Sound Impact Assessment Report

Cornerstone Solar, LLC

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Jefferson Township, Washington County, Pennsylvania

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1.0 Introduction

Cornerstone Solar, LLC (Cornerstone) proposes to develop the Cornerstone Solar Project (Project) within Jefferson Township, Washington County, in southwestern Pennsylvania (PA).

1.1 Project Description

The Project will include the installation of photovoltaic solar panel arrays and any associated accessories including electrical infrastructure, access roads, and operation facilities. The Project abuts the PA/West Virginia (WV) state border line on its western extent and is bisected by both Bethel Ridge Road and Miller Road. The Study Area has a total area of approximately 1,484 acres. The site is bounded on all sides with forested, agricultural and residential land uses.

2.0 Concepts of Environmental Sound

Sounds are generated by a variety of sources (e.g., a musical instrument, a voice speaking, or an airplane that passes overhead). Energy is required to produce sound, and this sound energy is transmitted through the air in the form of sound waves – tiny, quick oscillations of pressure just above and just below atmospheric pressure. These oscillations, or sound pressures, impinge on the ear, creating the sound we hear. The range of sound pressures that can be detected by a person with normal hearing is very wide, ranging from about 20 micro-pascals (μPa) for very faint sounds at the threshold of hearing to nearly 10 million μPa for extremely loud sounds, such as a jet during take-off at a distance of 300 feet. Because the range of human hearing is so wide, sound levels are reported using "sound pressure levels", which are expressed in terms of decibels. The sound pressure level in decibels is the logarithm of the ratio of the sound pressure of the source to the reference sound pressure of 20 μPa, multiplied by 20.

Table 2.0-1 provides some examples of common sources of sound and their sound pressure levels. All sound levels in this assessment are provided in A-weighted decibels, abbreviated "dB(A)" or "dBA." The A-weighted sound level reflects how the human ear responds to sound, by deemphasizing sounds that occur in frequencies at which the human ear is least sensitive to sound (at frequencies below about 100 hertz and above 10,000 hertz) and emphasizing sounds that occur in frequencies at which the human ear is most sensitive to sound (in the mid-frequency range from about 200 to 8,000 hertz). In the context of environmental sound, noise is defined as "unwanted sound."

Table 2.0-1 Examples of Common Sound Pressure Levels

Sound Level dB(A)	Common Indoor Sounds	Common Outdoor Sounds
110	Rock Band at 16 feet	Jet Fly-Over at 1000 feet Chainsaw at 3 feet
100	Inside NYC Subway Train Circular Saw at 3 feet	Car Horn at 3 feet Helicopter at 100 feet
90	Food Blender at 3 feet Newspaper Press	Gas Lawn Mower at 3 feet Motorcycle at 25 feet
80	Garbage Disposal at 3 feet Shouting at 3 feet	Noisy Urban

Table 2.0-1 Examples of Common Sound Pressure Levels

Sound Level dB(A)	Common Indoor Sounds	Common Outdoor Sounds
70	Vacuum Cleaner at 10 feet Loud Restaurant	Busy Highway at 50 feet Gas Lawn Mower at 100 feet
60	Normal Speech at 3 feet Business Office	Commercial Area
50	Dishwasher in Next Room Background Music	Quiet Urban Daytime
40	Library Conference Room	Quiet Urban Nighttime Bird Calls
30	Bedroom at Night Concert Hall (Background)	Quiet Rural Nighttime
20	Whisper Recording Studio	Natural Area (No Wind) Rustling Leaves
Source: FAA, 2022		

Sound pressure levels are typically presented in community noise assessments utilizing the noise metrics described below and expressed in terms of A-weighted decibels.

- "L_{10}" is the sound level that is exceeded for 10 percent of the time. This metric is a measure of the intrusiveness of relatively short-duration noise events that occurred during the measurement period.
- "L_{50}" is the sound level that is exceeded for 50 percent of the measurement period.
- "L_{90}" is the sound level that is exceeded for 90 percent of the time and is a measure of the background or residual sound levels in the absence of recurring noise events.
- "L_{eq}" is the is the constant sound level which would contain the same acoustic energy as the varying sound levels during the time period and is representative of the average noise exposure level for that time period.
- "L_{MAX}" is the instantaneous maximum sound level for the time period.
- "L_d" is the average of daytime L_{90} background sound levels.

It is often necessary to combine the sound pressure levels from one or more sources. Because decibels are logarithmic quantities, it is not possible to simply add the values of the sound pressure levels together. For example, if two sound sources each produce 70 dB and they are operated together, their combined impact is 73 dB – not 140 dB as might be expected. Four equal 70 dB sources operating simultaneously result in a total sound pressure level of 76 dB. In fact, for every doubling of the number of equal sources, the sound pressure level goes up another three decibels. A tenfold increase in the number of sources makes the sound pressure level increase by 10 dB, while a hundredfold increase makes the level increase by 20 dB. The logarithmic combination of *n* different sound levels is calculated by the following equation:

$$L_{total}=10*\log_{10}\left(10^{\frac{L_1}{10}} + 10^{\frac{L_2}{10}} +\ldots+10^{\frac{L_n}{10}}\right)$$

Perceived changes in sound level can be slightly more subjective; the average person will not notice a change of 1-2 dB, a 3 dB increase is just barely perceptible, while a 5 dB change is clearly noticeable.

3.0 Applicable Standards and Regulations

With the exception of the U.S. Occupational Health and Safety Administration's regulations that describe worker health and safety limits for noise exposure, and the township of Jefferson's noise regulation, there are no other federal or state noise regulations or requirements applicable to the Project in the state of Pennsylvania. The regulatory framework at the federal, state, and local levels is presented below.

3.1 Federal Criteria

3.1.1 U.S. Environmental Protection Agency

In 1974, the United States Environmental Protection Agency (USEPA) published Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (USEPA 1974), which includes widely accepted recommendations for long-term exposure to environmental noise with the goal of protecting public health and safety. This report represents the only published study that includes a large database of community reaction to long-term noise impacts to which Project operation can be readily compared. This publication evaluates the effects of environmental noise with respect to health and safety and provides information for state and local governments to use in developing their own ambient (outdoor area) noise standards.

For the outdoors in residential areas and other places in which quiet is a basis for use, the recommended USEPA guideline is a day-night sound level ("Ldn") of 55 dBA. The Ldn is a 24-hour average sound level that includes a 10-decibel ("dB") addition to sound levels during nighttime hours. Although the Project is not located within a residential area, if, as anticipated, Project operations meet this criteria level, the closest residents, which are located more than 1,000 feet from the Project, would regard the noise levels as generally acceptable.

3.1.2 U.S. Department of Transportation

The Federal Highway Association of the U.S. Department of Transportation has identified criteria for the assessment and measurement of short- and long-term construction activities for both stationary and mobile projects, and specifically for linear projects (FHWA 2018). The Federal Highway Administration recommends abatement of construction noise that exceeds maximum recommended levels at noise sensitive receptors and the use of best management practices to reduce the noise levels.

These project construction noise assessment criteria account for the diurnal pattern of construction activities, the absolute noise levels during construction activities, the duration of the construction, and the adjacent land use. While these criteria were not developed to specifically address construction noise impact for drilling projects, these guidelines provide reasonable steps for assessment and best management practices to be used. If the USEPA noise levels are exceeded, adverse community reaction may result, thus this document provides guidance on how to calculate the Project noise levels and best management practices to reduce them.

3.2 State, County, and Local Criteria

The Jefferson Township's Solar Energy Systems Ordinance stipulates that ambient sound during operation of a Solar Energy Facility shall not exceed the existing sound levels as measured at the property line (baseline ambient sound) plus 10 dBA during daylight hours. At night, defined as one hour after dusk, predicted sound levels from the Project shall not exceed the baseline ambient sound. Additionally, construction activities are restricted to the hours of 7 AM to 7 PM Monday through Friday, and 7 AM to 5 PM on Saturday.

TRC did not identify any other state, county or local numerical noise ordinances applicable to the proposed project.

3.3 Noise Sensitive Areas

The facility is being proposed in a rural area with a few nearby noise sensitive areas (NSAs) such as residences, schools, and hospitals. Noise-Sensitive Areas (NSAs) are defined as areas that may be particularly sensitive to noise and may require additional protection. Table 3.3-1 lists the most impacted NSA groups and their approximate distance and direction from the proposed Project. Individual NSAs (primarily residential buildings) are also depicted on attached Figure 3, Potential Noise Sensitive Areas.

Table 3.3-1 Potential Noise Sensitive Areas

NSA	Description	Approx. Distance from property line to NSA, feet	Direction to NSA
1	Residence	1,470	E
2	Residence	930	E
3	Residence	1,030	E
4	Residence	1,790	E
5	Residence	1,180	E
6	Residence	2,260	E
7	Residence	2,440	E
8	Residence	1,640	N
9	Residence	1,070	N
10	Residence	750	N
11	Residence	850	N
12	Residence	1,210	W
13	Residence	840	W

Table 3.3-1 Potential Noise Sensitive Areas

NSA	Description	Approx. Distance from property line to NSA, feet	Direction to NSA
14	Residence	950	W
15	Residence	1,940	W
16	Residence	1,820	W
17	Residence	1,060	E
18	Residence	320	W
19	Residence	400	N
20	Residence	1,000	S
21	Residence	780	N
22	Residence	1,020	S

4.0 Background Sound Measurements

A pre-construction ambient sound survey was completed at the proposed facility property on June 16-17 and July 9-10, 2025 to characterize the existing sound environment (i.e., background) in the project area. Short term sound level measurements were taken at various site property lines and near potential NSAs for approximately ten minutes at each location during multiple time periods.

