October 22, 2025

Eli Varol
RWE Clean Energy, LLC

Subject: ***Gateway Solar – Sound Study***
Randolph County, Illinois

Executive Summary

The purpose of this technical memorandum is to summarize the evaluated sound levels associated with the operational equipment located throughout the proposed Gateway Solar Site in Randolph County, IL. The proposed solar photovoltaic project site is located just east of Sparta, approximately 1.5 miles south of Tilden, approximately 2.5 miles southwest of Coulterville, and approximately 6.5 miles north of Steeleville. The site is generally located south of Kelly Road, west of Zeigler Mine Road, north of Moffatt Road, and east of State Route 4 with State Route 153, Wilson Road, Michael Road, Hunter Field Road, and Union Pacific (UP) railroad tracks intersecting the site. Additionally, Sparta Community Airport is located directly west of the site. The solar site will be located on agricultural land with residential properties surrounding the project site and a cemetery to the southwest. The location of the proposed Gateway Solar Site is shown in **Figure 1**.

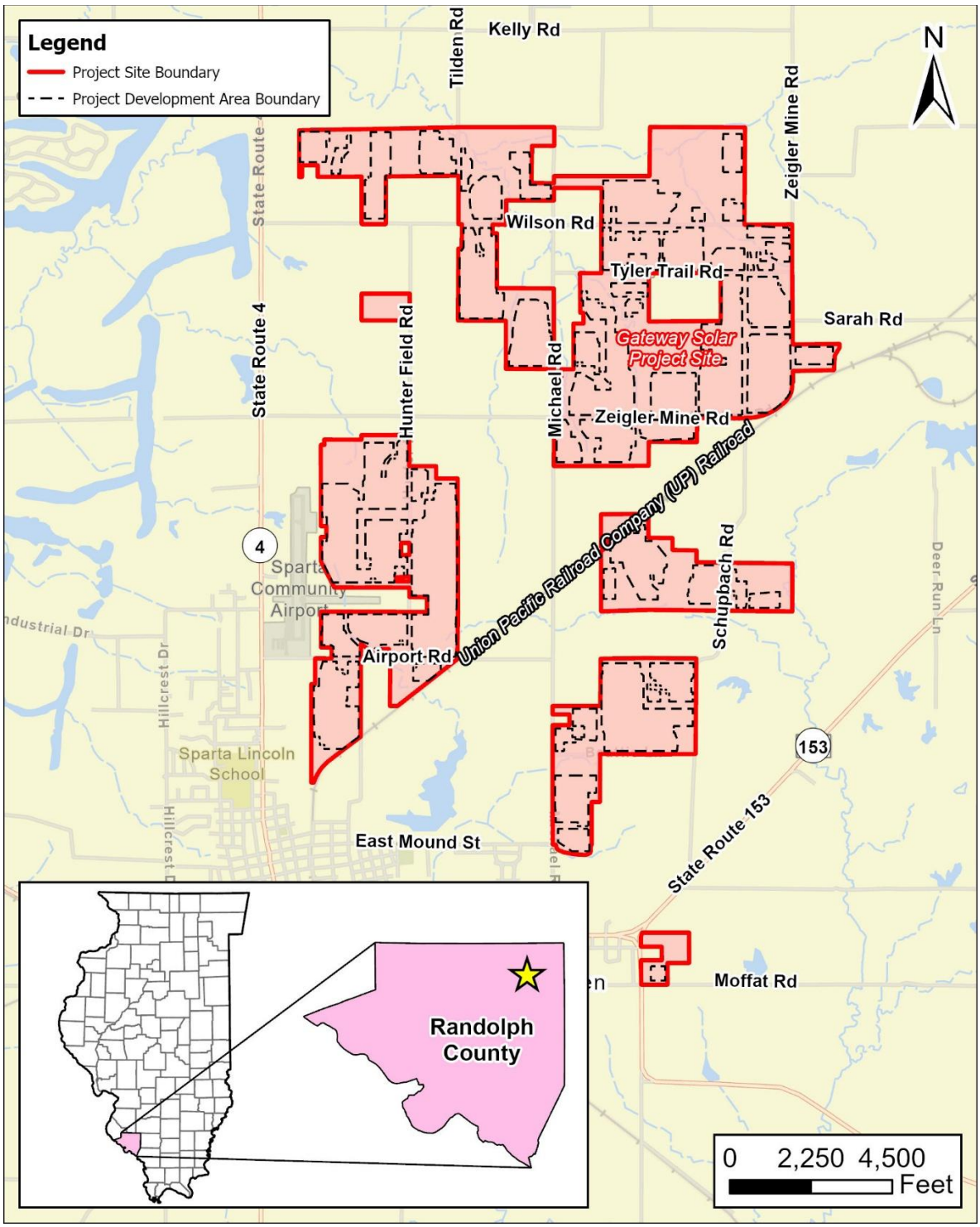
Analysis Findings

- *The solar site will be located on agricultural land with residential properties surrounding the site, a cemetery to the southwest, UP railroad tracks intersecting the site, and an airport to the west. The Illinois Pollution Control Board (IPCB) noise regulations are based on allowable octave band sound pressure levels that vary depending on the category of land the noise is generated from and the category of land the noise is received at. It is to be noted that there are no established maximum octave band sound pressure levels for noise emissions from Class C properties (i.e. agricultural uses) to Class C properties. Modeled maximum operational sound levels are anticipated to remain below the octave band limits established by IPCB at the surrounding Class A (i.e. residences) and Class B (i.e. cemeteries) land uses during daytime and nighttime hours; therefore, noise mitigation measures are not recommended.*

