



Juliet Solar

Exhibit G

Noise Assessment

Case No. 20-1760-EL-BGN

**7X Energy**

# JULIET ENERGY PROJECT NOISE ASSESSMENT

March 10, 2021





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## 1.0 INTRODUCTION

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Juliet Energy (the “Project”) is a proposed 101 MW solar energy facility in Wood County, Ohio. The Project area is approximately 670 acres, which are primarily agricultural with some rural residences. As part of the Ohio Power Siting Board (OPSB) permitting process, RSG was hired by 7X Energy to perform a Noise Assessment of existing acoustical conditions in the area and sound emissions of the primary sound-producing project components, namely inverters and transformers. This report of the assessment includes:

- A Project description;
- Sound level limits applicable to the Project;
- Sound level monitoring procedures and results;
- Operational sound propagation modeling procedures and results;
- Construction noise modeling; and
- Conclusions.

A primer of acoustical terminology used in this report can be found in Appendix A.

## 2.0 PROJECT DESCRIPTION

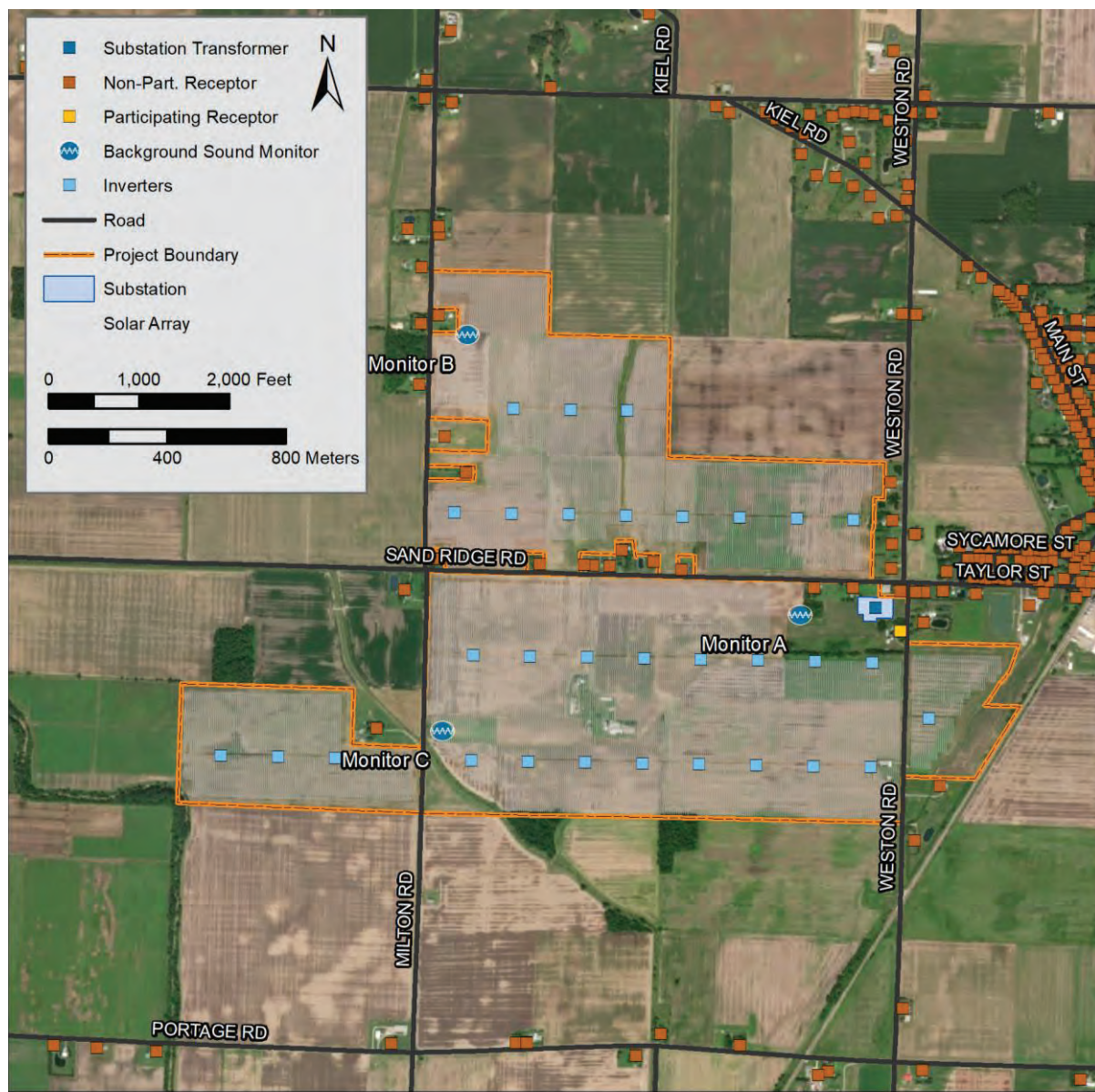
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The Project is proposed to be located on the western side of Wood County, Ohio just west of the Village of Weston (Figure 1). Sand Ridge Road transects the Project area dividing it into a northern and southern area. Weston Road runs north and south on the eastern side of the Project area and is paralleled by Milton Road on the western side of the Project area. Most of the Project is located between these two roads, but south of Sand Ridge Road, there are small portions of the Project east of Weston Road, and west of Milton Road. Just east of the eastern extent of the Project area is the CSX rail line that runs through Weston.

The area is primarily agricultural with some residences along Sand Ridge Road, Milton Road, and Weston Road. A total of 855 receptors are included in this assessment, most of which are homes in the Village of Weston. The closest receptors along with Project elements are shown in Figure 1.

The primary operational sound sources include 31 inverter skids (Power Electronic HEM, 3430MU) spread throughout the Project area and a main high voltage transformer (139 MVA) at the Project substation. The Project substation location is south of an existing substation on the south side of Sand Ridge Road, near the corner of Sand Ridge Road and Weston Road. Each inverter skid includes an inverter and medium voltage transformer. Noise emissions from all of these sources are analyzed in this assessment. Typical operations of the Project include transformers and inverters operating during the day and only transformers operating at night. However, the inverters may operate sometimes at night for VAR support. As such, it has been assumed for this assessment that all sources could operate at night.





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FIGURE 1: PROJECT AREA MAP

### 3.0 APPLICABLE SOUND LEVEL LIMITS

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State noise policy applicable to this Project can be found in Ohio Administrative Code (“OAC”) Chapter 4906-4 Section 8(A). This Section requires that information on noise be provided including:

- Projected sound levels at the nearest property boundary due to construction;
- Projected sound levels at the nearest property boundary due to operation;
- Descriptions of mitigation measures; and
- A preconstruction background sound level study.

Although there is a specific sound level limit for wind power projects within the OAC, there is not one for solar power projects. The design threshold for non-participating sensitive receptors used in this assessment of the Project is the measured ambient sound level plus 5 dB for daytime and nighttime periods. That is, the design threshold during the daytime is the measured daytime ambient sound level plus 5 dB, and the nighttime design threshold will be the measured nighttime ambient sound level plus 5 dB.

Based on the background sound monitoring conducted at three locations throughout the Project Area (see Section 4.0), the average existing daytime and nighttime equivalent continuous sound levels ( $L_{eq}$ ) in the area are 43 dBA and 40 dBA, respectively. This sets the daytime design threshold at 48 dBA and the nighttime design threshold at 45 dBA.



## 4.0 SOUND LEVEL MONITORING

### 4.1 PROCEDURES

Background sound levels were measured at three locations representative of different soundscapes around the Project Area. A map showing all three monitor locations is provided in Figure 1 in Section 2.0. Monitoring was conducted from January 13 through January 25, 2021, although each monitor ran for varying lengths of time. Monitor A gathered continuous data over a five-day period (1/14 to 1/19), Monitor B gathered data over a 10-day period (1/13 to 1/23), and Monitor C gathered data over a 12-day period (1/13 to 1/25).<sup>1</sup>

#### Equipment

Sound levels at each location were measured using a Cesva SC 310 sound level meter, which is an ANSI/IEC Class 1 instrument. All meters logged A-weighted and 1/3 octave band equivalent continuous sound levels once each second. Each sound level meter was attached to external audio recorders (Roland R-05) to aid in source identification and soundscape characterization.

Each sound level meter's microphone was mounted on a wooden stake at a height of approximately 1.5 meters (5 feet) and covered with a seven-inch weather-resistant windscreen. The windscreen reduces the influence of wind-induced self-noise on the measurements. The sound level meters were field-calibrated before and after each measurement period.

Wind data was logged at each site using an ONSET anemometer which recorded average wind speed and wind gust speed data once per minute and was installed at microphone height (1.5 meters). Other meteorological data was taken from the National Weather Service ASOS station at the Toledo Express Airport in Swanton, OH (KTOL).

#### Location Descriptions

##### *Monitor A*

Monitor A was located at the edge of a field near the middle of the Project area and approximately 120 meters (394 feet) south of Sand Ridge Road, which is classified as a minor collector road by ODOT.<sup>2</sup> The proposed substation would be between approximately 195 meters

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<sup>1</sup> The background periods vary at each monitor as the power systems are more sensitive to temperature during winter monitoring, but enough data was gathered across all the monitor locations to sufficiently quantify the existing background sound levels in the area.

<sup>2</sup> Map of Wood County Functional Class Routes, ODOT, October 26, 2016, [https://www.dot.state.oh.us/Divisions/Planning/ProgramManagement/MajorPrograms/MapRoom/Rural%20County%20Map\\_Wood.PDF](https://www.dot.state.oh.us/Divisions/Planning/ProgramManagement/MajorPrograms/MapRoom/Rural%20County%20Map_Wood.PDF)

(640 feet) and 310 meters (1,017 feet) east of the Monitor A location. The nearest residence to the monitor location is approximately 100 meters (328 feet) to the north-northeast, closer to Sand Ridge Road.

Monitor A measured a soundscape that is representative of residences along Sand Ridge Road, although most residences are closer to the road and would likely experience background sound levels that are higher than those measured at this monitor. A map of the monitor location is provided in Figure 2.



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**FIGURE 2: MAP OF MONITOR A LOCATION**



### ***Monitor B***

Monitor B was located in a field in the northwest region of the Project area and was set back approximately 125 meters (410 feet) east of Milton Road, which is classified as local road by ODOT.<sup>2</sup> This area is approximately 790 meters (2,592 feet) north of Sand Ridge Road. The nearest residence to the monitor location is approximately 112 meters (367 feet) to the northwest, closer to Milton Road.

Monitor B measured a soundscape that is representative of residences along Milton Road north of Sand Ridge Road, although most residences are closer to Milton Road and would likely experience background sound levels that are higher than those measured at this monitor depending on the level of local traffic. A photograph of the monitor is provided in Figure 3, and map of the monitor location is provided in Figure 4.



**FIGURE 3: PHOTOGRAPH OF MONITOR B**



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**FIGURE 4: MAP OF MONITOR B LOCATION**



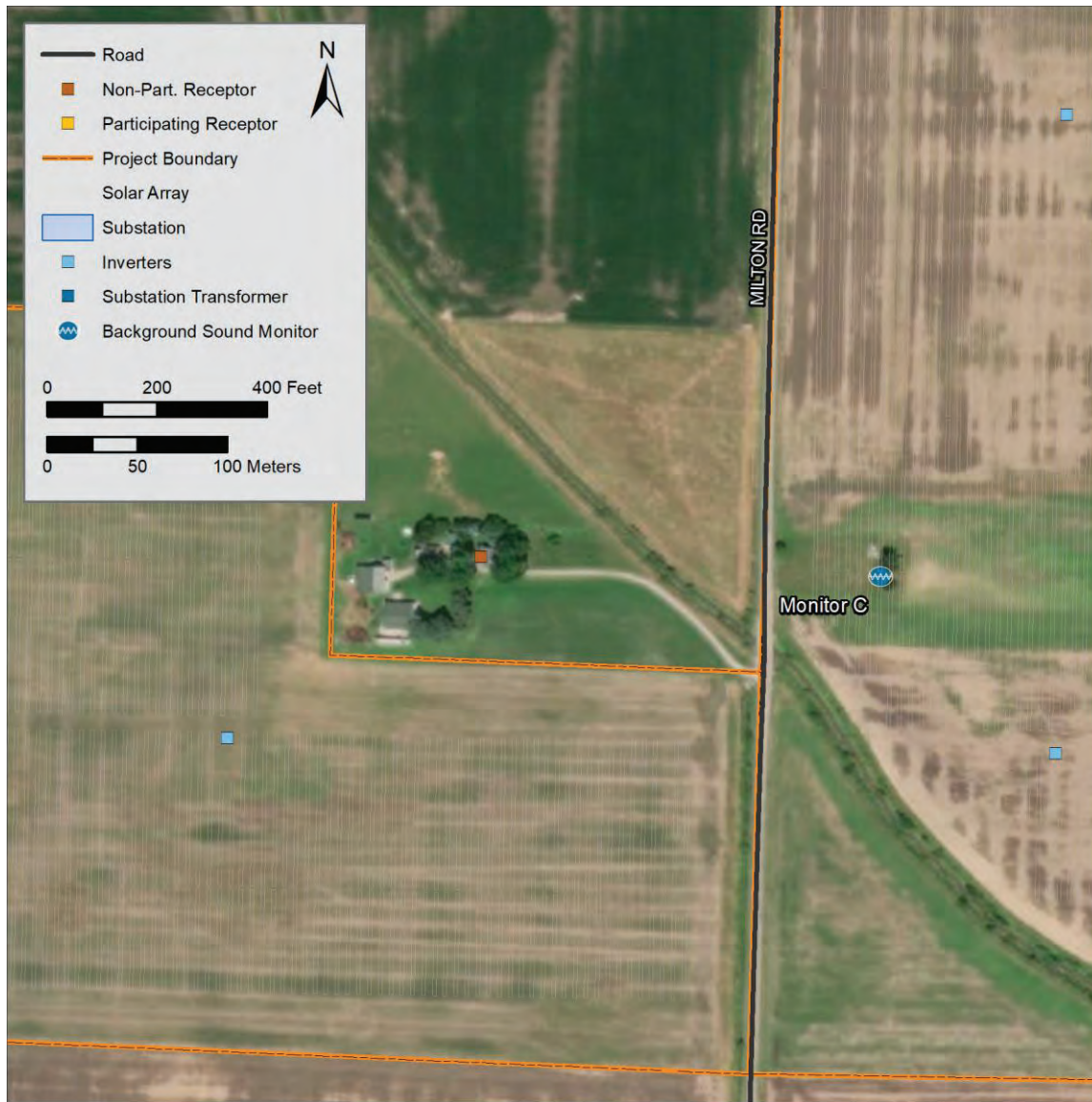
### ***Monitor C***

Monitor C was located in a grassy area in the southwest region of the Project area and was set back approximately 62 meters (203 feet) east of Milton Road. This area is approximately 550 meters (1,804 feet) south of Sand Ridge Road. The nearest residence to the monitor location is approximately 220 meters (722 feet) to the west.

Monitor C measured a soundscape that is representative of residences along Milton Road south of Sand Ridge Road and at distances that are closer to Milton Road than Monitor B. A photograph of the monitor is provided in Figure 5, and map of the monitor location is provided in Figure 6.



**FIGURE 5: PHOTOGRAPH OF MONITOR C**



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**FIGURE 6: MAP OF MONITOR C LOCATION**

## Data Processing

Following the collection of the sound level meters, data was downloaded, processed, and summarized into 10-minute, overall day, overall night, and full monitoring-period length durations. For each 10-minute period, equivalent average ( $L_{eq}$ ), upper 10<sup>th</sup> percentile ( $L_{10}$ ), median ( $L_{50}$ ), and lower 10<sup>th</sup> percentile ( $L_{90}$ ) sound levels were also calculated.



To maintain the integrity of the background sound levels data, conditions that would cause false sound level readings or artificially high levels were excluded from the data. These periods include:

- Wind speeds above 5 m/s (11 mph);
- Precipitation and thunderstorm events;
- Anomalous events;
- Temperatures below -10°C (14°F) and
- Equipment interactions by RSG staff, other people, or animals.

## 4.2 BACKGROUND SOUND LEVEL SUMMARY

An overall summary of the monitoring results is provided in this section, followed by time-history graphs for each monitor in Section 4.3. Sound levels for each location are summarized into daytime, nighttime, and entire-period levels in Table 1 for sound level metrics including the equivalent continuous average ( $L_{eq}$ ), upper 10<sup>th</sup> percentile ( $L_{10}$ ), median ( $L_{50}$ ), and lower 10<sup>th</sup> percentile ( $L_{90}$ ) sound levels.

The nighttime  $L_{eq}$  across the Project area is 40 dBA, and the daytime  $L_{eq}$  across the Project area is 43 dBA. As discussed in Section 3.0, this sets the nighttime project design threshold at 45 dBA and the daytime project design threshold at 48 dBA.

