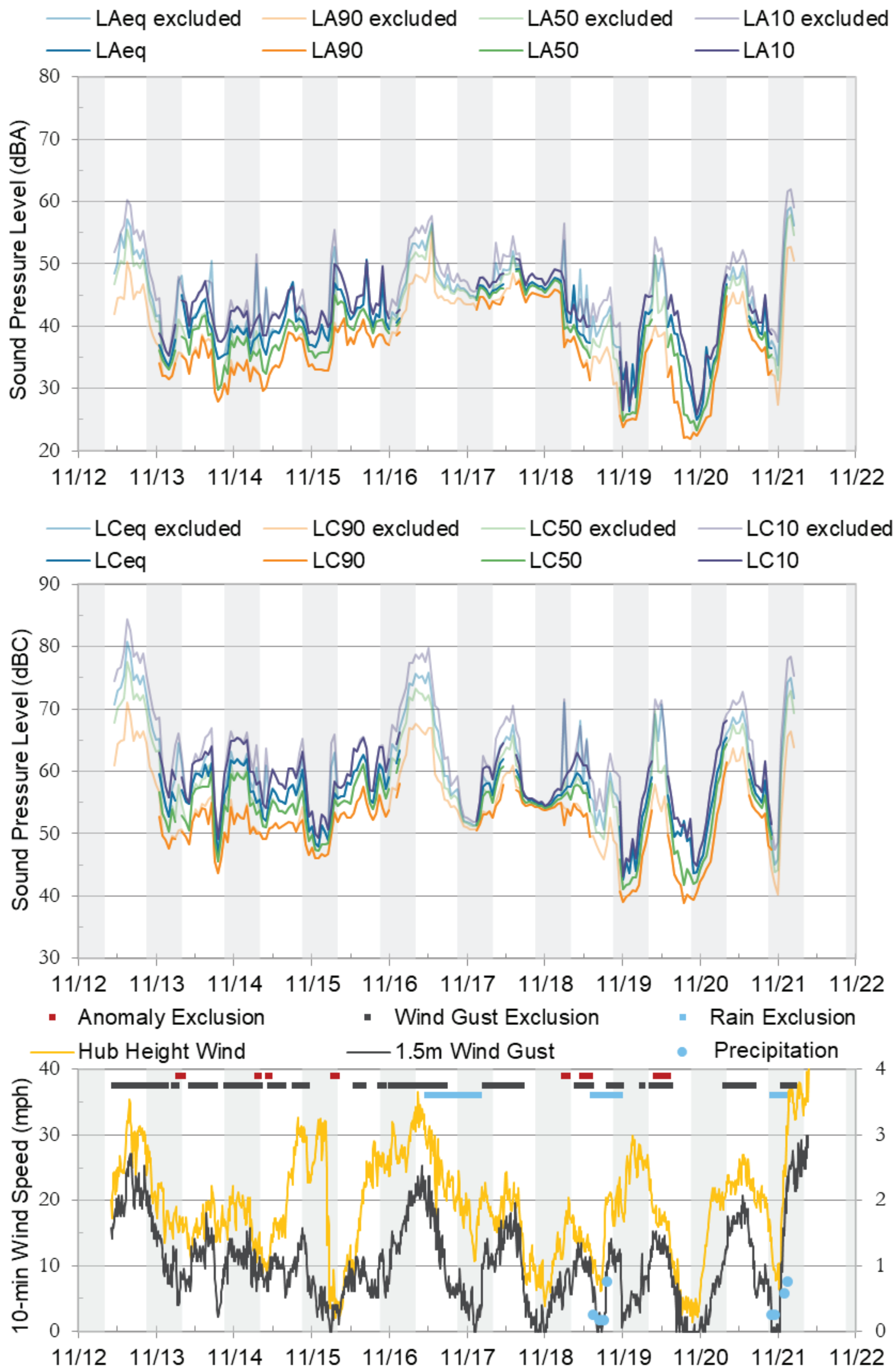

FIGURE 24: PRE-CONSTRUCTION MONITORING RESULTS AT MONITOR 4

Monitor 5

Results for Monitor 5 are presented in Figure 25. Monitor 5 was similar in soundscape to Monitor 4. The primary noise sources at this location were, distant traffic, biogenic sounds (primarily birds), distant mechanical equipment, occasional aircraft overflights, distant train passbys, and wind rustling through trees. The location generally exhibited a diurnal pattern. The quietest nighttime periods were between 25 and 30 dBA, and some higher nighttime periods were between 40 and 50 dBA. The highest nighttime hourly L_{50} at this site was 44 dBA. Over the entire monitoring period, the daytime L_{50} at this site was 39 dBA and the nighttime L_{50} was 36 dBA.

