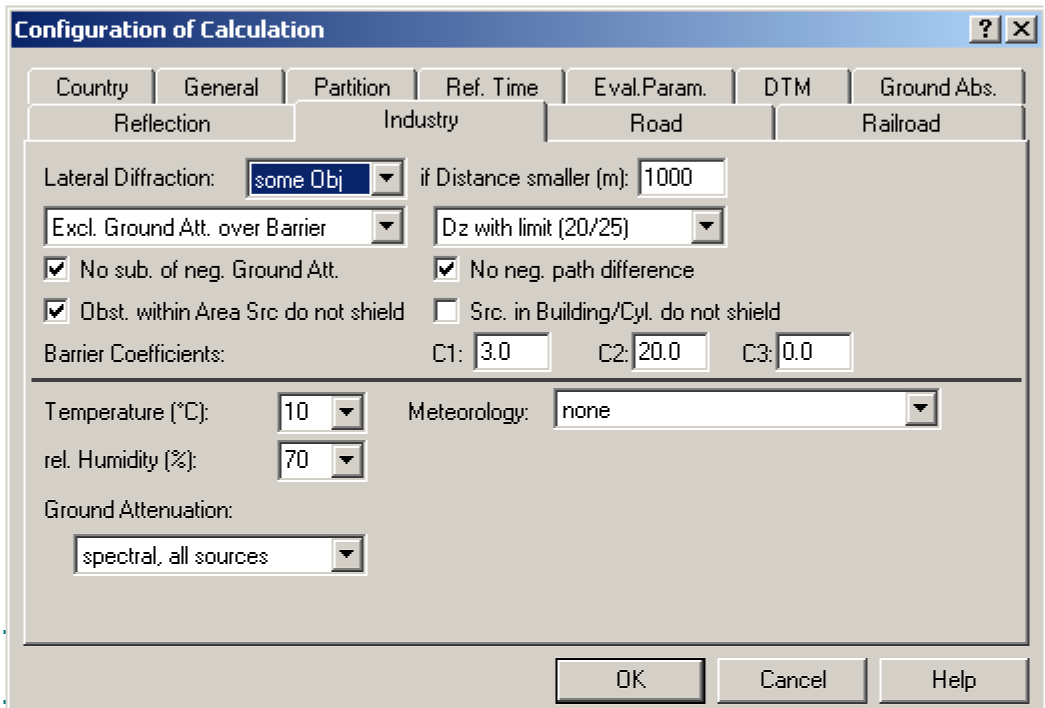


**Figure 2.1 CADNA-A Configurations**

# 3. Noise Sources

The main sources of noise from the Project will be seven inverter clusters, each one containing two inverters and one medium-voltage transformer, and a substation containing the main step-up transformer. The Project layout is provided in Figure A.2. The coordinates of each modeled noise source are presented in Table B.1 of Appendix B.

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

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

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

## 3.1 Substation Transformer

A 10-MVA step-up transformer that will step-up the 27.6-kV power to 44 kV, required by the local distribution company, will be located in the substation. Since the transformer make and model has not been selected at this point (although it is known that the transformer will be of ONAF (oil natural air forced) type), a conservative estimate of sound power level was based on the data from NEMA TRI – 1993 (2000) and 35-$m^2$ transformer surface area. This standard provides maximum sound level values for transformers, and manufacturers routinely meet this specification. Hence, the results based on NEMA may slightly overestimate the impact on POR since the actual transformer is expected to be quieter. The NEMA levels were then converted into frequency spectra using empirical correlations for transformer noise (Crocker, 2007). This calculation is available in Figure B.3 of Appendix B, The transformer configurations are expected to be similar to those shown in Figure B.2. The noise source height representing the transformer was assumed 3.5-m.

Power transformers are considered by the MOE to be tonal noise sources. A 5-dB penalty was added to the sound power spectrum, as recommended by Publication NPC-104, “Sound Level Adjustments” for tonality. Table B.2 in Appendix B shows the frequency spectrum used to model the substation transformer.

## 3.2 Inverter Clusters

Northland is planning to use inverters manufactured by SMA. Seven inverter clusters will be installed as part of the Project. Each cluster comprises of two SMA Sunny Central 800CP inverters and one medium voltage transformer. The installed capacity of each Sunny Central 800CP inverter is 800 kW, making for a total cluster capacity of 1.6 MW. A schematic layout with approximate dimensions of the cluster is available in Figure 3.1. The cluster components listed above were modeled as point sources shown in Figure 3.2. *Note that the planned enclosure over the inverters was not taken into account as a mitigation measure in the noise model.*

SMA provided third-octave noise data for the Sunny Central 800CP inverter (Appendix B). The provided third octave spectrum was converted to a full octave spectrum and the contribution from both inverters was combined into a single sound power spectrum for use with CADNA-A model (calculations are available in Figure B.4 of Appendix B). A 5-dBA penalty was added to the frequency spectrum, as stipulated in Publication NPC-104, “Sound Level Adjustments,” to allow for tonality. The frequency spectrum used to model combined noise emission from the two inverters located next to each other within the same cluster is shown in Table B.2 of Appendix B. Table B. 3 of Appendix B contains coordinates of the individual inverters.

A 1.6-MVA transformer used to step-up the 360-V power from the inverters to 27.6 kV will be located in close proximity to the inverters. Since the transformer make and model have not been selected at this point (although it is known that the transformer will be of ONAN (oil natural air natural) type ), the sound power level resulting from the operation of the transformer was evaluated using data from NEMA TR 1-1993 (R2000) and 14.88-m$^2$ transformer surface area. The NEMA levels were then converted into frequency spectrum using empirical correlations for transformer noise (Crocker, 2007). This calculation is available in Figure B.5 of Appendix B. Power transformers are considered by the MOE to be tonal noise sources. A 5-dB penalty was added to the sound power spectrum, as recommended by Publication NPC-104, “Sound Level Adjustments” for tonality. Table B.2 in Appendix B shows the frequency spectrum used to model the transformers located in the clusters.

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

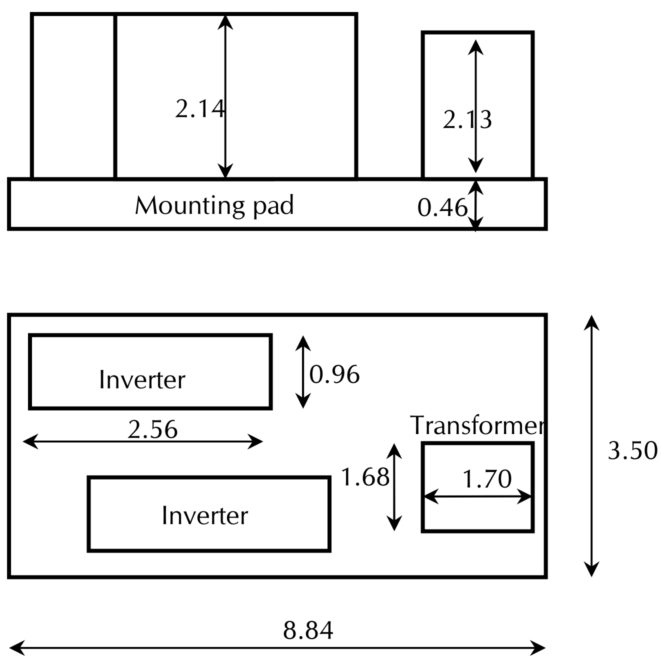


**Figure 3.1 Schematic Inverter Cluster Layout**
(all dimensions in metres)

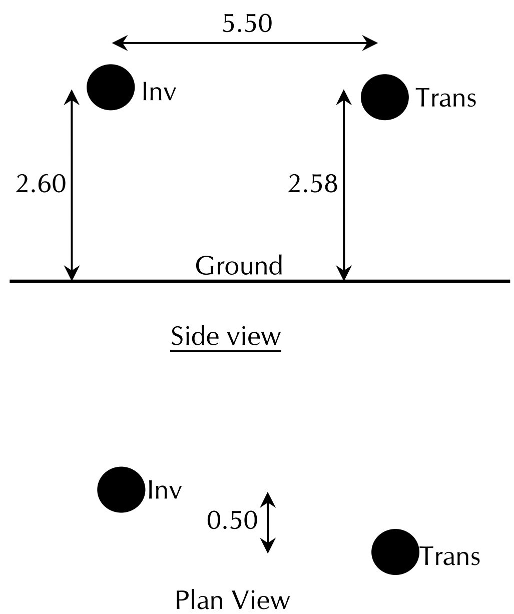


**Figure 3.2 Inverter Cluster CADNA-A Acoustical Model**

where: Inv = Noise Source Representing Two Sunny Central 800CP Inverters; and Trans = Noise Source Representing 360-V/27.6-kV/1.6-MVA Cluster Transformer (all dimensions in metres).

## 3.3 Noise Source Summary Table

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

**Table 3.1 Noise Source Summary for North Burgess Solar Project**

| Source ID | Description | Total Sound Power Level (dBA) | Source Location | Sound Characteristics | Noise Control Measures |
|---|---|---|---|---|---|
| Sub | 27.6-kV/44-kV/10-MVA substation transformer | 90.8 | O | S-T | U |
| Inv1 | Two Sunny Central 800CP inverters at Cluster 1 | 91.3 | O | S-T | U |
| Inv2 | Two Sunny Central 800CP inverters at Cluster 2 | 91.3 | O | S-T | U |
| Inv3 | Two Sunny Central 800CP inverters at Cluster 3 | 91.3 | O | S-T | U |
| Inv4 | Two Sunny Central 800CP inverters at Cluster 4 | 91.3 | O | S-T | U |
| Inv5 | Two Sunny Central 800CP inverters at Cluster 5 | 91.3 | O | S-T | U |
| Inv6 | Two Sunny Central 800CP inverters at Cluster 6 | 91.3 | O | S-T | U |

| Source ID | Description | Total Sound Power Level (dBA) | Source Location | Sound Characteristics | Noise Control Measures |
|---|---|---|---|---|---|
| Inv7 | Two Sunny Central 800CP inverters at Cluster 7 | 91.3 | O | S-T | U |
| Trans1 | 360-V/27.6-kV/1.6-MVA cluster transformer at Cluster 1 | 80.1 | O | S-T | U |
| Trans2 | 360-V/27.6-kV/1.6-MVA cluster transformer at Cluster 2 | 80.1 | O | S-T | U |
| Trans3 | 360-V/27.6-kV/1.6-MVA cluster transformer at Cluster 3 | 80.1 | O | S-T | U |
| Trans4 | 360-V/27.6-kV/1.6-MVA cluster transformer at Cluster 4 | 80.1 | O | S-T | U |
| Trans5 | 360-V/27.6-kV/1.6-MVA cluster transformer at Cluster 5 | 80.1 | O | S-T | U |
| Trans6 | 360-V/27.6-kV/1.6-MVA cluster transformer at Cluster 6 | 80.1 | O | S-T | U |
| Trans7 | 360-V/27.6-kV/1.6-MVA cluster transformer at Cluster 7 | 80.1 | O | S-T | U |

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

## 3.4 Adjacent Solar Projects

To identify the adjacent solar projects, Hatch's internal database of solar projects and MOE records available in http://www.ene.gov.on.ca/environment/en/subject/renewable_energy/projects/index.htm were searched. (September 11, 2012)

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

# 4. Noise Receptors and Points of Reception

The Noise Receptors used in this study were identified from the OBM and Google Earth Pro aerial imagery (June 2005) within 1-km distance from the Project Site[2] boundary, and also from visual observations of the Project Site surroundings conducted in Summer 2010. The Noise Receptors were indentified in accordance with O. Reg. 359/09, and its amendment (O. Reg. 521/10).

The Noise Receptors corresponding to the vacant lots were added based on parcel information provided by First Base Solutions (Teranet Data) and located according to the requirements outlined in O. Reg. 359/09, and its amendment (O. Reg. 521/10).

The total number of Noise Receptors within a 1-km distance from the Project Site of North Burgess Solar Project boundary is 126, including the vacant lots. Noise Receptors were represented in the CADNA-A computer model by Points of Reception (POR) according to the following rules:

1) existing Noise Receptors located in the immediate proximity to the North Burgess Solar Project Site were represented by building footprints with a POR located at the point on the façade where sound pressure level is maximum at 4.5-m above ground height
2) existing Noise Receptors located in the immediate proximity to the North Burgess Solar Project Site were also represented by envelopes extended 30 m from the building footprints and trimmed by property lines with a POR located at the point on the envelope where sound pressure level is maximum at 1.5-m above ground height
3) existing and vacant lot Noise Receptors located further away from the North Burgess Solar Project Site were represented by a POR placed at the center of building footprint elevated 4.5 m above ground
4) existing and vacant lot Noise Receptors located further away from the North Burgess Solar Project Site were also represented by a POR located within 30-m distance measured from the POR position as defined in Item 3) where sound pressure level is max at 1.5 m above ground height.

Six of these POR, identified in Table 4.1 and Table 4.2, were chosen as representative for evaluating the noise contribution from each individual source. These POR were chosen in order to represent sound pressure level contributions on different areas around the Project Location. The complete set of results for all POR representing 126 Noise Receptors is provided in Table 6.2 while a list containing coordinates of building footprint centers for all 126 Noise Receptors is provided in Table C. 1 of Appendix C.

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

**Table 4.1 4.5-m Case - Point of Reception Noise Impact from Individual Noise Sources of North Burgess Solar Project**

| Source ID | Noise Receptor ID | | | | | |
|---|---|---|---|---|---|---|
| | R045 | | R085 | | R104 | |
| | Dist [m] | Sound Pressure Contribution [dBA] | Dist [m] | Sound Pressure Contribution [dBA] | Dist [m] | Sound Pressure Contribution [dBA] |
| Sub | 1582.8 | 12.9 | 285.7 | 30.2 | 833.0 | 20.0 |
| Inv1 | 1240.4 | 15.8 | 445.6 | 26.1 | 854.3 | 19.7 |
| Inv2 | 1383.7 | 14.5 | 303.1 | 29.7 | 938.1 | 18.8 |
| Inv3 | 1536.9 | 13.3 | 238.3 | 31.7 | 862.7 | 19.6 |
| Inv4 | 1441.6 | 14.1 | 436.0 | 26.3 | 665.8 | 22.3 |
| Inv5 | 1327.6 | 15.0 | 671.3 | 22.2 | 429.7 | 26.5 |
| Inv6 | 1226.8 | 15.9 | 770.4 | 20.8 | 338.8 | 28.7 |
| Inv7 | 1074.2 | 17.3 | 858.1 | 19.7 | 334.4 | 28.8 |
| Trans1 | 1240.8 | 4.6 | 445.2 | 15.2 | 849.4 | 8.7 |
| Trans2 | 1384.1 | 3.4 | 302.3 | 18.8 | 933.5 | 7.7 |
| Trans3 | 1538.0 | 2.1 | 242.1 | 20.8 | 859.0 | 8.6 |
| Trans4 | 1443.3 | 2.9 | 439.9 | 15.3 | 662.2 | 11.3 |
| Trans5 | 1330.0 | 3.8 | 675.1 | 11.1 | 426.2 | 15.6 |
| Trans6 | 1229.6 | 4.7 | 773.8 | 9.7 | 334.4 | 17.9 |
| Trans7 | 1077.0 | 6.2 | 860.7 | 8.6 | 328.9 | 18.0 |

**Table 4.2 1.5-m Case - Point of Reception Noise Impact from Individual Noise Sources of North Burgess Solar Project**

| Source ID | Noise Receptor ID | | | | | |
|---|---|---|---|---|---|---|
| | R045 | | R085 | | R104 | |
| | Dist [m] | Sound Pressure Contribution [dBA] | Dist [m] | Sound Pressure Contribution [dBA] | Dist [m] | Sound Pressure Contribution [dBA] |
| Sub | 1554.1 | 10.6 | 258.2 | 29.5 | 810.0 | 18.1 |
| Inv1 | 1213.4 | 13.5 | 423.7 | 24.6 | 825.7 | 17.7 |
| Inv2 | 1357.0 | 12.2 | 283.2 | 28.4 | 910.3 | 16.7 |
| Inv3 | 1508.6 | 11.0 | 208.5 | 31.2 | 838.0 | 17.6 |
| Inv4 | 1412.4 | 11.7 | 406.3 | 25.0 | 641.6 | 20.4 |
| Inv5 | 1297.6 | 12.7 | 641.4 | 20.4 | 405.4 | 25.0 |
| Inv6 | 1196.8 | 13.6 | 740.4 | 18.9 | 311.7 | 27.5 |
| Inv7 | 1044.2 | 15.2 | 828.5 | 17.7 | 305.6 | 27.7 |
| Trans1 | 1213.9 | 2.6 | 423.1 | 14.0 | 820.8 | 7.0 |
| Trans2 | 1357.4 | 1.3 | 282.0 | 17.9 | 905.8 | 5.9 |
| Trans3 | 1509.7 | 0.0 | 212.4 | 20.6 | 834.4 | 6.8 |
| Trans4 | 1414.1 | 0.8 | 410.2 | 14.3 | 638.1 | 9.7 |
| Trans5 | 1300.1 | 1.8 | 645.2 | 9.6 | 402.0 | 14.5 |
| Trans6 | 1199.6 | 2.7 | 743.8 | 8.1 | 307.5 | 17.1 |
| Trans7 | 1047.0 | 4.3 | 831.1 | 6.9 | 300.2 | 17.3 |

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# 5. Mitigation Measures

The analysis indicates that no mitigation measures are necessary to meet the MOE requirement of 40 dBA for all POR.

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# 6. Impact Assessment

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

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

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

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

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

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

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

## 6.1 Compliance with Performance Limits

Table 6.2 presents the predicted sound pressure levels for the POR representing the Noise Receptors located within 1 km from the Project Site. Sound pressure contours at 4.5 m and 1.5 m are available in Figure C.1.1, Figure C.1.2 and Figure C.2. Appendix D includes a detailed calculation log for the representative POR.

The results of this study show that all Noise Receptors are compliant with MOE guidelines based on the 40-dBA performance limit.