**TABLE 1: SUMMARY OF BACKGROUND SOUND LEVELS**

Site	Sound Pressure Level (dBA)			
	L <sub>eq</sub>	L <sub>90</sub>	L <sub>50</sub>	L <sub>10</sub>
<b>Overall</b>				
A	43	25	33	41
B	39	25	32	39
C	45	25	35	47
<b>Day</b>				
A	43	27	34	42
B	41	27	33	41
C	46	26	36	49
<b>Daytime Average</b>	<b>43</b>			
<b>Daytime Limit</b>	<b>48</b>			
<b>Night</b>				
A	41	24	31	40
B	35	24	30	36
C	43	23	33	45
<b>Nighttime Average</b>	<b>40</b>			
<b>Nighttime Limit</b>	<b>45</b>			

### 4.3 MONITOR RESULTS BY LOCATION

For display purposes, the one-second data that was collected is displayed in 10-minute summarized values in the time history-graphs to show overall trends. Sound levels are plotted along with ambient temperature and wind speed to show relating trends. Time periods during which data was removed for the sound level summary presented in Section 4.1 are indicated with color-coded markers at the bottom of each sound level graph. Sound level data during periods when the entire 10-minute interval was excluded for wind, rain, or anomalies are still present in these graphs as lighter colors, with the darker colors representing 10-minute intervals where there were no data exclusions or only partial data exclusions.<sup>3</sup> Each graph exhibits day/night shading where night is defined as 22:00 to 7:00 and shaded grey.

<sup>3</sup> For some 10-minute periods, shorter durations within the 10-minutes are excluded due to wind, rain, or anomalies, but the rest of the 10-minute interval is still used in the summary. These periods are shown in the darker colors (L<sub>eq</sub> and L<sub>90</sub>) as only some of the 10-minute period was excluded.

## Monitor A Results

Background sound level monitoring results for Monitor A are shown in Figure 7. The primary sources of sound at this monitor location are vehicle passbys on Sand Ridge Road, geophonic sounds such as wind blowing over obstacles (i.e. tree trunks, branches, posts, etc.), and distant sounds from the village. Secondary sources of sound included distant dog barking, other occasional biogenic sounds, and aircraft overflights. There were several train passbys during the monitoring period at the rail line which is approximately 765 meters (2,510 feet) to the southeast which caused some of the highest sound levels shown in Figure 7 due to train horns. Monitor A had the most traffic of the three monitor locations, but it was not a constant source. As shown in Figure 7, there were a few periods of precipitation and wind gusts that necessitated exclusion from the dataset.

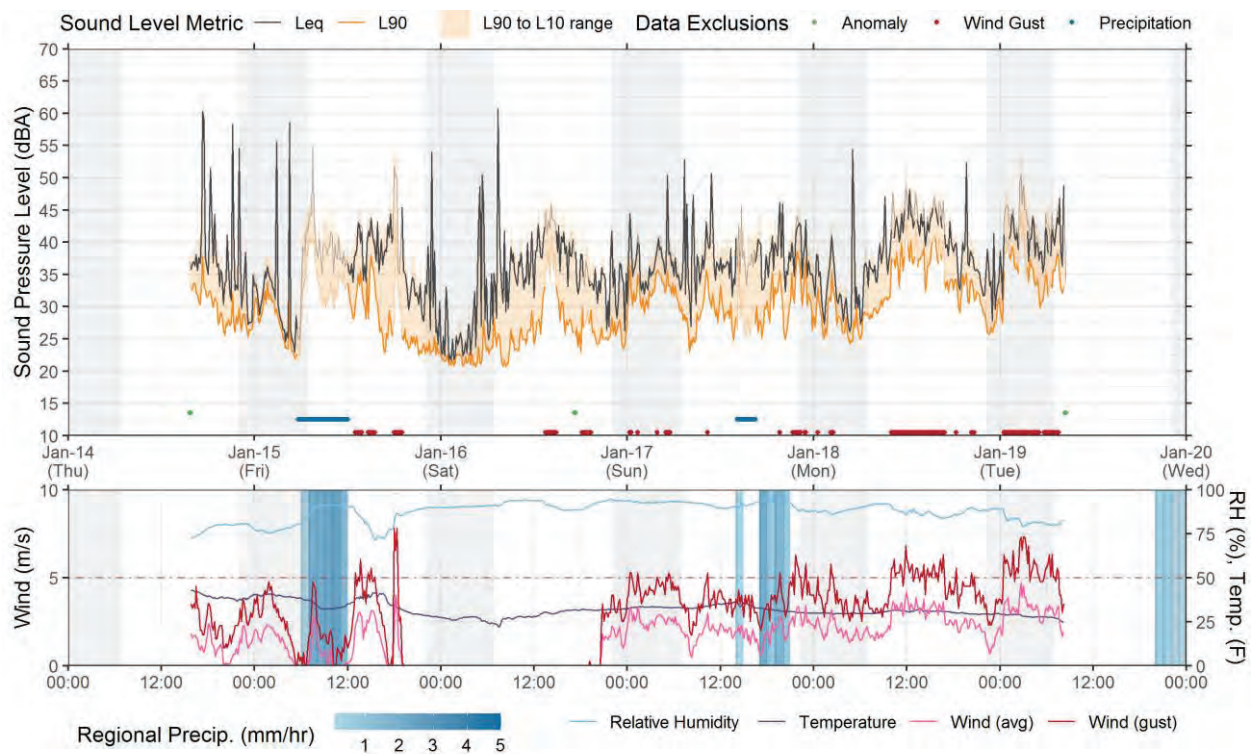


FIGURE 7: SOUND PRESSURE LEVELS OVER TIME - MONITOR A, JANUARY 14 TO 19

## Monitor B Results

Background sound level monitoring results for Monitor B are provided in Figure 8. The primary sound source at this location is geophonic sound, as background sound levels appear to be well correlated with wind speed. There was occasional sound from passing vehicles, but not as many as there were at Monitor A. Other secondary sources at Monitor B include aircraft overflights and occasional biogenic sounds. As can be seen in Figure 8, there were a few periods of precipitation that were excluded from the analysis, and many periods of high winds, particularly from January 18 through January 23, that were excluded from the analysis.

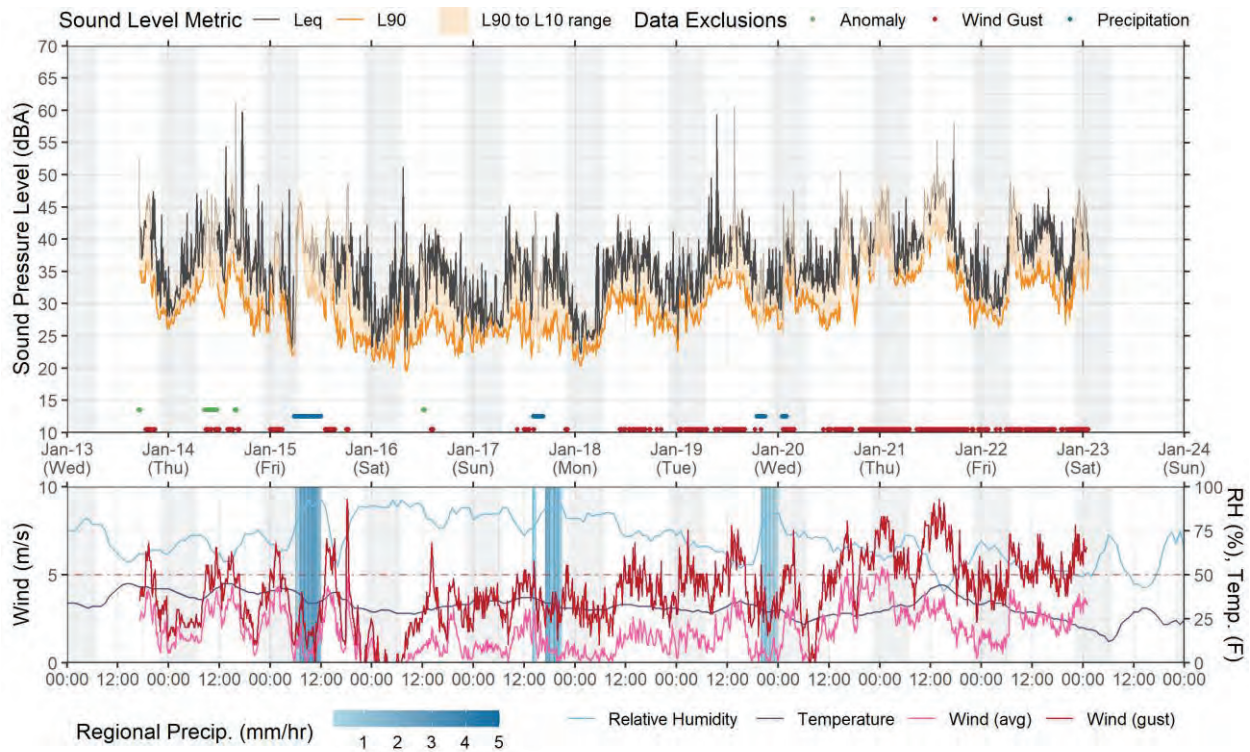


FIGURE 8: SOUND PRESSURE LEVELS OVER TIME - MONITOR B, JANUARY 13 TO 23



## Monitor C Results

Background sound level monitoring results for Monitor C are shown in Figure 9. Like Monitor B, background sound levels at Monitor C were well correlated with wind speed indicating that the primary source of sound at this monitor location was geophonic sound. There were also vehicle passbys, which were less frequent than at Monitor A, but more frequent than at Monitor B. Secondary sources of sound include aircraft overflights, occasional train passbys, and biogenic sounds. There were a few periods of precipitation and several periods of high winds that were excluded from the data analysis. It was particularly windy from January 17 through January 21, but winds died down for the last 4 days of data collection.

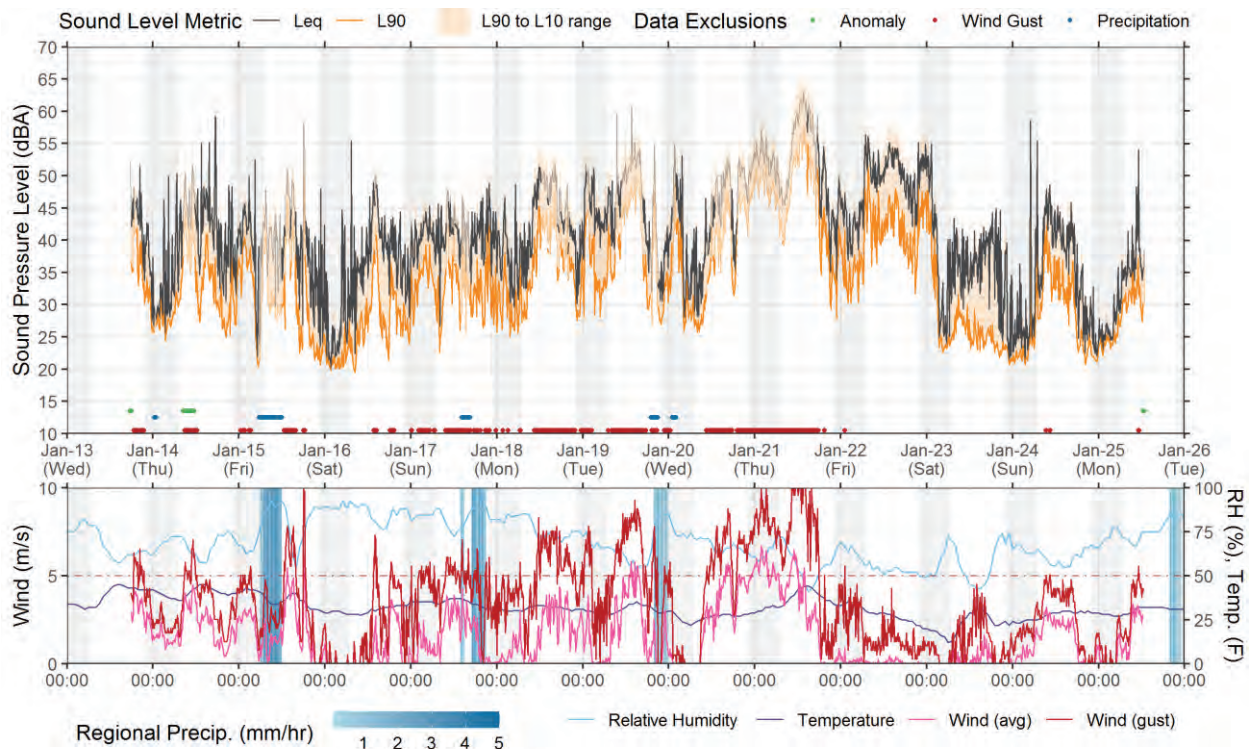


FIGURE 9: SOUND PRESSURE LEVELS OVER TIME - MONITOR C, JANUARY 13 TO 25

## 5.0 SOUND PROPAGATION MODELING

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### 5.1 PROCEDURES

Modeling for the Project was in accordance with the standard ISO 9613-2, “Acoustics – Attenuation of sound during propagation outdoors, Part 2: General Method of Calculation.” The ISO standard states,

This part of ISO 9613 specifies an engineering method for calculating the attenuation of sound during propagation outdoors in order to predict the levels of environmental noise at a distance from a variety of sources. The method predicts the equivalent continuous A-weighted sound pressure level ... under meteorological conditions favorable to propagation from sources of known sound emissions. These conditions are for downwind propagation ... or, equivalently, propagation under a well-developed moderate ground-based temperature inversion, such as commonly occurs at night.

The model takes into account source sound power levels, surface reflection and absorption, atmospheric absorption, geometric divergence, meteorological conditions, walls, barriers, berms, and terrain. The acoustical modeling software used here was CadnaA, from Datakustik GmbH. CadnaA is a widely accepted acoustical propagation modeling tool, used by many noise control professionals in the United States and internationally.

ISO 9613-2 also assumes downwind sound propagation between every source and every receiver. Consequently, all wind directions, including the prevailing wind directions, are taken into account.

Model input parameters are listed in Appendix B, including the modeled sound power spectra for each source. A total of 855 discrete receivers within one mile of the Project were placed at a height of 4 meters (13 feet) above ground level. In addition, a grid of receivers spaced 10 meters by 10 meters was setup at a height of 1.5 meters above ground covering approximately 30 sq. km. (11.5 sq. mi.) around the Project area.

### 5.2 MODEL RESULTS

A summary of the sound propagation model results is provided in Table 2, and Appendix C provides a list of the calculated overall sound pressure levels at each receptor. As shown in Table 2, all non-participating receptors are projected to be less than the daytime design threshold, 48 dBA, and less than or equal to the nighttime design threshold, 45 dBA.



**TABLE 2: SUMMARY OF MODELED SOUND PRESSURE LEVELS ACCOUNTING FOR MITIGATION IN SECTION 5.3**

	DAYTIME			NIGHTTIME		
	AVG	MIN	MAX	AVG	MIN	MAX
Non-participating Receptors	33 dBA	28 dBA	46 dBA	33 dBA	28 dBA	45 dBA
Participating Receptors	38 dBA	30 dBA	46 dBA	37 dBA	30 dBA	44 dBA

The highest non-participating receptors during the day are at 46 dBA and are the two closest receptors west of the proposed substation. During the day, the substation transformer is modeled at stage two cooling (ONAF) which would involve cooling fans operating. At night, under ONAN cooling, which does not involve cooling fan operation, the projected sound level at those receptors is 45 dBA. The maximum projected sound levels are equal to or less than the daytime and nighttime design thresholds discussed in Section 3.0.

A map of the projected daytime sound levels throughout the Project area, including at the Project boundary, is provided in Figure 10, and the projected nighttime sound levels with VAR support are shown in Figure 11. The highest projected sound level at the Project boundary is 53 dBA, which occurs at southern property line of the southwestern section of the Project area, adjacent to a neighboring field.