Project Description

The proposed Gateway Solar Site will be developed on approximately 2,519 acres of agricultural land in an unincorporated portion of Randolph County, IL. The solar site will consist of solar arrays throughout the project area with seventy-three (73) inverters located throughout the site and one (1) substation located towards the southern portion of the site.

Figure 1: Site Location and Vicinity



Characteristics of Noise

Noise is generally defined as unwanted sound. It is emitted from many natural and man-made sources. Sound pressure levels are usually measured and expressed in decibels (dB). The decibel scale is logarithmic and expresses the ratio of the sound pressure unit being measured to a standard reference level. Most sounds occurring in the environment do not consist of a single frequency, but rather a broad band of differing frequencies. The intensities of each frequency add together to generate sound. Because the human ear does not respond to all frequencies equally, the method commonly used to quantify environmental noise consists of evaluating all of the frequencies of a sound according to a weighting system. It has been found that the A-weighted decibel [dB(A)] filter on a sound level meter, which includes circuits to differentially measure selected audible frequencies, best approximates the frequency response of the human ear.

The degree of disturbance from exposure to unwanted sound – noise – depends upon three factors:

1. The amount, nature, and duration of the intruding noise
2. The relationship between the intruding noise and the existing sound environment; and
3. The situation in which the disturbing noise is heard