**Table 6.2 Calculated Sound Pressure Levels at POR within 1 km of North Burgess Solar Project**
(Shaded rows correspond to representative POR)
Existing = Existing dwelling, Vacant = Vacant Lot. The performance limit is 40.0-dBA.

| Noise Receptor ID | Description | Point of Reception at 4.5 m | | | | | Point of Reception at 1.5 m | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | UTM Coordinates NAD 83 Zone 18 [m] | | Sound Power Level (dBA) | Nearest Project Source | | UTM Coordinates NAD 83 Zone 18 (m) | | Sound Power Level (dBA) | Nearest Project Source | |
| | | X | Y | | Dist[m] | ID | X | Y | | Dist (m) | ID |
| R001 | Existing | 395261.1 | 4963260.8 | 23.8 | 1138.4 | Inv1 | 395290.8 | 4963265.0 | 21.5 | 1108.7 | Inv1 |
| R002 | Existing | 395270.1 | 4964493.8 | 22.3 | 1328.0 | Inv2 | 395293.0 | 4964474.4 | 19.9 | 1298.1 | Inv2 |
| R003 | Existing | 395277.7 | 4963288.0 | 24.0 | 1115.0 | Inv1 | 395307.6 | 4963289.5 | 21.7 | 1085.7 | Inv1 |
| R004 | Existing | 395295.1 | 4963159.8 | 23.8 | 1139.1 | Inv1 | 395323.2 | 4963170.2 | 21.5 | 1109.1 | Inv1 |
| R005 | Vacant | 395352.5 | 4963308.0 | 24.6 | 1037.6 | Inv1 | 395382.4 | 4963309.2 | 22.4 | 1008.4 | Inv1 |
| R006 | Vacant | 395383.1 | 4963190.7 | 24.6 | 1045.9 | Inv1 | 395412.5 | 4963196.6 | 22.3 | 1016.4 | Inv1 |
| R007 | Existing | 395413.1 | 4963334.8 | 25.2 | 972.1 | Inv1 | 395442.0 | 4963342.6 | 23.0 | 942.1 | Inv1 |
| R008 | Existing | 395452.1 | 4963362.8 | 25.6 | 927.5 | Inv1 | 395482.1 | 4963362.8 | 23.5 | 898.3 | Inv1 |
| R009 | Existing | 395486.1 | 4963220.8 | 25.5 | 939.2 | Inv1 | 395515.5 | 4963226.6 | 23.3 | 909.8 | Inv1 |
| R010 | Existing | 395517.1 | 4963368.8 | 26.3 | 862.9 | Inv1 | 395546.1 | 4963376.4 | 24.1 | 832.9 | Inv1 |
| R011 | Existing | 395530.6 | 4963421.0 | 26.5 | 838.4 | Inv1 | 395560.5 | 4963422.5 | 24.4 | 808.7 | Inv1 |
| R012 | Existing | 395547.1 | 4963429.8 | 26.7 | 820.5 | Inv1 | 395577.0 | 4963431.1 | 24.6 | 790.8 | Inv1 |
| R013 | Vacant | 395575.9 | 4963405.9 | 26.9 | 797.1 | Inv1 | 395605.0 | 4963413.0 | 24.9 | 767.1 | Inv1 |
| R014 | Existing | 395627.1 | 4963334.8 | 27.3 | 767.0 | Inv1 | 395656.8 | 4963338.5 | 25.2 | 737.6 | Inv1 |
| R015 | Existing | 395645.1 | 4964152.8 | 26.6 | 827.2 | Inv2 | 395670.1 | 4964136.3 | 24.5 | 797.2 | Inv2 |
| R016 | Existing | 395649.1 | 4963316.8 | 27.4 | 752.3 | Inv1 | 395677.4 | 4963326.6 | 25.4 | 722.3 | Inv1 |
| R017 | Existing | 395656.7 | 4963418.1 | 27.8 | 715.6 | Inv1 | 395685.8 | 4963425.5 | 25.8 | 685.6 | Inv1 |
| R018 | Existing | 395659.1 | 4963319.8 | 27.5 | 741.9 | Inv1 | 395687.4 | 4963329.6 | 25.5 | 711.9 | Inv1 |
| R019 | Existing | 395660.1 | 4964183.8 | 26.6 | 831.0 | Inv2 | 395682.8 | 4964164.2 | 24.5 | 801.3 | Inv2 |
| R020 | Existing | 395670.1 | 4964534.8 | 24.6 | 1059.0 | Inv2 | 395689.4 | 4964511.8 | 22.4 | 1029.0 | Inv2 |

| Noise Receptor ID | Description | Point of Reception at 4.5 m | | | | | Point of Reception at 1.5 m | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | UTM Coordinates NAD 83 Zone 18 [m] | | Sound Power Level (dBA) | Nearest Project Source | | UTM Coordinates NAD 83 Zone 18 (m) | | Sound Power Level (dBA) | Nearest Project Source | |
| | | X | Y | | Dist[m] | ID | X | Y | | Dist (m) | ID |
| R021 | Existing | 395711.2 | 4963334.9 | 28.2 | 687.8 | Inv1 | 395739.6 | 4963344.8 | 26.2 | 657.8 | Inv1 |
| R022 | Vacant | 395756.6 | 4963961.6 | 28.7 | 641.9 | Inv2 | 395784.1 | 4963949.6 | 26.8 | 611.9 | Inv2 |
| R023 | Existing | 395761.1 | 4963356.8 | 28.8 | 633.4 | Inv1 | 395789.4 | 4963366.5 | 26.9 | 603.4 | Inv1 |
| R024 | Existing | 395783.7 | 4964265.6 | 27.2 | 784.9 | Inv2 | 395810.1 | 4964251.3 | 25.2 | 755.9 | Inv2 |
| R025 | Existing | 395795.1 | 4964315.8 | 27.0 | 812.3 | Inv2 | 395815.1 | 4964293.4 | 24.9 | 782.3 | Inv2 |
| R026 | Vacant | 395818.1 | 4963557.0 | 30.2 | 536.0 | Inv1 | 395846.7 | 4963565.9 | 28.5 | 507.1 | Inv1 |
| R027 | Existing | 395831.1 | 4963662.8 | 30.5 | 526.4 | Inv2 | 395861.1 | 4963663.5 | 28.8 | 496.5 | Inv2 |
| R028 | Existing | 395842.4 | 4965290.4 | 20.6 | 1630.9 | Inv3 | 395854.7 | 4965263.0 | 18.2 | 1600.9 | Inv3 |
| R029 | Existing | 395843.7 | 4965313.1 | 20.4 | 1650.6 | Inv3 | 395855.9 | 4965285.6 | 18.0 | 1620.7 | Inv3 |
| R030 | Existing | 395844.1 | 4963409.8 | 30.1 | 537.3 | Inv1 | 395872.7 | 4963418.9 | 28.3 | 507.3 | Inv1 |
| R031 | Existing | 395854.6 | 4962970.4 | 27.4 | 788.2 | Inv1 | 395877.6 | 4962989.6 | 25.3 | 758.8 | Inv1 |
| R032 | Existing | 395860.1 | 4963346.4 | 30.0 | 546.3 | Inv1 | 395887.9 | 4963357.5 | 28.1 | 516.3 | Inv1 |
| R033 | Existing | 395871.5 | 4963399.7 | 30.4 | 515.0 | Inv1 | 395899.9 | 4963409.3 | 28.6 | 485.0 | Inv1 |
| R034 | Existing | 395897.8 | 4963218.8 | 29.6 | 581.9 | Inv1 | 395923.9 | 4963233.7 | 27.7 | 552.3 | Inv1 |
| R035 | Existing | 395899.1 | 4963192.8 | 29.4 | 597.5 | Inv1 | 395924.7 | 4963208.3 | 27.5 | 567.9 | Inv1 |
| R036 | Vacant | 395944.0 | 4964507.8 | 26.5 | 882.6 | Inv2 | 395960.3 | 4964482.6 | 24.4 | 852.8 | Inv2 |
| R037 | Existing | 395950.6 | 4963398.1 | 31.5 | 442.3 | Inv1 | 395978.0 | 4963410.3 | 29.8 | 412.3 | Inv1 |
| R038 | Existing | 395972.8 | 4963467.3 | 32.3 | 397.3 | Inv1 | 396001.6 | 4963475.7 | 30.7 | 367.3 | Inv1 |
| R039 | Existing | 395978.1 | 4964546.8 | 26.4 | 902.7 | Inv2 | 395993.5 | 4964521.0 | 24.3 | 872.9 | Inv2 |
| R040 | Existing | 395981.2 | 4964570.9 | 26.2 | 923.4 | Inv2 | 395996.3 | 4964545.0 | 24.1 | 893.6 | Inv2 |
| R041 | Existing | 395989.1 | 4963438.8 | 32.4 | 391.1 | Inv1 | 396017.5 | 4963448.4 | 30.8 | 361.2 | Inv1 |
| R042 | Existing | 396010.4 | 4964668.3 | 25.6 | 1003.0 | Inv2 | 396024.3 | 4964641.8 | 23.4 | 973.2 | Inv2 |
| R043 | Vacant | 396076.8 | 4964785.0 | 24.9 | 1074.2 | Inv3 | 396089.0 | 4964757.6 | 22.7 | 1044.3 | Inv3 |

| Noise Receptor ID | Description | Point of Reception at 4.5 m | | | | | Point of Reception at 1.5 m | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | UTM Coordinates NAD 83 Zone 18 [m] | | Sound Power Level (dBA) | Nearest Project Source | | UTM Coordinates NAD 83 Zone 18 (m) | | Sound Power Level (dBA) | Nearest Project Source | |
| | | X | Y | | Dist[m] | ID | X | Y | | Dist (m) | ID |
| R044 | Existing | 396080.1 | 4962872.8 | 28.4 | 758.8 | Inv1 | 396095.3 | 4962898.6 | 26.4 | 729.2 | Inv1 |
| R045 | Existing | 396134.1 | 4962359.8 | 24.4 | 1074.2 | Inv7 | 396151.7 | 4962384.0 | 22.1 | 1044.2 | Inv7 |
| R046 | Vacant | 396137.7 | 4964949.3 | 23.7 | 1198.8 | Inv3 | 396148.0 | 4964921.1 | 21.5 | 1168.8 | Inv3 |
| R047 | Existing | 396148.1 | 4962472.8 | 25.4 | 975.9 | Inv7 | 396160.7 | 4962500.0 | 23.2 | 946.9 | Inv7 |
| R048 | Existing | 396157.1 | 4962223.8 | 23.4 | 1175.1 | Inv7 | 396172.6 | 4962249.4 | 21.1 | 1145.1 | Inv7 |
| R049 | Existing | 396160.5 | 4962786.5 | 28.1 | 748.4 | Inv7 | 396181.4 | 4962808.0 | 26.1 | 718.9 | Inv7 |
| R050 | Existing | 396166.1 | 4962248.8 | 23.7 | 1149.1 | Inv7 | 396180.4 | 4962275.1 | 21.4 | 1119.1 | Inv7 |
| R051 | Existing | 396171.1 | 4962373.8 | 24.6 | 1041.4 | Inv7 | 396188.2 | 4962398.4 | 22.4 | 1011.4 | Inv7 |
| R052 | Existing | 396173.1 | 4962163.8 | 23.1 | 1219.1 | Inv7 | 396187.7 | 4962190.0 | 20.7 | 1189.1 | Inv7 |
| R053 | Existing | 396175.1 | 4962708.8 | 27.5 | 786.1 | Inv7 | 396194.6 | 4962731.6 | 25.4 | 756.4 | Inv7 |
| R054 | Existing | 396176.1 | 4962381.8 | 24.7 | 1032.0 | Inv7 | 396187.4 | 4962409.5 | 22.5 | 1002.7 | Inv7 |
| R055 | Existing | 396179.1 | 4962314.8 | 24.2 | 1086.2 | Inv7 | 396195.3 | 4962340.0 | 21.9 | 1056.2 | Inv7 |
| R056 | Existing | 396180.1 | 4962360.8 | 24.6 | 1047.1 | Inv7 | 396196.9 | 4962385.6 | 22.3 | 1017.1 | Inv7 |
| R057 | Vacant | 396181.6 | 4965056.9 | 23.0 | 1285.6 | Inv3 | 396190.8 | 4965028.3 | 20.7 | 1255.6 | Inv3 |
| R058 | Existing | 396210.1 | 4962344.8 | 24.5 | 1044.2 | Inv7 | 396224.6 | 4962371.0 | 22.3 | 1014.3 | Inv7 |
| R059 | Existing | 396214.1 | 4962397.8 | 25.0 | 997.5 | Inv7 | 396224.9 | 4962425.8 | 22.8 | 968.2 | Inv7 |
| R060 | Existing | 396214.4 | 4962602.8 | 26.8 | 833.7 | Inv7 | 396226.9 | 4962630.1 | 24.6 | 805.0 | Inv7 |
| R061 | Existing | 396219.1 | 4962163.8 | 23.2 | 1197.5 | Inv7 | 396228.3 | 4962192.3 | 20.9 | 1167.9 | Inv7 |
| R062 | Existing | 396225.1 | 4962460.8 | 25.6 | 939.2 | Inv7 | 396236.1 | 4962488.7 | 23.4 | 910.0 | Inv7 |
| R063 | Existing | 396225.9 | 4962553.1 | 26.4 | 864.6 | Inv7 | 396242.4 | 4962578.1 | 24.2 | 834.7 | Inv7 |
| R064 | Existing | 396232.1 | 4962510.3 | 26.0 | 894.8 | Inv7 | 396247.9 | 4962535.8 | 23.9 | 864.9 | Inv7 |
| R065 | Existing | 396239.4 | 4962346.7 | 24.7 | 1027.4 | Inv7 | 396254.8 | 4962372.4 | 22.4 | 997.4 | Inv7 |
| R066 | Existing | 396242.4 | 4962493.9 | 25.9 | 902.1 | Inv7 | 396257.9 | 4962519.6 | 23.7 | 872.2 | Inv7 |

| Noise Receptor ID | Description | Point of Reception at 4.5 m | | | | | Point of Reception at 1.5 m | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | UTM Coordinates NAD 83 Zone 18 [m] | | Sound Power Level (dBA) | Nearest Project Source | | UTM Coordinates NAD 83 Zone 18 (m) | | Sound Power Level (dBA) | Nearest Project Source | |
| | | X | Y | | Dist[m] | ID | X | Y | | Dist (m) | ID |
| R067 | Existing | 396246.1 | 4962365.8 | 24.8 | 1007.6 | Inv7 | 396261.6 | 4962391.4 | 22.6 | 977.6 | Inv7 |
| R068 | Existing | 396257.1 | 4962377.8 | 25.0 | 991.6 | Inv7 | 396272.5 | 4962403.5 | 22.7 | 961.6 | Inv7 |
| R069 | Vacant | 396273.7 | 4965392.8 | 20.8 | 1587.0 | Sub | 396280.4 | 4965363.6 | 18.4 | 1557.0 | Sub |
| R070 | Existing | 396277.1 | 4962387.8 | 25.1 | 972.9 | Inv7 | 396292.2 | 4962413.7 | 22.9 | 942.9 | Inv7 |
| R071 | Existing | 396283.1 | 4962459.8 | 25.8 | 908.0 | Inv7 | 396299.0 | 4962485.2 | 23.6 | 878.0 | Inv7 |
| R072 | Vacant | 396295.7 | 4962299.5 | 24.4 | 1041.8 | Inv7 | 396309.3 | 4962326.3 | 22.2 | 1011.8 | Inv7 |
| R073 | Existing | 396309.4 | 4962492.5 | 26.1 | 866.4 | Inv7 | 396325.2 | 4962517.9 | 24.0 | 836.4 | Inv7 |
| R074 | Existing | 396311.1 | 4962418.8 | 25.5 | 929.2 | Inv7 | 396324.4 | 4962445.6 | 23.3 | 899.2 | Inv7 |
| R075 | Existing | 396327.1 | 4962432.8 | 25.7 | 909.2 | Inv7 | 396341.6 | 4962459.0 | 23.5 | 879.2 | Inv7 |
| R076 | Existing | 396345.0 | 4962511.8 | 26.4 | 831.5 | Inv7 | 396358.6 | 4962538.5 | 24.3 | 801.6 | Inv7 |
| R077 | Vacant | 396346.1 | 4962338.2 | 24.9 | 985.0 | Inv7 | 396354.0 | 4962367.2 | 22.7 | 955.4 | Inv7 |
| R078 | Existing | 396373.9 | 4964010.3 | 36.5 | 267.3 | Inv3 | 396389.2 | 4963984.4 | 35.5 | 238.8 | Inv3 |
| R079 | Existing | 396396.1 | 4962481.8 | 26.3 | 833.9 | Inv7 | 396409.4 | 4962508.6 | 24.2 | 803.9 | Inv7 |
| R080 | Existing | 396400.3 | 4964049.4 | 36.0 | 277.6 | Inv3 | 396412.3 | 4964022.0 | 34.9 | 248.7 | Inv3 |
| R081 | Vacant | 396408.4 | 4962391.4 | 25.5 | 911.1 | Inv7 | 396420.2 | 4962419.0 | 23.3 | 881.1 | Inv7 |
| R082 | Existing | 396418.9 | 4962572.1 | 27.3 | 743.0 | Inv7 | 396432.9 | 4962598.6 | 25.2 | 713.0 | Inv7 |
| R083 | Existing | 396420.1 | 4962507.8 | 26.7 | 800.1 | Inv7 | 396433.1 | 4962534.8 | 24.5 | 770.1 | Inv7 |
| R084 | Existing | 396419.8 | 4964059.3 | 36.0 | 273.9 | Inv3 | 396434.1 | 4964032.9 | 34.9 | 244.1 | Inv3 |
| R085 | Existing | 396426.6 | 4964020.1 | 37.0 | 238.3 | Inv3 | 396442.6 | 4963994.8 | 36.0 | 208.5 | Inv3 |
| R086 | Existing | 396438.1 | 4964270.9 | 32.2 | 458.8 | Inv3 | 396447.1 | 4964242.3 | 30.6 | 428.8 | Inv3 |
| R087 | Existing | 396447.1 | 4962610.8 | 27.8 | 695.7 | Inv7 | 396460.9 | 4962637.4 | 25.8 | 665.7 | Inv7 |
| R088 | Existing | 396457.1 | 4964263.8 | 32.4 | 446.7 | Inv3 | 396465.7 | 4964235.0 | 30.8 | 416.7 | Inv3 |
| R090 | Existing | 396576.5 | 4962694.4 | 29.2 | 567.8 | Inv7 | 396586.6 | 4962722.6 | 27.3 | 537.8 | Inv7 |

| Noise Receptor ID | Description | Point of Reception at 4.5 m | | | | | Point of Reception at 1.5 m | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | UTM Coordinates NAD 83 Zone 18 [m] | | Sound Power Level (dBA) | Nearest Project Source | | UTM Coordinates NAD 83 Zone 18 (m) | | Sound Power Level (dBA) | Nearest Project Source | |
| | | X | Y | | Dist[m] | ID | X | Y | | Dist (m) | ID |
| R091 | Existing | 396584.1 | 4964665.8 | 27.1 | 816.0 | Sub | 396587.9 | 4964636.0 | 25.1 | 786.0 | Sub |
| R092 | Vacant | 396589.3 | 4965062.9 | 23.4 | 1211.7 | Sub | 396592.2 | 4965033.0 | 21.2 | 1181.7 | Sub |
| R093 | Existing | 396595.1 | 4964630.8 | 27.5 | 780.1 | Sub | 396598.7 | 4964601.0 | 25.5 | 750.2 | Sub |
| R094 | Existing | 396610.1 | 4964654.8 | 27.3 | 803.0 | Sub | 396608.9 | 4964624.8 | 25.2 | 773.2 | Sub |
| R095 | Existing | 396620.1 | 4962544.8 | 27.5 | 700.7 | Inv7 | 396626.4 | 4962574.1 | 25.5 | 670.7 | Inv7 |
| R096 | Existing | 396630.1 | 4964645.8 | 27.4 | 793.1 | Sub | 396628.2 | 4964615.8 | 25.3 | 763.2 | Sub |
| R097 | Vacant | 396680.7 | 4964876.1 | 25.0 | 1023.1 | Sub | 396681.4 | 4964846.1 | 22.8 | 993.1 | Sub |
| R098 | Existing | 396812.9 | 4962953.5 | 34.0 | 280.3 | Trans7 | 396827.5 | 4962979.8 | 32.6 | 257.4 | Trans7 |
| R099 | Existing | 396836.1 | 4964862.8 | 25.0 | 1025.1 | Sub | 396832.9 | 4964832.9 | 22.8 | 995.1 | Sub |
| R100 | Existing | 396869.1 | 4964896.8 | 24.6 | 1064.6 | Sub | 396867.2 | 4964866.8 | 22.4 | 1034.9 | Sub |
| R101 | Existing | 396870.2 | 4962973.5 | 34.2 | 276.2 | Trans7 | 396858.7 | 4963001.2 | 33.0 | 246.3 | Trans7 |
| R102 | Existing | 397055.8 | 4962694.1 | 28.6 | 608.3 | Trans7 | 397041.6 | 4962720.5 | 26.7 | 578.3 | Trans7 |
| R103 | Existing | 397085.2 | 4963040.0 | 32.9 | 369.6 | Trans7 | 397063.4 | 4963060.6 | 31.5 | 340.4 | Trans7 |
| R104 | Existing | 397083.8 | 4963137.0 | 34.3 | 328.9 | Trans7 | 397057.0 | 4963148.1 | 32.9 | 300.2 | Trans7 |
| R105 | Existing | 397101.1 | 4962703.8 | 28.5 | 622.8 | Trans7 | 397085.0 | 4962729.1 | 26.5 | 592.8 | Trans7 |
| R106 | Existing | 397119.1 | 4963973.8 | 32.4 | 476.1 | Sub | 397094.6 | 4963956.4 | 30.8 | 448.2 | Sub |
| R107 | Existing | 397124.1 | 4963188.8 | 34.1 | 334.6 | Trans6 | 397104.2 | 4963186.7 | 32.5 | 319.2 | Trans6 |
| R108 | Vacant | 397134.1 | 4963071.8 | 32.6 | 398.7 | Trans7 | 397112.9 | 4963093.0 | 31.1 | 370.9 | Trans7 |
| R109 | Existing | 397139.1 | 4963974.8 | 32.1 | 495.7 | Sub | 397114.2 | 4963957.9 | 30.5 | 467.7 | Sub |
| R110 | Vacant | 397175.8 | 4963111.9 | 32.5 | 421.0 | Trans6 | 397151.9 | 4963130.0 | 30.9 | 391.0 | Trans6 |
| R111 | Existing | 397218.1 | 4963044.3 | 31.2 | 486.7 | Trans7 | 397195.3 | 4963063.8 | 29.5 | 458.2 | Trans7 |
| R112 | Existing | 397277.0 | 4963001.8 | 30.1 | 557.6 | Trans7 | 397253.9 | 4963021.0 | 28.3 | 528.8 | Trans7 |
| R113 | Existing | 397304.0 | 4962942.3 | 29.3 | 608.2 | Trans7 | 397281.9 | 4962962.5 | 27.4 | 579.1 | Trans7 |