4.1 Short-Term Sound Survey Methodology

The measurements were taken using a Larson Davis Model 831C sound level meter that meets the requirements of the American National Standards Institute (ANSI) Standards for Type I instruments. The sound level meter was calibrated before and after each monitoring period using a CAL200 acoustic calibrator. The microphone was positioned according to the ANSI Standard on a tripod 1.5 meters above ground, 7.5 meters from large reflecting surfaces, and at least 1.5 meters from tall trees.

Ambient sound level measurements were conducted on a weekday on a non-holiday week at 10 total measurement points and for a minimum of ten continuous minutes for each criterion. Measuring point 7 and 8 were monitored at two similar locations, labeled as “A” and “B”. The following measurement criteria are provided in Tables 5.1-5.2 for each measurement location and for each measurement period:

- LA_{EQ}, LC_{EQ}, LA_{10}, LA_{50}, and LA_{90}
- Unweighted octave-band analysis (16, 31.5, 63, 125, 250, 500, 1K, 2K, 4K, 8K Hz)

The Noise Measurement (NM) points are listed below:

- NM-1: At the Hidden Meadows Game Preserve
- NM-2: Directly West of Hidden Meadows Game Preserve
- NM-3: South of Hidden Meadows Game Preserve, on McCready Rd
- NM-4: South of Hidden Meadows Game Preserve, on McCready Rd, south of NM-3
- NM-5: South of Hidden Meadows Game Preserve, on McCready Rd, south of NM-4
- NM-6: Off Bethel Ridge Rd
- NM-7A and 7B: In pastures of property off Miller Rd.
- NM-8A and 8B: In pastures of property off Miller Rd.
- NM-9: Further North on Miller Rd.
- NM-10: South of NM-7 and NM-8 on Miller Rd.

The proposed Project site layout, showing the location of the measurement points, is shown on Figure 1.

4.2 Short-Term Sound Survey Results

The statistical results of the short-term sound level monitoring are shown below in Table 4.2-1. The L_{90}, representative of the background level excluding impulsive sounds, was between 33.7 and 44.1 dBA during daytime and between 24.7 and 42.7 dBA at night.

Table 4.2-1 Sound Level Monitoring Summary

Site ID	LA_{EQ}	LC_{EQ}	LA_{10}	LA_{50}	LA_{90}
Nighttime: June 16, 2025, 9 PM - 12 AM					
NM-1	37.5	45.7	38.7	36.8	35.8
NM-2	41.3	50.4	43.2	39.6	36.0
NM-3	39.0	45.8	41.7	37.4	36.0
NM-4	38.4	46.7	40.0	35.9	35.2
NM-6	43.9	52.6	44.6	43.8	42.7
NM-7A	33.2	46.7	33.4	32.3	31.7
NM-9	41.8	50.6	42.0	41.6	41.1
NM-10	36.4	50.3	36.8	35.1	34.1
Daytime: June 17, 2025, 8 AM - 11 AM					
NM-1	44.0	48.6	44.2	41.4	39.0
NM-2	43.0	53.3	43.2	40.0	38.1
NM-3	42.0	51.5	45.5	38.9	36.6
NM-4	45.3	47.4	47.9	44.4	41.8
NM-6	45.1	54.7	45.9	44.7	44.1
NM-7A	43.3	48.8	45.9	40.7	35.4
NM-8A	38.3	55.4	41.1	36.9	33.7
NM-9	38.7	52.0	40.8	37.3	35.6

Table 4.2-1 Sound Level Monitoring Summary

Site ID	LA_{EQ}	LC_{EQ}	LA_{10}	LA_{50}	LA_{90}
NM-10	40.6	50.3	44.8	36.0	34.4
Nighttime: July 9, 2025, 9 PM – 12 AM					
NM-5	41.2	47.1	42.9	39.8	39.2
NM-7B	37.0	51.1	41.8	41.8	28.7
NM-8B	32.9	47.3	34.8	27.6	24.7
Daytime: July 10, 2025, 8 AM - 11 AM					
NM-5	43.1	50.2	44.2	42.2	41.2
NM-7B	40.3	47.4	41.9	37.7	36.6
NM-8B	44.9	52.1	48.4	40.7	39.3

Table 4.2-2, below, shows the sound levels for individual octave band frequencies at each of the measurement locations during the short-term sound survey. This analysis is used to identify existing pure tone conditions. A pure tone condition occurs when the sound level for a particular octave band exceeds the sound level of both adjacent bands by three or more decibels. This can make a certain frequency stand out above broadband noise as a distinct whine or hum, making it more noticeable and potentially increasing the level of disturbance.

Table 4.2-2 Octave Band Analysis Summary

Site ID	Octave Band Center Frequency (Hz)									
	16	31.5	63	125	250	500	1000	2000	4000	8000
Nighttime: June 16, 2025, 9 PM - 12 AM										
NM-1	41.3	39.8	34.7	27.3	26.6	21.7	24.5	25.3	25.2	19.3
NM-2	42.4	43.2	41.4	36.0	30.4	26.3	26.2	26.1	33.3	21.2
NM-3	35.7	37.3	34.7	31.2	29.6	25.8	27.3	28.2	27.1	21.2
NM-4	39.7	39.2	37.1	30.7	32.7	26.6	25.6	27.8	26.0	20.5
NM-6	47.7	48.5	46.0	36.8	29.6	22.5	22.1	20.1	22.5	21.8
NM-7A	41.3	40.2	39.7	33.8	23.1	19.6	14.6	14.6	15.6	12.2
NM-9	43.2	46.2	42.6	32.7	28.9	18.8	17.6	19.7	23.9	26.8
NM-10	44.7	44.9	41.5	34.6	30.7	22.8	21.0	18.8	22.3	12.4
Daytime: June 17, 2025, 8 AM - 11 AM										
NM-1	39.3	37.1	39	31.8	37.3	25.9	28.7	30.4	32.6	27.3
NM-2	45.7	49.4	49.7	42.3	39.7	32.1	28.2	27.8	33.1	20.9
NM-3	46.7	41.6	44.8	38.8	26.1	25.5	26.4	29.1	32.4	27.0
NM-4	37.5	36.5	37.3	32.8	29.7	26.4	27.2	29.9	39.3	25.1
NM-6	37.6	43.9	44.1	37.5	28.8	22.5	21.7	24.6	31.4	19.7
NM-7A	44.0	39.9	37.5	33.9	29.7	22.1	20.2	22.6	36.6	27.4
NM-8A	55.0	45.4	38.9	36.5	32.8	20.8	20.0	21.9	31.5	24.3

Table 4.2-2 Octave Band Analysis Summary

Site ID	Octave Band Center Frequency (Hz)									
	16	31.5	63	125	250	500	1000	2000	4000	8000
NM-9	38.7	37.9	41.9	37.9	26.0	21.1	23.8	21.6	29.4	17.3
NM-10	42.7	43.6	42.8	37.4	31.4	23.8	20.3	22.8	34.0	21.5
Nighttime: July 9, 2025, 9 PM - 12 AM										
NM-5	36.0	35.5	35.0	31.4	35.6	24.1	19.4	25.7	18.4	19.6
NM-7B	38.0	41.5	43.9	39.0	34.8	21.4	11.7	16.0	10.7	16.7
NM-8B	37.9	40.3	40.9	31.5	31.6	15.5	7.4	14.3	10.4	14.7
Daytime: July 10, 2025, 8 AM - 11 AM										
NM-5	38.0	37.7	36.4	40.3	38.3	25.1	17.4	26.0	21.2	24.2
NM-7B	37.9	40.3	40.9	31.5	31.6	15.5	7.4	14.3	10.4	14.7
NM-8B	41.8	38.2	39.3	37.7	40.7	26.3	10.6	17.8	17.1	20.7

Using the data collected during the short-term monitoring, a Day-Night average (Ldn) of the ambient noise level was created for each of the monitoring sites (Table 4.2-3).

Table 4.2-3 Ambient Noise Measurements Summary

Site ID	Measured Sound Levels, dBA		
	Daytime Avg. Ld	Nighttime Avg. Ln	Day-Night Avg. Ldn
NM-1	39.3	37.5	44.2
NM-2	45.7	41.3	48.7
NM-3	46.7	39.0	47.7
NM-4	37.5	38.4	44.7
NM-5	43.1	41.2	47.9
NM-6	45.1	43.9	50.5
NM-7A	43.3	33.2	43.3
NM-7B	40.3	37.0	44.1
NM-8A	38.3	37.0	43.6
NM-8B	44.9	32.9	44.3
NM-9	38.7	41.8	47.9
NM-10	40.6	36.4	43.7

5.0 Operational Noise Impacts

Changes to existing noise levels due to operation of the Project were quantified using predictive noise modeling based on the proposed equipment layout and specifications. The Cadna-A®

computer noise model was used to predict future sound pressure levels from the operation of the Project at the property line and at the nearest noise-sensitive areas.

5.1 Modeling Inputs

An industry standard, Cadna A® was developed by DataKustik GmbH to provide an estimate of sound levels at distances from specific noise sources. This model takes into account:

- Sound power levels from stationary and mobile sources;
- The effects of terrain features including relative elevations of noise sources;
- Intervening objects including buildings and sound barrier walls; and
- Ground effects due to areas of pavement and unpaved ground.

Cadna-A® accounts for shielding and reflections due to intervening buildings or other structures in the propagation path, as well as diffracted paths around and over structures, which tend to reduce computed noise levels. The shielding effects due to intervening terrain are included in the model. The shielding effects due to the proposed equipment and existing off-site buildings and ground vegetation were excluded from the model to provide a level of conservatism to the analysis.