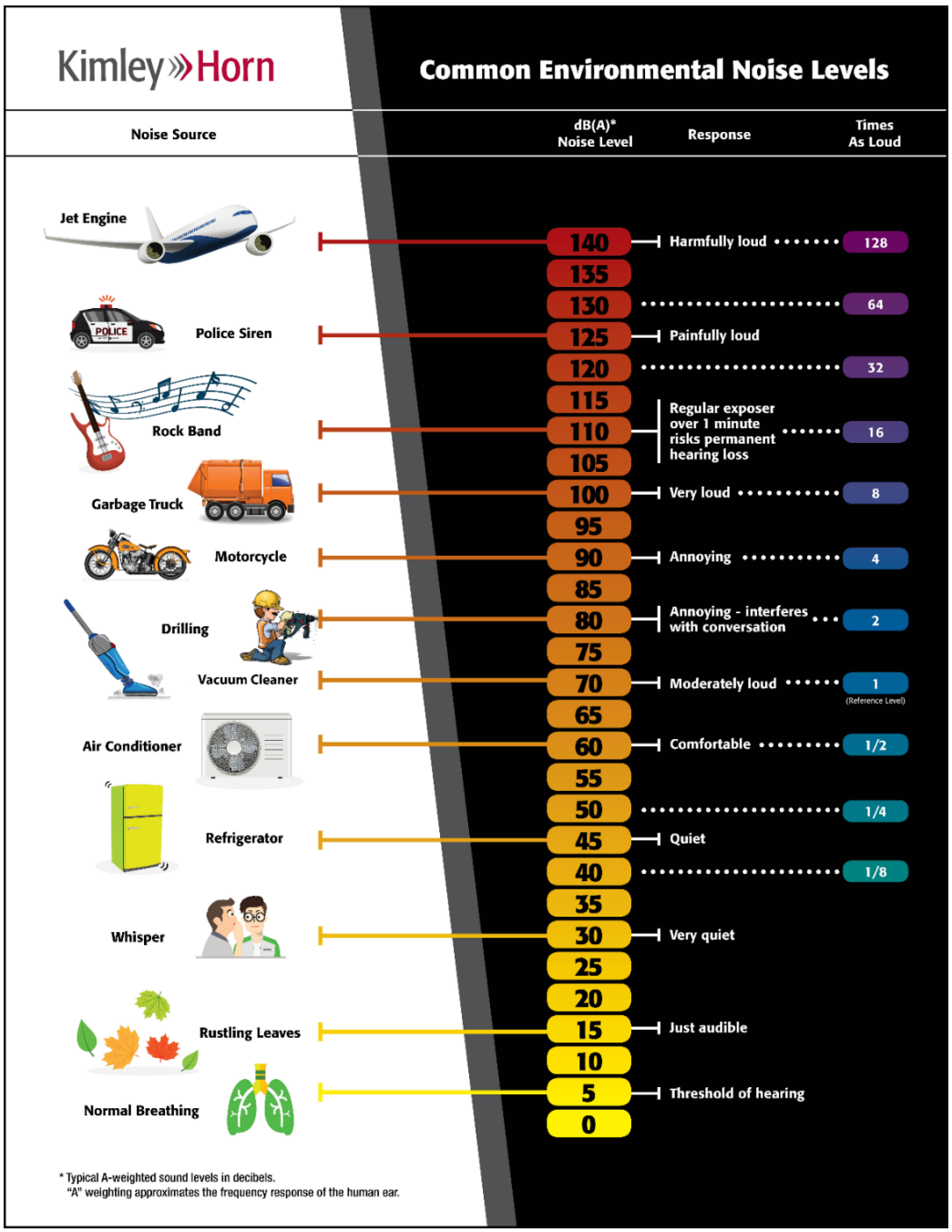
In considering the first of these factors, it is important to note that individuals have varying sensitivity to noise. Loud noises bother some people more than other people, and some individuals become increasingly upset if an unwanted noise persists. The time patterns and durations of noise(s) also affect perception as to whether or not it is offensive. For example, noises that occur during nighttime (sleeping) hours are typically considered to be more offensive than the same noises in the daytime.

With regard to the second factor, individuals tend to judge the annoyance of an unwanted noise in terms of its relationship to noise from other sources (background noise). A car horn blowing at night when background noise levels are low would generally be more objectionable than one blowing in the afternoon when background noise levels are typically higher. The response to noise stimulus is analogous to the response to turning on an interior light. During the daytime an illuminated bulb simply adds to the ambient light, but when eyes are conditioned to the dark of night, a suddenly illuminated bulb can be temporarily blinding.

The third factor – situational noise – is related to the interference of noise with activities of individuals. In a 60 dB(A) environment such as is commonly found in a large business office, normal conversation would be possible, while sleep might be difficult. Loud noises may easily interrupt activities that require a quiet setting for greater mental concentration or rest; however, the same loud noises may not interrupt activities requiring less mental focus or tranquility.