| Noise Receptor ID | Description | Point of Reception at 4.5 m | | | | | Point of Reception at 1.5 m | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | UTM Coordinates NAD 83 Zone 18 [m] | | Sound Power Level (dBA) | Nearest Project Source | | UTM Coordinates NAD 83 Zone 18 (m) | | Sound Power Level (dBA) | Nearest Project Source | |
| | | X | Y | | Dist[m] | ID | X | Y | | Dist (m) | ID |
| R114 | Existing | 397377.1 | 4963131.8 | 29.8 | 585.7 | Trans6 | 397349.6 | 4963143.8 | 28.0 | 555.7 | Trans6 |
| R115 | Existing | 397382.1 | 4963151.8 | 29.9 | 582.7 | Trans6 | 397354.2 | 4963162.8 | 28.1 | 552.7 | Trans6 |
| R116 | Existing | 397423.2 | 4963165.6 | 29.4 | 616.4 | Trans6 | 397394.8 | 4963175.4 | 27.6 | 586.4 | Trans6 |
| R117 | Existing | 397511.8 | 4963405.2 | 29.1 | 672.6 | Trans6 | 397481.8 | 4963403.4 | 27.1 | 642.6 | Trans6 |
| R118 | Vacant | 397603.1 | 4963471.8 | 28.0 | 762.9 | Trans5 | 397573.4 | 4963467.6 | 26.0 | 733.3 | Trans5 |
| R119 | Existing | 397661.0 | 4962791.5 | 25.1 | 994.7 | Trans7 | 397634.1 | 4962804.7 | 22.9 | 964.7 | Trans7 |
| R120 | Vacant | 397707.1 | 4962497.9 | 23.2 | 1190.6 | Trans7 | 397683.4 | 4962516.4 | 20.9 | 1160.6 | Trans7 |
| R121 | Existing | 397715.1 | 4963577.8 | 26.8 | 879.4 | Trans5 | 397685.2 | 4963574.7 | 24.7 | 849.4 | Trans5 |
| R122 | Existing | 397738.1 | 4963598.8 | 26.5 | 904.6 | Trans5 | 397709.0 | 4963591.2 | 24.4 | 874.9 | Trans5 |
| R123 | Existing | 397739.1 | 4963616.8 | 26.5 | 908.0 | Trans5 | 397709.4 | 4963612.5 | 24.4 | 878.0 | Trans5 |
| R124 | Existing | 397745.1 | 4963606.8 | 26.5 | 912.6 | Trans5 | 397716.1 | 4963599.1 | 24.3 | 882.9 | Trans5 |
| R125 | Existing | 397869.8 | 4963612.3 | 25.3 | 1037.0 | Trans5 | 397840.6 | 4963605.4 | 23.1 | 1007.2 | Trans5 |
| R126 | Vacant | 397876.4 | 4963702.1 | 25.1 | 1058.2 | Trans5 | 397847.8 | 4963692.9 | 22.9 | 1028.3 | Trans5 |

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# 7. Conclusions and Recommendations

For the North Burgess Solar Project, the sound pressure levels at the POR have been estimated using the CADNA-A model, based on ISO 9613-2. No mitigations are required for the Project operation.

Based on the results obtained in this study, it is concluded that the sound pressure levels at the POR, resulting from the North Burgess Solar Project operation, will be below MOE requirements for Class 3 areas of 40 dBA at all times.

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# 8. Signatures

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**Report Reviewed and Approved By**

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Sept 13, 2012

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# 9. References

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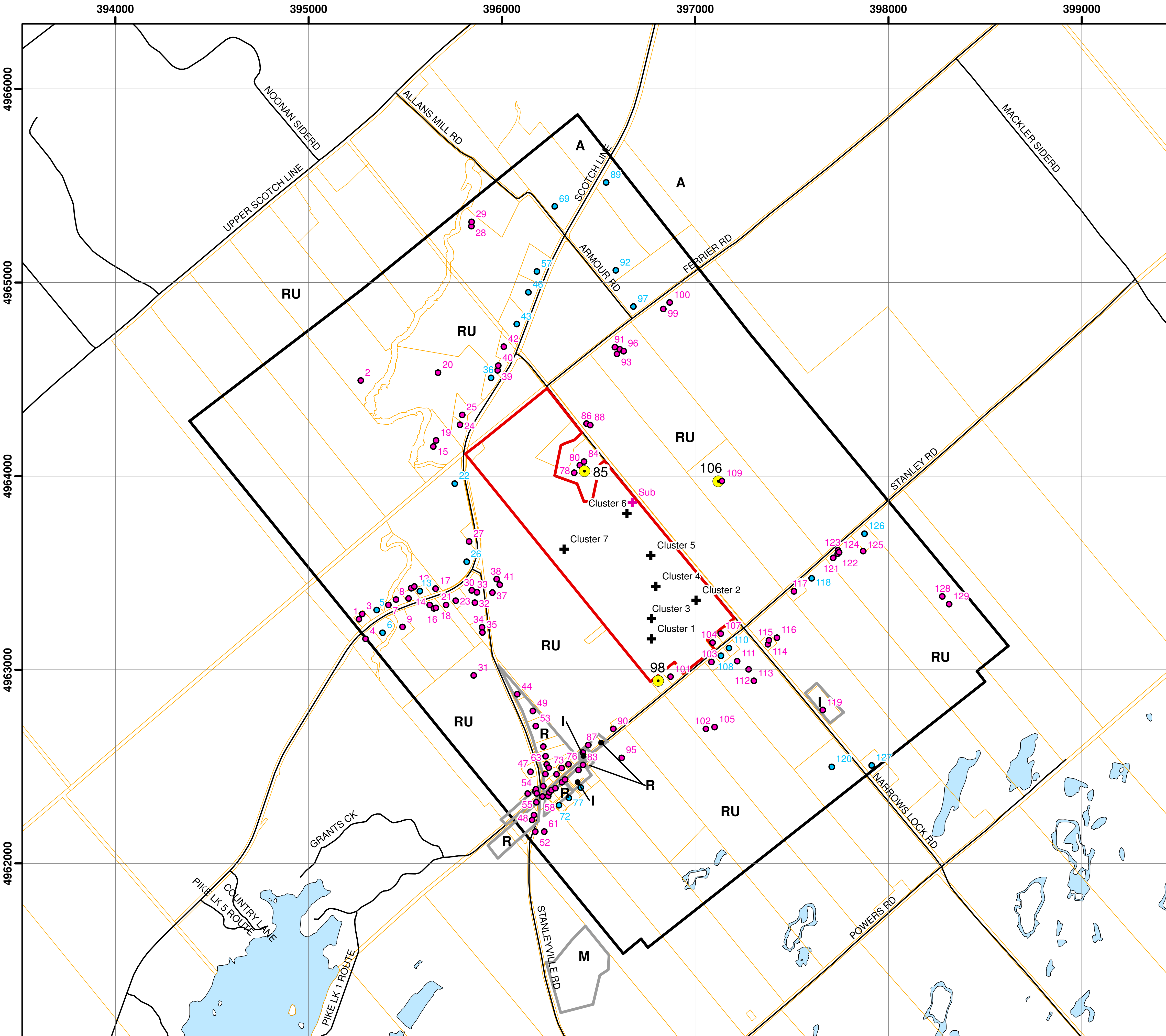
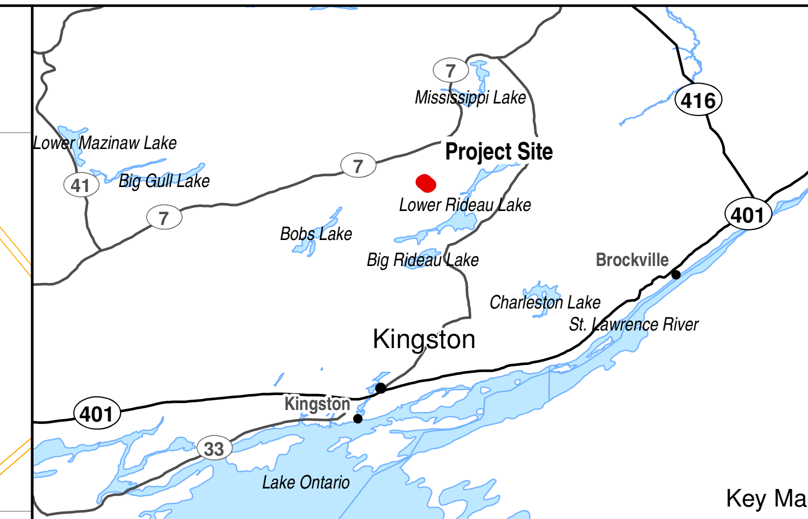
# Appendix A

# Land Use Zoning Designation Plan and Area Location Plan




## Legend

- Cluster # Inverter Cluster
- SUB Substation Transformer
- # Noise Receptor - Existing
- # Noise Receptor - Vacant
- # Representative Noise Receptor
- Road
- Parcel
- Project Site
- 1000 m from Project Site
- Waterbody
- Zone Boundary

**ZONES**

| | |
|---|---|
| RU | Rural |
| A | Agriculture |
| R | General Residential |
| I | Institutional |
| M | General Industrial |

Notes:
1. Produced by Hatch under licence from Ontario Ministry of Natural Resources, Copyright (c) Queens Printer 2011.
2. Spatial referencing UTM NAD 83.
3. Zoning information obtained from Zoning By Law 02-121 Schedule A1, Tay Valley Township, Dec. 2008

0 125 250 500 Meters

NORTH

1:20,000

Figure A.1
Northland Power Solar
North Burgess L.P.

**North Burgess Solar Project**
**Zoning Designation Plan**

HATCH

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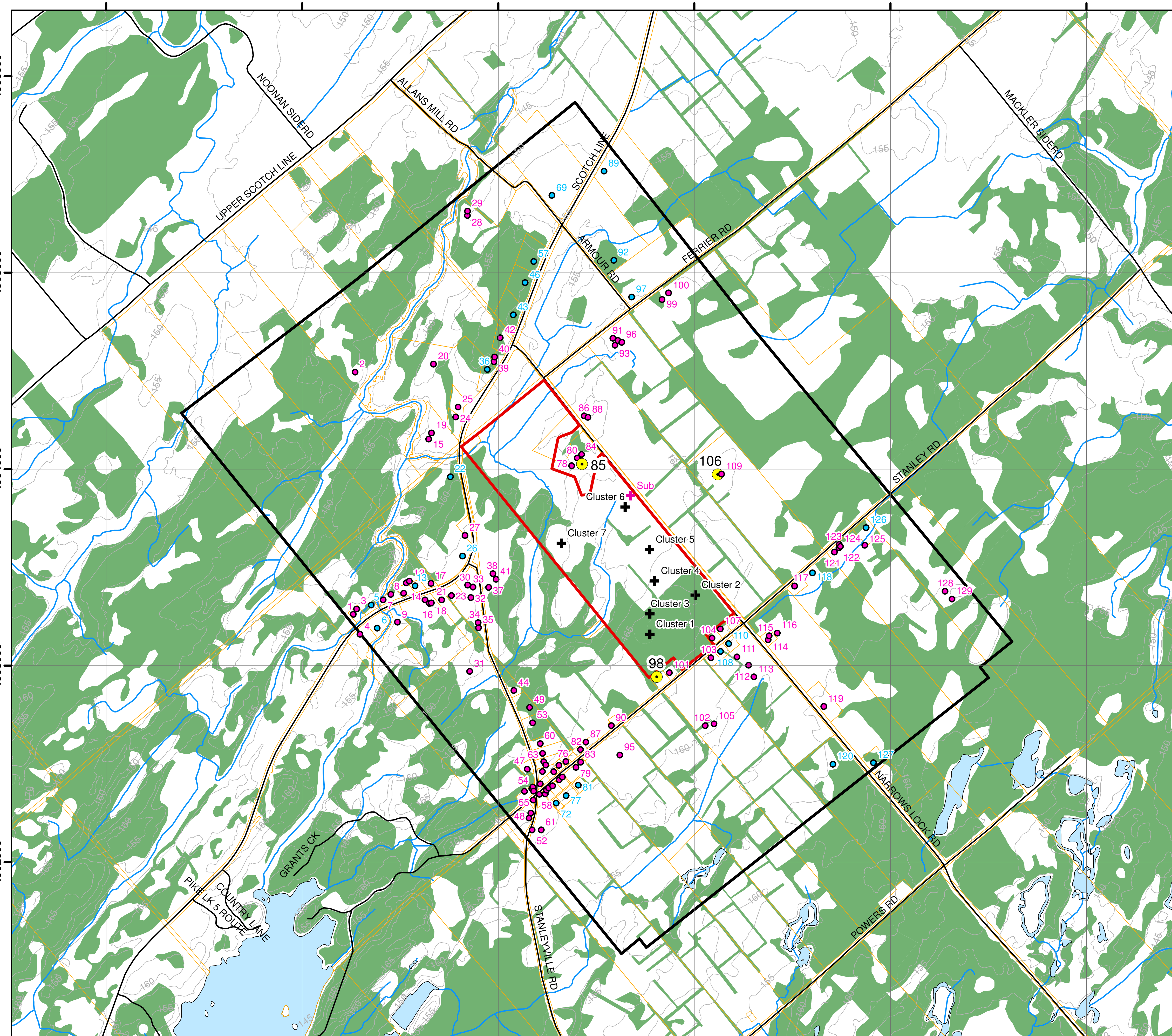


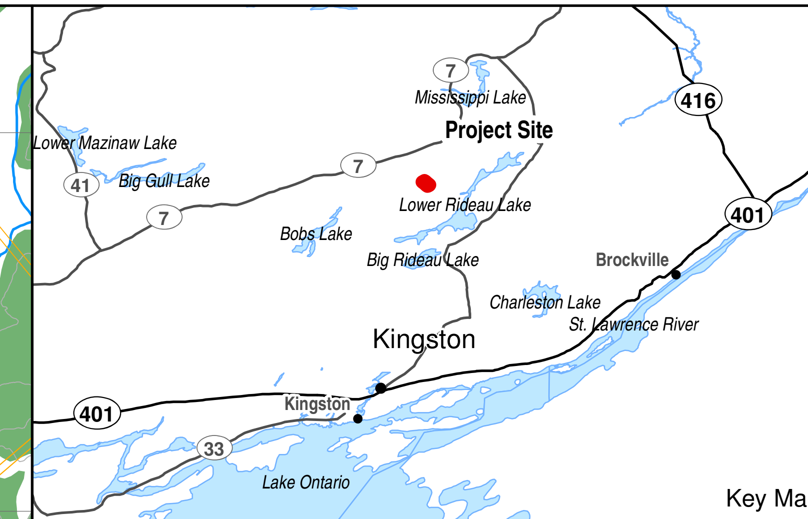


## Legend

- Inverter Cluster (Cluster #)
- Substation Transformer (SUB)
- Noise Receptor - Existing
- Noise Receptor - Vacant
- Representative Noise Receptor
- Road
- Topographic Contour (5m interval)
- Watercourse
- Parcel
- Project Site
- 1000 m from Project Site
- Waterbody
- Woodland

Notes:
1. Produced by Hatch under licence from Ontario Ministry of Natural Resources, Copyright (c) Queens Printer 2011.
2. Spatial referencing UTM NAD 83.
3. Due to scale limitations, the three-part inverter unit is represented as a single point.

0 125 250 500 Meters

1:20,000

NORTH

Figure A.2
Northland Power Solar
North Burgess L.P.