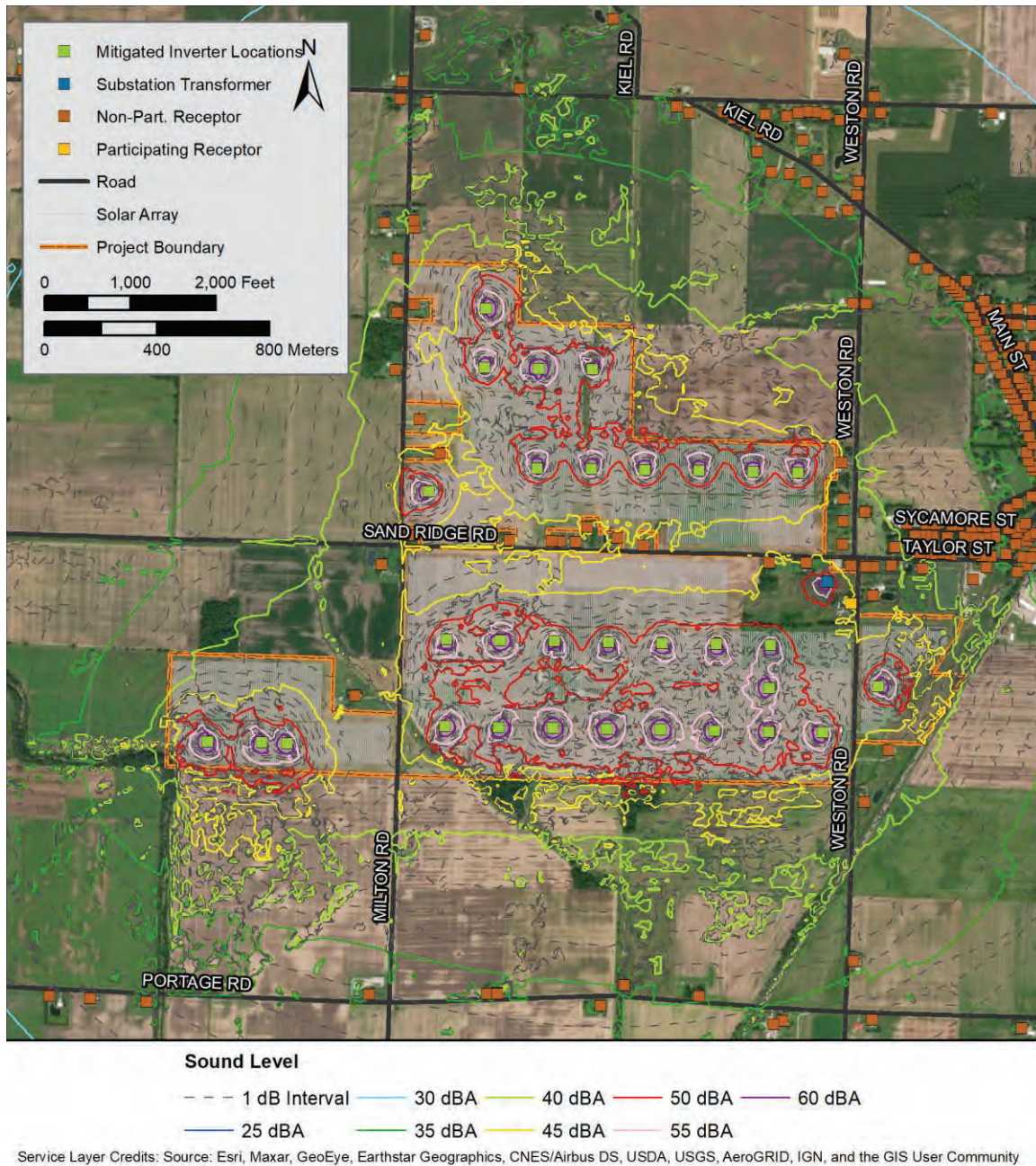
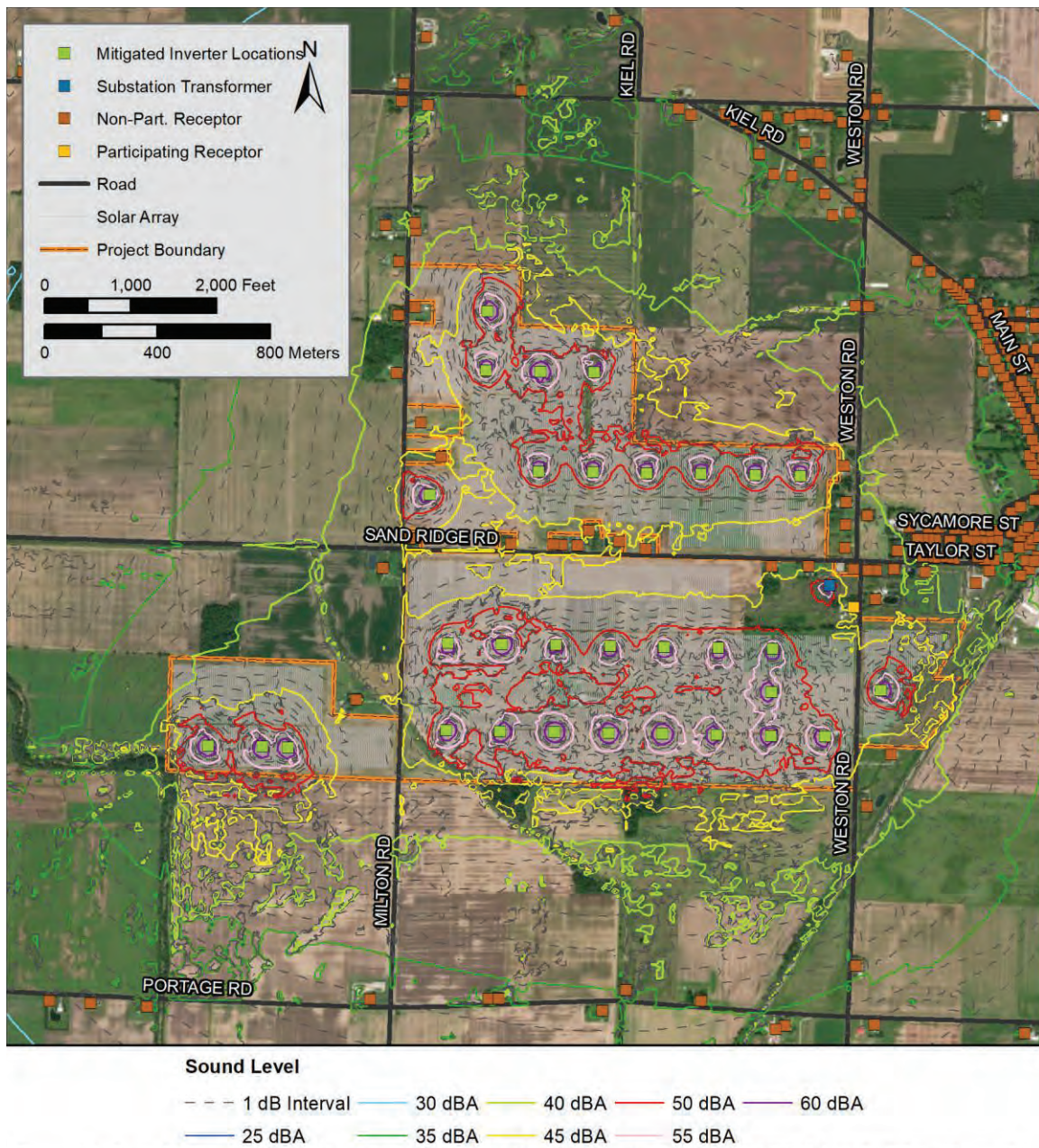


FIGURE 10: DAYTIME MODEL RESULTS ACCOUNTING FOR MITIGATION IN SECTION 5.3





**FIGURE 11: NIGHTTIME MODEL RESULTS WITH VAR SUPPORT ACCOUNTING FOR MITIGATION IN SECTION 5.3**

## 5.3 MITIGATION

Mitigation that has been incorporated into the model is needed to meet both the daytime and nighttime design thresholds. The mitigation in the model includes:

1. Shifting the location of 21 inverters;
2. Installing barriers adjacent to 26 inverters; and
3. Installing a barrier in the substation adjacent to the transformer.

These mitigations measures are discussed below.

### Shifting Inverter Locations

A total of 21 inverter locations were shifted in the sound propagation model to reduce sound levels to meet the daytime and nighttime design thresholds. The original inverter locations are shown in the site map in Figure 1, and the mitigated inverter locations are shown in the model results in Figures 10 and 11. The shifts are shown in Figure 12.

### Inverter Barriers

A total of 26 inverters had barriers<sup>4</sup> modeled next to them to mitigate the sound from propagating toward some receptors. The inverters that had a barrier modeled adjacent to them are circled in Figure 12. Based on the height of the inverter and the terrain in the area, the height of the modeled barriers was 3.7 meters (12 feet), and the barriers were set back 2 meters (6.6 feet) from the inverter pads. The length of the barriers varied between 11 and 24 meters (36 and 79 feet) as some inverters only need a barrier on two sides while others need a barrier on three sides. If barriers are used in the final layout, the location of each barrier for each inverter can be provided in detail with the updated model results for the final layout.

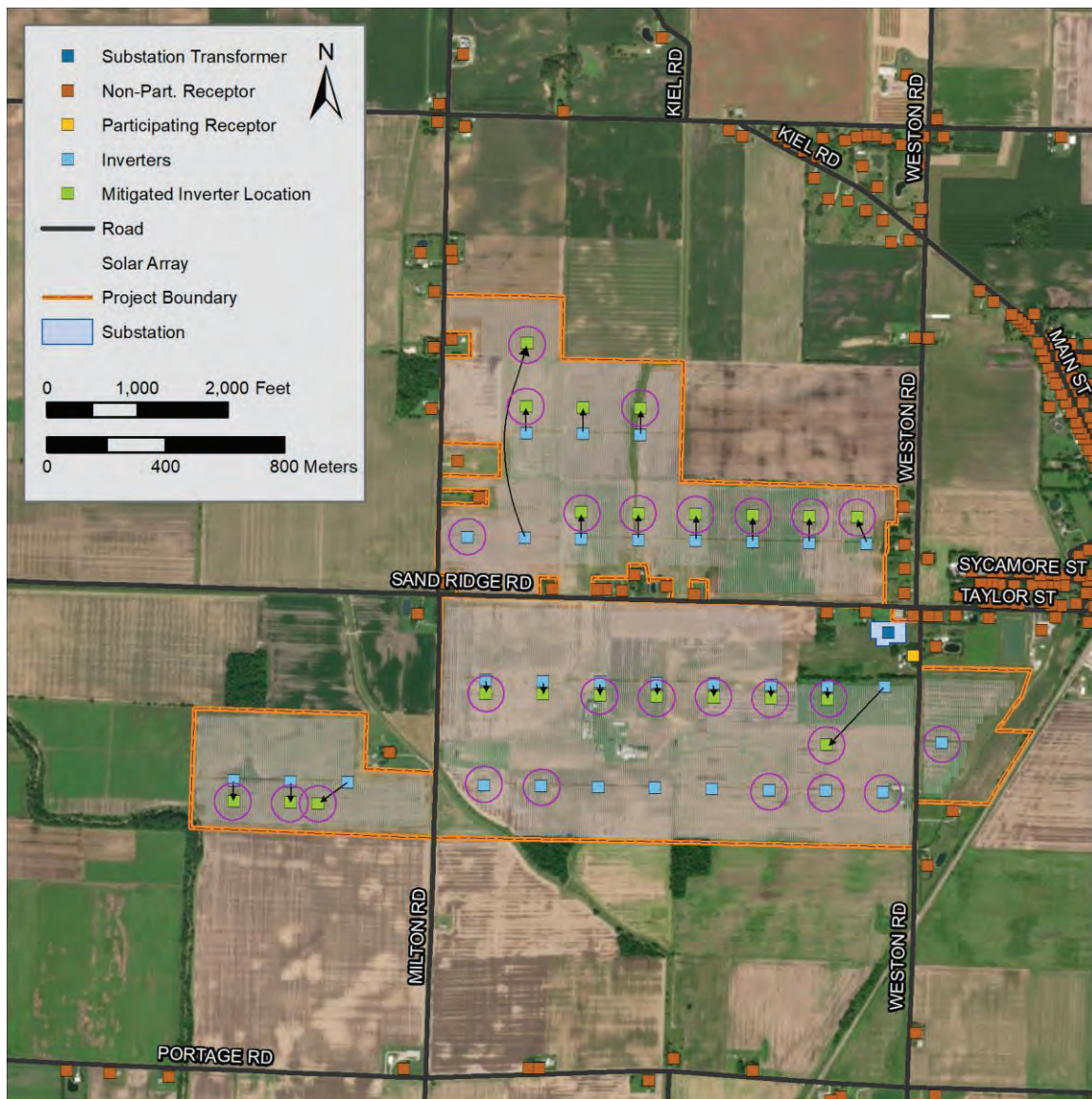
### Substation Transformer Barrier

The model includes a barrier adjacent to the substation transformer. The final dimensions of the barrier will depend on the final dimensions of the selected transformer, but the barrier used in the model is 4.3 meters tall (14 feet) and is sited 2 meters (6.6 feet) from the transformer pad on the northwest, northeast, and southeast sides of the transformer.

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<sup>4</sup> The barriers should be flush with the ground, containing no air gaps, and have a surface weight of at least 4 pounds per square foot.





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**FIGURE 12: MAP OF SHIFTED INVERTER LOCATIONS AND INVERTERS WITH BARRIERS CIRCLED**

## **Inverter Manufacturer Provided Mitigation**

The mitigation presented above represents an example of feasible mitigation, but is not the only option. Other options might include:

- Quieter equipment;
- Baffles;

- Enclosures;
- Manufacturer provided mitigation that is specific to the inverter; or
- Limiting the use of the inverters at night for VAR support.

Based on manufacturer data and as shown in Appendix B, the sound power level of the inverter used in the model is 99.6 dBA with much of that acoustical energy in the 63 Hz octave band. The inverter manufacturer may be able to provide a mitigation solution for their system that reduces the sound emissions, particularly in the 63 Hz octave band. This could reduce or negate the need for the barrier mitigation and inverter shifts, but more information would be needed from the manufacturer in order to evaluate this option. The barrier may also be reduced in size or removed if a quieter transformer is specified in the final design. Once equipment and mitigation methods are finalized, modeling will be redone to ensure efficacy.



## 6.0 CONSTRUCTION NOISE

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Construction activities include road construction, substation construction, trenching, inverter and transformer installation, piling and racking. In any given area, construction will be relatively short in duration, particularly for road construction, trenching, piling, and racking. Construction of substations typically lasts longer than these other activities. Road construction would take place within and adjacent to the solar arrays. Trenching would take place along the underground collection line routes. Inverter installation would take place at each inverter pad location. Lastly, piling and racking will take place throughout the solar arrays.

Construction that involves increasing sound above ambient levels will take place between 7 AM and 7 PM or dusk, whichever is later. Pile driving will be limited to the hours of 9 AM to 7 PM, or until dusk if sunset is after 7 PM. Like other solar projects in Ohio impact pile driving may occur between 7 AM and 9 AM if the construction sound levels at non-participating receptors are no greater than 10 dB over the daytime ambient  $L_{eq}$ . Construction equipment will be fitted with exhaust systems and mufflers to reduce exhaust noise. In addition, the material staging areas will be located away from sensitive receptors when feasible. To the extent possible, circular vehicular movements will be established to minimize the use of back alarms.

Equipment used for each activity will vary. Some of the louder pieces of equipment<sup>5</sup> are shown in Table 3 along with the approximate maximum sound pressure levels at a reference distance of 15 meters (50 feet) and 58 meters (190 feet), the closest distance between a nonparticipating receptor and a solar array where racking and piling will take place.

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<sup>5</sup> Sound source information was obtained from FHWA's Roadway Construction Noise Model and manufacturer data.

**TABLE 3: MAXIMUM SOUND LEVELS FROM VARIOUS TYPES OF CONSTRUCTION EQUIPMENT ASSUMING NO ATTENUATION FROM TREES OR TERRAIN**

Equipment	Maximum Sound Pressure Level at 58 meters (190 feet) (dBA) <sup>6</sup>	Maximum Sound Pressure Level at 15 meters (50 feet) (dBA)
Excavator	67	85
Dozer	67	85
Grader	66	85
Roller	66	85
Dump Truck	65	84
Concrete Mixing Truck	66	85
Concrete Pumper Truck	63	82
Man-lift	67	85
Flatbed Truck	65	84
Large Crane	67	85
Small Crane	65	83
Trencher	61	83
Compactor	58	80
Forklift	64	85
Boom Truck	65	84
HDD	72	87
Small Pile Driver	62	84

<sup>6</sup> Assumes hard ground around construction site, and ISO 9613-2 propagation with no vegetation reduction. Actual sound levels will likely be lower given the prevalence of vegetation and soft ground around the site.

## 7.0 CONCLUSIONS

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RSG conducted a sound level assessment of the Project that included background sound level monitoring of the existing environment in and around the Project area and sound propagation modeling to predict operational sound levels at nearby receptors. Summary and conclusions are as follows:

1. Sound sources in the existing soundscape include geophonic and biogenic sounds, local traffic noise, aircraft overflights, and trains. Presumably, sound from agricultural operations would be present spring through fall, but they were not present during the background sound level period in January.
  - a. The average daytime  $L_{eq}$  across the Project Area was 43 dBA.
  - b. The average nighttime  $L_{eq}$  across the Project Area was 40 dBA.
2. A project design threshold of 5 dB above existing  $L_{eq}$  was established, creating a daytime threshold of 48 dBA and a nighttime threshold of 45 dBA for non-participating receptors.
3. While the Project transformers are typically the only sources that operate at night from a solar project, there may be times that the inverters will operate at night for VAR support. As such, this assessment conservatively assumed:
  - a. All inverters would operate at night, and
  - b. The projected sound levels from those sources are evaluated against the nighttime threshold of 45 dBA.
4. Daytime sound levels were also modeled, with the only difference between daytime and nighttime operational sound levels being the cooling mode on the substation transformer, ONAF for the daytime scenario and ONAN for the nighttime scenario.
5. Sound propagation modeling was conducted in accordance with ISO 9613-2 at 855 receptors within 1 mile of the Project, using the planned inverter for the Project, Power Electronics HEM.
6. Model results are summarized in Section 5.2, and provided in tabular format in Appendix C. The highest modeled receptor is 46 dBA for the daytime and 45 dBA for the nighttime, which are below their respective design thresholds.
7. The highest modeled sound level at a property line from operation of the Project is 53 dBA, which occurs at southern property line of the southwestern section of the Project area, adjacent to a neighboring field.

