A NOISE IMPACT ASSESSMENT FOR

# USS Rhea Solar LLC

## Kane County, Illinois

DECEMBER 3, 2025

PREPARED FOR:

USS Rhea Solar LLC

PREPARED BY:

Westwood

Westwood

# Noise Impact Assessment

## USS Rhea Solar LLC

Kane County, Illinois

**Prepared For:**

USS Rhea Solar LLC
233 S Wacker Drive
Suite 4400
Chicago, IL 60606

**Prepared By:**

Westwood Professional Services
12701 Whitewater Drive
Suite 300
Minnetonka, MN 55343


Project Number: R0071460.00
Date: December 3, 2025

# Executive Summary

Westwood Professional Services, Inc. (Westwood) was contracted by USS Rhea Solar LLC (Client) to complete a noise assessment for USS Rhea Solar LLC (Project) located in Kane County, Illinois. The Project has a proposed nameplate capacity of 4.5 MW. This noise impact assessment was completed as required by the Kane County Code pursuant to the procedures set forth by the Illinois Pollution Control Board (IPCB).

An operational noise impact evaluation of the Project was conducted for the proposed Project layout. Noise propagation for each inverter was modeled using manufacturer sound data for overall sound power level. A typical inverter spectral curve was adjusted to the known overall level in the absence of manufacturer provided spectral data.

Project-generated noise levels were calculated at all noise sensitive receptors within ¼ mile of the proposed Project fenceline. Noise level regulations include the Kane County Code which requires compliance octave band noise limits and discrete tone limits set by the IPCB. Project levels do not exceed the limits set forth in the Illinois Administrative Code (IAC).

# Table of Contents



# Tables



# Figures



# Appendices

# 1.0 Project Background

## 1.1 Site Description

The proposed Project is located in Kane County, Illinois. Noise sensitive receptors in the Project vicinity include residences. Existing noise sources in the Project vicinity include local road traffic. The primary land uses in the Project vicinity are residential and agricultural.

## 1.2 Project Description

The Project is proposed to include solar arrays, solar string inverters, and associated equipment/infrastructure (**Figure 1**).


*Figure 1: Project Overview*

# 2.0 Regulatory Setting & Noise Level Requirements

Kane County Code §25-5-4-9 (11) requires proof of compliance with the noise level limits set forth by the IPCB within the IAC. These limits are stated within IAC *Title 35, Subtitle H, Chapter I, Part 901 Sound Emissions Standards and Limitations for Property-Line Noise-Sources*. This regulation regulates noise levels according to the land use where the noise is produced and where the noise is received. Land uses are split into three classes: Class A refers to residences or equally sensitive areas, Class B land is of mixed use, and Class C refers to agricultural and industrial land uses. Class A noise sensitive receptors as defined by the IPCB include dwellings and occupied community buildings, even those on agricultural land. In the absence of field verification of receptor land classification, the most conservative limits were analyzed for this Project – those of noise produced on Class C land impacting Class A land. The daytime and nighttime octave band limits are listed in **Table 1**.

***Table 1: Permissible Sound Levels, Class C to Class A ($L_{eq}$)***

| Time of Day | Octave Band (Hz) Sound Pressure Level Limits (dB) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 31.5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
| Daytime | 75 | 74 | 69 | 64 | 58 | 52 | 47 | 43 | 40 |
| Nighttime | 69 | 67 | 62 | 54 | 47 | 41 | 36 | 32 | 32 |

Additionally, the IAC prohibits the emission of prominent discrete tones from any property-line noise source located on Class C land to receiving Class A land, when measured at any point within the receiving land at least 25' away from the property-line noise source. A discrete tone is defined as a one-third octave band sound level that exceeds the arithmetic average of the sound pressure levels of the two adjacent one-third octave bands by the following levels: 5 dB if the center frequency is between 500 and 1000 Hz inclusive, by 8 dB if the center frequency is between 160 and 400 Hz inclusive, or by 15 dB if the center frequency is between 25 and 125 Hz inclusive. Discrete tones that have a one-third octave band sound pressure level 10 or more decibels below the allowable octave band sound pressure level specified in **Table 1** are not classified as prominent discrete tones.