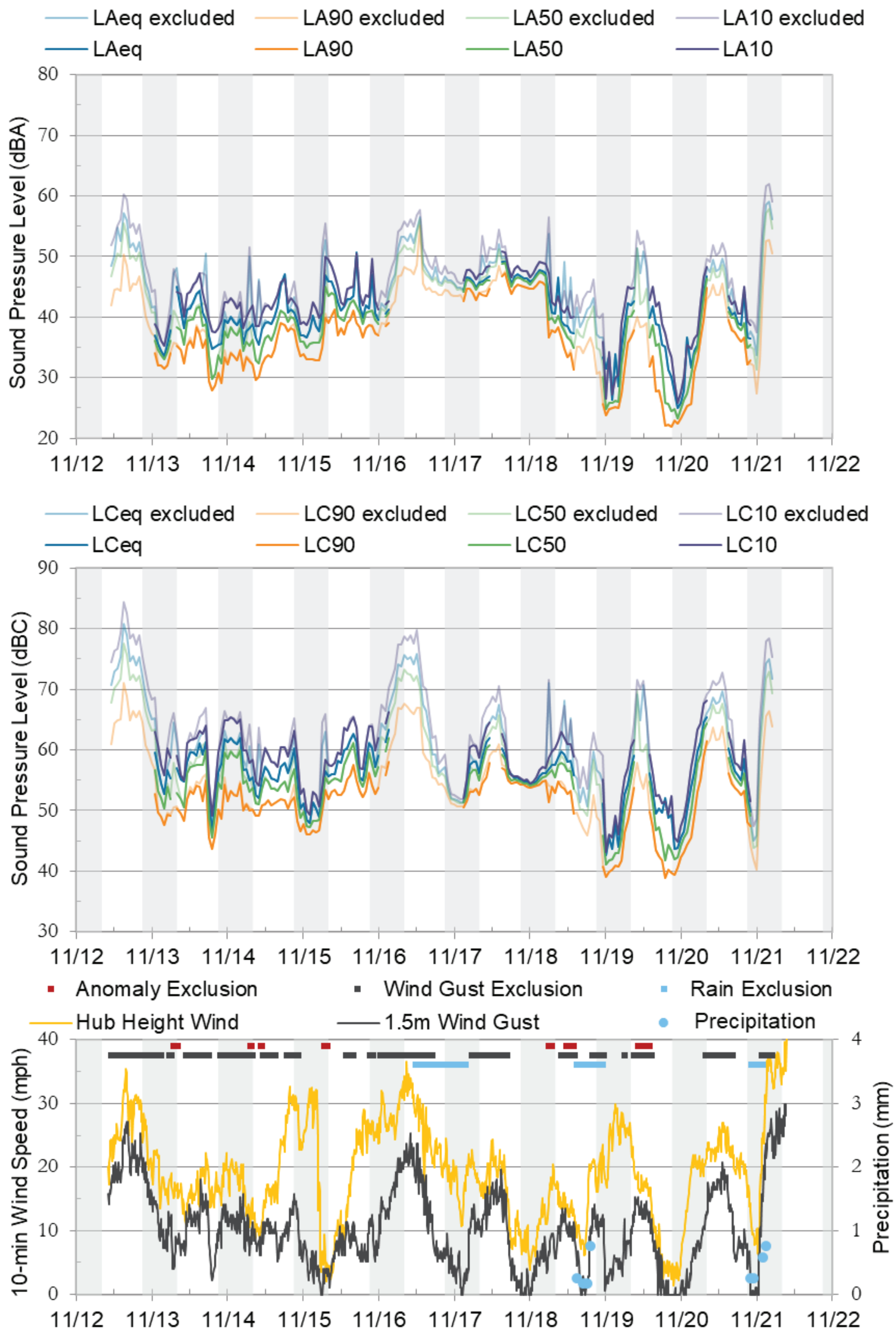

FIGURE 25: PRE-CONSTRUCTION MONITORING RESULTS AT MONITOR 5

Offsite Monitor

Results for the offsite monitor are presented in Figure 26. The primary noise sources at this location were distant traffic, biogenic sounds, occasional vehicle passbys, occasional aircraft overflights, local agricultural operations, distant train horn, and wind rustling through trees. The location generally exhibited a diurnal pattern, and sound levels were more similar to Monitors 1 through 3 than Monitors 4 and 5. The quietest nighttime periods were around 25 dBA, and some higher nighttime periods were between 40 and 45 dBA. Over the entire monitoring period, the daytime L_{50} at this site was 36 dBA and the nighttime L_{50} was 33 dBA.

Statistical spectral levels for a representative wind speed (9 m/s) at a representative hub height (109 meters) are presented in Figure 27.