**North Burgess Solar Project**
**Scaled Area Location Plan**

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# Appendix B

# Noise Sources

**Table B.1 Point Sources from North Burgess Solar Project Used in CADNA-A, Includes 5.0-dBA Tonality Penalty**

| Source ID | Description | Spectra ID | Total sound power level (dBA) | Correction (dBA) | Height (m) | UTM Coordinates, NAD 83 Zone 18 (m) | |
|---|---|---|---|---|---|---|---|
| | | | | | | X | Y |
| Sub | 27.6-kV/44-kV/10-MVA substation transformer | T44kV_10MVA | 90.8 | 5.0 | 3.50 | 396658.5 | 4963853.2 |
| Inv1 | Two Sunny Central 800CP inverters at Cluster 1 | SMA_SC800CPX2 | 91.3 | 5.0 | 2.60 | 396353.6 | 4963580.5 |
| Inv2 | Two Sunny Central 800CP inverters at Cluster 2 | SMA_SC800CPX2 | 91.3 | 5.0 | 2.60 | 396353.6 | 4963725.9 |
| Inv3 | Two Sunny Central 800CP inverters at Cluster 3 | SMA_SC800CPX2 | 91.3 | 5.0 | 2.60 | 396573.4 | 4963832.5 |
| Inv4 | Two Sunny Central 800CP inverters at Cluster 4 | SMA_SC800CPX2 | 91.3 | 5.0 | 2.60 | 396704.1 | 4963683.9 |
| Inv5 | Two Sunny Central 800CP inverters at Cluster 5 | SMA_SC800CPX2 | 91.3 | 5.0 | 2.60 | 396834.9 | 4963487.3 |
| Inv6 | Two Sunny Central 800CP inverters at Cluster 6 | SMA_SC800CPX2 | 91.3 | 5.0 | 2.60 | 396834.8 | 4963366.8 |
| Inv7 | Two Sunny Central 800CP inverters at Cluster 7 | SMA_SC800CPX2 | 91.3 | 5.0 | 2.60 | 396762.8 | 4963230.7 |
| Trans1 | 360-V/27.6-kV/1.6-MVA cluster transformer at Cluster 1 | T27.6kV_1.6MVA | 80.1 | 5.0 | 2.58 | 396359.1 | 4963580.0 |
| Trans2 | 360-V/27.6-kV/1.6-MVA cluster transformer at Cluster 2 | T27.6kV_1.6MVA | 80.1 | 5.0 | 2.58 | 396359.1 | 4963725.4 |
| Trans3 | 360-V/27.6-kV/1.6-MVA cluster transformer at Cluster 3 | T27.6kV_1.6MVA | 80.1 | 5.0 | 2.58 | 396578.9 | 4963832.0 |
| Trans4 | 360-V/27.6-kV/1.6-MVA cluster transformer at Cluster 4 | T27.6kV_1.6MVA | 80.1 | 5.0 | 2.58 | 396709.6 | 4963683.4 |
| Trans5 | 360-V/27.6-kV/1.6-MVA cluster transformer at Cluster 5 | T27.6kV_1.6MVA | 80.1 | 5.0 | 2.58 | 396840.4 | 4963486.8 |
| Trans6 | 360-V/27.6-kV/1.6-MVA cluster transformer at Cluster 6 | T27.6kV_1.6MVA | 80.1 | 5.0 | 2.58 | 396840.3 | 4963366.3 |
| Trans7 | 360-V/27.6-kV/1.6-MVA cluster transformer at Cluster 7 | T27.6kV_1.6MVA | 80.1 | 5.0 | 2.58 | 396768.3 | 4963230.2 |

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

| Spectra ID | Octave Spectrum (dBA) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 31.5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | A |
| SMA_SC800CPX2 | | 63.1 | 73.9 | 80.5 | 82.3 | 78.7 | 74.1 | 65.0 | 72.7 | 86.3 |
| T27.6kV_1.6MVA | 32.3 | 51.5 | 63.6 | 66.1 | 71.5 | 68.7 | 64.9 | 59.7 | 50.6 | 75.1 |
| T44kV_10MVA | 43.0 | 62.2 | 74.3 | 76.8 | 82.2 | 79.4 | 75.6 | 70.4 | 61.3 | 85.8 |

**Table B. 3 Individual Inverter Coordinates for North Burgess Solar Project**
Note: Modeled noise source representing inverter cluster uses a central location of the cluster. This table provides central points of individual inverters found within the same cluster.

| Inverter ID | Description | Sound Power Level (dBA) | UTM Coordinates NAD 83 Zone 18 [m] | |
|---|---|---|---|---|
| | | | X | Y |
| Inv1.1 | Sunny Central 800CP inverter at Cluster 1 | 83.3 | 396353.61 | 4963581.66 |
| Inv1.2 | Sunny Central 800CP inverter at Cluster 1 | 83.3 | 396353.61 | 4963579.42 |
| Inv2.1 | Sunny Central 800CP inverter at Cluster 2 | 83.3 | 396353.61 | 4963727.06 |
| Inv2.2 | Sunny Central 800CP inverter at Cluster 2 | 83.3 | 396353.61 | 4963724.82 |
| Inv3.1 | Sunny Central 800CP inverter at Cluster 3 | 83.3 | 396573.44 | 4963833.60 |
| Inv3.2 | Sunny Central 800CP inverter at Cluster 3 | 83.3 | 396573.44 | 4963831.36 |
| Inv4.1 | Sunny Central 800CP inverter at Cluster 4 | 83.3 | 396704.12 | 4963685.00 |
| Inv4.2 | Sunny Central 800CP inverter at Cluster 4 | 83.3 | 396704.12 | 4963682.76 |
| Inv5.1 | Sunny Central 800CP inverter at Cluster 5 | 83.3 | 396834.87 | 4963488.40 |
| Inv5.2 | Sunny Central 800CP inverter at Cluster 5 | 83.3 | 396834.87 | 4963486.16 |
| Inv6.1 | Sunny Central 800CP inverter at Cluster 6 | 83.3 | 396834.81 | 4963367.88 |
| Inv6.2 | Sunny Central 800CP inverter at Cluster 6 | 83.3 | 396834.81 | 4963365.64 |
| Inv7.1 | Sunny Central 800CP inverter at Cluster 7 | 83.3 | 396762.81 | 4963231.85 |
| Inv7.2 | Sunny Central 800CP inverter at Cluster 7 | 83.3 | 396762.81 | 4963229.61 |

# SUNNY CENTRAL 720CP / 760CP / 800CP

SC 720CP-10 / SC 760CP-10 / SC 800CP-10

**Economic**

- Direct deployment in the field due to outdoor enclosure
- Simplified shipping without concrete substation

**Efficient**

- Full nominal power at ambient temperatures up to 50 °C
- 10 % additional power for constant operation at ambient temperatures up to 25 °C

**Flexible**

- Powerful grid management functions (including LVRT)
- DC voltage range configurable

**Reliable**

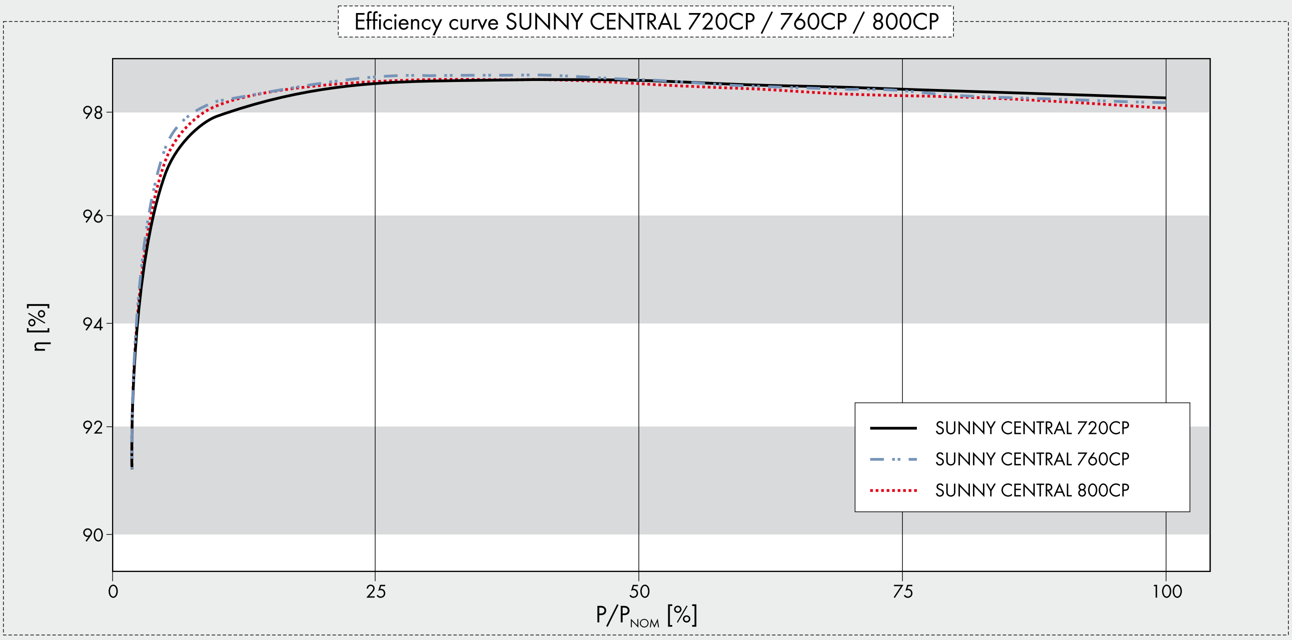
- Easy and safe installation due to a separate connection area
- Optional: extended input voltage range up to 1,100 V

## SUNNY CENTRAL 720CP / 760CP / 800CP

### High performance as standard

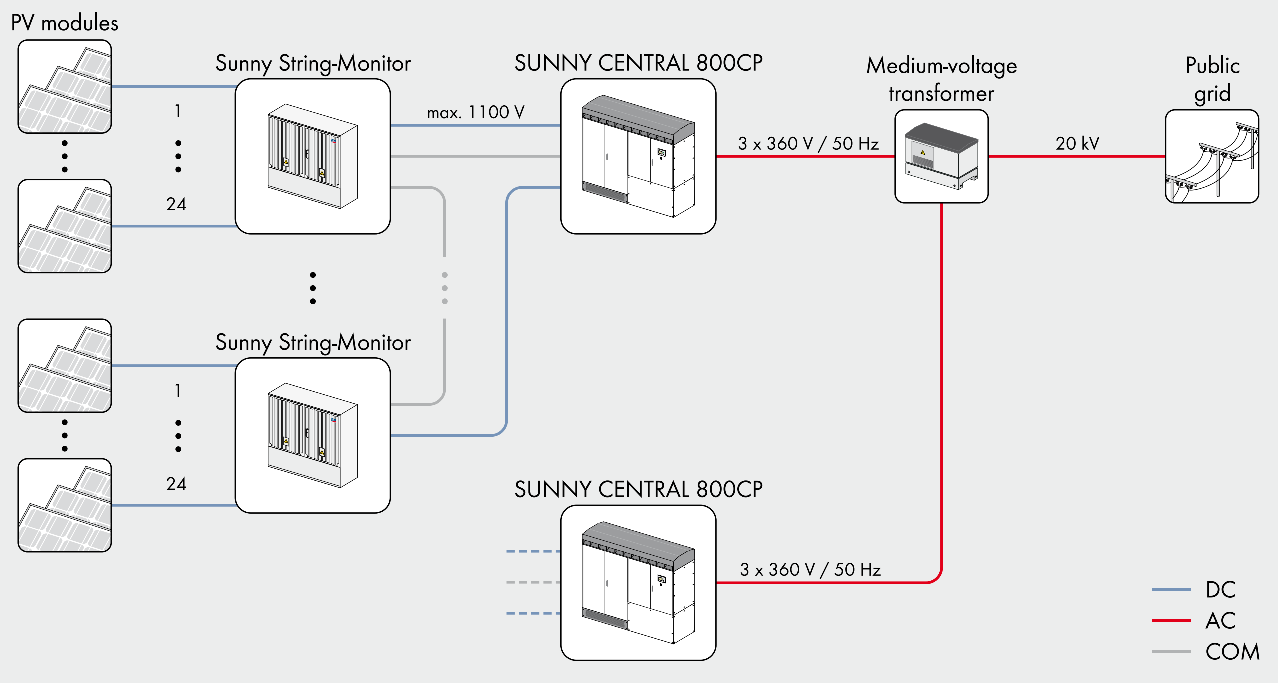
The completely new design of the Sunny Central CP series saves you real money. The compact and weatherproof enclosure is easy to load and transport and can be installed almost anywhere – there is no need for heavy protective concrete substations any longer. The innovative cooling concept OptiCool allows it to operate at full nominal power with ambient temperatures up to 50 °C. With the powerful grid management functions you are perfectly prepared for today's utility requirements as well as those still to come. The intelligent power management is the most important feature: in continuous operation, the Sunny Central 800CP can feed 880 kVA to the grid at ambient temperatures of up to 25 °C – that's 10 % more than the rated nominal power.

| Technical data | Sunny Central 720CP | Sunny Central 760CP | Sunny Central 800CP |
|---|---|---|---|
| **Input Data** | | | |
| MPP voltage range | 515 V – 820 V [3) 5)] | 545 V – 820 V [3) 5)] | 570 V – 820 V [3) 5)] |
| Max. DC voltage | | 1000 V / 1100 V [1)] Optional | |
| Max. DC current | 1400 A | 1400 A | 1400 A |
| Number of DC inputs | | 9 fused inputs | |
| **Output Values** | | | |
| Nominal AC output @ 50 °C | 720 kVA | 760 kVA | 800 kVA |
| Continuous AC power @ 25 °C | 792 kVA | 836 kVA | 880 kVA |
| Max. AC current | 1411 A | 1411 A | 1411 A |
| Nominal AC-current | 1283 A | 1283 A | 1283 A |
| Nominal AC-voltage ±10 % | 324 V | 342 V | 360 V |
| AC grid frequency 50 Hz | ● | ● | ● |
| AC grid frequency 60 Hz | ● | ● | ● |
| Power factor (cos φ) | | 0.9 leading ... 0.9 lagging | |
| Max. THD | < 3 % | < 3 % | < 3 % |
| **Power consumption** | | | |
| Internal consumption in operation | < 1500 W [4)] | < 1500 W [4)] | < 1500 W [4)] |
| Standby consumption | < 100 W | < 100 W | < 100 W |
| External auxiliary voltage | 3 x 230 V, 50 / 60 Hz | 3 x 230 V, 50 / 60 Hz | 3 x 230 V, 50 / 60 Hz |
| **Dimensions and Weight** | | | |
| Dimensions (W / H / D) in mm | 2562 / 2279 / 956 | 2562 / 2279 / 956 | 2562 / 2279 / 956 |
| Weight | 1800 kg | 1800 kg | 1800 kg |
| **Efficiency** [2)] | | | |
| Max. efficiency | 98.6 % | 98.6 % | 98.6 % |
| Euro ETA | 98.4 % | 98.4 % | 98.4 % |
| CEC-eta | 98.4 % | 98.4 % | 98.4 % |
| **Protection Rating and Ambient Conditions** | | | |
| Protection rating (as per IEC 60529) | IP54 | IP54 | IP54 |
| Protection rating (as per IEC 60721-3-3)<br>Ambient conditions: fixed location, with protection against wind and weather | | • Classification of chemically active substances: 3C2<br>• Classification of mechanically active substances: 3S2 | |
| Operation temperature range | –20 °C ... +50 °C | –20 °C ... +50 °C | –20 °C ... +50 °C |
| Rel. humidity | 15 % ... 95 % | 15 % ... 95 % | 15 % ... 95 % |
| Fresh air consumption | 3000 m³/h | 3000 m³/h | 3000 m³/h |
| Max. altitude above sea level | 2000 m | 2000 m | 2000 m |
| | | | |
| | | | |
| | | | |

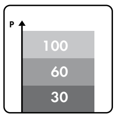


| | Sunny Central 720CP | Sunny Central 760CP | Sunny Central 800CP |
|---|---|---|---|
| **Features** | | | |
| Sunny WebBox | ● | ● | ● |
| Communication | Ethernet (optical fiber optional) | Ethernet (optical fiber optional) | Ethernet (optical fiber optional) |
| Communication with Sunny String-Monitor | RS485 | RS485 | RS485 |
| LCD graphic display | ● | ● | ● |
| Enclosure color | RAL 9016 | RAL 9016 | RAL 9016 |
| Color of base | RAL 7005 | RAL 7005 | RAL 7005 |
| Color of roof | RAL 7004 | RAL 7004 | RAL 7004 |
| Ground fault monitoring / insulation monitoring | ● | ● | ● |
| Circuit breaker AC side | ● | ● | ● |
| Motor driven load disconnection switch on DC side | ● | ● | ● |
| AC overvoltage protector | ● | ● | ● |
| DC overvoltage protector | ● | ● | ● |
| Overvoltage protectors for auxiliary supply | ● | ● | ● |
| **Certificates / Listings** | | | |
| EMC | EN 61000-6-2 EN 61000-6-4 | | |
| CE conformity | ● | ● | ● |
| BDEW-MSRL / FGW / TR8 [6] | ● | ● | ● |
| RD 1633 / 2000 | ● | ● | ● |
| Arrêté du 23 / 04 / 08 | ● | ● | ● |
| | | | |
| | | | |
| ● Standard features ❍ Optional features – Not available | | | |
| Type name | SC 720CP-10 | SC 760CP-10 | SC 800CP-10 |

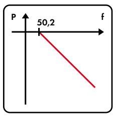
1) Startup at DC voltage < 1000 V
2) Efficiency measured without internal power supply
3) Further AC voltages, DC voltages and power classes can be configured (For detailed information see Technical Information „Innovations_CP" at www.SMA.de)
4) Internal consumption at nominal power
5) At 1.05 $U_{AC,nom}$ and cos φ= 1
6) With complete dynamic grid support



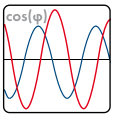
# POWERFUL GRID MANAGEMENT FUNCTIONS



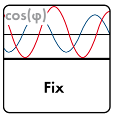

**Remote controlled power reduction in case of grid overload**
In order to avoid short-term grid overload, the grid operator presets a nominal active power value which the inverter will implement within 60 seconds. The nominal value is transmitted to the inverters via a ripple control receiver in combination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



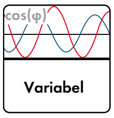

**Frequency-dependent control of active power**
As of a grid frequency of 50.2 Hz, the inverter automatically reduces the fed-in of active power according to a definable characteristic curve which thereby contributes to the stabilization of the grid frequency.



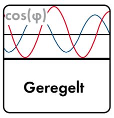

**Static voltage support based on reactive power**
To stabilize the grid voltage, SMA inverters feed reactive power (leading or lagging) into the grid. Three different modes are available:



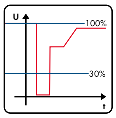

**a) Fixed definition of the reactive power by the grid operator**
The grid operator defines a fixed reactive power value or a fixed displacement factor between $\cos(\varphi)_{leading}$= 0.90 and $\cos(\varphi)_{lagging}$= 0.90.




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

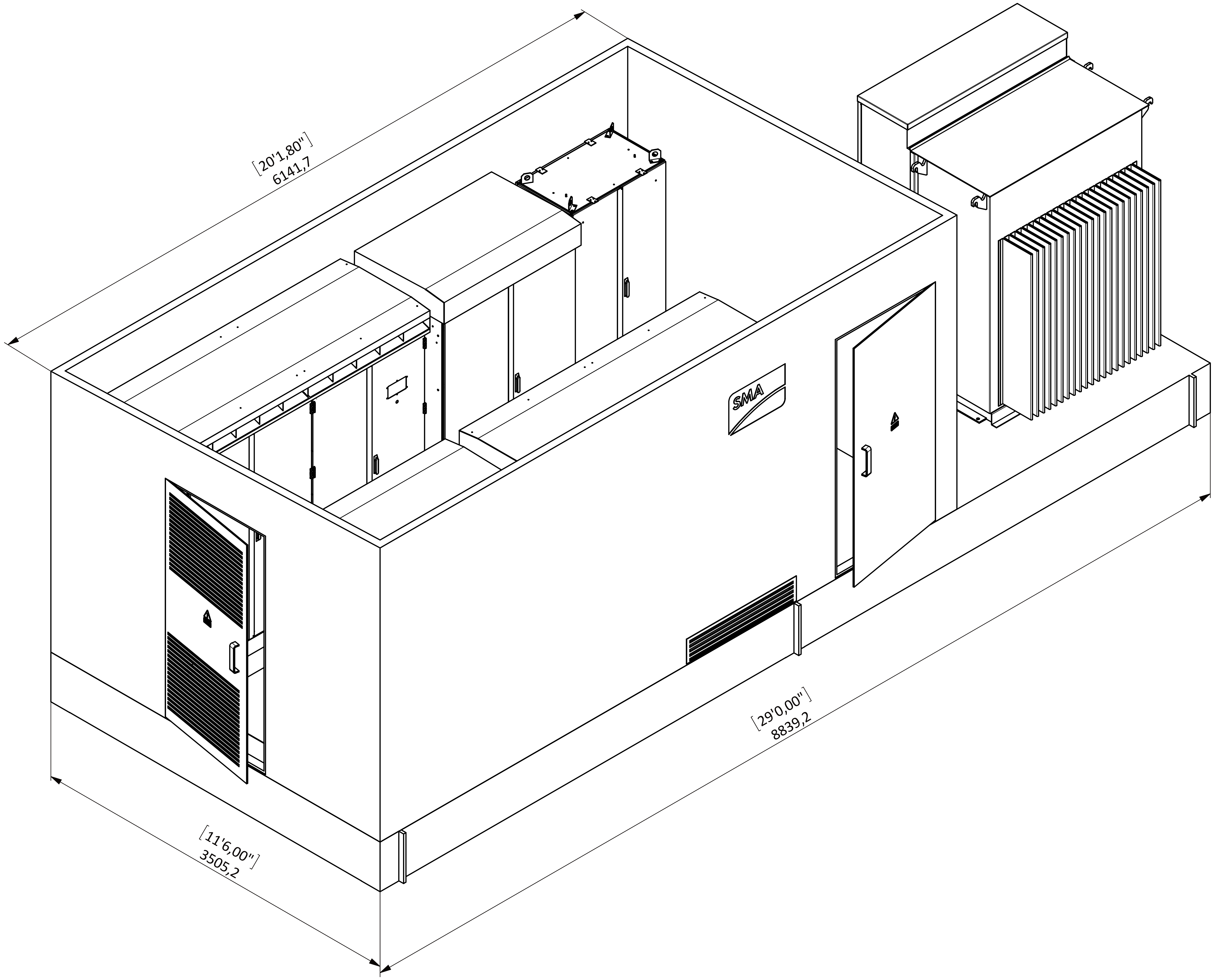



**c) Control of the reactive power over a characteristic curve**
The reactive power or the phase shift is controlled by a pre-defined characteristic curve – depending on the active power fed into the grid or the grid voltage.