For ground effects, the reflectivity of the surface is described by a "ground factor" variable (G), which ranges from 0 for 'hard' ground (paved surfaces, concrete, etc.) and 1 for "porous" ground (grassland and other vegetated areas). A ground absorption factor of 1 was used across the entire site, given the undeveloped nature of the study area. The proposed access roads and substation pads will be gravel (porous surface) and perennial vegetation will remain under the solar panels throughout the site.

The International Standards Organization current standard for outdoor sound propagation (ISO 9613 Part 2 – "Attenuation of sound during propagation outdoors") was used within Cadna-A®. This standard provides a method for calculating environmental noise in communities from a variety of sources with known emission levels. The method contained within the standard calculates the attenuation over the entire sound path under weather conditions that are favorable for sound propagation, such as for downwind propagation or "under a well-developed moderate ground-based temperature inversion." Application of conditions that are favorable for sound propagation yields conservative estimates of operational noise levels in the surrounding area.

Sound source inputs to the noise model consist of the 48 solar inverter modules. The Project will also include a 34.5 kV single circuit collector line that will connect the north and south areas; however, it is not expected that the collector line will produce perceptible sound above baseline ambient sound levels. Since the sound-producing equipment were assumed to be continuously operating, the LA_{90} (background level) and LA_{EQ} (equivalent constant level) of the proposed equipment are the same for the purposes of this assessment. Sound power levels were calculated based on equipment specifications provided by Cornerstone Solar and the manufacturer specifications included in Appendix A. The proposed SMA Sunny Central solar inverters have a sound pressure level of 65 dBA at 10m, with an equivalent sound power level of 96 dBA.

The north and south areas of the Project will be interconnected by a 34.5 kilovolt (kV) single circuit "collector" power line. The operation of transmission lines can create sound impacts in the immediate vicinity of the lines due to transmission electrostatic effects (also known as “corona” effects) during precipitation events or very high humidity. However, this effect requires a high enough voltage to ionize water droplets in the air, typically 345 kV or above. The proposed collector line is therefore not considered a significant source of sound and is excluded from the model.

5.2 Modeling Results

Cadna-A® allows the user to place receptors at selected locations and predicts sound levels at those specific receptor locations. For this analysis, specific receptors were placed at the ambient measurement locations to determine the potential increase in sound level due to operation of the proposed equipment, as well as at the exterior walls of the nearest potential noise-sensitive receptors.

Table 5.2-1 presents the predicted sound levels at each of the measurement locations resulting from the operation of the proposed equipment, as well as the resulting increase over measured ambient sound levels. Ambient sound levels for NSAs were based on the nearest monitoring location. The model also calculated sound levels for the surrounding area, using a 2-meter receptor grid, with a receptor height of 1.55 meters. This data is displayed in the isopleths on Figure 2, which show lines of equal sound level at the site and the surrounding area.

Table 5.2-1 Operational Noise Modeling Results- Monitoring Locations

Site ID	Existing Level Ldn (dBA)	Modeled Level (dBA)	Combined Sound Level (dBA)	Increase (dBA)
NM-1	44.2	16.1	44.2	< 0.1
NM-2	48.7	22.4	48.7	< 0.1
NM-3	47.7	13.2	47.7	< 0.1
NM-4	44.7	16.7	44.7	< 0.1
NM-5	47.9	18.5	47.9	< 0.1
NM-6	50.5	16.5	50.5	< 0.1
NM-7A	43.3	24.1	43.4	0.1
NM-7B	44.1	13.6	44.1	< 0.1
NM-8A	43.6	21.0	43.6	< 0.1
NM-8B	44.3	20.8	44.3	< 0.1
NM-9	47.9	13.4	47.9	< 0.1
NM-10	43.7	31.6	44.0	0.3

As shown in Table 5.2-1, the results of the noise modeling conducted predict the operation of the proposed project will have minimal increase in sound level at monitoring locations, with a maximum modeled increase of 0.3 dBA at NM-10. As shown below in Table 5.2-2, modeled sound levels at potential NSA locations are all well below estimated ambient levels and will result in increases below 1 dBA (not perceivable) at all non-participating residential NSAs.

Table 5.2-2 Operational Noise Modeling Results – Potential NSAs

NSA ID	Existing Level Ldn (dBA)	Modeled Level (dBA)	Combined Sound Level (dBA)	Increase (dBA)	Nearest NM
NSA-1	44.2	9.5	44.2	< 0.1	NM-1
NSA-2	47.7	19.8	47.7	< 0.1	NM-3
NSA-3	44.7	16.8	44.7	< 0.1	NM-4
NSA-4	44.7	20.3	44.7	< 0.1	NM-4
NSA-5	44.7	8.5	44.7	< 0.1	NM-4
NSA-6	47.9	12.8	47.9	< 0.1	NM-5
NSA-7	50.5	13.2	50.5	< 0.1	NM-6
NSA-8	50.5	16.9	50.5	< 0.1	NM-6
NSA-9	50.5	17.6	50.5	< 0.1	NM-6
NSA-10	50.5	15.1	50.5	< 0.1	NM-6
NSA-11	44.1	13.1	44.1	< 0.1	NM-7B
NSA-12	44.1	15.0	44.1	< 0.1	NM-7B
NSA-13	44.1	9.5	44.1	< 0.1	NM-7B
NSA-14	43.7	12.4	43.7	< 0.1	NM-10
NSA-15	43.7	11.8	43.7	< 0.1	NM-10
NSA-16	47.9	17.7	47.9	< 0.1	NM-9
NSA-17	44.1	13.7	44.1	< 0.1	NM-7B
NSA-18	47.9	15.0	47.9	< 0.1	NM-9
NSA-19	47.9	12.2	47.9	< 0.1	NM-9
NSA-20	43.7	13.1	43.7	< 0.1	NM-10

6.0 Conclusions

Based on the predictive modeling detailed above, offsite sound levels due to facility operation will be below ambient levels and will therefore not exceed the threshold set by Jefferson Township during any time of day. The maximum modeled increase in total sound level at a monitoring point at the Project's property boundary was 0.3 dBA, which is considered imperceptible to the human ear. The very minor sound level increases attributable to the Project at its boundary are not expected to create any adverse impacts to nearby receptors.

Modeled sound level increases at potentially noise-sensitive receptors including nearby residences are lower still (<0.1 dBA). The sound levels are due primarily to the greater than 1,000 foot distance from the facility sound sources to any of the NSAs. Therefore, no additional sound mitigation is expected to be necessary during facility operation.

As specified in the Jefferson Township Solar Energy System's Ordinance, Project construction activities will be limited to 7 AM to 7 PM, Monday through Friday and 7 AM to 5 PM on Saturday.

Due to the distance between the Project and the nearest residences, it is not expected that the Project will cause a nuisance to adjacent uses during construction. To reduce Project sound levels during construction, equipment idling and the use of backup beepers will be minimized, and construction truck traffic routes will avoid nearby residences to the extent practicable.

7.0 References

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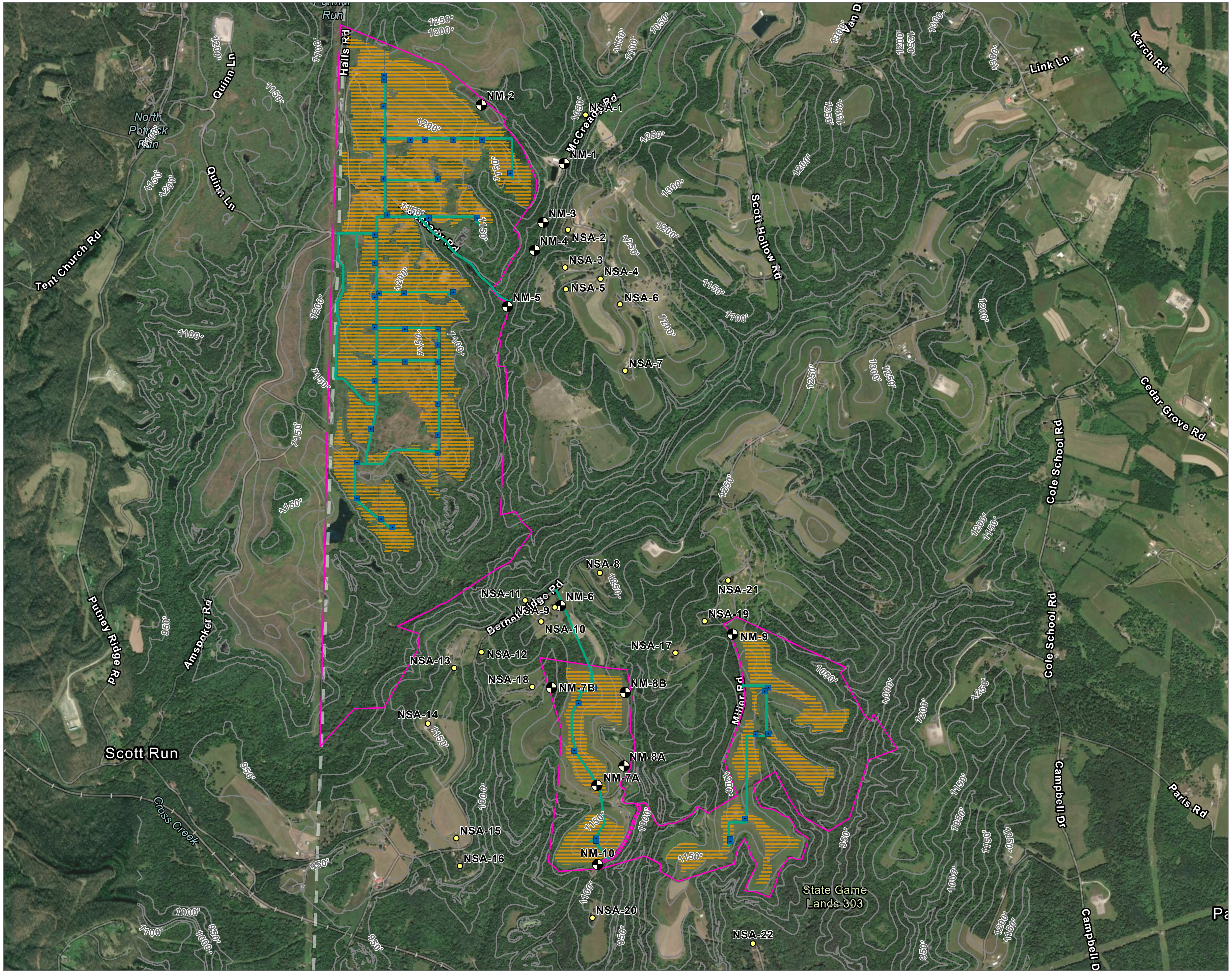