As shown in **Figure 2**, most individuals are exposed to fairly high noise levels from many sources on a regular basis. To perceive sounds of greatly varying pressure levels, human hearing has a non-linear sensitivity to sound pressure exposure. Doubling the sound pressure results in a three decibel change in the noise level; however, variations of three decibels [3 dB(A)] or less are commonly considered “barely perceptible” to normal human hearing. A five decibel [5 dB(A)] change is more readily noticeable. A ten-fold increase in the sound pressure level correlates to a 10 decibel [10 dB(A)] noise level increase; however, it is judged by most people as only sounding “twice as loud”.

Figure 2: Common Noise Levels



Over time, individuals tend to accept the noises that intrude into their lives on a regular basis. However, exposure to prolonged and/or extremely loud noise(s) can prevent use of exterior and interior spaces and has been theorized to pose health risks.

Local Regulations

The Gateway Solar Site is located in an unincorporated portion of Randolph County, IL. Article V, Division II, 40-5-37 of the Zoning Code within the Revised Code of Ordinances of Randolph County Illinois states that "All solar energy systems shall comply with all Federal and State requirements."

The Illinois Pollution Control Board (IPCB) noise regulations are state-level, applicable noise limits based on allowable octave band sound pressure levels during daytime and nighttime hours. The site will be located on Class C (i.e. agricultural use) land with Class A (i.e. residential use) and Class C land surrounding the site with Class B (i.e. cemeteries) land to the southwest. According to Title 35 (Environmental Protection), Subtitle H (Noise), Chapter I (Pollution Control Board), Part 901 (Sound Emission Standards and Limitations for Property Line-Noise Sources), a facility operating in a Class C land cannot cause an exceedance of sound levels at any point within a Class A land during daytime hours as shown in **Table 1**.

Table 1: Maximum Allowable Sound Emitted to Class A Land During Daytime Hours

Octave Band Center Frequency (Hertz)	Allowable Octave Band Sound Pressure Levels (dB) of Sound Emitted to any Receiving Class A Land from		
	Class C Land	Class B Land	Class A Land
31.5	**75**	72	72
63	**74**	71	71
125	**69**	65	65
250	**64**	57	57
500	**58**	51	51
1000	**52**	45	45
2000	**47**	39	39
4000	**43**	34	34
8000	**40**	32	32

Also, according to Title 35, Subtitle H, Chapter I, Part 901, a facility operating in an agricultural field (Class C Land) cannot cause an exceedance of sound levels at any point within a location for death care service land uses (Class B Land) throughout the entire day as shown in **Table 2.**

Table 2: Maximum Allowable Sound Emitted to Class B Land During Daytime Hours

Octave Band Center Frequency (Hertz)	Allowable Octave Band Sound Pressure Levels (dB) of Sound Emitted to any Receiving Class A Land from		
	Class C Land	Class B Land	Class A Land
31.5	**80**	79	72
63	**79**	78	71
125	**74**	72	65
250	**69**	64	57
500	**63**	58	51
1000	**57**	52	45
2000	**52**	46	39
4000	**48**	41	34
8000	**45**	39	32

The IPCB has also established the allowable octave band sound pressure levels for nighttime hours. However, these values are not applicable to the proposed solar site, as it will not be operational during nighttime hours. Also, it is to be noted that there are no established maximum octave band sound pressure levels for noise emissions from Class C to Class C land uses.

Noise Analysis

Sound levels from the proposed Gateway Solar Site were evaluated using SoundPLAN. This program computes predicted sound levels at noise-sensitive areas through a series of adjustments to reference sound levels. SoundPLAN also accounts for topography, groundcover type, and intervening structures. The inverter and transformer equipment are anticipated to be the main sources of sound from the proposed solar photovoltaic project site.

It should be noted that noise from surrounding roadways was not modeled in this analysis although Kelly Road, Zeigler Mine Road, Moffatt Road, State Route 4, State Route 153, Wilson Road, Michael Road, Hunter Field Road, and other roadways are anticipated to contribute to the ambient noise environment throughout the entire day. Additionally, per the Federal Railroad Administration Crossing Inventory, approximately six (6) train pass-by events during the week from the UP rail line are anticipated to occur and contribute to the ambient noise environment but were not modeled in this analysis.