8. To meet the Project daytime and nighttime design thresholds, the model included mitigation which is discussed in Section 5.3, and includes:
  - o Shifting the location of 21 inverters;
  - o Installing barriers adjacent to 26 inverters; and
  - a. Installing a barrier in the substation adjacent to the transformer.
9. Sound levels due to construction are summarized in Section 6.0

## APPENDIX A. ACOUSTICS PRIMER

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### Expressing Sound in Decibel Levels

The varying air pressure that constitutes sound can be characterized in many different ways. The human ear is the basis for the metrics that are used in acoustics. Normal human hearing is sensitive to sound fluctuations over an enormous range of pressures, from about 20 micropascals (the “threshold of audibility”) to about 20 pascals (the “threshold of pain”).<sup>7</sup> This factor of one million in sound pressure difference is challenging to convey in engineering units. Instead, sound pressure is converted to sound “levels” in units of “decibels” (dB, named after Alexander Graham Bell). Once a measured sound is converted to dB, it is denoted as a level with the letter “L”.

The conversion from sound pressure in pascals to sound level in dB is a four-step process. First, the sound wave’s measured amplitude is squared and the mean is taken. Second, a ratio is taken between the mean square sound pressure and the square of the threshold of audibility (20 micropascals). Third, using the logarithm function, the ratio is converted to factors of 10. The final result is multiplied by 10 to give the decibel level. By this decibel scale, sound levels range from 0 dB at the threshold of audibility to 120 dB at the threshold of pain.

Typical sound sources, and their sound pressure levels, are listed on the scale in Figure 13.

### Human Response to Sound Levels: Apparent Loudness

For every 20 dB increase in sound level, the sound pressure increases by a *factor* of 10; the sound *level* range from 0 dB to 120 dB covers 6 factors of 10, or one million, in sound *pressure*. However, for an increase of 10 dB in sound *level* as measured by a meter, humans perceive an approximate doubling of apparent loudness: to the human ear, a sound level of 70 dB sounds about “twice as loud” as a sound level of 60 dB. Smaller changes in sound level, less than 3 dB up or down, are generally not perceptible.

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<sup>7</sup> The pascal is a measure of pressure in the metric system. In Imperial units, they are themselves very small: one pascal is only 145 millionths of a pound per square inch (psi). The sound pressure at the threshold of audibility is only 3 one-billionths of one psi: at the threshold of pain, it is about 3 one-thousandths of one psi.



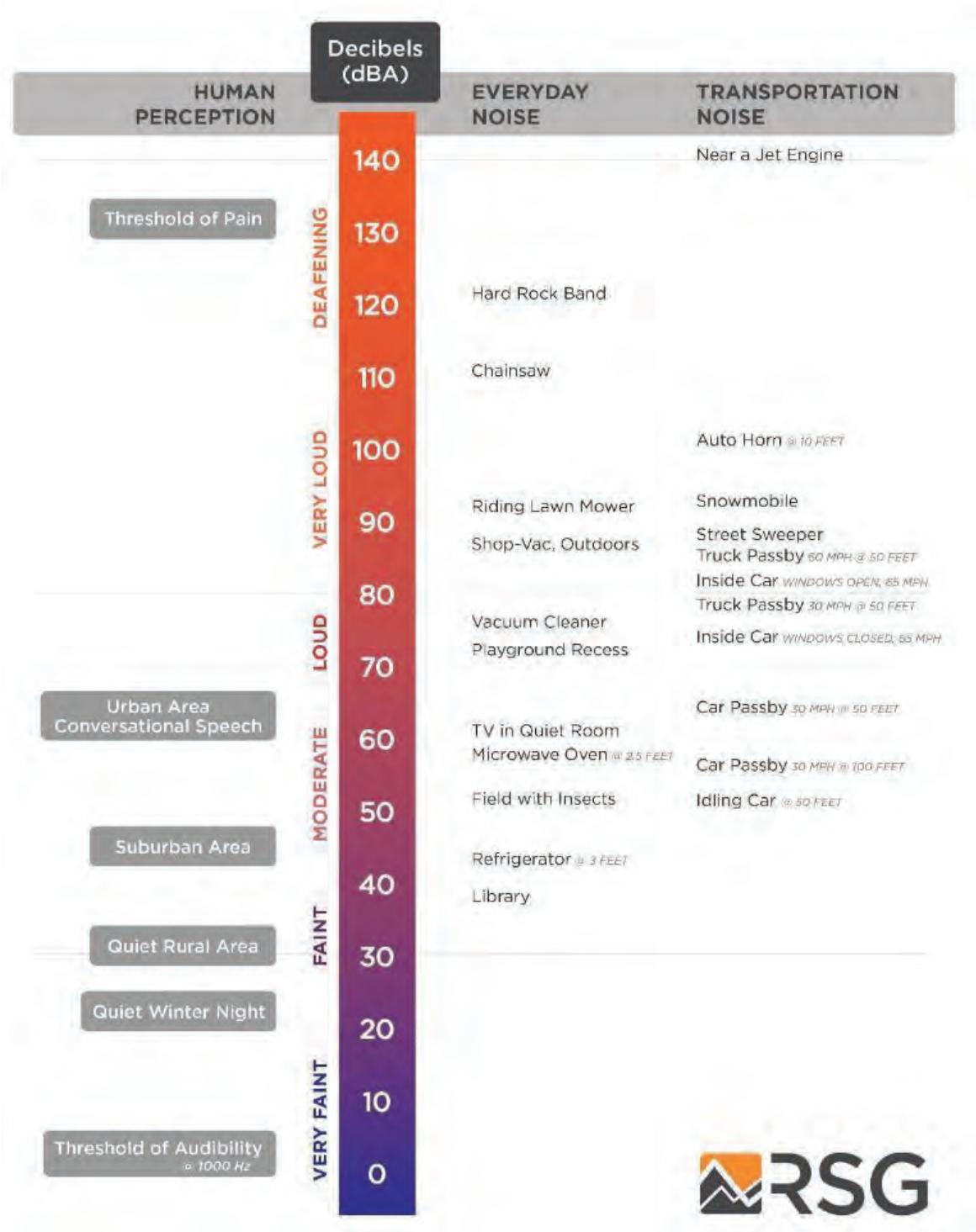


FIGURE 13: A SCALE OF SOUND PRESSURE LEVELS FOR TYPICAL SOUND SOURCES

## Frequency Spectrum of Sound

The “frequency” of a sound is the rate at which it fluctuates in time, expressed in Hertz (Hz), or cycles per second. Very few sounds occur at only one frequency: most sound contains energy at many different frequencies, and it can be broken down into different frequency divisions, or bands. These bands are similar to musical pitches, from low tones to high tones. The most common division is the standard octave band. An octave is the range of frequencies whose upper frequency limit is twice its lower frequency limit, exactly like an octave in music. An octave band is identified by its center frequency: each successive band’s center frequency is twice as high (one octave) as the previous band. For example, the 500 Hz octave band includes all sound whose frequencies range between 354 Hz (Hertz, or cycles per second) and 707 Hz. The next band is centered at 1,000 Hz with a range between 707 Hz and 1,414 Hz. The range of human hearing is divided into 10 standard octave bands: 31.5 Hz, 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1,000 Hz, 2,000 Hz, 4,000 Hz, 8,000 Hz, and 16,000 Hz. For analyses that require finer frequency detail, each octave-band can be subdivided. A commonly-used subdivision creates three smaller bands within each octave band, or so-called 1/3-octave bands.

## Human Response to Frequency: Weighting of Sound Levels

The human ear is not equally sensitive to sounds of all frequencies. Sounds at some frequencies seem louder than others, despite having the same decibel level as measured by a sound level meter. In particular, human hearing is much more sensitive to medium pitches (from about 500 Hz to about 4,000 Hz) than to very low or very high pitches. For example, a tone measuring 80 dB at 500 Hz (a medium pitch) sounds quite a bit louder than a tone measuring 80 dB at 60 Hz (a very low pitch). The frequency response of normal human hearing ranges from 20 Hz to 20,000 Hz. Below 20 Hz, sound pressure fluctuations are not “heard”, but sometimes can be “felt”. This is known as “infrasound”. Likewise, above 20,000 Hz, sound can no longer be heard by humans; this is known as “ultrasound”. As humans age, they tend to lose the ability to hear higher frequencies first; many adults do not hear very well above about 16,000 Hz. Most natural and man-made sound occurs in the range from about 40 Hz to about 4,000 Hz. Some insects and birdsongs reach to about 8,000 Hz.

To adjust measured sound pressure levels so that they mimic human hearing response, sound level meters apply filters, known as “frequency weightings”, to the signals. There are several defined weighting scales, including “A”, “B”, “C”, “D”, “G”, and “Z”. The most common weighting scale used in environmental noise analysis and regulation is A-weighting. This weighting represents the sensitivity of the human ear to sounds of low to moderate level. It attenuates sounds with frequencies below 1000 Hz and above 4000 Hz; it amplifies very slightly sounds between 1000 Hz and 4000 Hz, where the human ear is particularly sensitive. The C-weighting scale is sometimes used to describe louder sounds. The B- and D- scales are seldom used. All of these frequency weighting scales are normalized to the average human hearing response at

1000 Hz: at this frequency, the filters neither attenuate nor amplify. When a reported sound level has been filtered using a frequency weighting, the letter is appended to “dB”. For example, sound with A-weighting is usually denoted “dBA”. When no filtering is applied, the level is denoted “dB” or “dBZ”. The letter is also appended as a subscript to the level indicator “L”, for example “L<sub>A</sub>” for A-weighted levels.

## Time Response of Sound Level Meters

Because sound levels can vary greatly from one moment to the next, the time over which sound is measured can influence the value of the levels reported. Often, sound is measured in real time, as it fluctuates. In this case, acousticians apply a so-called “time response” to the sound level meter, and this time response is often part of regulations for measuring sound. If the sound level is varying slowly, over a few seconds, “Slow” time response is applied, with a time constant of one second. If the sound level is varying quickly (for example, if brief events are mixed into the overall sound), “Fast” time response can be applied, with a time constant of one-eighth of a second.<sup>8</sup> The time response setting for a sound level measurement is indicated with the subscript “S” for Slow and “F” for Fast: L<sub>S</sub> or L<sub>F</sub>. A sound level meter set to Fast time response will indicate higher sound levels than one set to Slow time response when brief events are mixed into the overall sound, because it can respond more quickly.

In some cases, the maximum sound level that can be generated by a source is of concern. Likewise, the minimum sound level occurring during a monitoring period may be required. To measure these, the sound level meter can be set to capture and hold the highest and lowest levels measured during a given monitoring period. This is represented by the subscript “max”, denoted as “L<sub>max</sub>”. One can define a “max” level with Fast response L<sub>Fmax</sub> (1/8-second time constant), Slow time response L<sub>Smax</sub> (1-second time constant), or Continuous Equivalent level over a specified time period L<sub>EQmax</sub>.

## Accounting for Changes in Sound Over Time

A sound level meter’s time response settings are useful for continuous monitoring. However, they are less useful in summarizing sound levels over longer periods. To do so, acousticians apply simple statistics to the measured sound levels, resulting in a set of defined types of sound level related to averages over time. An example is shown in Figure 14. The sound level at each instant of time is the grey trace going from left to right. Over the total time it was measured (1 hour in the figure), the sound energy spends certain fractions of time near various levels, ranging from the minimum (about 27 dB in the figure) to the maximum (about 65 dB in the figure). The simplest descriptor is the average sound level, known as the Equivalent Continuous

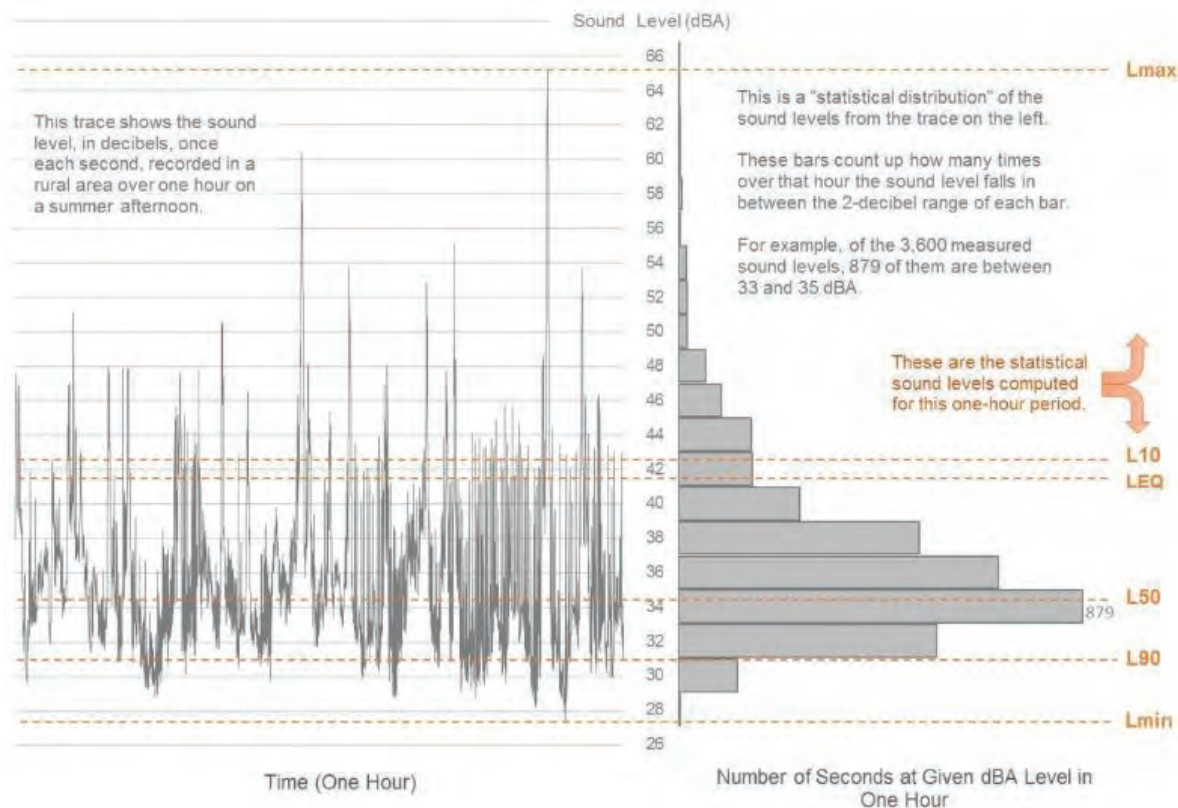
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<sup>8</sup> There is a third time response defined by standards, the “Impulse” response. This response was defined to enable use of older, analog meters when measuring very brief sounds; it is no longer in common use.

Sound Level. Statistical levels are used to determine for what percentage of time the sound is louder than any given level. These levels are described in the following sections.

### ***Equivalent Continuous Sound Level - $L_{eq}$***

One straightforward, common way of describing sound levels is in terms of the Continuous Equivalent Sound Level, or  $L_{eq}$ . The  $L_{eq}$  is the average sound pressure level over a defined period of time, such as one hour or one day.  $L_{eq}$  is the most commonly used descriptor in noise standards and regulations.  $L_{eq}$  is representative of the overall sound to which a person is exposed. Because of the logarithmic calculation of decibels,  $L_{eq}$  tends to favor higher sound levels: loud and infrequent sources have a larger impact on the resulting average sound level than quieter but more frequent sounds. For example, in Figure 14, even though the sound levels spends most of the time near about 34 dBA, the  $L_{eq}$  is 41 dBA, having been “inflated” by the maximum level of 65 dBA and other occasional spikes over the course of the hour.



**FIGURE 14: EXAMPLE OF DESCRIPTIVE TERMS OF SOUND MEASUREMENT OVER TIME**



### ***Percentile Sound Levels – $L_n$***

Percentile sound levels describe the statistical distribution of sound levels over time. “ $L_N$ ” is the level above which the sound spends “N” percent of the time. For example,  $L_{90}$  (sometimes called the “residual base level”) is the sound level exceeded 90% of the time: the sound is louder than  $L_{90}$  most of the time.  $L_{10}$  is the sound level that is exceeded only 10% of the time.  $L_{50}$  (the “median level”) is exceeded 50% of the time: half of the time the sound is louder than  $L_{50}$ , and half the time it is quieter than  $L_{50}$ . Note that  $L_{50}$  (median) and  $L_{EQ}$  (mean) are not always the same, for reasons described in the previous section.

$L_{90}$  is often a good representation of the “ambient sound” in an area. This is the sound that persists for longer periods, and below which the overall sound level seldom falls. It tends to filter out other short-term environmental sounds that aren’t part of the source being investigated.  $L_{10}$  represents the higher, but less frequent, sound levels. These could include such events as barking dogs, vehicles driving by and aircraft flying overhead, gusts of wind, and work operations.  $L_{90}$  represents the background sound that is present when these event sounds are excluded.