SOLAR INVERTER LOCATION
NOISE MONITORING LOCATIONS
NON-PARTICIPATING RESIDENCES (NSAS)
ELEVATION CONTOURS (USGS)
SITE ACCESS ROADS
SOLAR MODULES
PROPERTY BOUNDARIES

BASE MAP: ESRI WORLD IMAGERY, 6/13/2024
DATA SOURCES:
1. SITE LAYOUT, TRC, 2025
2. ELEVATION DATA, USGS, 2025
NOTE: 25FT CONTOURS SHOWN, 2FT CONTOURS USED IN MODELING

1:24,000
1" = 2,000'
0 1,000 2,000 FEET

NORTH CORNERS ENERGY, LLC
JEFFERSON TOWNSHIP
WASHINGTON COUNTY, PA

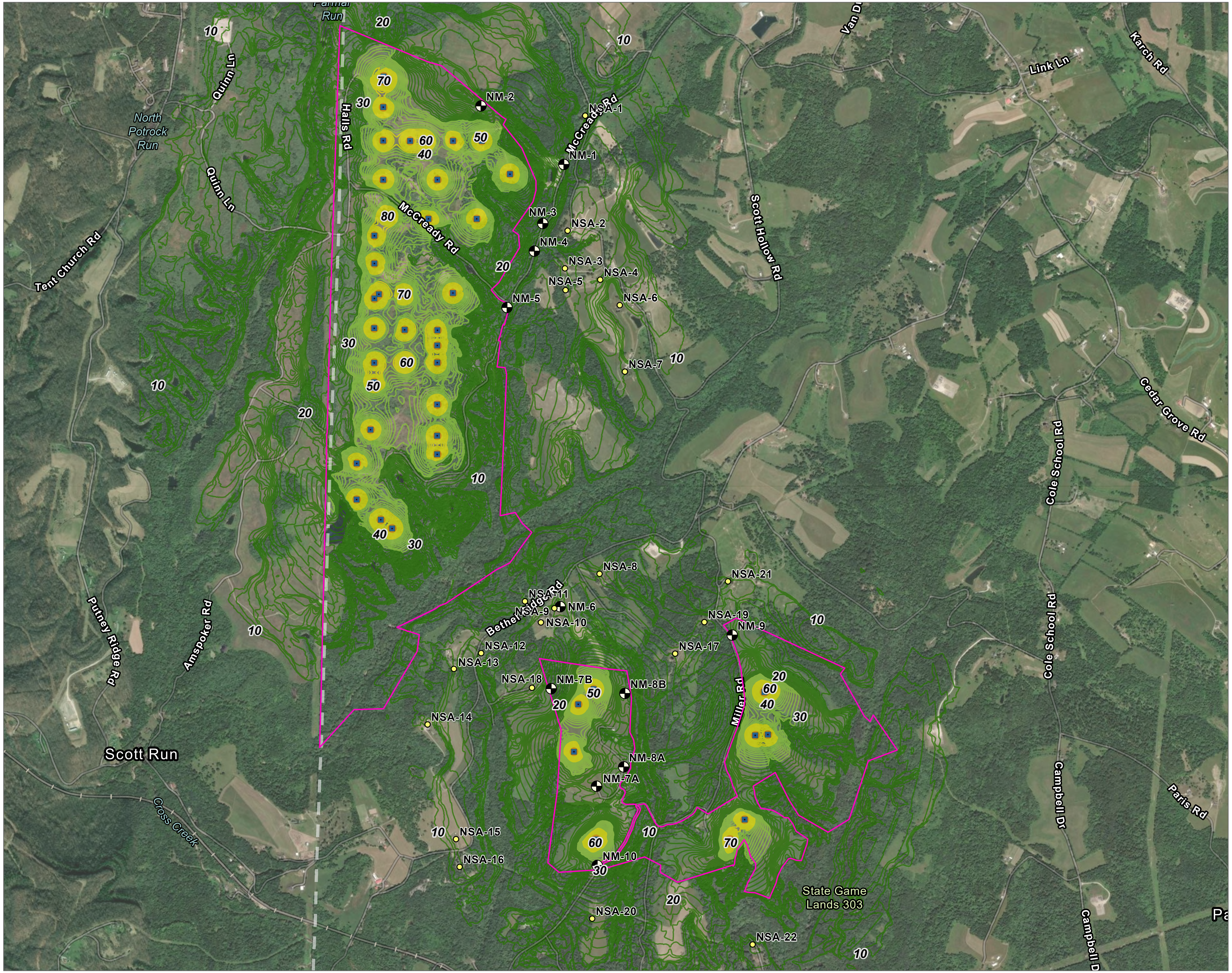
TITLE: **SOUND IMPACT ASSESSMENT SITE LAYOUT**

DRAWN BY:	M. ERNSTING	PROJ. NO.:	606374
CHECKED BY:	M. PROKO	FIGURE 1	
APPROVED BY:	C. WAGNER		
DATE:	AUGUST 2025		

TRC
1407 BROADWAY
SUITE 3301
NEW YORK, NY 10018

FILE: 606374 REV Cornerstone Solar Noise.aprx

m: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet; Map Rotation: 0
-- Saved By: MERNSTING on 8/11/2025, 14:16:15 PM; File Path: K:\606374 REV Renewables Cornerstone Solar Noise\04 GRAPHICS\APRX\606374 REV Cornerstone Solar Noise.aprx; Layout Name: NoiseFigure1_SiteLayout_11x17L



- SOLAR INVERTER LOCATION
- NOISE MONITORING LOCATIONS
- NON-PARTICIPATING RESIDENCES (NSAS)
- PROPERTY BOUNDARIES

SOUND LEVEL (DBA)

- ≤ 30
- 31 - 40
- 41 - 50
- 51 - 60
- 61 - 70
- > 70

BASE MAP: ESRI WORLD IMAGERY, 6/13/2024
DATA SOURCES:
1. SITE LAYOUT & MODELING CONTOURS, TRC, 2025

N

1:24,000
1" = 2,000'
0 1,000 2,000 FEET

NORTH CORNERS ENERGY, LLC
JEFFERSON TOWNSHIP
WASHINGTON COUNTY, PA

TITLE:
SOUND IMPACT ASSESSMENT MODEL RESULTS

DRAWN BY:	M. ERNSTING	PROJ. NO.:	606374
CHECKED BY:	M. PROKO	FIGURE 2	
APPROVED BY:	C. WAGNER		
DATE:	AUGUST 2025		

TRC

1407 BROADWAY
SUITE 3301
NEW YORK, NY 10018

FILE: 606374 REV Cornerstone Solar Noise.aprx

Appendix A. Equipment Specifications

SUNNY CENTRAL
4000 UP-US / 4200 UP-US / 4400 UP-US / 4600 UP-US

Efficient

- Up to 4 inverters can be transported in one standard shipping container
- Over-sizing up to 180% is possible
- Full power at ambient temperatures of up to 35 °C

Robust

- Intelligent air cooling system OptiCool for efficient cooling
- Suitable for outdoor use in all climatic ambient conditions worldwide

Flexible

- Conforms to all known grid requirements worldwide
- Q on demand
- DC-coupled storage with optional charging from grid

Easy to Use

- Improved DC connection area
- Connection area for customer equipment
- Integrated voltage support for internal and external loads

SUNNY CENTRAL
4000 UP-US / 4200 UP-US / 4400 UP-US / 4600 UP-US

The new Sunny Central: more power per cubic meter

With an output of up to 4600 kVA and system voltages of 1500 V DC, the SMA central inverter allows for more efficient system design and a reduction in specific costs for PV power plants. A separate voltage supply and additional space are available for the installation of customer equipment. True 1500 V technology and the intelligent cooling system OptiCool ensure smooth operation even in extreme ambient temperature as well as a long service life of 25 years.