**Limited Dynamic Grid Support**
The inverter continues to feed to the grid after short term voltage drops – as long as the grid voltage is within a defined voltage window.

**Dynamic Grid Support**
LVRT (Low-Voltage Ride Through): The inverter stays connected to the grid during voltage drops and supports the grid by feeding reactive power.

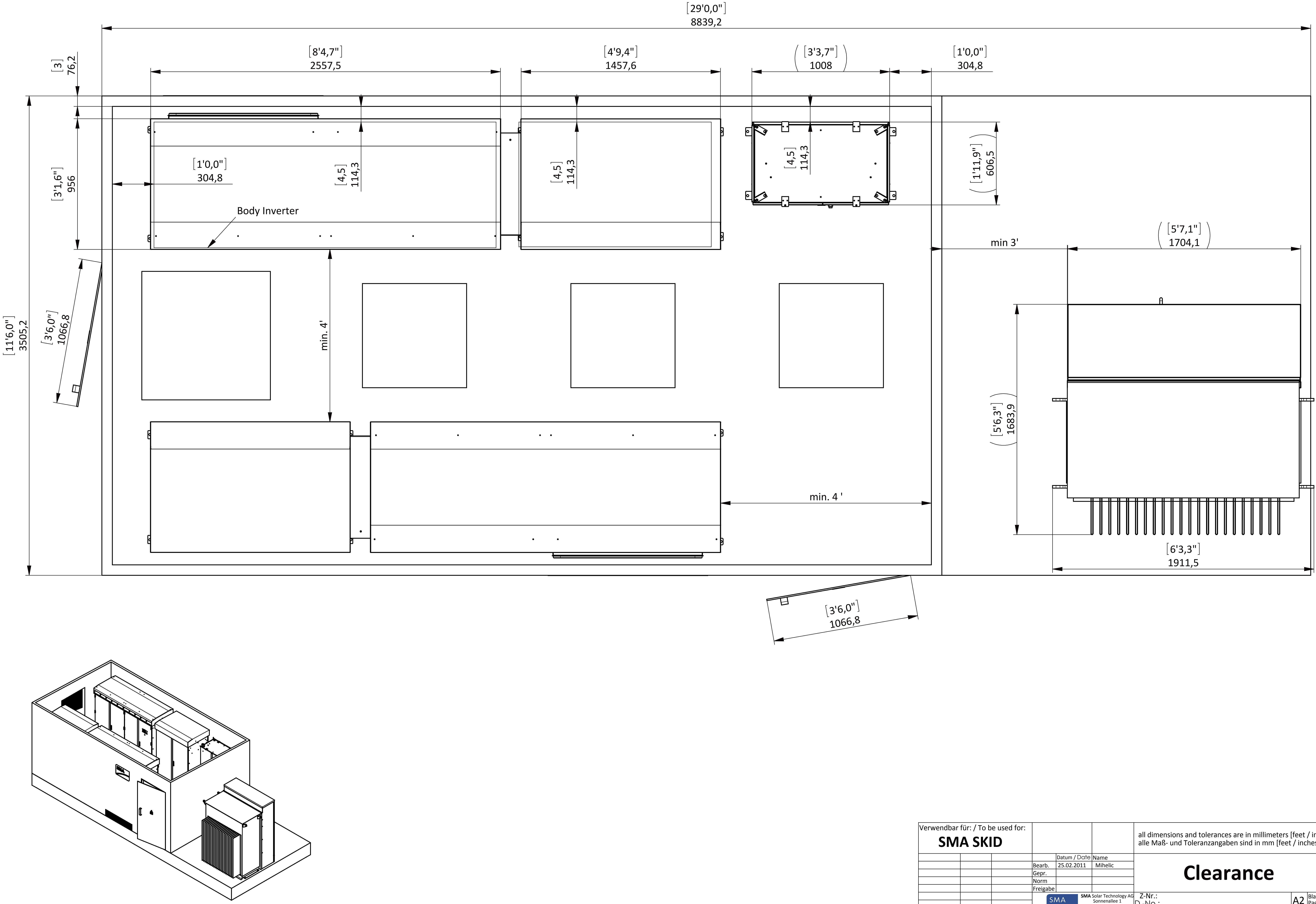



| Verwendbar für: / To be used for: **SMA SKID** | | | all dimensions and tolerances are in millimeters [feet / inches]<br>alle Maß- und Toleranzangaben sind in mm [feet / inches] |
|---|---|---|---|
| | Datum / Date | Name | **Layout enclosure** |
| Bearb. | 25.02.2011 | Mihelic | |
| Gepr. | | | |
| Norm | | | |
| Freigabe | | | |

SMA Solar Technology AG
Sonnenallee 1
34266 Niestetal
Tel.: +49 561 9522-0

Z-Nr.:
D.-No.:
A2
Blatt Page 1
EDV-Nr.:
Bl. / o.P. 1
Name :
Erstellt mit SolidWorks

| Rev. | Datum | Name | Urspr.: / Origin.: |
|---|---|---|---|




Verwendbar für: / To be used for:

**SMA SKID**

all dimensions and tolerances are in millimeters [feet / inches]
alle Maß- und Toleranzangaben sind in mm [feet / inches]

| | Datum / Date | Name |
|---|---|---|
| Bearb. | 25.02.2011 | Mihelic |
| Gepr. | | |
| Norm | | |
| Freigabe | | |

# Clearance

SMA Solar Technology AG
Sonnenallee 1
34266 Niestetal
Tel.: +49 561 9522-0

Z-Nr.:
D.-No.:
A2
Blatt
Page 1
EDV-Nr.:
Bl. / o.P. 1

Rev. | Datum | Name
Urspr.: / Origin.:
Name :
Erstellt mit SolidWorks

| Terz-midle-frequency [kHz] | Soundpower-level $L_{xpA}$ [$dB_A$]500kW | Soundpower-level $L_{xpA}$ [$dB_A$]640kW | Soundpower-level $L_{xpA}$ [$dB_A$]720kW | Soundpower-level $L_{xpA}$ [$dB_A$]760kW | Soundpower level $L_{xpA}$ [$dB_A$]800kW |
|---|---|---|---|---|---|
| 0,05 | 63,30 | 55,30 | 57,70 | 67,00 | 56,50 |
| 0,063 | 60,80 | 53,10 | 56,80 | 63,20 | 54,00 |
| 0,08 | 63,90 | 56,30 | 56,50 | 59,50 | 55,20 |
| 0,1 | 64,10 | 66,20 | 65,00 | 66,50 | 68,10 |
| 0,125 | 65,70 | 64,50 | 60,60 | 65,20 | 62,00 |
| 0,16 | 72,30 | 65,80 | 65,50 | 63,20 | 66,40 |
| 0,2 | 67,30 | 64,60 | 66,80 | 64,90 | 67,80 |
| 0,25 | 66,10 | 76,20 | 77,50 | 70,80 | 72,40 |
| 0,315 | 78,40 | 79,80 | 77,70 | 82,20 | 75,10 |
| 0,4 | 73,70 | 73,90 | 73,90 | 72,80 | 66,70 |
| 0,5 | 77,80 | 78,70 | 77,70 | 77,40 | 74,70 |
| 0,63 | 78,90 | 78,90 | 74,60 | 77,40 | 77,00 |
| 0,8 | 70,60 | 72,50 | 74,10 | 70,60 | 72,00 |
| 1 | 72,20 | 71,00 | 70,00 | 68,90 | 67,90 |
| 1,25 | 72,40 | 72,00 | 71,50 | 70,80 | 71,80 |
| 1,6 | 67,30 | 68,30 | 76,70 | 68,60 | 68,50 |
| 2 | 69,30 | 66,30 | 66,50 | 67,20 | 65,30 |
| 2,5 | 65,10 | 66,80 | 64,60 | 64,80 | 63,90 |
| 3,15 | 62,60 | 64,30 | 65,00 | 63,20 | 61,00 |
| 4,0 | 53,50 | 54,20 | 54,70 | 52,30 | 53,80 |
| 5,0 | 51,30 | 49,50 | 50,50 | 51,20 | 49,80 |
| 6,3 | 68,90 | 72,60 | 73,50 | 73,50 | 69,70 |

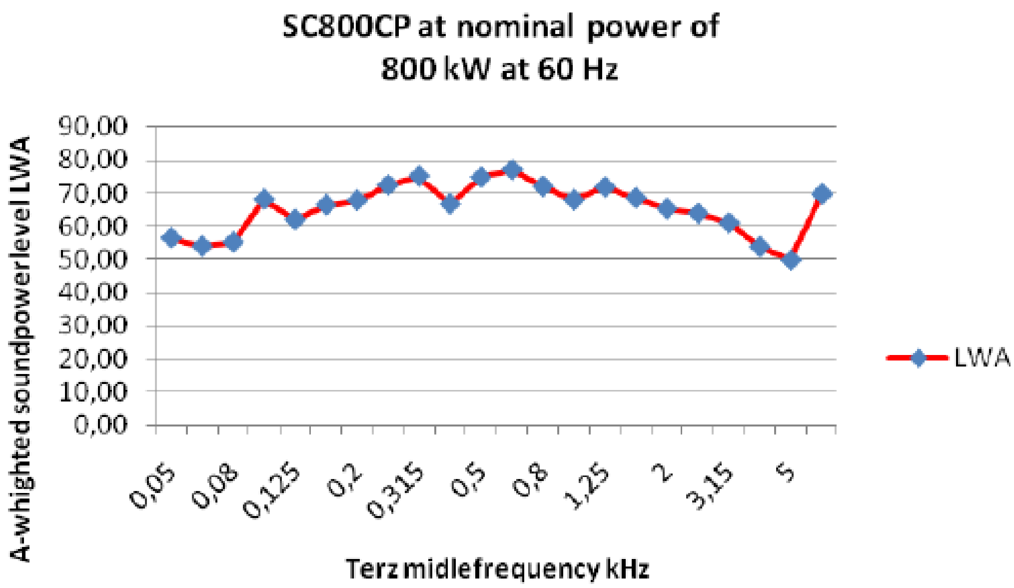
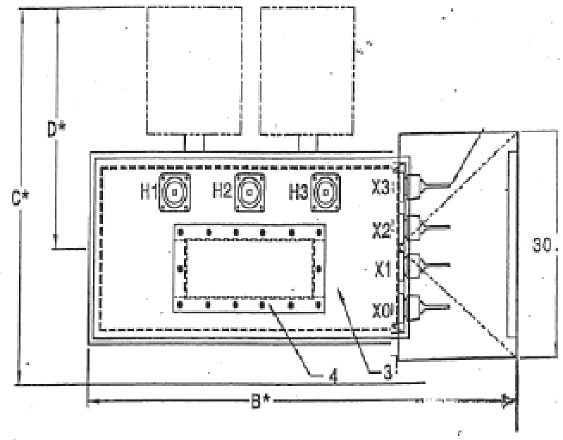
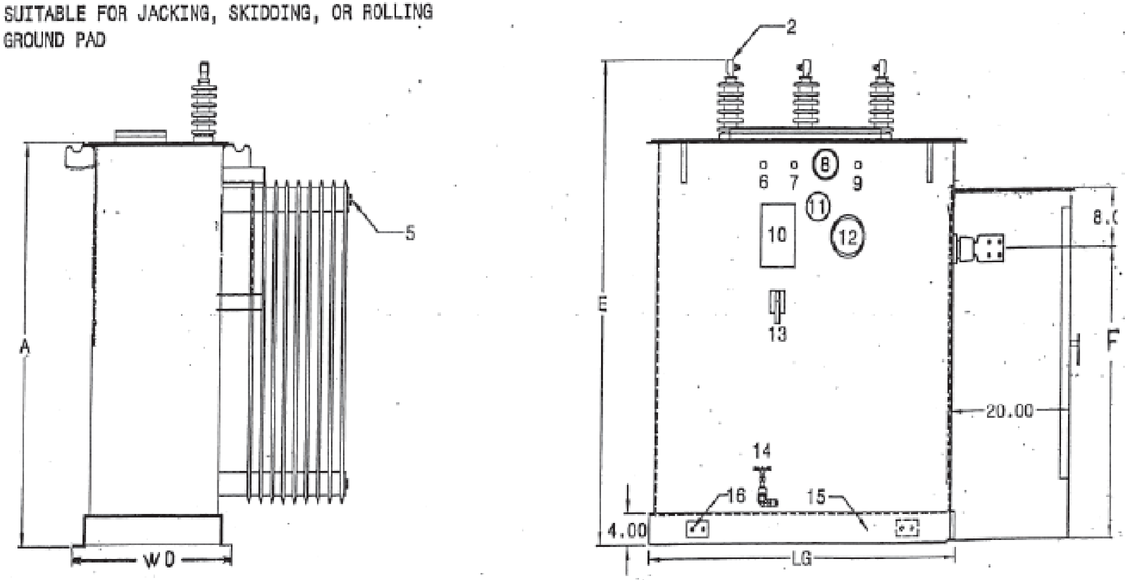



**Figure B.1 SC800CP Inverter Sound Power Level as Provided by SMA. Note that the Header in the Table above Represents Various Inverter Models of CS###CP Series.**

## STANDARD FEATURES

STANDARD FEATURES
1. L.V. BUSHING
2. H.V. BUSHING
3. TANK WITH WELDED-ON COVER
4. HANDHOLE
5. COOLING PANELS
6. GAS SAMPLING VALVE
7. PRESSURE VACUUM GAUGE
8. PRESSURE RELIEF VALVE
9. 1" FILL PLUG AND FILTER PRESS CONNECTION
10. STAINLESS STEEL NAMEPLATE AND CONNECTION DIAGRAM
11. LIQUID LEVEL GAUGE
12. DIAL-TYPE THERMOMETER
13. DE-ENERGIZED TAPCHANGER
14. 1" DRAIN VALVE WITH 3/8" SAMPLING DEVICE
15. BASE SUITABLE FOR JACKING, SKIDDING, OR ROLLING
16. NEMA GROUND PAD




| KVA | Fluid | Cond | HV BIL | LV BIL | WD | LG | A | B | C | D | E | F | Gal Liquid | Weight |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10000 | O | C | 250 | 150 | 48 | 95 | 111 | 113 | 138 | TBD | 132 | 82 | 1530 | 37597 |

**Figure B.2 44-kVA/10-MVA Substation Transformer Catalogue Dimensions (inches).**

## Estimated Frequency Spectra for Transformers

### Transformer - 44kV/10MVA

From Handbook of Noise and Vibration Control (Crocker, 2007, page 1335-1336, Eq. 18 and Table 20)

| | | |
|---|---|---|
| Average LpA | 68 dBA | Based on NEMA TR1-1993 (R2000), Table 0-2 |
| Estimated surface area | 35 m^2 | Estimated based on similar transformer dimensions |

Correction factors are in dB

| Freq. (Hz) | 31 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| C1 | -11.0 | -5.0 | -3.0 | -8.0 | -8.0 | -14.0 | -19.0 | -24.0 | -31.0 | Outdoors, indoors in mechanical room over 140 $m^3$ |
| C2 | -11 | -2 | 3 | -2 | -2 | -11 | -19 | -24 | -31 | Indoors |
| C3 | -11 | -2 | 3 | 2 | 2 | -4 | -9 | -14 | -21 | Serious Noise Problems |

Sound Power Level calculated as Lw=Average LpA + 10*log(Estimated surface area) + C + 10

| Freq. (Hz) | 31 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | Combined [dB] |
|---|---|---|---|---|---|---|---|---|---|---|
| C1 based [dB] | 82.4 | 88.4 | 90.4 | 85.4 | 85.4 | 79.4 | 74.4 | 69.4 | 62.4 | **94.5** |
| C2 based [dB] | 82.4 | 91.4 | 96.4 | 91.4 | 91.4 | 82.4 | 74.4 | 69.4 | 62.4 | **99.5** |
| C3 based [dB] | 82.4 | 91.4 | 96.4 | 95.4 | 95.4 | 89.4 | 84.4 | 79.4 | 72.4 | **101.5** |

Resulting A-weighted sound power level

| Freq. (Hz) | A-Weight | C1 based [dBA] | C2 based [dBA] | C2 based [dBA] |
|---|---|---|---|---|
| **31** | -39.4 | 43.0 | 52.0 | 57.0 |
| **63** | -26.2 | 62.2 | 65.2 | 65.2 |
| **125** | -16.1 | 74.3 | 80.3 | 80.3 |
| **250** | -8.6 | 76.8 | 82.8 | 86.8 |
| **500** | -3.2 | 82.2 | 88.2 | 92.2 |
| **1000** | 0 | 79.4 | 82.4 | 89.4 |
| **2000** | 1.2 | 75.6 | 75.6 | 85.6 |
| **4000** | 1 | 70.4 | 70.4 | 80.4 |
| **8000** | -1.1 | 61.3 | 61.3 | 71.3 |
| **LwA [dBA]** | | **85.8** | **90.8** | **95.6** |

Used in the study (green highlight)