Inverters

Photovoltaic (PV) inverter equipment can generate steady, unvarying sound that may create issues when located near noise-sensitive areas. It was assumed that seventy-three (73) inverters will be located throughout the site. Based on provided noise emission levels for Sungrow SG4400UD-MV-US inverter equipment, a maximum operational sound pressure level of approximately 82 dB(A) at 1.25 meters (i.e. approximately 4 feet) for each of the PV inverters was used. **Table 3** shows the octave band emission levels for a single PV inverter used for reference. The sound from the simultaneous operation of the PV inverters was calculated at the closest noise-sensitive receptors surrounding the project area using SoundPLAN.

Table 3: Sound Emissions for Inverter

Octave Band Center Frequency	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Frequency Sound Level	70	64	67	65	71	71	79	69	41

Sound generated by the inverters is not anticipated to significantly contribute to the existing environmental sound levels surrounding the site. Also, sound generated by the inverters is expected to be mitigated by providing sufficient offsets between the inverters and surrounding noise-sensitive land uses as well as by the physical presence of the solar arrays, which are anticipated to shield and disperse some of the sound generated by the inverters.

Substation/Transformers

Transformer equipment can also generate steady, unvarying noise that may create issues when located near noise-sensitive uses. It was assumed that one (1) transformer would be located at the proposed substation near the southern portion of the site. Additional equipment may be present at the substation but are not anticipated to contribute significant noise and was not analyzed. Based on emission levels for typical transformer equipment, a reference sound level of 75 dB(A) at 1 meter (i.e. 3 feet) was used. **Table 4** shows the octave band emission levels for the transformer used for reference. The sound from the operation of the transformer was calculated at the closest noise-sensitive receptors surrounding the project area using SoundPLAN.

Table 4: Sound Emissions for Transformer

Octave Band Center Frequency	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Frequency Sound Level	72	78	80	75	75	69	64	59	52

Sound generated by the transformer is not anticipated to significantly contribute to the existing environmental sound levels surrounding the site. Also, sound generated by the transformer is expected to be mitigated by providing sufficient offsets between the transformer and surrounding noise-sensitive land uses.

Results

The SoundPLAN-predicted maximum octave band operational sound levels at the surrounding noise-sensitive land uses are anticipated to remain below the applicable octave band limits established by IPCB during daytime and nighttime hours; therefore, noise mitigation measures do not need to be considered in the project design at this time. It is to be noted that there are no established maximum octave band sound pressure levels for noise emissions from Class C properties (i.e. agricultural uses) to Class C properties. See **Table 5** for the maximum predicted octave band emissions at the closest Class A properties and **Table 6** for the maximum predicted octave band emissions at the closest Class B properties. The anticipated operational sound contours are shown in **Figure 3**.

Table 5: Predicted Maximum Sound Emissions at Class A Properties

Octave Band Center Frequency	31 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Maximum Octave Band SPLs from Inverters	45.6	39.6	33.7	20.9	28.9	38.1	46.1	31.1	-