SUNNY CENTRAL 4000 UP-US / 4200 UP-US

Technical data	SC 4000 UP-US	SC 4200 UP-US
Input (DC)		
MPP voltage range V_{DC} (at 25 °C / at 50 °C)	880 to 1325 V / 1050 V	921 to 1325 V / 1050 V
Min. input voltage $V_{DC, min}$ / Start voltage $V_{DC, Start}$	849 V / 1030 V	891 V / 1071 V
Max. input voltage $V_{DC, max}$	1500 V	1500 V
Max. input current $I_{DC, max}$	4750 A	4750 A
Max. short-circuit current $I_{DC, sc}$	8400 A	8400 A
Number of DC inputs	24 double pole fused (32 single pole fused)	
Number of DC inputs with optional DC coupling of battery	18 double pole fused (36 single pole fused) for PV, 6 double pole fused for batteries	
Max. number of DC cables per DC input (for each polarity)	2 x 800 kcmil, 2 x 400 mm²	
Integrated zone monitoring	○	
Available PV fuse sizes (per input)	200 A, 250 A, 315 A, 350 A, 400 A, 450 A, 500 A	
Available battery fuse size (per input)	750 A	
Output (AC)		
Nominal AC power at cos φ =1 (at 35°C / at 50°C)	4000 kVA[11] / 3600 kVA	4200 kVA[11] / 3780 kVA
Nominal AC power at cos φ =0.8 (at 35°C / at 50°C)	3200 kW[11] / 2880 kW	3360 kW[11] / 3024 kW
Nominal AC current $I_{AC, nom}$ (at 35°C / at 50°C)	3850 A / 3465 A	3850 A / 3465 A
Max. total harmonic distortion	< 3% at nominal power	< 3% at nominal power
Nominal AC voltage / nominal AC voltage range[1) 8)]	600 V / 480 V to 720 V	630 V / 504 V to 756 V
AC power frequency / range	50 Hz / 47 Hz to 53 Hz 60 Hz / 57 Hz to 63 Hz	
Min. short-circuit ratio at the AC terminals[9)]	> 2	
Power factor at rated power / displacement power factor adjustable[8) 10)]	1 / 0.8 overexcited to 0.8 underexcited	
Efficiency		
Max. efficiency[2)] / European efficiency[2)] / CEC efficiency[3)]	98.8% / 98.6% / 98.5%	98.8% / 98.7% / 98.5%
Protective Devices		
Input-side disconnection point	DC load break switch	
Output-side disconnection point	AC circuit breaker	
DC overvoltage protection	Surge arrester, type I	
AC overvoltage protection (optional)	Surge arrester, class I	
Lightning protection (according to IEC 62305-1)	Lightning Protection Level III	
Ground-fault monitoring / remote ground-fault monitoring	○ / ○	
Insulation monitoring	○	
Degree of protection	NEMA 3R	
General Data		
Dimensions (W / H / D)	2780 / 2318 / 1588 mm (109.4 / 91.3 / 62.5 inch)	
Weight	<3700 kg / < 8158 lb	
Self-consumption (max.[4)] / partial load[5)] / average[6)])	< 8100 W / < 1800 W / < 2000 W	
Self-consumption (standby)	< 370 W	
Internal auxiliary power supply	○ Integrated 8.4 kVA transformer	
Operating temperature range (optional)[8)]	(−37°C) −25°C to 60°C / (−37°C) −13°F to 140°F	
Noise emission[7)]	65.0 dB(A)*	
Temperature range (standby)	−40°C to 60°C / −40°F to 140°F	
Temperature range (storage)	−40°C to 70°C / −40°F to 158°F	
Max. permissible value for relative humidity (condensing / non-condensing)	95% to 100% (2 month/year) / 0% to 95%	
Maximum operating altitude above MSL[8)] 1000 m / 2000 m	● / ○ (earlier temperature-dependent derating)	
Fresh air consumption	6500 m³/h	
Features		
DC connection	Terminal lug on each input (without fuse)	
AC connection	With busbar system (three busbars, one per line conductor)	
Communication	Ethernet, Modbus Master, Modbus Slave	
Communication with SMA string monitor (transmission medium)	Modbus TCP / Ethernet (FO MM, Cat-5)	
Enclosure / roof color	RAL 9016 / RAL 7004	
Supply transformer for external loads	○ (2.5 kVA)	
Standards and directives complied with	UL 62109-1, UL 1741 (Chapter 31, CDR 6I), NERC, UL 1741-SB, UL 1998, IEEE 1547-2018[12)], MIL-STD-810G	
EMC standards	FCC Part 15 Class A	
Quality standards and directives complied with	VDI/VDE 2862 page 2, DIN EN ISO 9001	

● Standard features ○ Optional

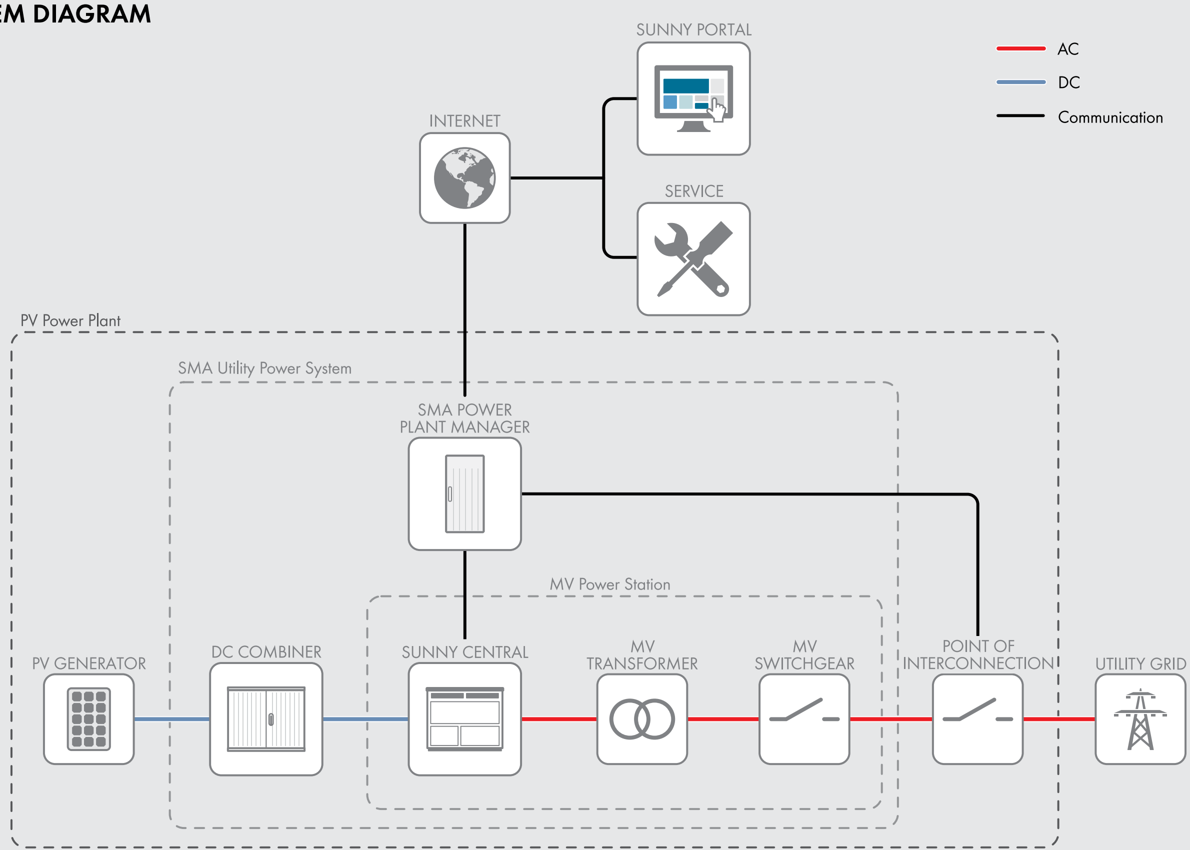
1) At nominal AC voltage, nominal AC power decreases in the same proportion
2) Efficiency measured without internal power supply
3) Efficiency measured with internal power supply
4) Self-consumption at rated operation
5) Self-consumption at < 75% Pn at 25°C
6) Self-consumption averaged out from 5% to 100% Pn at 25°C
7) Sound pressure level at a distance of 10 m
8) Values apply only to inverters. Permissible values for SMA MV solutions from SMA can be found in the corresponding data sheets.
9) A short-circuit ratio of < 2 requires a special approval from SMA
10) Depending on the DC voltage
11) Nominal power at 35°C max DC voltage of 1050 V
12) Harmonics are within IEEE 1547-2018 limits with at least 2 inverters in operation