# 3.0 Modeling Methodology & Parameters

A noise propagation model was developed and run for the Project using CADNA-A (a noise modeling software in compliance with ISO 9613-2). The proposed Project string inverters were modeled as omnidirectional point sources. Inverter broadband noise source data was taken from manufacturer cut sheets (67 dBA @ 3 m); octave band and one-third octave band levels were calculated referencing manufacturer spectral data from a similar solar inverter (Kaco Blueplanet 125 TL3).

Model parameters were as follows:

- Ground absorption factor of G=0
- Receptor height of 1.5 m above ground level
- Assumed meteorological conditions of 10°C (50°F) and 70% humidity
- No other model adjustments

Project equipment and layout configuration details are shown below in **Table 2**.

***Table 2 Project Equipment & Layout Configuration***

| Noise Source | # of Units | Equipment Model/Reference | Est. Source Height Above Ground Level (AGL) | Broadband Sound Pressure Level @ 1 m (Single Unit) |
|---|---|---|---|---|
| Solar String Inverter | 27 | Yaskawa Solectria XGI 1500-166 | 1.6 m* | 77 dBA |
| Transformer | 2 | Nema TR-1 Auxiliary Transformer | 1.5 m | 61 dBA |

**Source height represents approximate height of solar string inverter rack.*

Unweighted octave-band sound power levels for Project inverters are listed in **Table 3** along with overall A-weighted sound power level.

***Table 3 Project Equipment Spectral & Overall Data***

| Noise Source | Unweighted Octave Band (Hz) Sound Power Levels (dB $L_w$) | | | | | | | | | Broadband Sound Power Level |
|---|---|---|---|---|---|---|---|---|---|---|
| | 31.5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | |
| Solar String Inverter | 67.0 | 69.0 | 74.4 | 85.6 | 84.6 | 79.0 | 72.6 | 68.7 | 58.8 | 85 dBA |
| Transformer | 66.0 | 72.0 | 74.0 | 69.0 | 69.0 | 63.0 | 58.0 | 53.0 | 46.0 | 69 dBA |

Cumulative Project noise was calculated at all noise-sensitive receptors within ¼ mile of the proposed Project fenceline (**Figure 2**). Note that receptor locations have not been field verified and are based upon aerial imagery only. Receptor location coordinates can be found in **Appendix A.**


*Figure 2: Noise Sensitive Receptor Locations*

# 4.0 Noise Level Estimates & Impact Assessment

Octave band $L_{eq}$ sound pressure levels were calculated for each receptor from 31.5 Hz to 8 kHz. The octave band levels were then compared to the nighttime regulation levels from **Table 1** above, as the nighttime levels are most conservative, especially given solar inverter operations occur only when sunlight is present (daytime). As the daytime limits are less stringent, complying with the nighttime limits ensures daytime compliance as well.

All noise sensitive receptors within ¼ mile of the proposed Project fenceline modeled at or below the octave band noise level limits set forth in IAC *Title 35, Subtitle H, Chapter I, Part 901 Sound Emissions Standards and Limitations for Property-Line Noise-Sources*. Additionally, no discrete tones were determined to be present when analyzing the one-third octave band levels with regards to the IAC discrete tone criteria.

Octave band and third-octave band levels at each receptor can be found in **Appendix B** and **Appendix C,** respectively.