**Figure B.3 Sound Power Level Calculation for 27.6-kV/44-kV/10-MVA Substation Transformer.**

## Sound Power Level Calculation for SMA Sunny Central 800CP, 100% LOAD

| Third octave, as provided | | |
|---|---|---|
| Freq # | Freq (Hz) | LwA (dBA) |
| 1 | 25 | |
| 2 | 31.5 | |
| 3 | 40 | |
| 4 | 50 | 56.5 |
| 5 | 63 | 54.0 |
| 6 | 80 | 55.2 |
| 7 | 100 | 68.1 |
| 8 | 125 | 62.0 |
| 9 | 160 | 66.4 |
| 10 | 200 | 67.8 |
| 11 | 250 | 72.4 |
| 12 | 315 | 75.1 |
| 13 | 400 | 66.7 |
| 14 | 500 | 74.7 |
| 15 | 630 | 77.0 |
| 16 | 800 | 72.0 |
| 17 | 1000 | 67.9 |
| 18 | 1250 | 71.8 |
| 19 | 1600 | 68.5 |
| 20 | 2000 | 65.3 |
| 21 | 2500 | 63.9 |
| 22 | 3150 | 61.0 |
| 23 | 4000 | 53.8 |
| 24 | 5000 | 49.8 |
| 25 | 6300 | 69.7 |
| 26 | 8000 | |
| 27 | 10000 | |
| | **Total LwA** | **83.3** |

| Full octave, as used in CADNA-A model | | | |
|---|---|---|---|
| Freq # | Freq (Hz) | LwA 1 inverter (dBA) | LwA 2 inverters (dBA) |
| | 31.5 | | |
| 5 | 63 | 60.1 | 63.1 |
| 8 | 125 | 70.9 | 73.9 |
| 11 | 250 | 77.5 | 80.5 |
| 14 | 500 | 79.3 | 82.3 |
| 17 | 1000 | 75.7 | 78.7 |
| 20 | 2000 | 71.1 | 74.1 |
| 23 | 4000 | 62.0 | 65.0 |
| 26 | 8000 | 69.7 | 72.7 |
| | **Total LwA** | **83.3** | **86.3** |

$$10\log\left(10^{\frac{56.5}{10}}+10^{\frac{54.0}{10}}+10^{\frac{55.2}{10}}\right)=60.1dBA$$

$$10\log\left(10^{\frac{60.1}{10}}+10^{\frac{60.1}{10}}\right)=63.1dBA$$

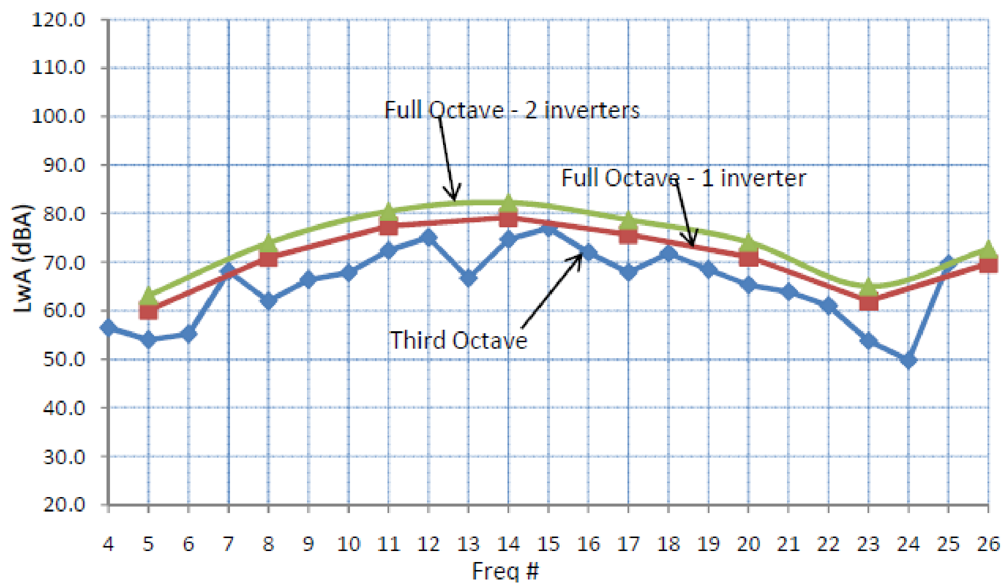



**Figure B.4 Sound Power Level Calculation for SMA Sunny Central 800CP, 100% LOAD.**

## Estimated Frequency Spectra for Transformers

### Transformer - 27.6kV/1.6MVA

From Handbook of Noise and Vibration Control (Crocker, 2007, page 1335-1336, Eq. 18 and Table 20)

| | | |
|---|---|---|
| Average LpA | 61 dBA | Based on NEMA TR1-1993 (R2000), Table 0-2 |
| Estimated surface area | 14.872 m^2 | Estimated based on client transformer drawings |

Correction factors are in dB

| Freq. (Hz) | 31 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| C1 | -11.0 | -5.0 | -3.0 | -8.0 | -8.0 | -14.0 | -19.0 | -24.0 | -31.0 | Outdoors, indoors in mechanical room over 140 $m^3$ |
| C2 | -11 | -2 | 3 | -2 | -2 | -11 | -19 | -24 | -31 | Indoors |
| C3 | -11 | -2 | 3 | 2 | 2 | -4 | -9 | -14 | -21 | Serious Noise Problems |

Sound Power Level calculated as Lw=Average LpA + 10*log(Estimated surface area) + C + 10

| Freq. (Hz) | 31 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | Combined [dB] |
|---|---|---|---|---|---|---|---|---|---|---|
| C1 based [dB] | 71.7 | 77.7 | 79.7 | 74.7 | 74.7 | 68.7 | 63.7 | 58.7 | 51.7 | **83.8** |
| C2 based [dB] | 71.7 | 80.7 | 85.7 | 80.7 | 80.7 | 71.7 | 63.7 | 58.7 | 51.7 | **88.8** |
| C3 based [dB] | 71.7 | 80.7 | 85.7 | 84.7 | 84.7 | 78.7 | 73.7 | 68.7 | 61.7 | **90.8** |

Resulting A-weighted sound power level

| Freq. (Hz) | A-Weight | C1 based [dBA] | C2 based [dBA] | C2 based [dBA] |
|---|---|---|---|---|
| **31** | -39.4 | 32.3 | 41.3 | 46.3 |
| **63** | -26.2 | 51.5 | 54.5 | 54.5 |
| **125** | -16.1 | 63.6 | 69.6 | 69.6 |
| **250** | -8.6 | 66.1 | 72.1 | 76.1 |
| **500** | -3.2 | 71.5 | 77.5 | 81.5 |
| **1000** | 0 | 68.7 | 71.7 | 78.7 |
| **2000** | 1.2 | 64.9 | 64.9 | 74.9 |
| **4000** | 1 | 59.7 | 59.7 | 69.7 |
| **8000** | -1.1 | 50.6 | 50.6 | 60.6 |
| **LwA [dBA]** | | **75.1** | **80.1** | **84.9** |

Used in the study

**Figure B.5 Sound Power Level Calculation for 360-V/27.6-kV/1.6-MVA Cluster Transformer.**

# Appendix C

# Noise Maps from CADNA-A, Complete Noise Receptor List

**Table C. 1 List of all Noise Receptors considered for the noise study. Coordinates represent building footprint centers.**

| ID | Description | Coordinates, UTM NAD83 Zone18 (m) | |
|---|---|---|---|
| | | X (m) | Y (m) |
| R001 | Existing | 395261.1 | 4963260.8 |
| R002 | Existing | 395270.1 | 4964493.8 |
| R003 | Existing | 395277.7 | 4963288.0 |
| R004 | Existing | 395295.1 | 4963159.8 |
| R005 | Vacant | 395352.5 | 4963308.0 |
| R006 | Vacant | 395383.1 | 4963190.7 |
| R007 | Existing | 395413.1 | 4963334.8 |
| R008 | Existing | 395452.1 | 4963362.8 |
| R009 | Existing | 395486.1 | 4963220.8 |
| R010 | Existing | 395517.1 | 4963368.8 |
| R011 | Existing | 395530.6 | 4963421.0 |
| R012 | Existing | 395547.1 | 4963429.8 |
| R013 | Vacant | 395575.9 | 4963405.9 |
| R014 | Existing | 395627.1 | 4963334.8 |
| R015 | Existing | 395645.1 | 4964152.8 |
| R016 | Existing | 395649.1 | 4963316.8 |
| R017 | Existing | 395656.7 | 4963418.1 |
| R018 | Existing | 395659.1 | 4963319.8 |
| R019 | Existing | 395660.1 | 4964183.8 |
| R020 | Existing | 395670.1 | 4964534.8 |
| R021 | Existing | 395711.2 | 4963334.9 |
| R022 | Vacant | 395756.6 | 4963961.6 |
| R023 | Existing | 395761.1 | 4963356.8 |
| R024 | Existing | 395783.7 | 4964265.6 |
| R025 | Existing | 395795.1 | 4964315.8 |
| R026 | Vacant | 395818.1 | 4963557.0 |
| R027 | Existing | 395831.1 | 4963662.8 |
| R028 | Existing | 395842.4 | 4965290.4 |
| R029 | Existing | 395843.7 | 4965313.1 |
| R030 | Existing | 395844.1 | 4963409.8 |
| R031 | Existing | 395854.6 | 4962970.4 |
| R032 | Existing | 395860.1 | 4963346.4 |
| R033 | Existing | 395871.5 | 4963399.7 |
| R034 | Existing | 395897.8 | 4963218.8 |
| R035 | Existing | 395899.1 | 4963192.8 |
| R036 | Vacant | 395944.0 | 4964507.8 |
| R037 | Existing | 395950.6 | 4963398.1 |
| R038 | Existing | 395972.8 | 4963467.3 |

| ID | Description | Coordinates, UTM NAD83 Zone18 (m) | |
|---|---|---|---|
| | | X (m) | Y (m) |
| R039 | Existing | 395978.1 | 4964546.8 |
| R040 | Existing | 395981.2 | 4964570.9 |
| R041 | Existing | 395989.1 | 4963438.8 |
| R042 | Existing | 396010.4 | 4964668.3 |
| R043 | Vacant | 396076.8 | 4964785.0 |
| R044 | Existing | 396080.1 | 4962872.8 |
| R045 | Existing | 396134.1 | 4962359.8 |
| R046 | Vacant | 396137.7 | 4964949.3 |
| R047 | Existing | 396148.1 | 4962472.8 |
| R048 | Existing | 396157.1 | 4962223.8 |
| R049 | Existing | 396160.5 | 4962786.5 |
| R050 | Existing | 396166.1 | 4962248.8 |
| R051 | Existing | 396171.1 | 4962373.8 |
| R052 | Existing | 396173.1 | 4962163.8 |
| R053 | Existing | 396175.1 | 4962708.8 |
| R054 | Existing | 396176.1 | 4962381.8 |
| R055 | Existing | 396179.1 | 4962314.8 |
| R056 | Existing | 396180.1 | 4962360.8 |
| R057 | Vacant | 396181.6 | 4965056.9 |
| R058 | Existing | 396210.1 | 4962344.8 |
| R059 | Existing | 396214.1 | 4962397.8 |
| R060 | Existing | 396214.4 | 4962602.8 |
| R061 | Existing | 396219.1 | 4962163.8 |
| R062 | Existing | 396225.1 | 4962460.8 |
| R063 | Existing | 396225.9 | 4962553.1 |
| R064 | Existing | 396232.1 | 4962510.3 |
| R065 | Existing | 396239.4 | 4962346.7 |
| R066 | Existing | 396242.4 | 4962493.9 |
| R067 | Existing | 396246.1 | 4962365.8 |
| R068 | Existing | 396257.1 | 4962377.8 |
| R069 | Vacant | 396273.7 | 4965392.8 |
| R070 | Existing | 396277.1 | 4962387.8 |
| R071 | Existing | 396283.1 | 4962459.8 |
| R072 | Vacant | 396295.7 | 4962299.5 |
| R073 | Existing | 396309.4 | 4962492.5 |
| R074 | Existing | 396311.1 | 4962418.8 |
| R075 | Existing | 396327.1 | 4962432.8 |
| R076 | Existing | 396345.0 | 4962511.8 |
| R077 | Vacant | 396346.1 | 4962338.2 |
| R078 | Existing | 396374.1 | 4964016.8 |
| R079 | Existing | 396396.1 | 4962481.8 |

| ID | Description | Coordinates, UTM NAD83 Zone18 (m) | |
|---|---|---|---|
| | | X (m) | Y (m) |
| R080 | Existing | 396402.5 | 4964057.3 |
| R081 | Vacant | 396408.4 | 4962391.4 |
| R082 | Existing | 396418.9 | 4962572.1 |
| R083 | Existing | 396420.1 | 4962507.8 |
| R084 | Existing | 396423.1 | 4964071.6 |
| R085 | Existing | 396425.8 | 4964025.9 |
| R086 | Existing | 396438.1 | 4964270.9 |
| R087 | Existing | 396447.1 | 4962610.8 |
| R088 | Existing | 396457.1 | 4964263.8 |
| R090 | Existing | 396576.5 | 4962694.4 |
| R091 | Existing | 396584.1 | 4964665.8 |
| R092 | Vacant | 396589.3 | 4965062.9 |
| R093 | Existing | 396595.1 | 4964630.8 |
| R094 | Existing | 396610.1 | 4964654.8 |
| R095 | Existing | 396620.1 | 4962544.8 |
| R096 | Existing | 396630.1 | 4964645.8 |
| R097 | Vacant | 396680.7 | 4964876.1 |
| R098 | Existing | 396807.5 | 4962942.5 |
| R099 | Existing | 396836.1 | 4964862.8 |
| R100 | Existing | 396869.1 | 4964896.8 |
| R101 | Existing | 396874.1 | 4962964.4 |
| R102 | Existing | 397055.8 | 4962694.1 |
| R103 | Existing | 397085.2 | 4963040.0 |
| R104 | Existing | 397097.8 | 4963143.1 |
| R105 | Existing | 397101.1 | 4962703.8 |
| R106 | Existing | 397119.1 | 4963973.8 |
| R107 | Existing | 397133.1 | 4963186.8 |
| R108 | Vacant | 397134.1 | 4963071.8 |
| R109 | Existing | 397139.1 | 4963974.8 |
| R110 | Vacant | 397175.8 | 4963111.9 |
| R111 | Existing | 397218.1 | 4963044.3 |
| R112 | Existing | 397277.0 | 4963001.8 |
| R113 | Existing | 397304.0 | 4962942.3 |
| R114 | Existing | 397377.1 | 4963131.8 |
| R115 | Existing | 397382.1 | 4963151.8 |
| R116 | Existing | 397423.2 | 4963165.6 |
| R117 | Existing | 397511.8 | 4963405.2 |
| R118 | Vacant | 397603.1 | 4963471.8 |
| R119 | Existing | 397661.0 | 4962791.5 |
| R120 | Vacant | 397707.1 | 4962497.9 |
| R121 | Existing | 397715.1 | 4963577.8 |

| ID | Description | Coordinates, UTM NAD83 Zone18 (m) | |
|---|---|---|---|
| | | X (m) | Y (m) |
| R122 | Existing | 397738.1 | 4963598.8 |
| R123 | Existing | 397739.1 | 4963616.8 |
| R124 | Existing | 397745.1 | 4963606.8 |
| R125 | Existing | 397869.8 | 4963612.3 |
| R126 | Vacant | 397876.4 | 4963702.1 |

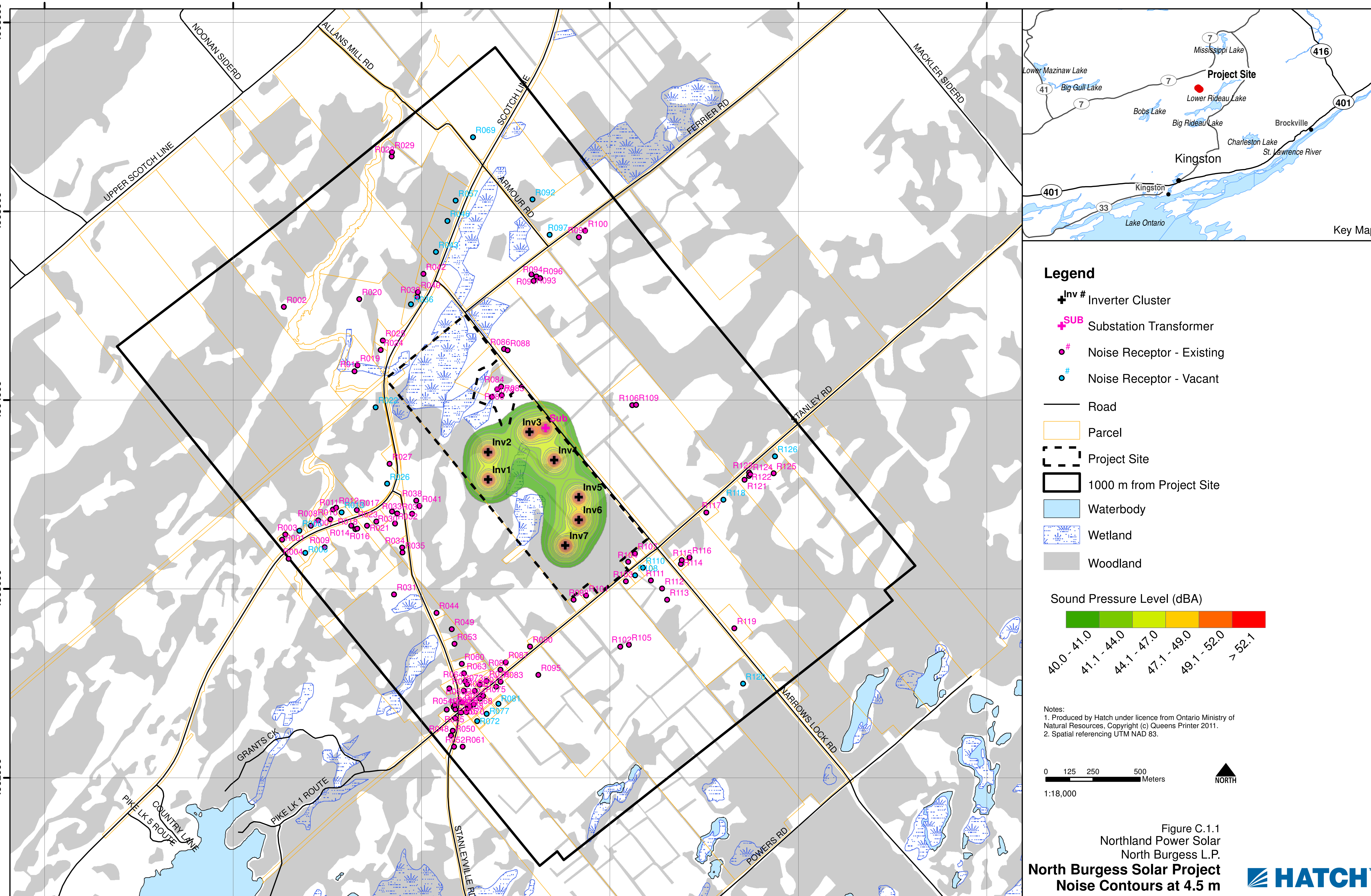



Figure C.1.1
Northland Power Solar
North Burgess L.P.
**North Burgess Solar Project**
**Noise Contours at 4.5 m**

Path: P:\NORTHLAND\333751\DATABASES\334844\GIS\NBurgess\North Burgess_Noise_C11_Contours_4_5m.mxd Date Saved: 9/13/2012 6:54:39 PM