SUNNY CENTRAL 4400 UP-US / 4600 UP-US

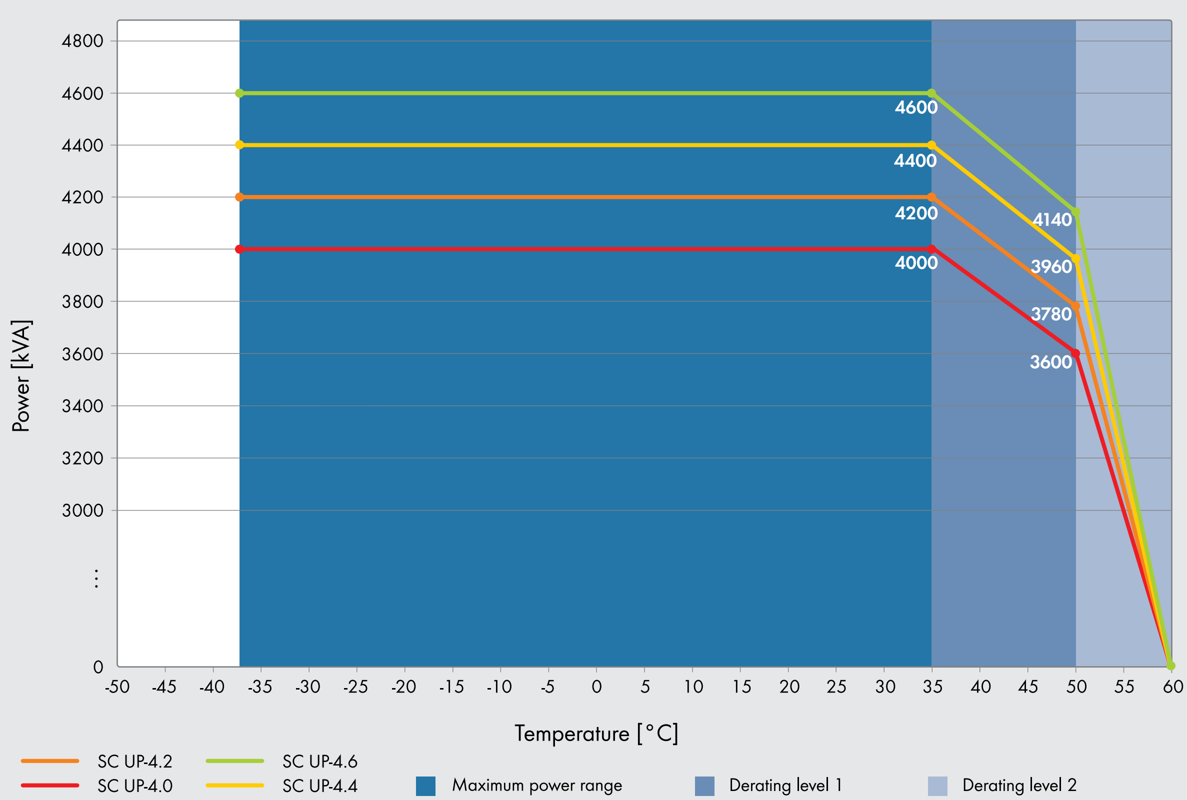
Technical data	SC 4400 UP-US	SC 4600 UP-US
Input (DC)		
MPP voltage range V_{DC} (at 25 °C / at 50 °C)	962 to 1325 V / 1050 V	1003 to 1325 V / 1050 V
Min. input voltage $V_{DC, min}$ / Start voltage $V_{DC, Start}$	934 V / 1112 V	976 V / 1153 V
Max. input voltage $V_{DC, max}$	1500 V	1500 V
Max. input current $I_{DC, max}$	4750 A	4750 A
Max. short-circuit current $I_{DC, sc}$	8400 A	8400 A
Number of DC inputs	24 double pole fused (32 single pole fused)	
Number of DC inputs with optional DC coupling of battery	18 double pole fused (36 single pole fused) for PV, 6 double pole fused for batteries	
Max. number of DC cables per DC input (for each polarity)	2 x 800 kcmil, 2 x 400 mm²	
Integrated zone monitoring	○	
Available PV fuse sizes (per input)	200 A, 250 A, 315 A, 350 A, 400 A, 450 A, 500 A	
Available battery fuse size (per input)	750 A	
Output (AC)		
Nominal AC power at cos φ =1 (at 35°C / at 50°C)	4400 kVA[11] / 3960 kVA	4600 kVA[11] / 4140 kVA
Nominal AC power at cos φ =0.8 (at 35°C / at 50°C)	3520 kW[11] / 3168 kW	3680 kW[11] / 3312 kW
Nominal AC current $I_{AC, nom}$ (at 35°C / at 50°C)	3850 A / 3465 A	3850 A / 3465 A
Max. total harmonic distortion	< 3% at nominal power	< 3% at nominal power
Nominal AC voltage / nominal AC voltage range[1) 8)]	660 V / 528 V to 759 V	690 V / 552 V to 759 V
AC power frequency / range	50 Hz / 47 Hz to 53 Hz 60 Hz / 57 Hz to 63 Hz	
Min. short-circuit ratio at the AC terminals[9)]	> 2	
Power factor at rated power / displacement power factor adjustable[8) 10)]	1 / 0.8 overexcited to 0.8 underexcited	
Efficiency		
Max. efficiency[2)] / European efficiency[2)] / CEC efficiency[3)]	98.8% / 98.7% / 98.5%	98.9% / 98.7% / 98.5%
Protective Devices		
Input-side disconnection point	DC load break switch	
Output-side disconnection point	AC circuit breaker	
DC overvoltage protection	Surge arrester, type I	
AC overvoltage protection (optional)	Surge arrester, class I	
Lightning protection (according to IEC 62305-1)	Lightning Protection Level III	
Ground-fault monitoring / remote ground-fault monitoring	○ / ○	
Insulation monitoring	○	
Degree of protection	NEMA 3R	
General Data		
Dimensions (W / H / D)	2780 / 2318 / 1588 mm (109.4 / 91.3 / 62.5 inch)	
Weight	<3700 kg / < 8158 lb	
Self-consumption (max.[4)] / partial load[5)] / average[6)])	< 8100 W / < 1800 W / < 2000 W	
Self-consumption (standby)	< 370 W	
Internal auxiliary power supply	○ Integrated 8.4 kVA transformer	
Operating temperature range (optional)[8)]	(−37°C) −25°C to 60°C / (−37°C) −13°F to 140°F	
Noise emission[7)]	65.0 dB(A)*	
Temperature range (standby)	−40°C to 60°C / −40°F to 140°F	
Temperature range (storage)	−40°C to 70°C / −40°F to 158°F	
Max. permissible value for relative humidity (condensing / non-condensing)	95% to 100% (2 month/year) / 0% to 95%	
Maximum operating altitude above MSL[8)] 1000 m / 2000 m	● / ○ (earlier temperature-dependent derating)	
Fresh air consumption	6500 m³/h	
Features		
DC connection	Terminal lug on each input (without fuse)	
AC connection	With busbar system (three busbars, one per line conductor)	
Communication	Ethernet, Modbus Master, Modbus Slave	
Communication with SMA string monitor (transmission medium)	Modbus TCP / Ethernet (FO MM, Cat-5)	
Enclosure / roof color	RAL 9016 / RAL 7004	
Supply transformer for external loads	○ (2.5 kVA)	
Standards and directives complied with	UL 62109-1, UL 1741 (Chapter 31, CDR 6I), NERC, UL 1741-SB, UL 1998, IEEE 1547-2018[12)], MIL-STD-810G	
EMC standards	FCC Part 15 Class A	
Quality standards and directives complied with	VDI/VDE 2862 page 2, DIN EN ISO 9001	
● Standard features ○ Optional		

1) At nominal AC voltage, nominal AC power decreases in the same proportion
2) Efficiency measured without internal power supply
3) Efficiency measured with internal power supply
4) Self-consumption at rated operation
5) Self-consumption at < 75% Pn at 25°C
6) Self-consumption averaged out from 5% to 100% Pn at 25°C
7) Sound pressure level at a distance of 10 m
8) Values apply only to inverters. Permissible values for SMA MV solutions from SMA can be found in the corresponding data sheets.
9) A short-circuit ratio of < 2 requires a special approval from SMA
10) Depending on the DC voltage
11) Nominal power at 35°C max DC voltage of 1050 V
12) Harmonics are within IEEE 1547-2018 limits with at least 2 inverters in operation

SYSTEM DIAGRAM



TEMPERATURE BEHAVIOR (at 1000 m)



Sound Power

Kodiak 2.0 SC_UP

Noise Measurement

Revision History

Document Number SC4xxx-UP	Edition and Revision Type [1])		Annotations	Author
-910:LE2019	1.0	A	First Edition	S. Vorderbrügge

[1]) A: First Edition or minor modifications due to errors or improvements in the documentation.
This version replaces and invalidate former version in brackets.
B: Modifications maintaining full and upward compatibility.
This version replaces and invalidate former version in brackets.
C: Modifications limiting or excluding compatibility.
Valid only in combination with former version in brackets.

Tested by	25.06.2019 X Authorized signatory Signiert von: Stephan Vorderbruegge	**Released by**	25.06.2019 X Senior Ingenieur EMC & Global Certification (T TS TC EC) Authorized signatory Signiert von: Peter Thomae

Explanation of Symbols Used

For ensuring the understanding of this test report please note the following explanations of the symbols being used.

This symbol indicates an important comment.
For this reason read these sections carefully.

This symbol indicates an example.

This symbol indicates an opinion or an interpretation to circumstances.

Table of Contents

1 Overview of Results

Customer:	Manufacturer:	Test center:
SMA Solar Technology AG Sonnenallee 1 34266 Niestetal (Germany) Developer	**SMA** Solar Technology AG Miramstrasse 28 34123 Kassel (Germany) J. Alter	**SMA** Solar Technology AG Sonnenallee 1 EMC and Environmental Laboratory 34266 Niestetal (Germany) Building 4

Order number/account assignment:	85000947
Project title:	Kodiak-2_2019-04-17_FuMu2_Abnahme
Type of test / thresholds and requirements:	Sound Power level measurement according to DIN EN ISO 9614-2:2010-11 of sinusoidal, irregularly shaped, transient signals. Classification of ambient conditions in compliance with the German Noise Control Guidelines (TA Lärm). (according to Section 1.1.1)
Type of device:	e.g. solar central inverter for large-scale PV power plants
Type designation:	SC4600-UP of type SC4xxx-UP
Test specification:	Level of emissions according to the German Noise Control Guidelines and acoustic power
Tested by:	Stephan Vorderbrügge
Date of measurement:	13.05.2019

ID of the unit under test:

ID of the Unit Under Test:	3244		
Type designation:	SC4600-UP of type Kodial 2.0 SC_UP		
Serial number:	3004809309	**Hrdwareversion:**	B1 FuMu2.6
Option Code:	226D11EN2U11111204241000200084000311 0000		
Aditional information:	36 PV-Inlets + DC-Coupling		
SW-Bundle:	06.00.20.B		
Device	**Serial number**	**Device**	**Serial number**
SC30CONT:	2752	SC30COM:	5094
SC30RIO:	4996	SC40GFDI:	Funktion sample
SC30ACC:	1481	SC30DCC:	15
SC30DCM:	4704 / 4499	SC40IMP:	Funktion sample
SC30Biene / SC30DST:	0504153172/ 0504153173/ 0504153431		

The results outlined in this inspection report only apply to the test item that has been tested. Any modification, e.g. in terms of the design, circuit technology or components used, can produce different test results.