Note that if one sound source is very constant and dominates the soundscape in an area, all of the descriptive sound levels mentioned here tend toward the same value. It is when the sound is varying widely from one moment to the next that the statistical descriptors are useful.

## APPENDIX B. MODEL INPUT DATA

**TABLE 4: MODEL PARAMETER SETTINGS**

Model Parameter	Setting
Atmospheric Absorption	Based on 10°C and 70% RH
Foliage	No Foliage Attenuation
Ground Absorption	ISO 9613-2 spectral, G=0 on concrete equipment pads, G=0.6 at substation, and G=1 elsewhere
Receiver Height	1.5 meters for sound level isolines and 4.0 meters discrete receptors
Search Radius	10,000 meters from each source

**TABLE 5: MODELED SOUND POWER SPECTRA, dBZ UNLESS OTHERWISE NOTED**

Source	Octave Band Center Frequency (Hz)									Overall Sound Power Level		Reference
	31.5	63	125	250	500	1000	2000	4000	8000	dBA	dBZ	
Substation Transformer ONAF	85	88	108	104	98	92	88	82	73	100	110	Calculated from Juliet Energy provided specs <sup>9</sup>
Power Electronics HEM	124	124	105	96	90	86	84	77	77	100	127	Manufacturer test data

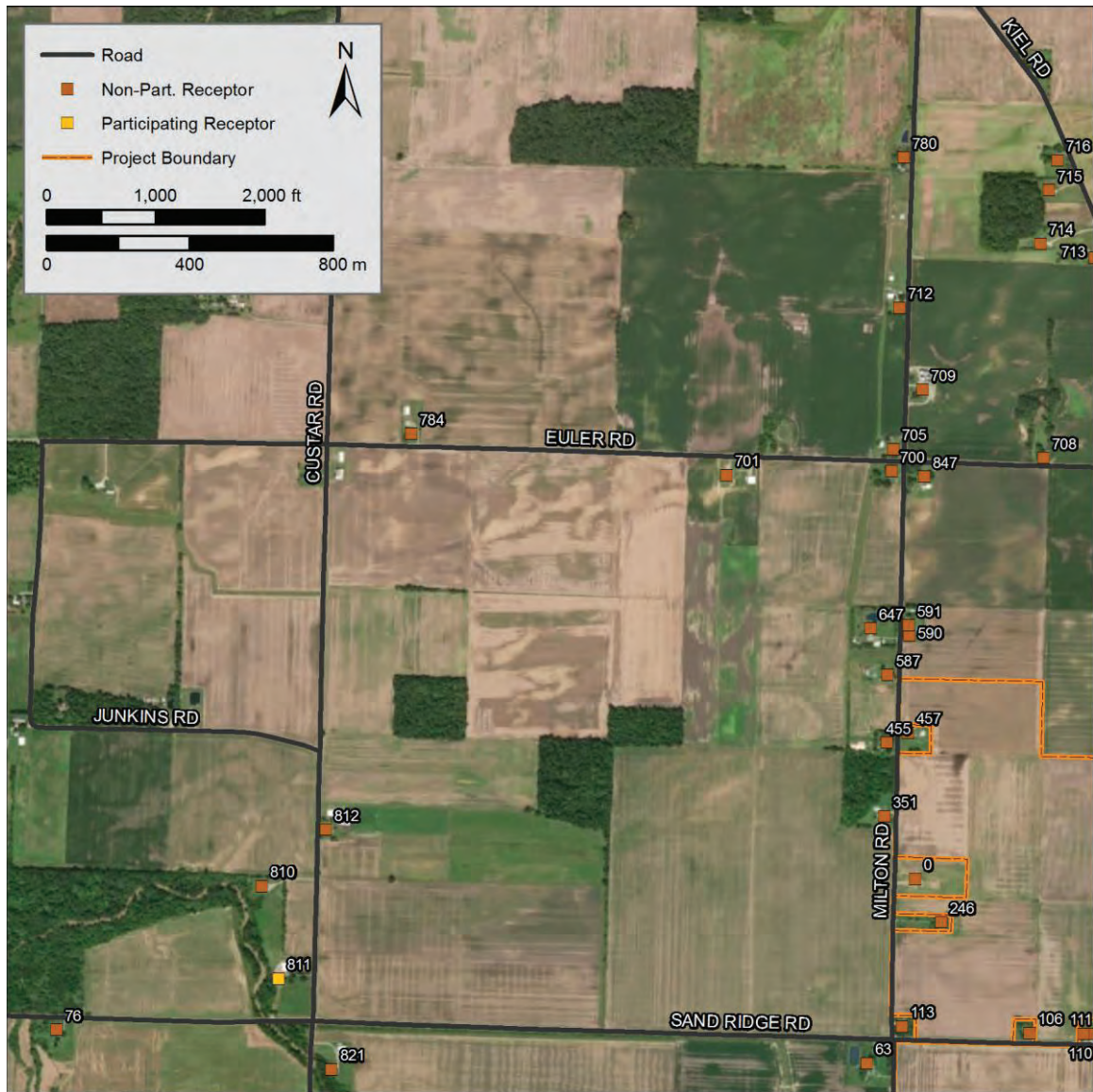
**TABLE 6: SOURCE INPUT DATA**

Source	Overall Sound Power Level (dBA)	Relative Height (m)	Coordinates UTM NAD83 Z17N		Absolute Elevation (m)
			X (m)	Y (m)	
Inverter 1	99.6	1.8	263811.6	4580031.0	208.7
Inverter 2	99.6	1.8	264003.8	4580027.7	208.8
Inverter 3	99.6	1.8	264196.0	4580024.4	209.1
Inverter 4	99.6	1.8	264388.3	4580021.0	209.1

<sup>9</sup> Spectrum based on RSG measurements of similarly sized transformer

Source	Overall Sound Power Level (dBA)	Relative Height (m)	Coordinates UTM NAD83 Z17N		Absolute Elevation (m)
			X (m)	Y (m)	
Inverter 5	99.6	1.8	264580.5	4580017.7	209.0
Inverter 6	99.6	1.8	264772.7	4580014.3	208.9
Inverter 7	99.6	1.8	264964.9	4580011.0	209.1
Inverter 8	99.6	1.8	265157.1	4580007.6	209.2
Inverter 9	99.6	1.8	265355.3	4580173.2	208.8
Inverter 10	99.6	1.8	263817.8	4580340.3	208.6
Inverter 11	99.6	1.8	264010.0	4580337.0	208.9
Inverter 12	99.6	1.8	264202.2	4580333.6	209.9
Inverter 13	99.6	1.8	264394.4	4580330.3	209.5
Inverter 14	99.6	1.8	264586.6	4580326.9	209.0
Inverter 15	99.6	1.8	264778.9	4580323.6	208.7
Inverter 16	99.6	1.8	264971.1	4580320.2	208.6
Inverter 17	99.6	1.8	264966.8	4580166.7	208.8
Inverter 18	99.6	1.8	262967.6	4579976.2	208.5
Inverter 19	99.6	1.8	263159.8	4579972.9	208.6
Inverter 20	99.6	1.8	263250.7	4579969.1	208.6
Inverter 21	99.6	1.8	263957.4	4581520.8	208.1
Inverter 22	99.6	1.8	264140.3	4580950.7	208.3
Inverter 23	99.6	1.8	264332.5	4580947.4	208.1
Inverter 24	99.6	1.8	264524.7	4580944.0	208.2
Inverter 25	99.6	1.8	264717.0	4580940.7	208.2
Inverter 26	99.6	1.8	264909.2	4580937.4	208.2
Inverter 27	99.6	1.8	265070.8	4580934.3	208.1
Inverter 28	99.6	1.8	263954.0	4581308.3	208.2
Inverter 29	99.6	1.8	264146.2	4581305.0	208.1
Inverter 30	99.6	1.8	264338.5	4581301.6	208.2
Inverter 31	99.6	1.8	263755.9	4580867.4	208.2
Substation Transformer	100.0	2.1	265174.9	4580545.0	209.3

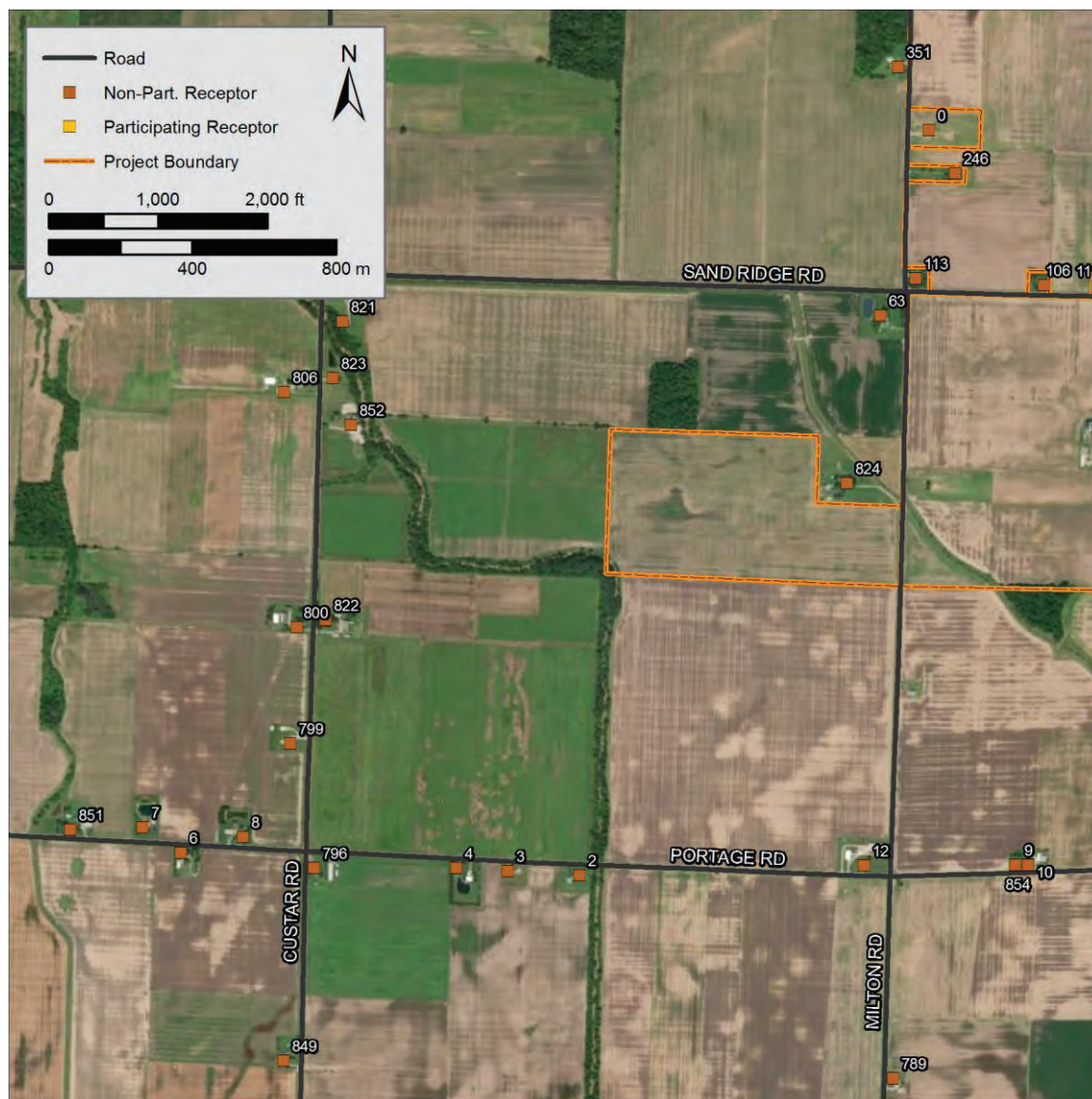
## APPENDIX C. MODEL RESULTS FOR EACH RECEPTOR



Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

FIGURE 15: MAP OF RECEPTORS, NW QUADRANT





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FIGURE 16: MAP OF RECEPTORS, SW QUADRANT



Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

FIGURE 17: MAP OF RECEPTORS, SE QUADRANT





Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

FIGURE 18: MAP OF RECEPTORS, NE QUADRANT



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FIGURE 19: MAP OF WESTON RECEPTORS, NW QUADRANT

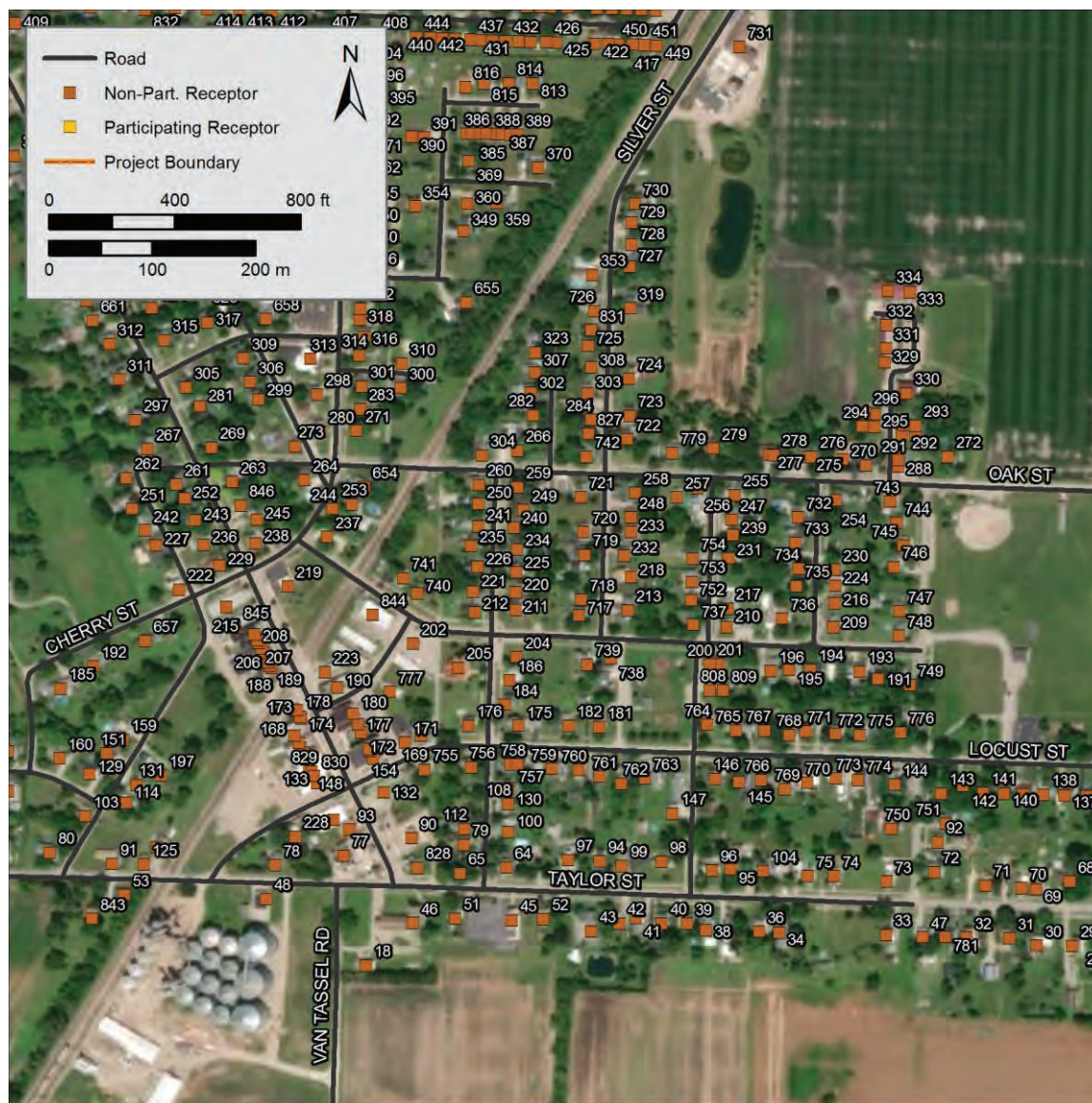




Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

**FIGURE 20: MAP OF WESTON RECEPTORS, SW QUADRANT**





Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

FIGURE 21: MAP OF WESTON RECEPTORS, SE QUADRANT





Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

FIGURE 22: MAP OF WESTON RECEPTORS, NE QUADRANT

**TABLE 7: MODEL RESULTS & RECEIVER COORDINATES**

Receptor ID	Participation Status	Daytime Modeled Level (dBA)	Nighttime <sup>10</sup> Modeled Level (dBA)	Coordinates UTM NAD83 Z17N		Absolute Elevation (m)
				X (m)	Y (m)	
0	Non-Participating	43	43	263720	4581125	211
1	Non-Participating	36	36	264553	4578542	212
2	Non-Participating	37	37	262747	4579049	212
3	Non-Participating	37	37	262547	4579061	211
4	Non-Participating	37	37	262402	4579069	211
5	Non-Participating	41	41	264365	4579035	212
6	Non-Participating	33	33	261635	4579112	212
7	Non-Participating	33	33	261528	4579182	212
8	Non-Participating	34	34	261808	4579156	212
9	Non-Participating	41	41	263961	4579077	213
10	Non-Participating	41	41	263995	4579079	213
11	Non-Participating	31	30	266889	4579589	211
12	Non-Participating	39	39	263539	4579076	212
13	Non-Participating	30	30	267073	4580481	211
14	Non-Participating	29	29	267010	4580481	211
15	Non-Participating	30	30	266913	4580484	211
16	Non-Participating	29	29	267071	4580511	211
17	Non-Participating	30	29	266918	4580506	211
18	Non-Participating	35	34	266114	4580535	211
19	Non-Participating	28	28	267274	4580539	211
20	Non-Participating	29	29	267190	4580543	211
21	Non-Participating	29	29	267145	4580541	211
22	Non-Participating	29	29	267118	4580539	211
23	Non-Participating	30	30	267073	4580545	211
24	Non-Participating	30	30	267019	4580544	212
25	Non-Participating	31	31	266976	4580555	211
26	Non-Participating	31	31	266953	4580568	211
27	Non-Participating	31	31	266918	4580555	211
28	Non-Participating	31	31	266830	4580560	211
29	Non-Participating	31	31	266799	4580554	211
30	Non-Participating	33	33	266765	4580554	211
31	Non-Participating	33	33	266738	4580561	211
32	Non-Participating	32	32	266696	4580562	211
33	Non-Participating	32	32	266619	4580565	211
34	Non-Participating	32	32	266515	4580567	211

<sup>10</sup> Assuming inverters may operate at times at night for VAR support.