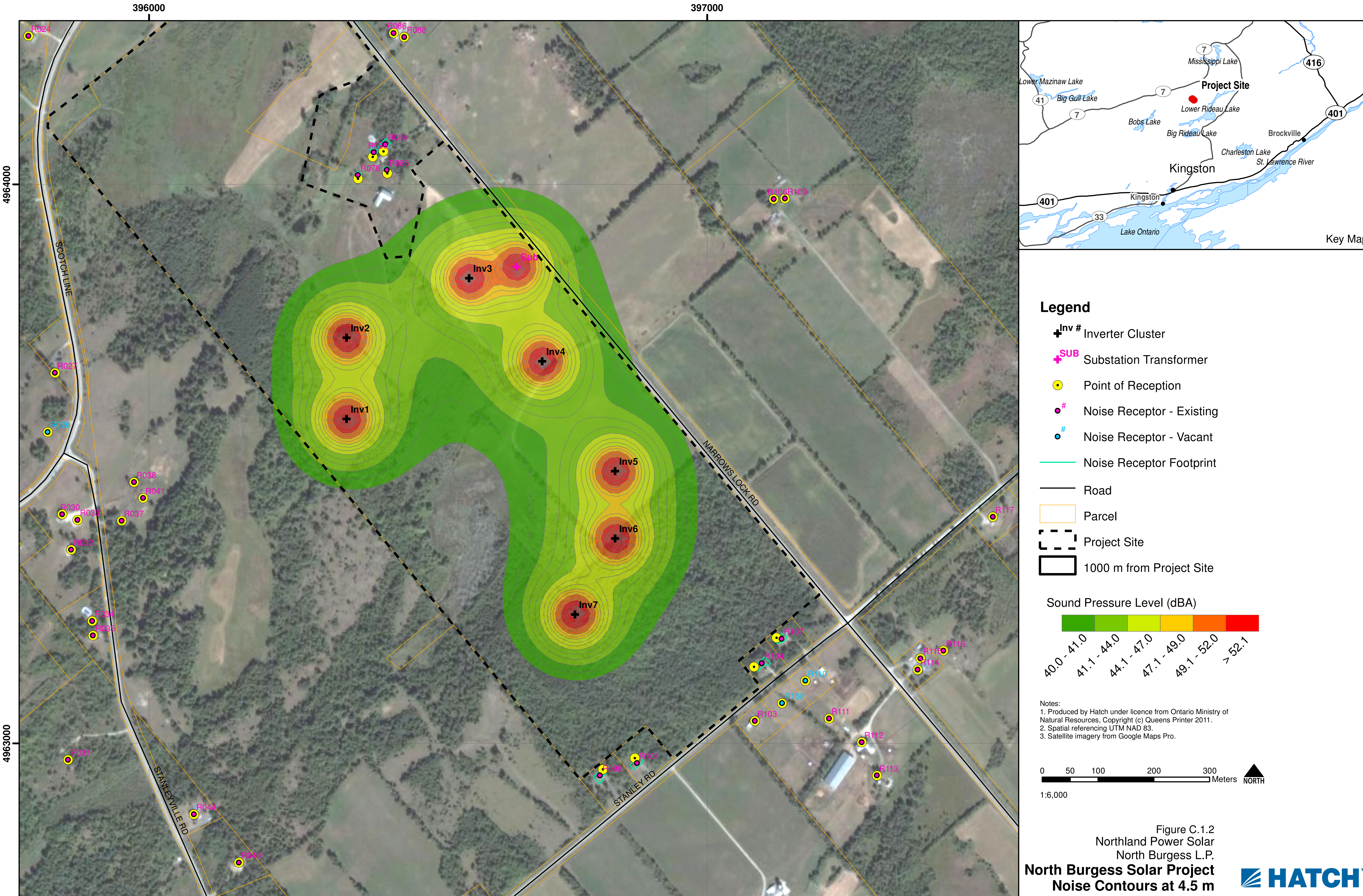
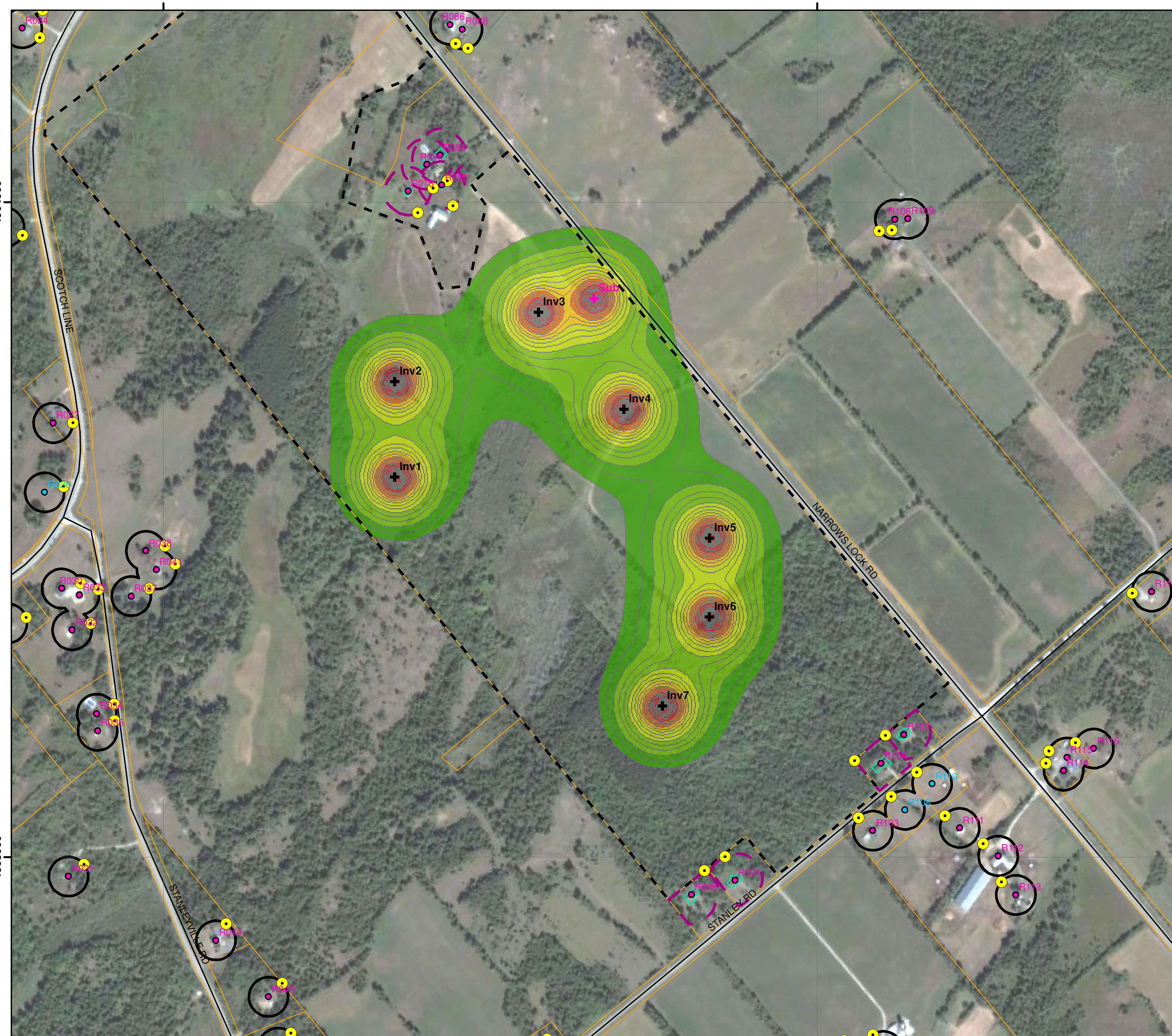
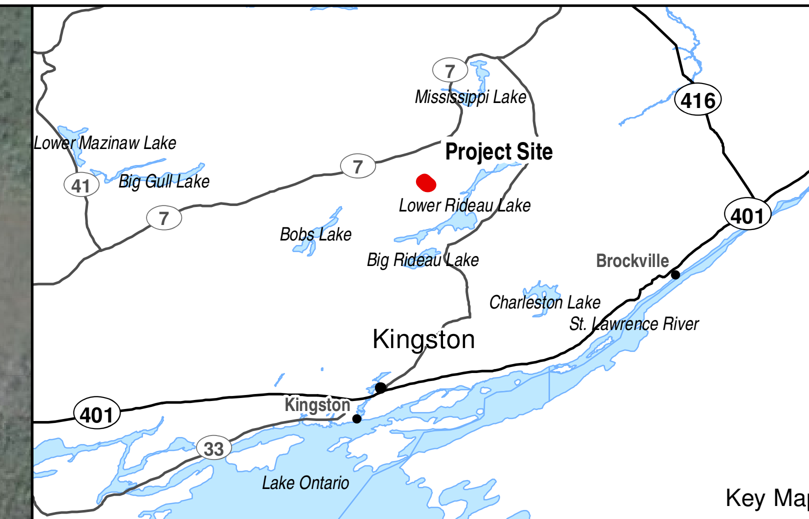



Figure C.1.2
Northland Power Solar
North Burgess L.P.
**North Burgess Solar Project**
**Noise Contours at 4.5 m**

Path: P:\NORTHLAND\333751\DATABASES\334844\GIS\NBurgess\North Burgess_Noise_C12_Contours_4_5m.mxdDate Saved: 9/13/2012 7:12:29 PM




## Legend

- Inv # Inverter Cluster
- SUB Substation Transformer
- Point of Reception
- Noise Receptor - Existing
- Noise Receptor - Vacant
- Noise Receptor Footprint
- 30m from Noise Receptor Footprint
- Road
- Parcel
- Project Site
- 30m from Noise Receptor Centre

Sound Pressure Level (dBA)

- 40.0 - 41.0
- 41.1 - 44.0
- 44.1 - 47.0
- 47.1 - 49.0
- 49.1 - 52.0
- > 52.1

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

0 50 100 200 300 Meters NORTH

1:6,000

Figure C.2
Northland Power Solar
North Burgess L.P.

**North Burgess Solar Project**
**Noise Contours at 1.5 m**

HATCH

Path: P:\NORTHLAND\333751\DATABASES\334844\GIS\NBurgess\North Burgess_Noise_C2_Contours_1_5m.mxd Date Saved: 9/14/2012 11:56:57 AM

# Appendix D

# CADNA-A Sample Calculations

| Configuration | |
|---|---|
| Parameter | Value |
| General | |
| Country | (user defined) |
| Max. Error (dB) | 0.00 |
| Max. Search Radius (m) | 3000.00 |
| Min. Dist Src to Rcvr | 0.00 |
| Partition | |
| Raster Factor | 0.50 |
| Max. Length of Section (m) | 1000.00 |
| Min. Length of Section (m) | 1.00 |
| Min. Length of Section (%) | 0.00 |
| Proj. Line Sources | On |
| Proj. Area Sources | On |
| Ref. Time | |
| Reference Time Day (min) | 960.00 |
| Reference Time Night (min) | 480.00 |
| Daytime Penalty (dB) | 0.00 |
| Recr. Time Penalty (dB) | 0.00 |
| Night-time Penalty (dB) | 0.00 |
| DTM | |
| Standard Height (m) | 0.00 |
| Model of Terrain | Triangulation |
| Reflection | |
| max. Order of Reflection | 1 |
| Search Radius Src | 100.00 |
| Search Radius Rcvr | 100.00 |
| Max. Distance Source - Rcvr | 1000.00 1000.00 |
| Min. Distance 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 | 0.70 |
| Wind Speed for Dir. (m/s) | 3.0 |
| Roads (RLS-90) | |
| Strictly acc. to RLS-90 | |
| Railways (Schall 03) | |
| Strictly acc. to Schall 03 / Schall-Transrapid | |
| Aircraft (???) | |
| Strictly acc. to AzB | |

Receiver
Name: 45_R085
ID: 45_R085
X: 396426.55
Y: 4964020.15
Z: 4.50

| Point Source, ISO 9613, Name: "Inv1", ID: "Inv1" | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | 396353.61 | 4963580.54 | 2.60 | 0 | 63 | 68.1 | 68.1 | 0.0 | 0.0 | 64.0 | 0.1 | -4.6 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 8.6 | 8.6 |
| 2 | 396353.61 | 4963580.54 | 2.60 | 0 | 125 | 78.9 | 78.9 | 0.0 | 0.0 | 64.0 | 0.2 | 2.9 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 11.8 | 11.8 |
| 3 | 396353.61 | 4963580.54 | 2.60 | 0 | 250 | 85.5 | 85.5 | 0.0 | 0.0 | 64.0 | 0.5 | 2.9 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 18.2 | 18.2 |
| 4 | 396353.61 | 4963580.54 | 2.60 | 0 | 500 | 87.3 | 87.3 | 0.0 | 0.0 | 64.0 | 0.9 | -0.9 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 23.4 | 23.4 |
| 5 | 396353.61 | 4963580.54 | 2.60 | 0 | 1000 | 83.7 | 83.7 | 0.0 | 0.0 | 64.0 | 1.6 | -1.4 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 19.4 | 19.4 |
| 6 | 396353.61 | 4963580.54 | 2.60 | 0 | 2000 | 79.1 | 79.1 | 0.0 | 0.0 | 64.0 | 4.3 | -1.4 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 12.2 | 12.2 |
| 7 | 396353.61 | 4963580.54 | 2.60 | 0 | 4000 | 70.0 | 70.0 | 0.0 | 0.0 | 64.0 | 14.6 | -1.4 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -7.2 | -7.2 |
| 8 | 396353.61 | 4963580.54 | 2.60 | 0 | 8000 | 77.7 | 77.7 | 0.0 | 0.0 | 64.0 | 52.1 | -1.4 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -37.0 | -37.0 |

| Point Source, ISO 9613, Name: "Inv2", ID: "Inv2" | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | 396353.61 | 4963725.94 | 2.60 | 0 | 63 | 68.1 | 68.1 | 0.0 | 0.0 | 60.6 | 0.0 | -3.9 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 11.3 | 11.3 |
| 2 | 396353.61 | 4963725.94 | 2.60 | 0 | 125 | 78.9 | 78.9 | 0.0 | 0.0 | 60.6 | 0.1 | 2.5 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 15.6 | 15.6 |
| 3 | 396353.61 | 4963725.94 | 2.60 | 0 | 250 | 85.5 | 85.5 | 0.0 | 0.0 | 60.6 | 0.3 | 3.1 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 21.5 | 21.5 |
| 4 | 396353.61 | 4963725.94 | 2.60 | 0 | 500 | 87.3 | 87.3 | 0.0 | 0.0 | 60.6 | 0.6 | -0.7 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 26.8 | 26.8 |
| 5 | 396353.61 | 4963725.94 | 2.60 | 0 | 1000 | 83.7 | 83.7 | 0.0 | 0.0 | 60.6 | 1.1 | -1.2 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 23.1 | 23.1 |
| 6 | 396353.61 | 4963725.94 | 2.60 | 0 | 2000 | 79.1 | 79.1 | 0.0 | 0.0 | 60.6 | 2.9 | -1.2 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 16.7 | 16.7 |
| 7 | 396353.61 | 4963725.94 | 2.60 | 0 | 4000 | 70.0 | 70.0 | 0.0 | 0.0 | 60.6 | 9.9 | -1.2 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 0.6 | 0.6 |
| 8 | 396353.61 | 4963725.94 | 2.60 | 0 | 8000 | 77.7 | 77.7 | 0.0 | 0.0 | 60.6 | 35.4 | -1.2 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -17.2 | -17.2 |

| Point Source, ISO 9613, Name: "Inv3", ID: "Inv3" | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | 396573.44 | 4963832.48 | 2.60 | 0 | 63 | 68.1 | 68.1 | 0.0 | 0.0 | 58.5 | 0.0 | -3.3 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 12.9 | 12.9 |
| 2 | 396573.44 | 4963832.48 | 2.60 | 0 | 125 | 78.9 | 78.9 | 0.0 | 0.0 | 58.5 | 0.1 | 2.5 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 17.8 | 17.8 |
| 3 | 396573.44 | 4963832.48 | 2.60 | 0 | 250 | 85.5 | 85.5 | 0.0 | 0.0 | 58.5 | 0.3 | 3.2 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 23.5 | 23.5 |
| 4 | 396573.44 | 4963832.48 | 2.60 | 0 | 500 | 87.3 | 87.3 | 0.0 | 0.0 | 58.5 | 0.5 | -0.6 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 28.9 | 28.9 |
| 5 | 396573.44 | 4963832.48 | 2.60 | 0 | 1000 | 83.7 | 83.7 | 0.0 | 0.0 | 58.5 | 0.9 | -1.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 25.3 | 25.3 |
| 6 | 396573.44 | 4963832.48 | 2.60 | 0 | 2000 | 79.1 | 79.1 | 0.0 | 0.0 | 58.5 | 2.3 | -1.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 19.3 | 19.3 |
| 7 | 396573.44 | 4963832.48 | 2.60 | 0 | 4000 | 70.0 | 70.0 | 0.0 | 0.0 | 58.5 | 7.8 | -1.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 4.6 | 4.6 |
| 8 | 396573.44 | 4963832.48 | 2.60 | 0 | 8000 | 77.7 | 77.7 | 0.0 | 0.0 | 58.5 | 27.9 | -1.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -7.7 | -7.7 |

| Point Source, ISO 9613, Name: "Inv4", ID: "Inv4" | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | 396704.12 | 4963683.88 | 2.60 | 0 | 63 | 68.1 | 68.1 | 0.0 | 0.0 | 63.8 | 0.1 | -4.5 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 8.8 | 8.8 |
| 2 | 396704.12 | 4963683.88 | 2.60 | 0 | 125 | 78.9 | 78.9 | 0.0 | 0.0 | 63.8 | 0.2 | 2.9 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 12.0 | 12.0 |
| 3 | 396704.12 | 4963683.88 | 2.60 | 0 | 250 | 85.5 | 85.5 | 0.0 | 0.0 | 63.8 | 0.5 | 2.9 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 18.4 | 18.4 |
| 4 | 396704.12 | 4963683.88 | 2.60 | 0 | 500 | 87.3 | 87.3 | 0.0 | 0.0 | 63.8 | 0.8 | -0.9 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 23.6 | 23.6 |
| 5 | 396704.12 | 4963683.88 | 2.60 | 0 | 1000 | 83.7 | 83.7 | 0.0 | 0.0 | 63.8 | 1.6 | -1.4 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 19.7 | 19.7 |
| 6 | 396704.12 | 4963683.88 | 2.60 | 0 | 2000 | 79.1 | 79.1 | 0.0 | 0.0 | 63.8 | 4.2 | -1.4 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 12.5 | 12.5 |
| 7 | 396704.12 | 4963683.88 | 2.60 | 0 | 4000 | 70.0 | 70.0 | 0.0 | 0.0 | 63.8 | 14.3 | -1.4 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -6.7 | -6.7 |
| 8 | 396704.12 | 4963683.88 | 2.60 | 0 | 8000 | 77.7 | 77.7 | 0.0 | 0.0 | 63.8 | 51.0 | -1.4 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -35.7 | -35.7 |

| Point Source, ISO 9613, Name: "Inv5", ID: "Inv5" | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | 396834.87 | 4963487.28 | 2.60 | 0 | 63 | 68.1 | 68.1 | 0.0 | 0.0 | 67.5 | 0.1 | -5.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 5.5 | 5.5 |
| 2 | 396834.87 | 4963487.28 | 2.60 | 0 | 125 | 78.9 | 78.9 | 0.0 | 0.0 | 67.5 | 0.3 | 3.6 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 7.5 | 7.5 |
| 3 | 396834.87 | 4963487.28 | 2.60 | 0 | 250 | 85.5 | 85.5 | 0.0 | 0.0 | 67.5 | 0.7 | 2.7 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 14.5 | 14.5 |
| 4 | 396834.87 | 4963487.28 | 2.60 | 0 | 500 | 87.3 | 87.3 | 0.0 | 0.0 | 67.5 | 1.3 | -1.1 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 19.5 | 19.5 |
| 5 | 396834.87 | 4963487.28 | 2.60 | 0 | 1000 | 83.7 | 83.7 | 0.0 | 0.0 | 67.5 | 2.5 | -1.5 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 15.2 | 15.2 |

| Point Source, ISO 9613, Name: "Inv5", ID: "Inv5" | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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) |
| 6 | 396834.87 | 4963487.28 | 2.60 | 0 | 2000 | 79.1 | 79.1 | 0.0 | 0.0 | 67.5 | 6.5 | -1.5 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 6.6 | 6.6 |
| 7 | 396834.87 | 4963487.28 | 2.60 | 0 | 4000 | 70.0 | 70.0 | 0.0 | 0.0 | 67.5 | 22.0 | -1.5 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -18.0 | -18.0 |
| 8 | 396834.87 | 4963487.28 | 2.60 | 0 | 8000 | 77.7 | 77.7 | 0.0 | 0.0 | 67.5 | 78.5 | -1.5 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -66.8 | -66.8 |