Partial duplication of this report is not permitted without written permission from the test center.

No research into additional relevant standards (such as ETSI standards in radio frequency applications, Bluetooth, etc.) applicable to this unit under test was carried out as part of this test.

It is therefore the responsibility of the client to obtain information in this regard.

Picture oft he EUT

1.1 Measured and derived levels

The EN 3744:04/2011, EN 9614-2:08/2011 and German Noise Control Guidelines form the testing specification for the thresholds and requirements	Requirement		4600 kW Serial U0N [dB_A]	XX kW Serial Standard [dB_A]	XX kW Silencer U0N [dB_A]	XX kW Silencer Standard [dB_A]	XX kW Silencer U0N [dB_A]	XX kW Silencer Standard [dB_A]
	Standard (Germany)	SMA						
EN 9614-2 **sound power** L_{WA} [3]	–	–	90,77	–	–	–	–	–
Sound pressure at a distance of 1m derived via Sound power level on Surface L_{pA} [2]	– [5]	– [5]	75,22	–	–	–	–	–
Sound pressure level in 10 m L_{xpA10} [4]	-	70	62,81-	–	–	–	–	–
Sound pressure level in 50 m L_{xpA50} [4]	**55** [1]	55	48,83	–	–	–	–	–
§48 of the German Federal Emission Control Act (BImSchG):09-2002 German Noise Control Guidelines; LPA 2) [5]	70	70	–	–	–	–	–	–
Overall result (if applicable)			Standard requirements: passed SMA requirements: passed					

Please note the detailed description of the measurement environment. See Section 3.2.2 Test Environment

[1] The Sound Pressure Level given at a distance of 50 m stands for the max level allowed at the system border of an industrial plant.

[2] Calculated average sound pressure level over the entire measurement area (see Section 8.1.1).Sound power resulting from sound intensity measurement (see Section 8.1.2).

[3] Measured Sound Power Level via Sound Intensity on equal surfaces.

[4] Calculated sound pressure level at the desired distance (see Section 5).

Dependent on the local standards and conditions at the mounting location (distance of 10m SMA standard, distance of 50m at the fence of industrial areas)

[5] The value of the maximum sound level as stated in the German Noise Control Guidelines refers to the so-called vulnerable area (e.g. residential buildings, offices). This is dependent on the local conditions at the mounting location (see also Section 1.1.1). This applies in particular to large-scale PV power plants!

1.1.1 Emission Guide Values for the Rating Level According to the German Noise Control Guidelines

Criterion	Rating level in vulnerable areas inside buildings in dBA	Rating level outside buildings in dBA
A Industrial areas	By day 35	By day 70
	At night 25	At night 70
B Industrial parks	By day 35	By day 65
	At night 25	At night 50
C Core, village and mixed areas	By day 35	By day 60
	At night 25	At night 45
D Housing estates and small housing estates	By day 35	By day 55
	At night 25	At night 40
E Purely residential areas	By day 35	By day 50
	At night 25	At night 35
F Spas and hospitals	By day 35	By day 45
	At night 25	At night 35
Noise spikes above the rating level	By day 10	By day 30
	At night 10	At night 20

2 Carrying Out the Inspection

2.1 General Information

The noise level of a device must be agreed between the manufacturer and the user. This agreement must comply with the local requirements (German Noise Control Guidelines). After the manufacturer and the user have reached an agreement, a test needs to be carried out to determine the effect of noise radiating from the device. Other sources of noise during operation, e.g. fans, motors or other hydraulic-pneumatic mechanisms, must also be taken into consideration.

2.1.1 Inspection Reference According to EN ISO 3744:2011-02

EN ISO 3744 is used as the basis for determining the noise emissions of the unit under test according to EN ISO 12001:05-2007.
As part of the acoustics, it includes the determination of the sound level of noise sources using the enveloping surface method of accuracy class 2 for essentially free field conditions over a reflective plane. Measurements must be carried out in compliance with IEC 551 and DIN EN 45645-1 according to DIN EN ISO 3744. To position the measurement instruments, the enclosure of the unit under test is considered a main radiation area.

2.1.2 Inspection Reference According to EN ISO 9614-2:2010-11

The sound level is determined according to DIN EN ISO 9614-2
"Determination of sound power levels of noise sources using sound intensity"

Part 2: "Measurement by permanent scanning"
This measurement procedure keeps interference on the measurement result caused by noises from the environment to a minimum.

3 Operating States, Test Setup and Test Environment

3.1 Operating States

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

- Operation of the inverter.
- Operating conditions: U_{DC}=1350 V; P I_{DC}=3450 A
- Operating conditions: U_{AC}=690 V; P 4600 kVA
- The device fans must be running at 100%.
- The unit under test must have reached its operating temperature.
- The unit under test must have reached an operating temperature of 25°C.

The following operating conditions and thresholds must be complied with (evaluation criteria):

- The extraneous noise level in the measurement environment must be kept as low as possible.
- The unit under test may not leave MPP operation.
- The unit under test may not leave feed-in operation.
- Error messages may not be displayed/issued.
- No function deviations are permitted.

3.2 Test Setup

Depending on the source of the sound (object to be tested), two different measuring arrangements can be used that give approximately the same **A**-rated measured values.

Procedure 1

Microphone arrangement on the hemispherical measurement area
In this case, values are recorded at a total of 32 measurement points. The table and the outlines set out in the standard DIN EN ISO 3744 must be complied with.

Procedure 2

Microphone arrangement on a cuboid measurement area
If not enough microphones are available (possibly only one), or if the dimensions of the unit under test are too small, a mobile microphone may be used to carry out the measurement. In this procedure, every flat surface, or side of the device enclosure, is considered individually and divided up so that each rectangular partial surface has edges 1 m long and is the same size as the others. The measurement microphone is now aligned at a measuring distance of 1 m from the surface of the unit under test at the mid-point of this imaginary rectangle.

Setting Up and Maintaining the Measuring Devices

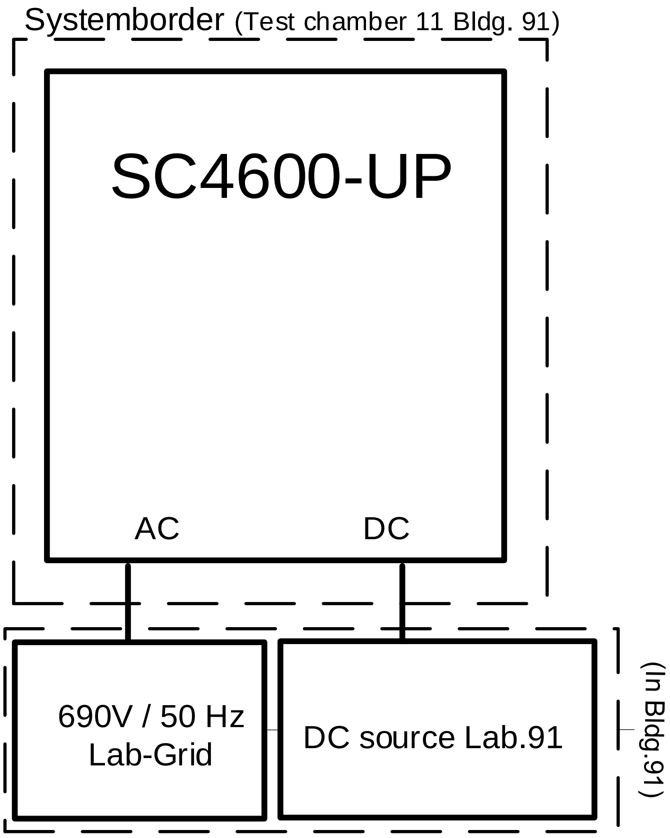
Sound pressure method

The microphones are aligned on a tripod above the stand space of the unit under test in the middle of the respective source of sound and at a measuring distance of 1 m. The measurement time per coordinate or side of the enclosure should be at least ten seconds, to ensure that fluctuations are reliably excluded.

Sound intensity method

The probe microphone is aligned above the stand space of the unit under test, perpendicular to the center of the respective sound source segment, at a measuring distance of 0.2 m and along a rather meandering route. The measurement time per coordinate field or side of the enclosure must be at least 20 seconds, to ensure that fluctuations are reliably excluded.

System Structure (Outline):



Lines and auxiliary equipment used			
EUT connection	Line	Auxiliary equipment/remote terminal	Notes
DC power supply	2 x 300 mm²	DC source SMA bldg. 91	-
AC feed-in	18 x 300 mm²	AC high-voltage transformer SMA bldg. 91	-
AC internal power supply	5 x 2,5 mm²	AC grid SMA bldg. 91	-
X501 (RJ45)	SFTP LAN line	PC/Notebook	-

3.2.1 Information About the Unit Under Test

- Dimensions of the unit under test (H x W x D): 2318 mm x 2780 mm x 1588 mm
- Device type of the unit under test:

Desktop device (80 cm above the floor)

The unit under test is set up on the table. The measurements are carried out.

at a distance of 1 m.

Floor-standing device with increased height > 90 cm .

The unit under test is set up on the floor. The measurements are carried out at a distance of 0,2 m.