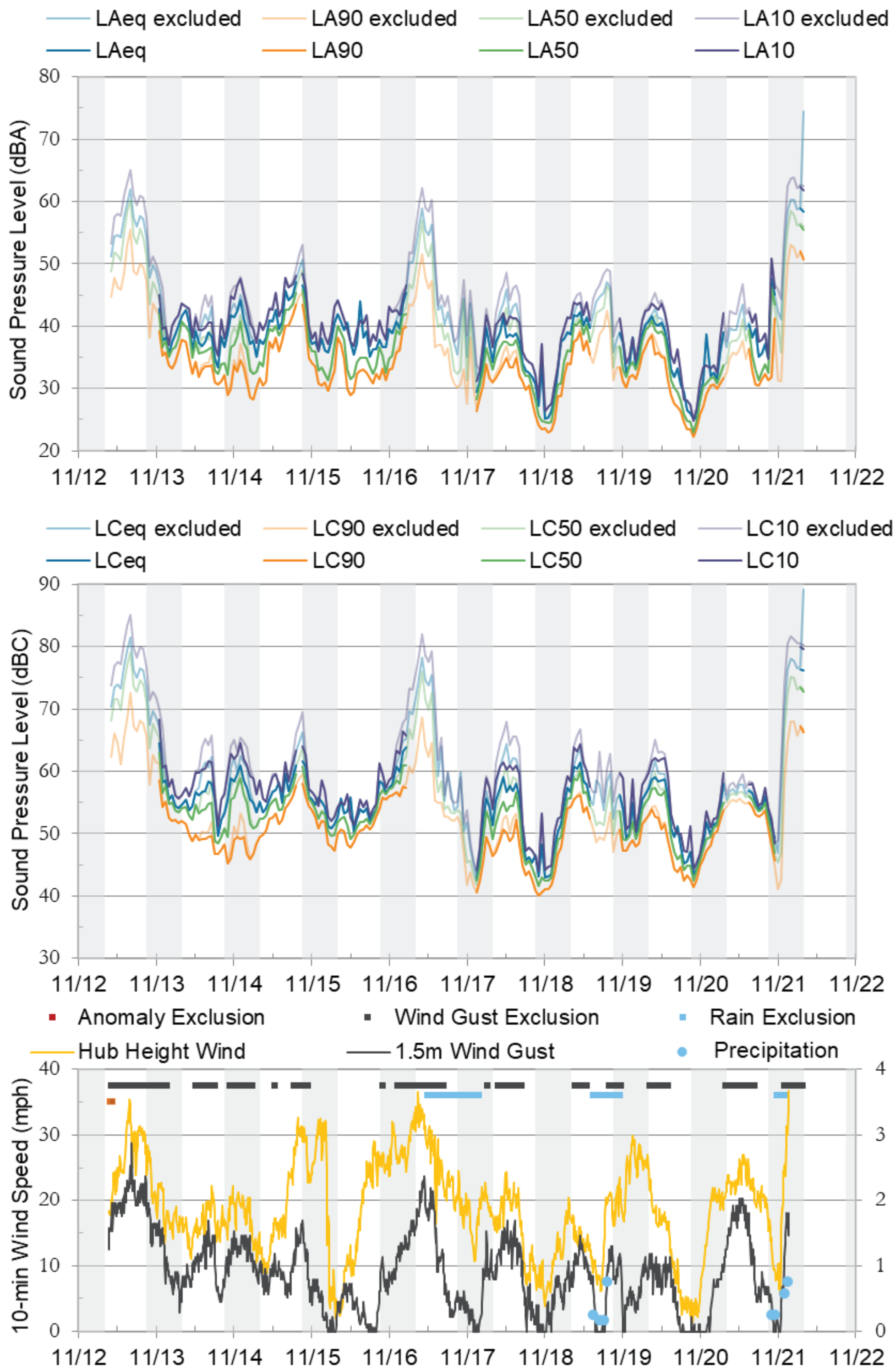

FIGURE 26: PRE-CONSTRUCTION MONITORING RESULTS AT THE OFFSITE MONITOR

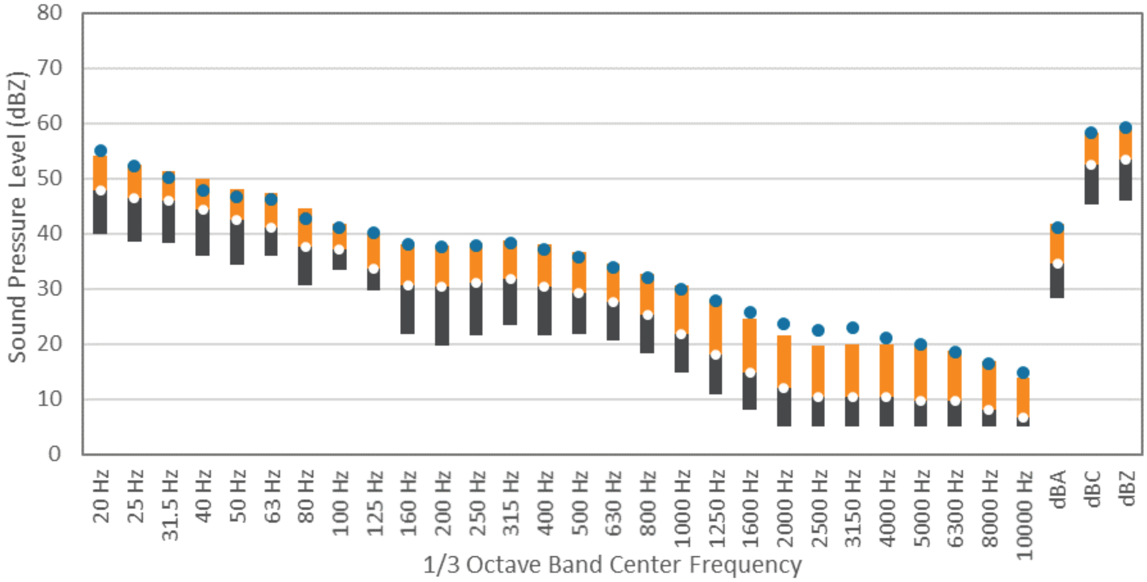

FIGURE 27: 1/3 OCTAVE BAND AND OVERALL STATISTICAL SOUND LEVELS AT THE OFFSITE MONITOR (FOR PERIODS WITH 9 m/s WIND SPEED AT HUB HEIGHT)

6.0 SOUND PROPAGATION MODELING

6.1 MODELING 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 turbine model.

For this analysis, we utilized a ground absorption factor of G=0.7, which is appropriate for comparing modeled results to the L50 metric used in the state standard, particularly when summing model results with the monitored L50 levels.[13] As is common practice, a 2-dB factor was added to the turbine sound power level to account for uncertainty.[14]

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[13] Generally accepted wind turbine modeling procedure calls for a ground absorption factor of G = 0.5, with a 2 dB uncertainty factor added to the manufacturer's guaranteed levels, to predict a maximum $L_{eq(1\text{-}hr)}$. In this case, the Minnesota state limit utilizes an L_{50} metric instead of maximum $L_{eq\ (1\text{-}hr)}$, which means a ground factor of G=0.7 can be used. Based on data from the Massachusetts Study on Wind Turbine Acoustics (2016) by MassCEC, the L_{50} from wind turbines is typically 0.7 to 1.0 dB lower than the L_{eq}. Using a ground factor of G=0.7 instead of 0.5 lowers the sound level projection of the model by 0.7 dB, on average, and as such serves as an adjustment factor to shift from an L_{eq}-based model to an L_{50}-based model to adhere to the Minnesota L_{50} noise standard.