| Point Source, ISO 9613, Name: "Inv6", ID: "Inv6" | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | 396834.81 | 4963366.76 | 2.60 | 0 | 63 | 68.1 | 68.1 | 0.0 | 0.0 | 68.7 | 0.1 | -5.2 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 4.4 | 4.4 |
| 2 | 396834.81 | 4963366.76 | 2.60 | 0 | 125 | 78.9 | 78.9 | 0.0 | 0.0 | 68.7 | 0.3 | 3.8 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 6.0 | 6.0 |
| 3 | 396834.81 | 4963366.76 | 2.60 | 0 | 250 | 85.5 | 85.5 | 0.0 | 0.0 | 68.7 | 0.8 | 2.7 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 13.3 | 13.3 |
| 4 | 396834.81 | 4963366.76 | 2.60 | 0 | 500 | 87.3 | 87.3 | 0.0 | 0.0 | 68.7 | 1.5 | -1.1 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 18.2 | 18.2 |
| 5 | 396834.81 | 4963366.76 | 2.60 | 0 | 1000 | 83.7 | 83.7 | 0.0 | 0.0 | 68.7 | 2.8 | -1.5 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 13.7 | 13.7 |
| 6 | 396834.81 | 4963366.76 | 2.60 | 0 | 2000 | 79.1 | 79.1 | 0.0 | 0.0 | 68.7 | 7.5 | -1.6 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 4.5 | 4.5 |
| 7 | 396834.81 | 4963366.76 | 2.60 | 0 | 4000 | 70.0 | 70.0 | 0.0 | 0.0 | 68.7 | 25.3 | -1.6 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -22.4 | -22.4 |
| 8 | 396834.81 | 4963366.76 | 2.60 | 0 | 8000 | 77.7 | 77.7 | 0.0 | 0.0 | 68.7 | 90.0 | -1.6 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -79.5 | -79.5 |

| Point Source, ISO 9613, Name: "Inv7", ID: "Inv7" | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | 396762.81 | 4963230.73 | 2.60 | 0 | 63 | 68.1 | 68.1 | 0.0 | 0.0 | 69.7 | 0.1 | -5.3 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 3.6 | 3.6 |
| 2 | 396762.81 | 4963230.73 | 2.60 | 0 | 125 | 78.9 | 78.9 | 0.0 | 0.0 | 69.7 | 0.4 | 4.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 4.9 | 4.9 |
| 3 | 396762.81 | 4963230.73 | 2.60 | 0 | 250 | 85.5 | 85.5 | 0.0 | 0.0 | 69.7 | 0.9 | 2.7 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 12.3 | 12.3 |
| 4 | 396762.81 | 4963230.73 | 2.60 | 0 | 500 | 87.3 | 87.3 | 0.0 | 0.0 | 69.7 | 1.7 | -1.1 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 17.1 | 17.1 |
| 5 | 396762.81 | 4963230.73 | 2.60 | 0 | 1000 | 83.7 | 83.7 | 0.0 | 0.0 | 69.7 | 3.1 | -1.6 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 12.5 | 12.5 |
| 6 | 396762.81 | 4963230.73 | 2.60 | 0 | 2000 | 79.1 | 79.1 | 0.0 | 0.0 | 69.7 | 8.3 | -1.6 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 2.7 | 2.7 |
| 7 | 396762.81 | 4963230.73 | 2.60 | 0 | 4000 | 70.0 | 70.0 | 0.0 | 0.0 | 69.7 | 28.1 | -1.6 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -26.2 | -26.2 |
| 8 | 396762.81 | 4963230.73 | 2.60 | 0 | 8000 | 77.7 | 77.7 | 0.0 | 0.0 | 69.7 | 100.3 | -1.6 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -90.7 | -90.7 |

| Point Source, ISO 9613, Name: "Sub", ID: "Sub" | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | 396658.45 | 4963853.21 | 3.50 | 0 | 32 | 48.0 | 48.0 | 0.0 | 0.0 | 60.1 | 0.0 | -3.5 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -8.7 | -8.7 |
| 2 | 396658.45 | 4963853.21 | 3.50 | 0 | 63 | 67.2 | 67.2 | 0.0 | 0.0 | 60.1 | 0.0 | -3.5 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 10.5 | 10.5 |
| 3 | 396658.45 | 4963853.21 | 3.50 | 0 | 125 | 79.3 | 79.3 | 0.0 | 0.0 | 60.1 | 0.1 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 16.1 | 16.1 |
| 4 | 396658.45 | 4963853.21 | 3.50 | 0 | 250 | 81.8 | 81.8 | 0.0 | 0.0 | 60.1 | 0.3 | 1.9 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 19.5 | 19.5 |
| 5 | 396658.45 | 4963853.21 | 3.50 | 0 | 500 | 87.2 | 87.2 | 0.0 | 0.0 | 60.1 | 0.6 | -1.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 27.5 | 27.5 |
| 6 | 396658.45 | 4963853.21 | 3.50 | 0 | 1000 | 84.4 | 84.4 | 0.0 | 0.0 | 60.1 | 1.1 | -1.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 24.3 | 24.3 |
| 7 | 396658.45 | 4963853.21 | 3.50 | 0 | 2000 | 80.6 | 80.6 | 0.0 | 0.0 | 60.1 | 2.8 | -1.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 18.8 | 18.8 |
| 8 | 396658.45 | 4963853.21 | 3.50 | 0 | 4000 | 75.4 | 75.4 | 0.0 | 0.0 | 60.1 | 9.4 | -1.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 7.0 | 7.0 |
| 9 | 396658.45 | 4963853.21 | 3.50 | 0 | 8000 | 66.3 | 66.3 | 0.0 | 0.0 | 60.1 | 33.4 | -1.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -26.2 | -26.2 |

| Point Source, ISO 9613, Name: "Trans1", ID: "Trans1" | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | 396359.11 | 4963580.04 | 2.58 | 0 | 32 | 37.3 | 37.3 | 0.0 | 0.0 | 64.0 | 0.0 | -4.6 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -22.1 | -22.1 |
| 2 | 396359.11 | 4963580.04 | 2.58 | 0 | 63 | 56.5 | 56.5 | 0.0 | 0.0 | 64.0 | 0.1 | -4.6 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -3.0 | -3.0 |
| 3 | 396359.11 | 4963580.04 | 2.58 | 0 | 125 | 68.6 | 68.6 | 0.0 | 0.0 | 64.0 | 0.2 | 2.9 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 1.5 | 1.5 |
| 4 | 396359.11 | 4963580.04 | 2.58 | 0 | 250 | 71.1 | 71.1 | 0.0 | 0.0 | 64.0 | 0.5 | 2.9 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 3.8 | 3.8 |
| 5 | 396359.11 | 4963580.04 | 2.58 | 0 | 500 | 76.5 | 76.5 | 0.0 | 0.0 | 64.0 | 0.9 | -0.9 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 12.6 | 12.6 |
| 6 | 396359.11 | 4963580.04 | 2.58 | 0 | 1000 | 73.7 | 73.7 | 0.0 | 0.0 | 64.0 | 1.6 | -1.4 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 9.5 | 9.5 |
| 7 | 396359.11 | 4963580.04 | 2.58 | 0 | 2000 | 69.9 | 69.9 | 0.0 | 0.0 | 64.0 | 4.3 | -1.4 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 3.0 | 3.0 |
| 8 | 396359.11 | 4963580.04 | 2.58 | 0 | 4000 | 64.7 | 64.7 | 0.0 | 0.0 | 64.0 | 14.6 | -1.4 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -12.5 | -12.5 |
| 9 | 396359.11 | 4963580.04 | 2.58 | 0 | 8000 | 55.6 | 55.6 | 0.0 | 0.0 | 64.0 | 52.0 | -1.4 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -59.0 | -59.0 |

| Point Source, ISO 9613, Name: "Trans2", ID: "Trans2" | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | 396359.11 | 4963725.44 | 2.58 | 0 | 32 | 37.3 | 37.3 | 0.0 | 0.0 | 60.6 | 0.0 | -3.9 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -19.4 | -19.4 |
| 2 | 396359.11 | 4963725.44 | 2.58 | 0 | 63 | 56.5 | 56.5 | 0.0 | 0.0 | 60.6 | 0.0 | -3.9 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -0.3 | -0.3 |
| 3 | 396359.11 | 4963725.44 | 2.58 | 0 | 125 | 68.6 | 68.6 | 0.0 | 0.0 | 60.6 | 0.1 | 2.5 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 5.3 | 5.3 |
| 4 | 396359.11 | 4963725.44 | 2.58 | 0 | 250 | 71.1 | 71.1 | 0.0 | 0.0 | 60.6 | 0.3 | 3.1 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 7.1 | 7.1 |
| 5 | 396359.11 | 4963725.44 | 2.58 | 0 | 500 | 76.5 | 76.5 | 0.0 | 0.0 | 60.6 | 0.6 | -0.7 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 16.0 | 16.0 |
| 6 | 396359.11 | 4963725.44 | 2.58 | 0 | 1000 | 73.7 | 73.7 | 0.0 | 0.0 | 60.6 | 1.1 | -1.2 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 13.1 | 13.1 |

| Point Source, ISO 9613, Name: "Trans2", ID: "Trans2" | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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) |
| 7 | 396359.11 | 4963725.44 | 2.58 | 0 | 2000 | 69.9 | 69.9 | 0.0 | 0.0 | 60.6 | 2.9 | -1.2 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 7.5 | 7.5 |
| 8 | 396359.11 | 4963725.44 | 2.58 | 0 | 4000 | 64.7 | 64.7 | 0.0 | 0.0 | 60.6 | 9.9 | -1.2 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -4.6 | -4.6 |
| 9 | 396359.11 | 4963725.44 | 2.58 | 0 | 8000 | 55.6 | 55.6 | 0.0 | 0.0 | 60.6 | 35.3 | -1.2 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -39.2 | -39.2 |

| Point Source, ISO 9613, Name: "Trans3", ID: "Trans3" | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | 396578.94 | 4963831.98 | 2.58 | 0 | 32 | 37.3 | 37.3 | 0.0 | 0.0 | 58.7 | 0.0 | -3.4 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -18.0 | -18.0 |
| 2 | 396578.94 | 4963831.98 | 2.58 | 0 | 63 | 56.5 | 56.5 | 0.0 | 0.0 | 58.7 | 0.0 | -3.4 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 1.2 | 1.2 |
| 3 | 396578.94 | 4963831.98 | 2.58 | 0 | 125 | 68.6 | 68.6 | 0.0 | 0.0 | 58.7 | 0.1 | 2.5 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 7.3 | 7.3 |
| 4 | 396578.94 | 4963831.98 | 2.58 | 0 | 250 | 71.1 | 71.1 | 0.0 | 0.0 | 58.7 | 0.3 | 3.2 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 8.9 | 8.9 |
| 5 | 396578.94 | 4963831.98 | 2.58 | 0 | 500 | 76.5 | 76.5 | 0.0 | 0.0 | 58.7 | 0.5 | -0.6 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 17.9 | 17.9 |
| 6 | 396578.94 | 4963831.98 | 2.58 | 0 | 1000 | 73.7 | 73.7 | 0.0 | 0.0 | 58.7 | 0.9 | -1.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 15.1 | 15.1 |
| 7 | 396578.94 | 4963831.98 | 2.58 | 0 | 2000 | 69.9 | 69.9 | 0.0 | 0.0 | 58.7 | 2.3 | -1.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 9.9 | 9.9 |
| 8 | 396578.94 | 4963831.98 | 2.58 | 0 | 4000 | 64.7 | 64.7 | 0.0 | 0.0 | 58.7 | 7.9 | -1.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -0.9 | -0.9 |
| 9 | 396578.94 | 4963831.98 | 2.58 | 0 | 8000 | 55.6 | 55.6 | 0.0 | 0.0 | 58.7 | 28.3 | -1.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -30.4 | -30.4 |

| Point Source, ISO 9613, Name: "Trans4", ID: "Trans4" | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | 396709.62 | 4963683.38 | 2.58 | 0 | 32 | 37.3 | 37.3 | 0.0 | 0.0 | 63.9 | 0.0 | -4.5 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -22.0 | -22.0 |
| 2 | 396709.62 | 4963683.38 | 2.58 | 0 | 63 | 56.5 | 56.5 | 0.0 | 0.0 | 63.9 | 0.1 | -4.5 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -2.9 | -2.9 |
| 3 | 396709.62 | 4963683.38 | 2.58 | 0 | 125 | 68.6 | 68.6 | 0.0 | 0.0 | 63.9 | 0.2 | 2.9 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 1.7 | 1.7 |
| 4 | 396709.62 | 4963683.38 | 2.58 | 0 | 250 | 71.1 | 71.1 | 0.0 | 0.0 | 63.9 | 0.5 | 2.9 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 3.9 | 3.9 |
| 5 | 396709.62 | 4963683.38 | 2.58 | 0 | 500 | 76.5 | 76.5 | 0.0 | 0.0 | 63.9 | 0.9 | -0.9 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 12.7 | 12.7 |
| 6 | 396709.62 | 4963683.38 | 2.58 | 0 | 1000 | 73.7 | 73.7 | 0.0 | 0.0 | 63.9 | 1.6 | -1.4 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 9.6 | 9.6 |
| 7 | 396709.62 | 4963683.38 | 2.58 | 0 | 2000 | 69.9 | 69.9 | 0.0 | 0.0 | 63.9 | 4.3 | -1.4 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 3.1 | 3.1 |
| 8 | 396709.62 | 4963683.38 | 2.58 | 0 | 4000 | 64.7 | 64.7 | 0.0 | 0.0 | 63.9 | 14.4 | -1.4 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -12.2 | -12.2 |
| 9 | 396709.62 | 4963683.38 | 2.58 | 0 | 8000 | 55.6 | 55.6 | 0.0 | 0.0 | 63.9 | 51.4 | -1.4 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -58.3 | -58.3 |

| Point Source, ISO 9613, Name: "Trans5", ID: "Trans5" | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | 396840.37 | 4963486.78 | 2.58 | 0 | 32 | 37.3 | 37.3 | 0.0 | 0.0 | 67.6 | 0.0 | -5.1 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -25.3 | -25.3 |
| 2 | 396840.37 | 4963486.78 | 2.58 | 0 | 63 | 56.5 | 56.5 | 0.0 | 0.0 | 67.6 | 0.1 | -5.1 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -6.1 | -6.1 |
| 3 | 396840.37 | 4963486.78 | 2.58 | 0 | 125 | 68.6 | 68.6 | 0.0 | 0.0 | 67.6 | 0.3 | 3.6 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -2.9 | -2.9 |
| 4 | 396840.37 | 4963486.78 | 2.58 | 0 | 250 | 71.1 | 71.1 | 0.0 | 0.0 | 67.6 | 0.7 | 2.8 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 0.1 | 0.1 |
| 5 | 396840.37 | 4963486.78 | 2.58 | 0 | 500 | 76.5 | 76.5 | 0.0 | 0.0 | 67.6 | 1.3 | -1.1 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 8.7 | 8.7 |
| 6 | 396840.37 | 4963486.78 | 2.58 | 0 | 1000 | 73.7 | 73.7 | 0.0 | 0.0 | 67.6 | 2.5 | -1.5 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 5.1 | 5.1 |
| 7 | 396840.37 | 4963486.78 | 2.58 | 0 | 2000 | 69.9 | 69.9 | 0.0 | 0.0 | 67.6 | 6.5 | -1.5 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -2.7 | -2.7 |
| 8 | 396840.37 | 4963486.78 | 2.58 | 0 | 4000 | 64.7 | 64.7 | 0.0 | 0.0 | 67.6 | 22.1 | -1.5 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -23.5 | -23.5 |
| 9 | 396840.37 | 4963486.78 | 2.58 | 0 | 8000 | 55.6 | 55.6 | 0.0 | 0.0 | 67.6 | 78.9 | -1.5 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -89.4 | -89.4 |

| Point Source, ISO 9613, Name: "Trans6", ID: "Trans6" | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | 396840.31 | 4963366.26 | 2.58 | 0 | 32 | 37.3 | 37.3 | 0.0 | 0.0 | 68.8 | 0.0 | -5.2 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -26.3 | -26.3 |
| 2 | 396840.31 | 4963366.26 | 2.58 | 0 | 63 | 56.5 | 56.5 | 0.0 | 0.0 | 68.8 | 0.1 | -5.2 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -7.2 | -7.2 |
| 3 | 396840.31 | 4963366.26 | 2.58 | 0 | 125 | 68.6 | 68.6 | 0.0 | 0.0 | 68.8 | 0.3 | 3.8 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -4.3 | -4.3 |
| 4 | 396840.31 | 4963366.26 | 2.58 | 0 | 250 | 71.1 | 71.1 | 0.0 | 0.0 | 68.8 | 0.8 | 2.7 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -1.2 | -1.2 |
| 5 | 396840.31 | 4963366.26 | 2.58 | 0 | 500 | 76.5 | 76.5 | 0.0 | 0.0 | 68.8 | 1.5 | -1.1 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 7.3 | 7.3 |
| 6 | 396840.31 | 4963366.26 | 2.58 | 0 | 1000 | 73.7 | 73.7 | 0.0 | 0.0 | 68.8 | 2.8 | -1.5 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 3.6 | 3.6 |
| 7 | 396840.31 | 4963366.26 | 2.58 | 0 | 2000 | 69.9 | 69.9 | 0.0 | 0.0 | 68.8 | 7.5 | -1.6 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -4.8 | -4.8 |
| 8 | 396840.31 | 4963366.26 | 2.58 | 0 | 4000 | 64.7 | 64.7 | 0.0 | 0.0 | 68.8 | 25.4 | -1.6 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -27.9 | -27.9 |
| 9 | 396840.31 | 4963366.26 | 2.58 | 0 | 8000 | 55.6 | 55.6 | 0.0 | 0.0 | 68.8 | 90.4 | -1.6 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -102.1 | -102.1 |

| Point Source, ISO 9613, Name: "Trans7", ID: "Trans7" | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | 396768.31 | 4963230.23 | 2.58 | 0 | 32 | 37.3 | 37.3 | 0.0 | 0.0 | 69.7 | 0.0 | -5.3 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -27.2 | -27.2 |
| 2 | 396768.31 | 4963230.23 | 2.58 | 0 | 63 | 56.5 | 56.5 | 0.0 | 0.0 | 69.7 | 0.1 | -5.3 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -8.0 | -8.0 |
| 3 | 396768.31 | 4963230.23 | 2.58 | 0 | 125 | 68.6 | 68.6 | 0.0 | 0.0 | 69.7 | 0.4 | 4.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -5.4 | -5.4 |
| 4 | 396768.31 | 4963230.23 | 2.58 | 0 | 250 | 71.1 | 71.1 | 0.0 | 0.0 | 69.7 | 0.9 | 2.7 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -2.2 | -2.2 |

| Point Source, ISO 9613, Name: "Trans7", ID: "Trans7" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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) |
| 5 | 396768.31 | 4963230.23 | 2.58 | 0 | 500 | 76.5 | 76.5 | 0.0 | 0.0 | 69.7 | 1.7 | -1.1 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 6.3 | 6.3 |
| 6 | 396768.31 | 4963230.23 | 2.58 | 0 | 1000 | 73.7 | 73.7 | 0.0 | 0.0 | 69.7 | 3.1 | -1.6 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 2.4 | 2.4 |
| 7 | 396768.31 | 4963230.23 | 2.58 | 0 | 2000 | 69.9 | 69.9 | 0.0 | 0.0 | 69.7 | 8.3 | -1.6 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -6.5 | -6.5 |
| 8 | 396768.31 | 4963230.23 | 2.58 | 0 | 4000 | 64.7 | 64.7 | 0.0 | 0.0 | 69.7 | 28.2 | -1.6 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -31.6 | -31.6 |
| 9 | 396768.31 | 4963230.23 | 2.58 | 0 | 8000 | 55.6 | 55.6 | 0.0 | 0.0 | 69.7 | 100.6 | -1.6 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -113.1 | -113.1 |