Receptor ID	Participation Status	Daytime Modeled Level (dBA)	Nighttime <sup>10</sup> Modeled Level (dBA)	Coordinates UTM NAD83 Z17N		Absolute Elevation (m)
				X (m)	Y (m)	
35	Non-Participating	29	29	267320	4580534	211
36	Non-Participating	33	32	266495	4580568	211
37	Non-Participating	35	35	266462	4580569	211
38	Non-Participating	35	35	266444	4580569	211
39	Non-Participating	35	35	266425	4580576	211
40	Non-Participating	35	35	266401	4580576	211
41	Non-Participating	35	35	266376	4580581	211
42	Non-Participating	35	35	266360	4580576	211
43	Non-Participating	36	35	266333	4580568	211
44	Non-Participating	31	31	266857	4580540	211
45	Non-Participating	36	36	266256	4580579	212
46	Non-Participating	37	37	266160	4580576	211
47	Non-Participating	32	32	266654	4580563	211
48	Non-Participating	37	37	266018	4580600	212
49	Non-Participating	28	28	267243	4580543	211
50	Non-Participating	29	29	267010	4580511	211
51	Non-Participating	34	34	266201	4580581	211
52	Non-Participating	36	36	266286	4580580	211
53	Non-Participating	39	39	265880	4580603	212
54	Non-Participating	37	37	265738	4580597	211
55	Non-Participating	38	38	265691	4580554	211
56	Non-Participating	42	42	265511	4580594	211
57	Non-Participating	42	42	265401	4580604	213
58	Non-Participating	42	42	265337	4580600	212
59	Non-Participating	43	43	265309	4580600	212
61	Non-Participating	46	45	265097	4580615	211
62	Non-Participating	46	45	264966	4580613	212
63	Non-Participating	44	44	263585	4580609	211
64	Non-Participating	36	36	266251	4580630	211
65	Non-Participating	36	36	266205	4580624	211
66	Non-Participating	31	31	266868	4580615	211
67	Non-Participating	31	31	266832	4580615	211
68	Non-Participating	31	31	266796	4580617	211
69	Non-Participating	31	31	266764	4580609	211
70	Non-Participating	31	31	266750	4580610	211
71	Non-Participating	32	31	266715	4580613	211
72	Non-Participating	32	32	266665	4580626	211

Receptor ID	Participation Status	Daytime Modeled Level (dBA)	Nighttime <sup>10</sup> Modeled Level (dBA)	Coordinates UTM NAD83 Z17N		Absolute Elevation (m)
				X (m)	Y (m)	
73	Non-Participating	32	32	266619	4580617	211
74	Non-Participating	32	32	266568	4580622	211
75	Non-Participating	34	34	266543	4580622	211
76	Non-Participating	28	28	261317	4580703	210
77	Non-Participating	36	36	266093	4580642	212
78	Non-Participating	37	37	266027	4580633	212
79	Non-Participating	36	35	266209	4580652	211
80	Non-Participating	36	36	265808	4580645	211
81	Non-Participating	37	36	265755	4580636	211
82	Non-Participating	38	38	265723	4580639	211
83	Non-Participating	38	38	265698	4580648	211
84	Non-Participating	39	39	265613	4580642	211
85	Non-Participating	39	39	265593	4580645	211
86	Non-Participating	41	41	265568	4580647	211
87	Non-Participating	41	41	265544	4580645	211
88	Non-Participating	42	41	265520	4580646	211
89	Non-Participating	42	42	265504	4580649	212
90	Non-Participating	36	36	266159	4580658	211
91	Non-Participating	39	39	265869	4580634	212
92	Non-Participating	32	32	266669	4580655	211
93	Non-Participating	36	36	266099	4580667	212
94	Non-Participating	33	33	266341	4580636	211
95	Non-Participating	33	33	266468	4580629	211
96	Non-Participating	33	33	266450	4580628	211
97	Non-Participating	33	33	266310	4580637	211
98	Non-Participating	33	33	266401	4580636	211
99	Non-Participating	33	33	266363	4580632	211
100	Non-Participating	32	32	266253	4580665	211
101	Non-Participating	30	30	267233	4580627	211
102	Non-Participating	36	36	266083	4580676	212
103	Non-Participating	36	35	265842	4580680	211
104	Non-Participating	35	34	266500	4580627	211
105	Non-Participating	45	45	264519	4580676	211
106	Non-Participating	44	44	264040	4580693	211
107	Non-Participating	44	44	264275	4580688	211
108	Non-Participating	32	32	266252	4580692	211
109	Non-Participating	45	45	264425	4580703	211

Receptor ID	Participation Status	Daytime Modeled Level (dBA)	Nighttime <sup>10</sup> Modeled Level (dBA)	Coordinates UTM NAD83 Z17N		Absolute Elevation (m)
				X (m)	Y (m)	
110	Non-Participating	44	44	264221	4580690	211
111	Non-Participating	44	44	264190	4580691	211
112	Non-Participating	36	35	266210	4580668	211
113	Non-Participating	45	45	263682	4580712	211
114	Non-Participating	35	35	265882	4580693	211
115	Non-Participating	44	43	265226	4580679	212
116	Non-Participating	36	36	265767	4580704	211
117	Non-Participating	37	37	265736	4580707	211
118	Non-Participating	37	37	265712	4580705	211
119	Non-Participating	38	38	265690	4580706	211
120	Non-Participating	38	38	265660	4580706	211
121	Non-Participating	40	40	265599	4580705	211
122	Non-Participating	41	41	265548	4580708	211
123	Non-Participating	41	41	265523	4580710	211
124	Non-Participating	38	38	265912	4580650	212
125	Non-Participating	38	38	265899	4580633	212
126	Non-Participating	41	41	265505	4580711	211
127	Non-Participating	41	41	265485	4580710	211
128	Non-Participating	41	41	265413	4580670	214
129	Non-Participating	36	36	265847	4580721	211
130	Non-Participating	35	35	266253	4580707	211
131	Non-Participating	36	36	265892	4580710	212
132	Non-Participating	36	36	266132	4580703	212
133	Non-Participating	36	36	266067	4580712	212
134	Non-Participating	30	30	266860	4580698	211
135	Non-Participating	30	30	266835	4580699	211
136	Non-Participating	30	30	266813	4580699	211
137	Non-Participating	31	31	266791	4580700	211
138	Non-Participating	31	31	266771	4580701	211
139	Non-Participating	31	31	266751	4580701	211
140	Non-Participating	33	33	266733	4580702	211
141	Non-Participating	33	33	266712	4580703	211
142	Non-Participating	32	31	266693	4580709	211
143	Non-Participating	32	32	266672	4580702	211
144	Non-Participating	32	32	266627	4580710	211
145	Non-Participating	32	32	266476	4580713	211
146	Non-Participating	31	31	266453	4580716	211

Receptor ID	Participation Status	Daytime Modeled Level (dBA)	Nighttime <sup>10</sup> Modeled Level (dBA)	Coordinates UTM NAD83 Z17N		Absolute Elevation (m)
				X (m)	Y (m)	
147	Non-Participating	33	33	266412	4580683	211
148	Non-Participating	36	36	266060	4580729	212
149	Non-Participating	45	45	264317	4580741	211
150	Non-Participating	36	36	266056	4580737	212
151	Non-Participating	36	36	265863	4580741	211
152	Non-Participating	36	36	266122	4580736	212
153	Non-Participating	30	29	267276	4580622	212
154	Non-Participating	36	36	266118	4580743	212
155	Non-Participating	36	36	266117	4580745	212
156	Non-Participating	36	36	266052	4580746	212
157	Non-Participating	36	36	266054	4580742	212
158	Non-Participating	36	36	266049	4580751	212
159	Non-Participating	36	36	265879	4580754	212
160	Non-Participating	35	35	265818	4580736	211
161	Non-Participating	37	37	265767	4580743	211
162	Non-Participating	37	37	265734	4580740	211
163	Non-Participating	37	36	265709	4580743	211
164	Non-Participating	37	37	265686	4580741	211
165	Non-Participating	38	38	265638	4580748	211
166	Non-Participating	38	38	265617	4580748	211
167	Non-Participating	38	38	265524	4580751	211
168	Non-Participating	36	36	266046	4580758	212
169	Non-Participating	35	35	266168	4580758	211
170	Non-Participating	40	40	265455	4580753	212
171	Non-Participating	36	36	266153	4580751	211
172	Non-Participating	36	36	266110	4580761	212
173	Non-Participating	37	37	266052	4580774	212
174	Non-Participating	37	37	266051	4580776	212
175	Non-Participating	32	32	266262	4580768	211
176	Non-Participating	33	32	266214	4580768	211
177	Non-Participating	36	36	266107	4580769	212
178	Non-Participating	37	37	266048	4580783	212
179	Non-Participating	43	43	265228	4580761	212
180	Non-Participating	36	36	266102	4580779	212
181	Non-Participating	32	32	266341	4580766	211
182	Non-Participating	32	32	266311	4580768	211
183	Non-Participating	42	42	265306	4580794	212



Receptor ID	Participation Status	Daytime Modeled Level (dBA)	Nighttime <sup>10</sup> Modeled Level (dBA)	Coordinates UTM NAD83 Z17N		Absolute Elevation (m)
				X (m)	Y (m)	
184	Non-Participating	32	32	266249	4580788	211
185	Non-Participating	35	35	265819	4580804	211
186	Non-Participating	35	35	266253	4580812	211
187	Non-Participating	36	35	266023	4580823	212
188	Non-Participating	36	35	266022	4580826	212
189	Non-Participating	36	35	266020	4580829	212
190	Non-Participating	36	36	266087	4580804	212
191	Non-Participating	31	31	266610	4580813	211
192	Non-Participating	35	35	265850	4580825	211
193	Non-Participating	31	31	266593	4580820	211
194	Non-Participating	31	31	266545	4580822	211
195	Non-Participating	31	31	266525	4580822	211
196	Non-Participating	31	31	266507	4580821	211
197	Non-Participating	35	34	265916	4580719	211
198	Non-Participating	31	31	266482	4580817	211
199	Non-Participating	36	35	266015	4580838	212
200	Non-Participating	31	31	266456	4580827	211
201	Non-Participating	31	31	266447	4580827	211
202	Non-Participating	36	36	266160	4580847	211
203	Non-Participating	36	35	266013	4580842	212
204	Non-Participating	35	35	266261	4580834	211
205	Non-Participating	36	35	266204	4580824	211
206	Non-Participating	36	35	266011	4580848	212
207	Non-Participating	36	35	266009	4580850	212
208	Non-Participating	36	35	266007	4580856	212
209	Non-Participating	31	31	266568	4580863	211
210	Non-Participating	31	31	266464	4580863	211
211	Non-Participating	32	32	266260	4580880	211
212	Non-Participating	32	32	266220	4580877	211
213	Non-Participating	32	32	266368	4580879	211
214	Non-Participating	44	44	265230	4580842	214
215	Non-Participating	36	36	265979	4580883	212
216	Non-Participating	31	31	266569	4580886	211
217	Non-Participating	31	31	266464	4580881	211
218	Non-Participating	32	31	266371	4580912	211
219	Non-Participating	35	35	266039	4580903	212
220	Non-Participating	32	32	266259	4580897	211

Receptor ID	Participation Status	Daytime Modeled Level (dBA)	Nighttime <sup>10</sup> Modeled Level (dBA)	Coordinates UTM NAD83 Z17N		Absolute Elevation (m)
				X (m)	Y (m)	
221	Non-Participating	32	32	266218	4580898	211
222	Non-Participating	35	35	265933	4580899	212
223	Non-Participating	37	37	266075	4580819	212
224	Non-Participating	31	31	266570	4580904	211
225	Non-Participating	32	32	266260	4580916	211
226	Non-Participating	32	32	266223	4580922	211
227	Non-Participating	35	35	265911	4580943	212
228	Non-Participating	37	37	266046	4580660	212
229	Non-Participating	35	35	265973	4580923	212
230	Non-Participating	31	31	266569	4580919	211
231	Non-Participating	31	31	266466	4580930	211
232	Non-Participating	32	31	266364	4580932	211
233	Non-Participating	32	31	266371	4580955	211
234	Non-Participating	32	32	266261	4580938	211
235	Non-Participating	32	32	266216	4580942	211
236	Non-Participating	35	35	265957	4580943	212
237	Non-Participating	35	35	266077	4580951	211
238	Non-Participating	35	35	266008	4580944	212
239	Non-Participating	31	31	266470	4580953	211
240	Non-Participating	32	32	266258	4580960	211
241	Non-Participating	32	32	266223	4580961	211
242	Non-Participating	36	36	265900	4580957	212
243	Non-Participating	35	35	265949	4580967	212
244	Non-Participating	34	34	266082	4580978	211
245	Non-Participating	35	35	266009	4580968	211
246	Non-Participating	45	45	263793	4581004	212
247	Non-Participating	31	31	266469	4580967	211
248	Non-Participating	31	31	266371	4580969	211
249	Non-Participating	32	32	266267	4580977	211
250	Non-Participating	32	32	266223	4580982	211
251	Non-Participating	36	36	265888	4580978	212
252	Non-Participating	35	35	265939	4580988	212
253	Non-Participating	34	34	266101	4580982	212
254	Non-Participating	32	32	266570	4580986	211
255	Non-Participating	31	31	266472	4580991	211
256	Non-Participating	32	32	266435	4580998	211
257	Non-Participating	31	31	266416	4580989	211

Receptor ID	Participation Status	Daytime Modeled Level (dBA)	Nighttime <sup>10</sup> Modeled Level (dBA)	Coordinates UTM NAD83 Z17N		Absolute Elevation (m)
				X (m)	Y (m)	
258	Non-Participating	31	31	266375	4580993	211
259	Non-Participating	33	33	266261	4580999	211
260	Non-Participating	32	32	266224	4581001	211
261	Non-Participating	35	35	265931	4581002	212
262	Non-Participating	36	36	265882	4581008	211
263	Non-Participating	34	34	265985	4581004	211
264	Non-Participating	34	34	266055	4581006	211
265	Non-Participating	45	45	265224	4580971	213
266	Non-Participating	33	33	266261	4581034	211
267	Non-Participating	36	36	265903	4581036	212
268	Non-Participating	32	31	266576	4581026	211
269	Non-Participating	35	35	265965	4581037	211
270	Non-Participating	31	31	266599	4581020	211
271	Non-Participating	34	33	266105	4581054	211
272	Non-Participating	31	31	266678	4581028	211
273	Non-Participating	34	34	266046	4581038	211
274	Non-Participating	32	32	266543	4581028	211
275	Non-Participating	32	32	266543	4581028	211
276	Non-Participating	32	32	266546	4581028	211
277	Non-Participating	32	32	266505	4581030	211
278	Non-Participating	32	32	266510	4581030	211
279	Non-Participating	32	32	266451	4581036	211
280	Non-Participating	34	34	266071	4581053	211
281	Non-Participating	35	35	265954	4581077	211
282	Non-Participating	33	33	266277	4581069	211
283	Non-Participating	33	33	266109	4581075	211
284	Non-Participating	32	32	266333	4581064	211
285	Non-Participating	31	31	266630	4581023	211
286	Non-Participating	31	31	266630	4581019	211
287	Non-Participating	31	31	266630	4581029	211
288	Non-Participating	31	31	266630	4581026	211
289	Non-Participating	31	31	266634	4581049	211
290	Non-Participating	31	31	266647	4581049	211
291	Non-Participating	31	31	266607	4581057	211
292	Non-Participating	31	31	266635	4581059	211
293	Non-Participating	31	31	266647	4581059	211
294	Non-Participating	31	31	266596	4581058	211