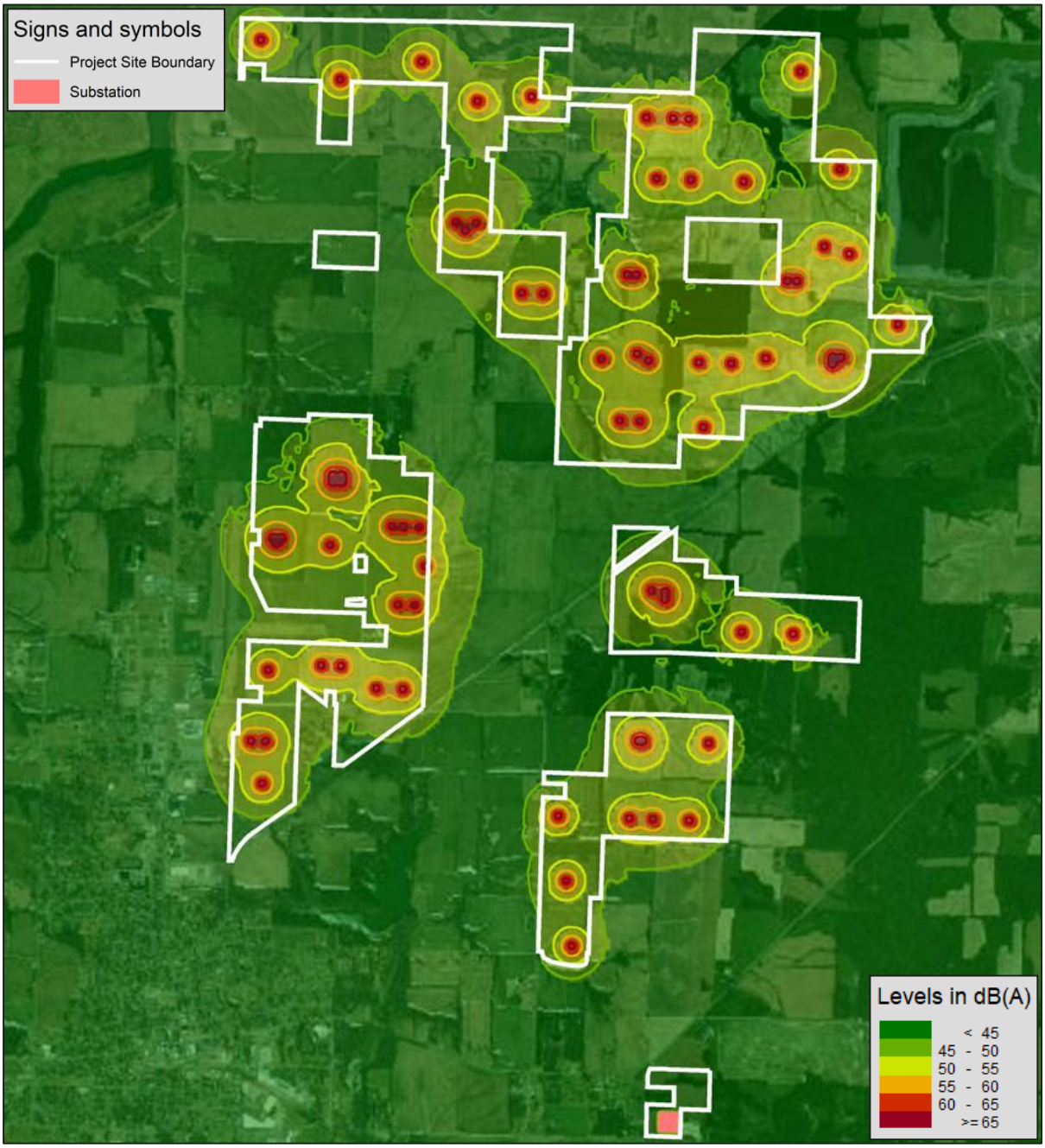
Table 6: Predicted Maximum Sound Emissions at Class B Properties

Octave Band Center Frequency	31 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Maximum Octave Band SPLs from Inverters	35.5	29.4	20.7	11.8	19.2	26.3	31.9	9.8	-

Conclusions

After modeling and analyzing the anticipated operational sound levels throughout the proposed solar site, it was determined that noise mitigation measures are not needed at this time since the anticipated operational octave band sound levels will remain below the IPCB allowable noise levels at the surrounding Class A and Class B land uses during daytime and nighttime hours. It is to be noted that there are no established maximum octave band sound pressure levels for noise emissions from Class C properties (i.e. agricultural uses) to Class C properties.

Figure 3: Operational Sound Contours



Excedances of the IPCB octave band sound pressure level limits are not anticipated at surrounding Class A or Class B land uses, and there are no established maximum octave band sound pressure levels for noise emissions to Class C land uses. Therefore, noise mitigation measures do not need to be considered in the project design at this time.