3.2.2 Test Environment

- Test chamber 11 – lowest distance to walls or other structures: 5 m
- Measurement space – dimensions (H x W x D): 6,5 m x 11 m x 9 m – lowest distance from EUT to other structures: 5 m
- Increased ambient/test temperature of 27,34 °C
- Date of Test 13.05.2019

4 Determining the Sound Power L_{WA} According to EN ISO 9614-2

4.1 Determining the Overall Measurement Surface S and the Partial Measurement Surface PS

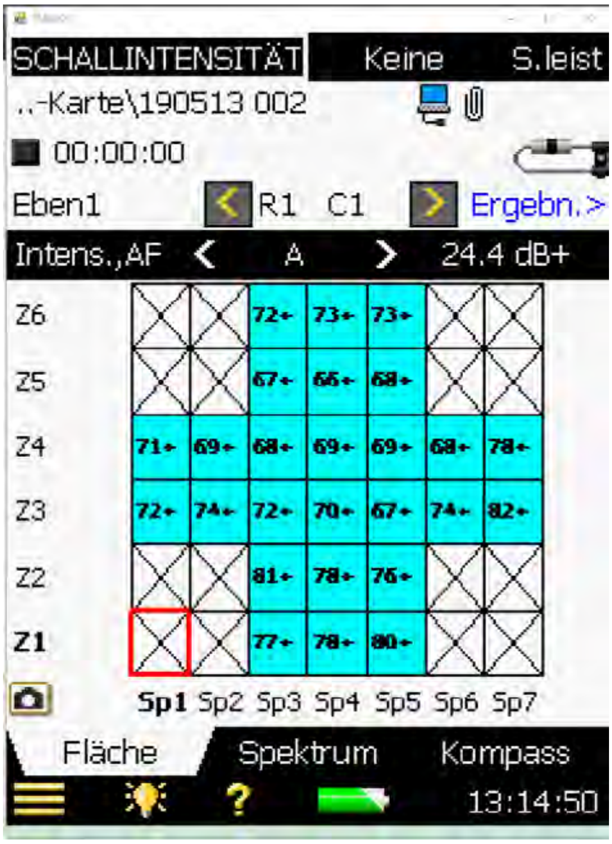
The surface of the measuring cube (not including base area) is the measurement surface S in m^2.

Cuboid measurement surface with 26 finite measurement surfaces of 1,25m x 1,1m.

Measurement surface **S=35,75m²**

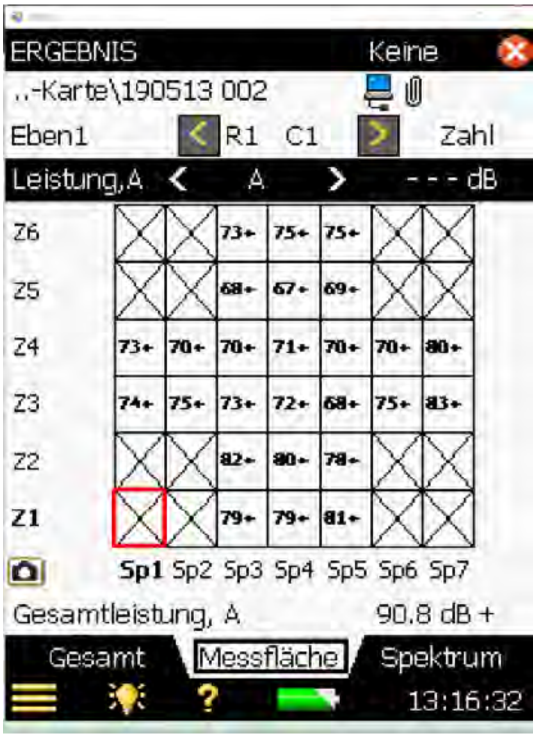
Measurement distance **d = 0.2 m**

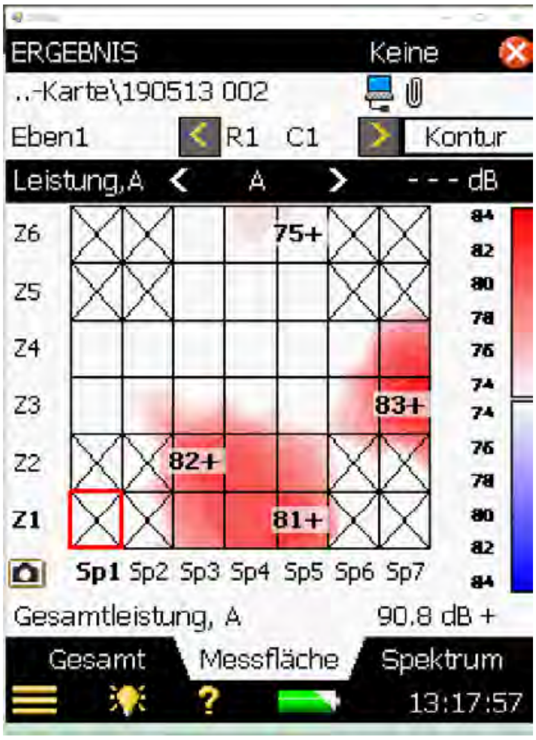
Measured Sound Intensoty on surface



Fenite surfaces measured Sound Intesity on surfaces

Sound Power on suface Segments



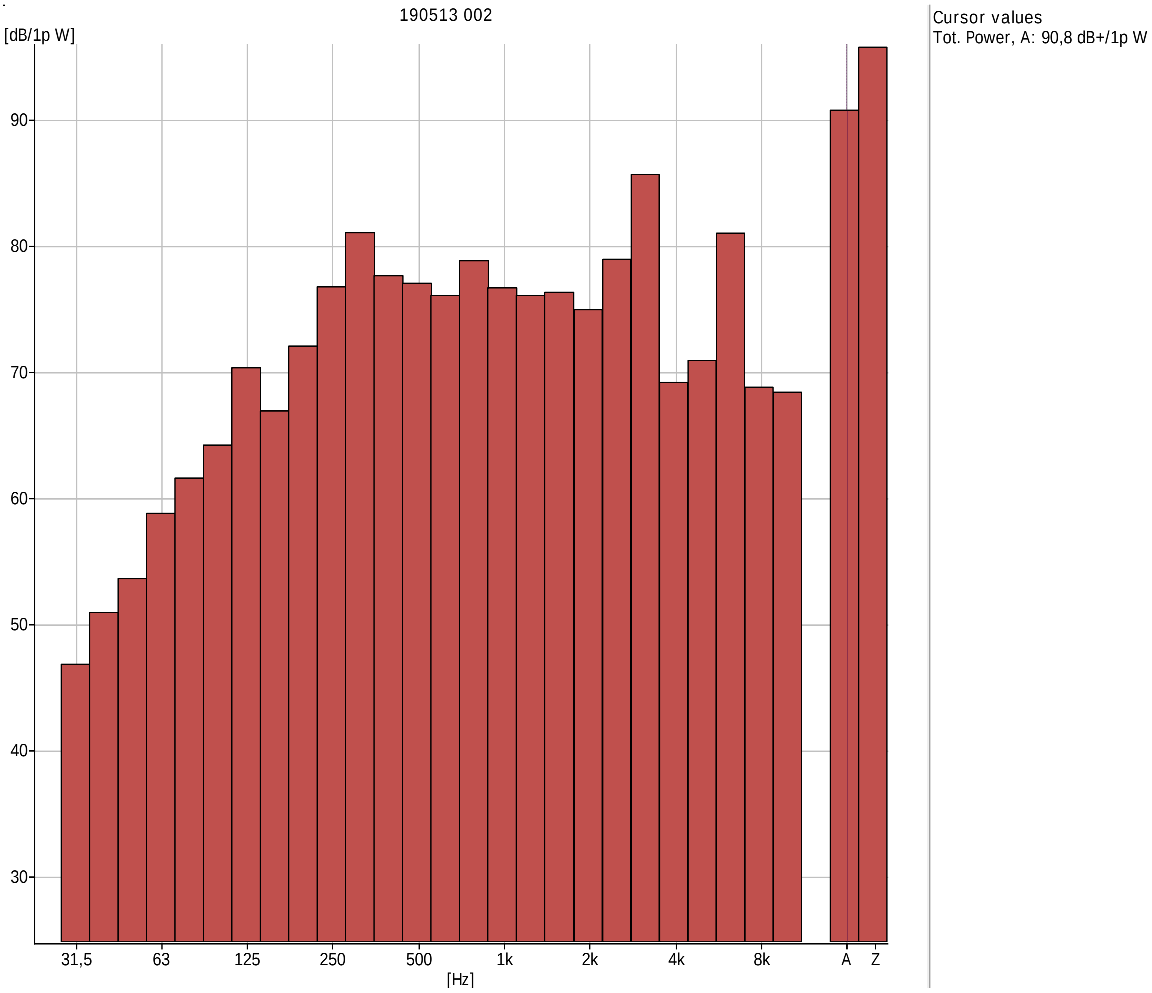


Fenite surfaces Sound Power on surfaces Sound Power peak at surfaces

Exhaust seen on right side Z3 / Sp7

4.2 Measurement at 4600 kVA, 1350 V DC U0N modulation 100% fan load

Sound Power Levels of the Third Octave Band Frequencies according to EN ISO 9614-2



Overview of the Sound Power

Third octave band center frequency [Hz]	Sound - Power- level LwA [dBA/pW] 2475 kW
31,5 Hz	24,73
40 Hz	46,84
50 Hz	50,95
63 Hz	53,64
80 Hz	58,81
100 Hz	61,6
125 Hz	64,22
160 Hz	70,35
200 Hz	66,93
250 Hz	72,07
315 Hz	76,77
400 Hz	81,06
500 Hz	77,65
630 Hz	77,05
800 Hz	76,08
1 kHz	78,84
1,25 kHz	76,69
1,6 kHz	76,08
2 kHz	76,33
2,5 kHz	74,96
3,15 kHz	78,95
4 kHz	85,67
5 kHz	69,19
6,3 kHz	70,93
8 kHz	81,02
10 kHz	68,81
A	**90,77**
Z	95,76