Receptor ID	Participation Status	Daytime Modeled Level (dBA)	Nighttime <sup>10</sup> Modeled Level (dBA)	Coordinates UTM NAD83 Z17N		Absolute Elevation (m)
				X (m)	Y (m)	
295	Non-Participating	31	31	266607	4581070	211
296	Non-Participating	31	31	266598	4581071	211
297	Non-Participating	36	36	265891	4581064	211
298	Non-Participating	34	34	266067	4581089	211
299	Non-Participating	35	34	266010	4581084	211
300	Non-Participating	33	33	266148	4581095	211
301	Non-Participating	33	33	266110	4581096	211
302	Non-Participating	33	33	266274	4581091	211
303	Non-Participating	32	32	266329	4581090	211
304	Non-Participating	33	33	266227	4581030	211
305	Non-Participating	34	34	265940	4581095	211
306	Non-Participating	34	34	266002	4581101	211
307	Non-Participating	33	33	266278	4581110	211
308	Non-Participating	32	32	266333	4581115	211
309	Non-Participating	34	34	265996	4581124	212
310	Non-Participating	33	33	266149	4581119	211
311	Non-Participating	36	36	265876	4581103	211
312	Non-Participating	35	35	265866	4581138	211
313	Non-Participating	34	34	266061	4581123	211
314	Non-Participating	33	33	266108	4581127	211
315	Non-Participating	34	34	265919	4581141	211
316	Non-Participating	33	33	266113	4581145	211
317	Non-Participating	34	34	265961	4581159	211
318	Non-Participating	33	33	266109	4581161	211
319	Non-Participating	32	32	266371	4581172	211
320	Non-Participating	35	35	265844	4581179	211
321	Non-Participating	33	33	266111	4581187	211
322	Non-Participating	33	33	266109	4581172	211
323	Non-Participating	33	33	266279	4581130	211
324	Non-Participating	34	34	265907	4581172	211
325	Non-Participating	34	34	265958	4581189	211
326	Non-Participating	34	33	266073	4581197	211
327	Non-Participating	33	33	266073	4581211	211
328	Non-Participating	35	35	265834	4581199	211
329	Non-Participating	31	31	266617	4581120	211
330	Non-Participating	31	31	266638	4581090	211
331	Non-Participating	31	31	266618	4581133	211



Receptor ID	Participation Status	Daytime Modeled Level (dBA)	Nighttime <sup>10</sup> Modeled Level (dBA)	Coordinates UTM NAD83 Z17N		Absolute Elevation (m)
				X (m)	Y (m)	
332	Non-Participating	30	30	266619	4581156	211
333	Non-Participating	30	30	266641	4581188	211
334	Non-Participating	30	30	266620	4581189	211
335	Non-Participating	34	34	265951	4581221	211
336	Non-Participating	32	32	266112	4581217	211
337	Non-Participating	36	36	265824	4581218	211
338	Non-Participating	35	34	265884	4581210	211
339	Non-Participating	35	35	265813	4581234	211
340	Non-Participating	32	32	266113	4581237	211
341	Non-Participating	32	32	266070	4581242	211
342	Non-Participating	33	33	266044	4581245	211
343	Non-Participating	34	34	265876	4581235	211
344	Non-Participating	33	33	266020	4581245	211
345	Non-Participating	33	33	265997	4581245	211
346	Non-Participating	33	33	265980	4581242	211
347	Non-Participating	33	33	265932	4581238	211
348	Non-Participating	35	35	265807	4581254	211
349	Non-Participating	32	32	266209	4581247	211
350	Non-Participating	32	32	266113	4581252	211
351	Non-Participating	42	42	263633	4581300	211
352	Non-Participating	34	34	265865	4581252	211
353	Non-Participating	32	32	266334	4581205	211
354	Non-Participating	32	32	266162	4581271	210
355	Non-Participating	32	32	266113	4581271	211
356	Non-Participating	33	32	266077	4581272	211
357	Non-Participating	34	34	265925	4581262	211
358	Non-Participating	34	34	265855	4581272	211
359	Non-Participating	32	31	266241	4581275	210
360	Non-Participating	32	32	266213	4581273	211
361	Non-Participating	35	35	265791	4581289	211
362	Non-Participating	32	32	266116	4581296	211
363	Non-Participating	32	32	266076	4581300	211
364	Non-Participating	33	33	266023	4581282	211
365	Non-Participating	34	34	265908	4581301	211
366	Non-Participating	34	34	265958	4581291	211
367	Non-Participating	36	36	265773	4581320	211
368	Non-Participating	34	34	265897	4581317	211

Receptor ID	Participation Status	Daytime Modeled Level (dBA)	Nighttime <sup>10</sup> Modeled Level (dBA)	Coordinates UTM NAD83 Z17N		Absolute Elevation (m)
				X (m)	Y (m)	
369	Non-Participating	32	32	266214	4581315	210
370	Non-Participating	31	31	266281	4581308	211
371	Non-Participating	32	32	266118	4581317	211
372	Non-Participating	32	32	266078	4581324	211
373	Non-Participating	36	36	265830	4581321	211
374	Non-Participating	32	32	266080	4581344	211
375	Non-Participating	32	32	266035	4581343	211
376	Non-Participating	34	34	266010	4581343	211
377	Non-Participating	34	34	265995	4581346	211
378	Non-Participating	35	35	265946	4581328	211
379	Non-Participating	32	32	266115	4581343	211
380	Non-Participating	34	34	265879	4581339	211
381	Non-Participating	36	36	265759	4581351	211
382	Non-Participating	32	32	266212	4581342	211
383	Non-Participating	32	31	266217	4581342	211
384	Non-Participating	32	31	266226	4581342	211
385	Non-Participating	32	31	266232	4581342	211
386	Non-Participating	31	31	266242	4581341	210
387	Non-Participating	31	31	266246	4581341	210
388	Non-Participating	31	31	266255	4581341	210
389	Non-Participating	31	31	266261	4581340	210
390	Non-Participating	32	32	266159	4581339	210
391	Non-Participating	32	32	266171	4581338	211
392	Non-Participating	32	32	266115	4581368	211
393	Non-Participating	35	35	265817	4581359	211
394	Non-Participating	35	35	265858	4581383	211
395	Non-Participating	32	32	266129	4581385	211
396	Non-Participating	32	32	266119	4581384	211
397	Non-Participating	36	36	265803	4581385	211
398	Non-Participating	35	35	265794	4581407	211
399	Non-Participating	32	32	266048	4581381	211
400	Non-Participating	32	32	266032	4581380	211
401	Non-Participating	32	32	266013	4581383	211
402	Non-Participating	34	33	265983	4581384	211
403	Non-Participating	34	34	265967	4581383	211
404	Non-Participating	32	32	266118	4581406	211
405	Non-Participating	34	34	265947	4581383	211

Receptor ID	Participation Status	Daytime Modeled Level (dBA)	Nighttime <sup>10</sup> Modeled Level (dBA)	Coordinates UTM NAD83 Z17N		Absolute Elevation (m)
				X (m)	Y (m)	
406	Non-Participating	35	35	265909	4581387	211
407	Non-Participating	33	33	266074	4581437	211
408	Non-Participating	32	32	266123	4581435	211
409	Non-Participating	35	35	265774	4581449	211
410	Non-Participating	36	36	265714	4581441	211
411	Non-Participating	32	32	266071	4581466	210
412	Non-Participating	32	32	266024	4581460	210
413	Non-Participating	33	33	265992	4581462	210
414	Non-Participating	33	33	265961	4581463	211
415	Non-Participating	34	34	265930	4581464	211
416	Non-Participating	31	31	266381	4581462	210
417	Non-Participating	31	31	266373	4581428	211
418	Non-Participating	31	31	266367	4581462	210
419	Non-Participating	31	31	266359	4581428	211
420	Non-Participating	31	31	266349	4581428	211
421	Non-Participating	31	31	266353	4581463	211
422	Non-Participating	31	31	266336	4581429	211
423	Non-Participating	31	31	266338	4581463	211
424	Non-Participating	31	31	266310	4581464	210
425	Non-Participating	31	31	266298	4581430	211
426	Non-Participating	31	31	266289	4581430	211
427	Non-Participating	31	31	266293	4581464	210
428	Non-Participating	31	31	266285	4581465	210
429	Non-Participating	31	31	266274	4581430	211
430	Non-Participating	31	31	266271	4581465	210
431	Non-Participating	31	31	266263	4581431	211
432	Non-Participating	31	31	266250	4581431	210
433	Non-Participating	31	31	266237	4581432	210
434	Non-Participating	31	31	266240	4581466	210
435	Non-Participating	31	31	266225	4581432	210
436	Non-Participating	31	31	266225	4581467	210
437	Non-Participating	31	31	266216	4581433	210
438	Non-Participating	31	31	266201	4581433	210
439	Non-Participating	31	31	266201	4581468	210
440	Non-Participating	31	31	266188	4581434	210
441	Non-Participating	31	31	266190	4581468	210
442	Non-Participating	32	31	266177	4581434	210

Receptor ID	Participation Status	Daytime Modeled Level (dBA)	Nighttime <sup>10</sup> Modeled Level (dBA)	Coordinates UTM NAD83 Z17N		Absolute Elevation (m)
				X (m)	Y (m)	
443	Non-Participating	31	31	266176	4581468	210
444	Non-Participating	32	31	266163	4581435	211
445	Non-Participating	32	31	266163	4581469	210
446	Non-Participating	32	31	266150	4581469	210
447	Non-Participating	32	32	266137	4581470	210
448	Non-Participating	32	32	266124	4581470	210
449	Non-Participating	31	31	266396	4581427	211
450	Non-Participating	31	31	266396	4581461	211
451	Non-Participating	31	31	266384	4581427	211
452	Non-Participating	35	35	265813	4581466	211
453	Non-Participating	35	35	265756	4581479	211
454	Non-Participating	36	36	265700	4581474	211
455	Non-Participating	43	43	263641	4581507	211
456	Non-Participating	36	36	265691	4581498	211
457	Non-Participating	44	44	263700	4581535	211
458	Non-Participating	32	32	266081	4581518	211
459	Non-Participating	35	35	265738	4581518	211
460	Non-Participating	32	32	266028	4581509	210
461	Non-Participating	32	32	265993	4581508	210
462	Non-Participating	32	32	265964	4581510	210
463	Non-Participating	32	32	265927	4581513	211
464	Non-Participating	34	34	265904	4581514	211
465	Non-Participating	36	36	265678	4581524	211
466	Non-Participating	40	40	265310	4581538	212
467	Non-Participating	35	35	265788	4581517	211
468	Non-Participating	35	35	265730	4581547	211
469	Non-Participating	30	30	266442	4581548	210
470	Non-Participating	30	30	266427	4581548	211
471	Non-Participating	30	30	266410	4581549	210
472	Non-Participating	30	30	266397	4581549	210
473	Non-Participating	31	30	266379	4581550	210
474	Non-Participating	31	30	266367	4581550	210
475	Non-Participating	31	31	266352	4581550	210
476	Non-Participating	31	31	266331	4581551	210
477	Non-Participating	31	31	266302	4581549	210
478	Non-Participating	31	31	266287	4581550	210
479	Non-Participating	31	31	266257	4581553	210



Receptor ID	Participation Status	Daytime Modeled Level (dBA)	Nighttime <sup>10</sup> Modeled Level (dBA)	Coordinates UTM NAD83 Z17N		Absolute Elevation (m)
				X (m)	Y (m)	
480	Non-Participating	31	31	266242	4581554	210
481	Non-Participating	31	30	266408	4581489	210
482	Non-Participating	30	30	266413	4581521	210
483	Non-Participating	31	30	266399	4581521	210
484	Non-Participating	31	31	266378	4581489	210
485	Non-Participating	31	31	266362	4581490	210
486	Non-Participating	31	31	266367	4581522	210
487	Non-Participating	31	31	266348	4581490	210
488	Non-Participating	31	31	266335	4581491	210
489	Non-Participating	31	31	266338	4581523	210
490	Non-Participating	31	31	266319	4581491	210
491	Non-Participating	31	31	266323	4581523	210
492	Non-Participating	31	31	266305	4581492	210
493	Non-Participating	31	31	266307	4581524	210
494	Non-Participating	31	31	266288	4581492	210
495	Non-Participating	31	31	266272	4581493	210
496	Non-Participating	31	31	266255	4581493	210
497	Non-Participating	31	31	266243	4581494	210
498	Non-Participating	31	31	266246	4581524	210
499	Non-Participating	31	31	266231	4581525	210
500	Non-Participating	31	31	266211	4581495	210
501	Non-Participating	31	31	266196	4581495	210
502	Non-Participating	31	31	266198	4581526	210
503	Non-Participating	31	31	266182	4581493	210
504	Non-Participating	31	31	266185	4581528	210
505	Non-Participating	31	31	266166	4581493	210
506	Non-Participating	31	31	266170	4581528	210
507	Non-Participating	31	31	266142	4581532	210
508	Non-Participating	32	32	266069	4581575	211
509	Non-Participating	40	40	265263	4581540	212
510	Non-Participating	38	38	265647	4581567	212
511	Non-Participating	38	38	265634	4581581	213
512	Non-Participating	38	38	265622	4581592	213
513	Non-Participating	38	38	265608	4581604	212
514	Non-Participating	30	30	266535	4581534	210
515	Non-Participating	38	38	265589	4581618	212
516	Non-Participating	30	30	266456	4581547	210

Receptor ID	Participation Status	Daytime Modeled Level (dBA)	Nighttime <sup>10</sup> Modeled Level (dBA)	Coordinates UTM NAD83 Z17N		Absolute Elevation (m)
				X (m)	Y (m)	
517	Non-Participating	30	30	266431	4581520	210
518	Non-Participating	31	31	266140	4581616	210
519	Non-Participating	31	31	266141	4581651	210
520	Non-Participating	31	31	266158	4581615	210
521	Non-Participating	31	31	266159	4581650	210
522	Non-Participating	31	31	266172	4581615	210
523	Non-Participating	31	31	266173	4581650	210
524	Non-Participating	31	31	266188	4581650	210
525	Non-Participating	31	31	266197	4581614	210
526	Non-Participating	31	31	266220	4581651	210
527	Non-Participating	31	31	266236	4581651	210
528	Non-Participating	31	31	266242	4581613	210
529	Non-Participating	31	31	266248	4581651	210
530	Non-Participating	31	31	266260	4581612	210
531	Non-Participating	31	31	266277	4581646	210
532	Non-Participating	31	31	266294	4581646	210
533	Non-Participating	31	31	266306	4581611	210
534	Non-Participating	31	31	266323	4581611	210
535	Non-Participating	31	30	266326	4581644	210
536	Non-Participating	30	30	266345	4581645	210
537	Non-Participating	30	30	266355	4581644	210
538	Non-Participating	30	30	266355	4581610	210
539	Non-Participating	30	30	266370	4581644	210
540	Non-Participating	30	30	266369	4581609	210
541	Non-Participating	30	30	266387	4581644	210
542	Non-Participating	30	30	266387	4581609	210
543	Non-Participating	30	30	266397	4581608	210
544	Non-Participating	30	30	266404	4581643	210
545	Non-Participating	30	30	266412	4581608	210
546	Non-Participating	30	30	266418	4581642	210
547	Non-Participating	30	30	266429	4581607	210
548	Non-Participating	30	30	266435	4581642	210
549	Non-Participating	30	30	266445	4581607	210
550	Non-Participating	30	30	266451	4581641	210
551	Non-Participating	30	30	266462	4581641	210
552	Non-Participating	30	30	266462	4581606	210
553	Non-Participating	30	30	266477	4581606	210

Receptor ID	Participation Status	Daytime Modeled Level (dBA)	Nighttime <sup>10</sup> Modeled Level (dBA)	Coordinates UTM NAD83 Z17N		Absolute Elevation (m)
				X (m)	Y (m)	
554	Non-Participating	30	30	266489	4581640	210
555	Non-Participating	30	30	266461	4581579	211
556	Non-Participating	30	30	266434	4581579	211
557	Non-Participating	30	30	266420	4581580	211
558	Non-Participating	30	30	266403	4581580	210
559	Non-Participating	30	30	266388	4581581	210
560	Non-Participating	30	30	266373	4581581	210
561	Non-Participating	31	31	266342	4581582	210
562	Non-Participating	31	31	266298	4581584	210
563	Non-Participating	31	31	266265	4581583	210
564	Non-Participating	31	31	266251	4581584	210
565	Non-Participating	31	31	266237	4581584	210
566	Non-Participating	31	31	266224	4581554	210
567	Non-Participating	31	31	266220	4581585	210
568	Non-Participating	31	31	266211	4581555	210
569	Non-Participating	31	31	266205	4581585	210
570	Non-Participating	31	31	266195	4581555	210
571	Non-Participating	31	31	266190	4581588	210
572	Non-Participating	31	31	266181	4581558	210
573	Non-Participating	31	31	266168	4581558	210
574	Non-Participating	31	31	266159	4581589	210
575	Non-Participating	31	31	266153	4581559	210
576	Non-Participating	31	31	266147	4581589	210
577	Non-Participating	31	31	266139	4581559	210
578	Non-Participating	33	33	266070	4581706	213
579	Non-Participating	37	37	265529	4581662	211
580	Non-Participating	31	31	266124	4581678	211
581	Non-Participating	31	31	266137	4581679	211
582	Non-Participating	31	31	266152	4581679	211
583	Non-Participating	31	31	266159	4581713	211
584	Non-Participating	31	31	266144	4581714	211
585	Non-Participating	31	31	266126	4581714	211
586	Non-Participating	30	30	266522	4581718	210
587	Non-Participating	42	42	263642	4581696	211
588	Non-Participating	37	37	265482	4581698	211
589	Non-Participating	30	30	266535	4581742	210
590	Non-Participating	40	40	263703	4581807	210