## Appendix A Noise Sensitive Receptor Locations

| Receptor ID | UTM NAD83 Zone 16 | | Elevation AMSL (m) |
|---|---|---|---|
| | Easting (m) | Northing (m) | |
| RS-NSR-1 | 373057.28 | 4641868.05 | 269.5 |
| RS-NSR-2 | 373095.23 | 4641913.87 | 269.06 |
| RS-NSR-3 | 373118.6 | 4641851.39 | 270.13 |
| RS-NSR-4 | 373077.64 | 4641829.64 | 269.5 |
| RS-NSR-5 | 373135.95 | 4641869.21 | 269.5 |

## Appendix B Receptor Octave Band Levels

| | 31.5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
|---|---|---|---|---|---|---|---|---|---|
| **Nighttime Regulation** | *69* | *67* | *62* | *54* | *47* | *41* | *36* | *32* | *32* |
| | | | | | | | | | |
| RS-NSR-1 | 21.0 | 23.3 | 28.2 | 38.8 | 37.3 | 30.7 | 21.1 | 7.0 | 0.0 |
| RS-NSR-2 | 21.6 | 23.9 | 28.9 | 39.5 | 38.0 | 31.5 | 22.1 | 8.6 | 0.0 |
| RS-NSR-3 | 21.9 | 24.2 | 29.2 | 39.8 | 38.3 | 31.8 | 22.5 | 9.4 | 0.0 |
| RS-NSR-4 | 21.2 | 23.5 | 28.5 | 39.0 | 37.6 | 31.0 | 21.4 | 7.6 | 0.0 |
| RS-NSR-5 | 22.3 | 24.6 | 29.5 | 40.1 | 38.7 | 32.2 | 23.0 | 10.2 | 0.0 |

# Appendix C Receptor 1/3 Octave Band Levels

| | 25 | 31.5 | 40 | 50 | 63 | 80 | 100 | 125 | 160 | 200 | 250 | 315 | 400 | 500 | 630 | 800 | 1000 | 1250 | 1600 | 2000 | 2500 | 3150 | 4000 | 5000 | 6300 | 8000 | 10000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RS-NSR-1 | 16.3 | 16.2 | 16.2 | 18.6 | 18.5 | 18.5 | 23.5 | 23.5 | 23.4 | 34.2 | 34.0 | 33.9 | 32.7 | 32.6 | 32.3 | 26.4 | 26.0 | 25.3 | 17.9 | 16.3 | 13.7 | 5.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| RS-NSR-2 | 16.9 | 16.9 | 16.9 | 19.2 | 19.2 | 19.1 | 24.2 | 24.1 | 24.0 | 34.8 | 34.7 | 34.6 | 33.4 | 33.3 | 33.1 | 27.2 | 26.8 | 26.1 | 18.8 | 17.3 | 15.0 | 7.4 | 1.9 | 0.0 | 0.0 | 0.0 | 0.0 |
| RS-NSR-3 | 17.2 | 17.2 | 17.2 | 19.5 | 19.5 | 19.4 | 24.5 | 24.4 | 24.3 | 35.1 | 35.0 | 34.9 | 33.7 | 33.6 | 33.4 | 27.5 | 27.1 | 26.5 | 19.2 | 17.8 | 15.5 | 8.1 | 2.7 | 0.0 | 0.0 | 0.0 | 0.0 |
| RS-NSR-4 | 16.5 | 16.5 | 16.5 | 18.8 | 18.8 | 18.7 | 23.8 | 23.7 | 23.6 | 34.4 | 34.3 | 34.1 | 33.0 | 32.8 | 32.6 | 26.7 | 26.3 | 25.6 | 18.2 | 16.6 | 14.2 | 6.5 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 |
| RS-NSR-5 | 17.5 | 17.5 | 17.5 | 19.8 | 19.8 | 19.8 | 24.8 | 24.8 | 24.7 | 35.5 | 35.4 | 35.2 | 34.1 | 34.0 | 33.8 | 27.9 | 27.5 | 27.0 | 19.7 | 18.3 | 16.1 | 8.9 | 3.7 | 0.0 | 0.0 | 0.0 | 0.0 |