Receptor ID	Participation Status	Daytime Modeled Level (dBA)	Nighttime <sup>10</sup> Modeled Level (dBA)	Coordinates UTM NAD83 Z17N		Absolute Elevation (m)
				X (m)	Y (m)	
591	Non-Participating	40	40	263701	4581835	211
592	Non-Participating	30	29	266555	4581764	210
593	Non-Participating	30	30	266520	4581791	210
594	Non-Participating	29	29	266571	4581788	210
595	Non-Participating	31	31	266083	4581816	213
596	Non-Participating	31	31	266063	4581774	212
597	Non-Participating	31	31	266193	4581727	211
598	Non-Participating	31	31	266194	4581769	212
599	Non-Participating	31	31	266236	4581682	210
600	Non-Participating	31	31	266246	4581722	211
601	Non-Participating	31	31	266261	4581682	210
602	Non-Participating	31	30	266265	4581722	211
603	Non-Participating	31	31	266278	4581681	210
604	Non-Participating	31	30	266295	4581681	210
605	Non-Participating	30	30	266300	4581716	211
606	Non-Participating	30	30	266317	4581715	211
607	Non-Participating	30	30	266325	4581680	210
608	Non-Participating	30	30	266330	4581715	210
609	Non-Participating	30	30	266339	4581679	210
610	Non-Participating	30	30	266355	4581679	210
611	Non-Participating	30	30	266359	4581715	211
612	Non-Participating	30	30	266371	4581679	210
613	Non-Participating	30	30	266374	4581715	211
614	Non-Participating	30	30	266392	4581714	211
615	Non-Participating	30	30	266397	4581678	210
616	Non-Participating	30	30	266407	4581714	210
617	Non-Participating	30	30	266417	4581677	210
618	Non-Participating	30	30	266421	4581712	210
619	Non-Participating	30	30	266430	4581677	210
620	Non-Participating	30	30	266436	4581711	210
621	Non-Participating	30	30	266453	4581710	210
622	Non-Participating	30	30	266459	4581676	210
623	Non-Participating	30	30	266466	4581710	210
624	Non-Participating	30	30	266477	4581675	210
625	Non-Participating	30	30	266484	4581715	210
626	Non-Participating	30	30	266514	4581704	210
627	Non-Participating	30	30	266499	4581749	210



Receptor ID	Participation Status	Daytime Modeled Level (dBA)	Nighttime <sup>10</sup> Modeled Level (dBA)	Coordinates UTM NAD83 Z17N		Absolute Elevation (m)
				X (m)	Y (m)	
628	Non-Participating	31	31	266253	4581802	211
629	Non-Participating	31	31	266266	4581802	211
630	Non-Participating	30	30	266301	4581793	211
631	Non-Participating	30	30	266320	4581753	211
632	Non-Participating	30	30	266336	4581800	211
633	Non-Participating	30	30	266350	4581800	211
634	Non-Participating	30	30	266363	4581755	210
635	Non-Participating	30	30	266377	4581799	210
636	Non-Participating	30	30	266380	4581755	210
637	Non-Participating	30	30	266410	4581798	210
638	Non-Participating	30	30	266439	4581797	210
639	Non-Participating	30	30	266473	4581795	210
640	Non-Participating	30	30	266301	4581755	211
641	Non-Participating	31	31	266192	4581815	212
642	Non-Participating	31	31	266192	4581804	212
643	Non-Participating	31	31	266191	4581789	212
644	Non-Participating	31	31	266231	4581761	211
645	Non-Participating	31	31	266232	4581729	211
646	Non-Participating	31	31	266190	4581686	211
647	Non-Participating	39	39	263595	4581827	211
648	Non-Participating	31	31	266077	4581841	213
649	Non-Participating	31	31	266081	4581861	213
650	Non-Participating	35	35	265244	4581870	211
651	Non-Participating	31	31	266082	4581890	213
652	Non-Participating	31	31	266150	4581864	213
653	Non-Participating	31	31	266133	4581908	213
654	Non-Participating	34	34	266113	4580999	212
655	Non-Participating	33	33	266212	4581178	211
656	Non-Participating	38	38	265558	4580752	211
657	Non-Participating	36	36	265901	4580850	211
658	Non-Participating	34	34	266018	4581162	211
659	Non-Participating	32	32	266082	4581380	211
660	Non-Participating	34	33	265987	4581282	211
661	Non-Participating	35	35	265850	4581160	211
662	Non-Participating	31	31	266081	4581924	212
663	Non-Participating	34	34	265278	4581925	210
664	Non-Participating	31	31	266085	4581953	212

Receptor ID	Participation Status	Daytime Modeled Level (dBA)	Nighttime <sup>10</sup> Modeled Level (dBA)	Coordinates UTM NAD83 Z17N		Absolute Elevation (m)
				X (m)	Y (m)	
665	Non-Participating	36	36	265155	4581937	211
666	Non-Participating	29	29	266651	4581938	210
667	Non-Participating	37	37	265097	4581969	211
668	Non-Participating	29	29	266652	4581980	210
669	Non-Participating	37	37	265037	4582002	211
670	Non-Participating	30	30	266141	4582041	212
671	Non-Participating	35	35	265284	4581975	210
672	Non-Participating	36	36	265137	4582049	211
673	Non-Participating	33	33	266075	4581995	212
674	Non-Participating	37	37	264973	4582007	211
675	Non-Participating	38	38	264922	4582078	211
676	Non-Participating	35	35	265275	4582125	210
677	Non-Participating	30	30	266150	4582128	212
678	Non-Participating	37	37	264934	4582149	211
679	Non-Participating	37	37	264889	4582170	211
680	Non-Participating	37	37	265085	4582120	212
681	Non-Participating	37	37	264839	4582198	211
682	Non-Participating	30	30	266363	4582039	213
683	Non-Participating	30	30	266205	4582201	212
684	Non-Participating	30	30	266147	4582205	212
685	Non-Participating	30	30	266084	4582214	211
686	Non-Participating	31	31	265989	4582210	211
687	Non-Participating	31	31	265756	4582217	211
688	Non-Participating	35	35	265361	4582218	211
689	Non-Participating	36	36	265294	4582218	212
690	Non-Participating	36	36	265219	4582192	211
691	Non-Participating	35	35	265166	4582211	211
692	Non-Participating	35	35	265131	4582221	211
693	Non-Participating	35	35	265100	4582222	210
694	Non-Participating	36	35	265068	4582218	210
695	Non-Participating	36	36	265027	4582205	211
696	Non-Participating	36	36	264951	4582213	211
697	Non-Participating	38	38	264681	4582219	211
698	Non-Participating	38	38	264803	4582220	210
699	Non-Participating	38	38	264636	4582240	211
700	Non-Participating	36	36	263653	4582268	211
701	Non-Participating	34	34	263192	4582256	211

Receptor ID	Participation Status	Daytime Modeled Level (dBA)	Nighttime <sup>10</sup> Modeled Level (dBA)	Coordinates UTM NAD83 Z17N		Absolute Elevation (m)
				X (m)	Y (m)	
702	Non-Participating	35	35	265339	4582276	212
703	Non-Participating	29	29	266212	4582259	211
704	Non-Participating	30	29	266162	4582283	211
705	Non-Participating	35	35	263660	4582329	210
706	Non-Participating	31	31	265980	4582265	212
707	Non-Participating	34	34	265235	4582427	211
708	Non-Participating	38	38	264078	4582305	211
709	Non-Participating	34	34	263740	4582495	211
710	Non-Participating	37	37	264410	4582552	211
711	Non-Participating	33	33	265373	4582683	211
712	Non-Participating	32	32	263676	4582725	210
713	Non-Participating	35	35	264222	4582865	211
714	Non-Participating	34	34	264070	4582905	211
715	Non-Participating	32	32	264094	4583055	210
716	Non-Participating	32	32	264117	4583138	211
717	Non-Participating	32	32	266321	4580875	211
718	Non-Participating	32	32	266323	4580890	211
719	Non-Participating	32	32	266326	4580933	211
720	Non-Participating	32	32	266325	4580955	211
721	Non-Participating	32	32	266323	4580989	211
722	Non-Participating	32	32	266368	4581045	211
723	Non-Participating	32	32	266370	4581068	211
724	Non-Participating	32	32	266369	4581104	211
725	Non-Participating	32	32	266330	4581136	211
726	Non-Participating	32	32	266335	4581170	211
727	Non-Participating	31	31	266370	4581213	211
728	Non-Participating	31	31	266372	4581234	211
729	Non-Participating	31	31	266372	4581255	211
730	Non-Participating	31	31	266375	4581274	211
731	Non-Participating	30	30	266476	4581425	211
732	Non-Participating	31	31	266533	4580970	211
733	Non-Participating	31	31	266531	4580945	211
734	Non-Participating	31	31	266534	4580920	211
735	Non-Participating	31	31	266531	4580903	211
736	Non-Participating	31	31	266518	4580871	211
737	Non-Participating	31	31	266432	4580866	211
738	Non-Participating	32	32	266352	4580833	211

Receptor ID	Participation Status	Daytime Modeled Level (dBA)	Nighttime <sup>10</sup> Modeled Level (dBA)	Coordinates UTM NAD83 Z17N		Absolute Elevation (m)
				X (m)	Y (m)	
739	Non-Participating	32	32	266328	4580827	211
740	Non-Participating	33	33	266164	4580896	211
741	Non-Participating	33	33	266150	4580911	211
742	Non-Participating	33	32	266328	4581028	211
743	Non-Participating	30	30	266623	4580985	211
744	Non-Participating	30	30	266629	4580964	211
745	Non-Participating	30	30	266635	4580942	211
746	Non-Participating	30	30	266626	4580921	211
747	Non-Participating	30	30	266632	4580879	211
748	Non-Participating	30	30	266631	4580855	211
749	Non-Participating	31	30	266641	4580807	211
750	Non-Participating	34	34	266623	4580668	211
751	Non-Participating	32	32	266677	4580673	211
752	Non-Participating	31	31	266430	4580889	211
753	Non-Participating	31	31	266430	4580907	211
754	Non-Participating	31	31	266431	4580929	211
755	Non-Participating	33	33	266172	4580725	211
756	Non-Participating	33	32	266216	4580727	211
757	Non-Participating	35	35	266255	4580730	211
758	Non-Participating	35	35	266261	4580730	211
759	Non-Participating	35	35	266294	4580726	211
760	Non-Participating	32	32	266321	4580725	211
761	Non-Participating	32	32	266341	4580718	211
762	Non-Participating	32	32	266362	4580711	211
763	Non-Participating	32	32	266385	4580716	211
764	Non-Participating	31	31	266445	4580768	211
765	Non-Participating	31	31	266473	4580763	211
766	Non-Participating	32	32	266497	4580715	211
767	Non-Participating	31	31	266501	4580763	211
768	Non-Participating	31	31	266524	4580759	211
769	Non-Participating	32	32	266520	4580706	211
770	Non-Participating	32	32	266542	4580712	211
771	Non-Participating	31	31	266541	4580762	211
772	Non-Participating	31	31	266569	4580760	211
773	Non-Participating	32	32	266570	4580717	211
774	Non-Participating	32	32	266591	4580715	211
775	Non-Participating	32	32	266593	4580759	211



Receptor ID	Participation Status	Daytime Modeled Level (dBA)	Nighttime <sup>10</sup> Modeled Level (dBA)	Coordinates UTM NAD83 Z17N		Absolute Elevation (m)
				X (m)	Y (m)	
776	Non-Participating	32	32	266633	4580761	211
777	Non-Participating	36	35	266138	4580801	211
778	Non-Participating	30	30	266140	4582086	211
779	Non-Participating	32	32	266411	4581032	211
780	Non-Participating	31	31	263687	4583146	210
781	Non-Participating	32	32	266676	4580563	211
782	Non-Participating	36	36	265730	4581406	211
783	Non-Participating	40	40	264715	4579069	212
784	Non-Participating	29	29	262309	4582372	212
785	Non-Participating	37	37	265667	4581620	212
786	Non-Participating	35	34	265850	4581519	211
787	Non-Participating	35	35	265848	4581464	211
788	Non-Participating	33	33	265256	4578430	212
789	Non-Participating	36	36	263620	4578484	212
790	Non-Participating	32	32	265253	4578465	212
791	Non-Participating	31	31	266399	4578933	213
792	Non-Participating	36	36	265864	4578955	213
793	Non-Participating	37	37	265331	4578985	212
794	Non-Participating	38	38	265013	4578981	212
795	Non-Participating	39	39	264980	4578969	213
796	Non-Participating	35	35	262006	4579069	212
797	Non-Participating	30	30	266735	4579008	212
798	Non-Participating	38	38	265266	4579195	212
799	Non-Participating	34	34	261941	4579415	211
800	Non-Participating	36	36	261960	4579739	211
801	Non-Participating	44	44	265304	4579761	211
802	Non-Participating	44	44	265391	4579945	211
803	Participating	45	44	265257	4580468	213
804	Non-Participating	44	44	265334	4580498	212
805	Non-Participating	44	44	265257	4580603	212
806	Non-Participating	31	31	261923	4580395	212
807	Non-Participating	30	30	266985	4580675	211
808	Non-Participating	31	31	266448	4580802	211
809	Non-Participating	31	31	266460	4580802	211
810	Non-Participating	30	30	261892	4581105	210
811	Participating	30	30	261938	4580846	210
812	Non-Participating	30	30	262070	4581263	211

Receptor ID	Participation Status	Daytime Modeled Level (dBA)	Nighttime <sup>10</sup> Modeled Level (dBA)	Coordinates UTM NAD83 Z17N		Absolute Elevation (m)
				X (m)	Y (m)	
813	Non-Participating	31	31	266276	4581390	211
814	Non-Participating	31	31	266253	4581390	210
815	Non-Participating	31	31	266229	4581390	210
816	Non-Participating	31	31	266211	4581387	210
817	Non-Participating	33	33	265965	4581616	212
818	Non-Participating	36	36	265183	4581862	210
819	Non-Participating	30	30	266065	4582092	211
820	Non-Participating	31	30	266052	4582137	212
821	Non-Participating	31	31	262087	4580591	210
822	Non-Participating	37	37	262038	4579760	211
823	Non-Participating	31	31	262059	4580433	211
824	Non-Participating	45	45	263491	4580141	213
825	Non-Participating	30	29	266837	4581060	210
826	Non-Participating	36	36	265740	4581385	211
827	Non-Participating	33	32	266330	4581050	211
828	Non-Participating	36	36	266164	4580630	211
829	Non-Participating	36	36	266062	4580723	212
830	Non-Participating	36	36	266064	4580719	212
831	Non-Participating	32	32	266333	4581151	211
832	Non-Participating	34	34	265900	4581462	211
833	Non-Participating	31	31	266175	4581588	210
834	Non-Participating	34	34	265995	4581200	211
835	Non-Participating	31	30	266394	4581487	210
836	Non-Participating	31	31	266289	4581530	210
837	Non-Participating	31	31	266318	4581550	210
838	Non-Participating	31	31	266266	4581645	210
839	Non-Participating	31	31	266203	4581649	210
840	Non-Participating	31	30	266310	4581645	210
841	Non-Participating	30	30	266348	4581753	210
842	Non-Participating	30	30	266395	4581752	210
843	Non-Participating	39	39	265849	4580581	212
844	Non-Participating	35	35	266121	4580875	212
845	Non-Participating	36	36	265988	4580863	212
846	Non-Participating	35	35	265993	4580981	211
847	Non-Participating	39	39	263746	4582252	212
848	Non-Participating	30	30	266804	4579000	212
849	Non-Participating	30	30	261922	4578532	212

Receptor ID	Participation Status	Daytime Modeled Level (dBA)	Nighttime <sup>10</sup> Modeled Level (dBA)	Coordinates UTM NAD83 Z17N		Absolute Elevation (m)
				X (m)	Y (m)	
850	Non-Participating	42	42	264449	4579109	212
851	Non-Participating	28	28	261327	4579175	211
852	Non-Participating	32	32	262110	4580303	211
853	Non-Participating	36	36	265716	4581306	211
854	Non-Participating	41	41	263997	4579078	213



55 Railroad Row  
White River Junction, VT 05001  
802.295.4999  
[www.rsginc.com](http://www.rsginc.com)



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**Case No(s). 20-1760-EL-BGN**

Summary: Application Exhibit G - Noise Assessment electronically filed by Teresa Orahod  
on behalf of Dylan F. Borchers