[14] Kaliski, et. al., Regulating and predicting wind turbine sound in the U.S., Inter-Noise 2018.

Residences were modeled as discrete receivers at a height of 4 meters (13 feet) above ground level.[15] A total of 969 residences were modeled throughout and around the Project area. The grid, represented in the results maps by sound pressure level contours, is also calculated at a height of 4 meters (13 feet). Use of a 4-meter receiver height in the model results in a conservative calculation of the expected sound levels at 1.5 meters (5 feet) which may be used for post-construction compliance monitoring. Modeling at a height of 4 meters is supported by post-construction monitoring at a number of projects,[14] and by the Institute of Acoustics' Good Practice Guide on Wind Turbine Noise (2013), "as it has the effect of reducing the potential oversensitivity of the calculation to the receiver region ground factor compared to lower receiver heights." The sound pressure level contours represent turbine-only sound levels.

A search distance up to 8,000 meters (5 miles) allows for the contributions of distant turbines to be considered at receivers. The contribution of distant turbines will depend on the geometry and geography of the Project.

The model included the 53 turbine locations for each turbine model. The Nordex N163 and GE 158 included mitigation in the form of Low-Noise Trailing Edge (LNTE) blades. No LNTE or STE[16] was used for the Vestas V162 wind turbine. No Noise Reduced Operating modes (NROs) were included in the model.

6.2 MODELING RESULTS

Overall A-weighted Model Results

A summary of the sound propagation model results is presented in Table 8. For each turbine model, results are presented as turbine-only sound levels from the sound propagation model and total sound levels. The latter is calculated by summing (logarithmically)[17] the modeled turbine-only sound levels with the average monitored nighttime background L_{50} across all monitor locations, which was 33 dBA.

The highest modeled turbine-only sound level (L_{50}) at a non-participating residence is 44 dBA for the V162 and the GE-158, and the average turbine-only L_{50} across all non-participating residences is 30 to 32 dBA depending on which turbine model is selected. The highest modeled turbine-only sound level at a participating residence is 47 dBA for the V162 and GE-158, and the average turbine-only L_{50} across all participating residences is 36 to 38 dBA depending on which turbine model is selected. For all turbine models, when added with the average monitored

[15] Some other site permit applications (PUC Docket Nos. 17-307, 18-179, and 19-394, for example) have used receiver heights of 1.5 meters as opposed to 4 meters. However, using a receiver height of 4 meters is more conservative and results in a projected sound level that is 1.6 dB higher, on average, than the results modeled at a height of 1.5 meters.
[16] Serrated Trailing Edge
[17] $L_{p1,2} = 10 \times \log_{10}\left(10^{L_{p1}/10} + 10^{L_{p2}/10}\right)$

nighttime background L_{50} across all monitor locations, 33 dBA in Table 5, the total sound level is less than the 50 dBA noise standard.

Maps of model results for each turbine model are shown in Figures 28 through 30. Results are presented as contour lines representing 5-dB increments of calculated A-weighted sound pressure levels. Appendix C provides a list of the calculated sound pressure levels at each receiver in tabular format and a map showing all receiver identification numbers for reference in the appendix table.

TABLE 8: MODEL RESULTS SUMMARY

TURBINE MODEL	SOUND SOURCE	STATISTICAL L_{50} METRIC[18]	RESIDENCE CLASSIFICATION		
			ALL RESIDENCES	PARTICIPATING	NON-PARTICIPATING
V162	Turbine-Only	Avg	33	38	32
		Max	47	47	44
		Min	16	20	16
	Total Sound (Background + Turbine)	Avg	36	39	36
		Max	47	47	44
		Min	33	33	33
GE-158 LNTE	Turbine-Only	Avg	33	38	32
		Max	47	47	44
		Min	18	21	18
	Total Sound (Background + Turbine)	Avg	36	39	36
		Max	47	47	44
		Min	33	33	33
N163 LNTE	Turbine-Only	Avg	31	36	30
		Max	45	45	42
		Min	16	19	16
	Total Sound (Background + Turbine)	Avg	35	38	35
		Max	45	45	42
		Min	33	33	33

[18] The average L_{50} across all residences is provided as a simple means of compare the overall potential impact across the project area between the different turbine models being considered. The maximum L_{50} represents the worst-case receptors. The minimum L_{50} represents the receptor with the least projected wind turbine sound.

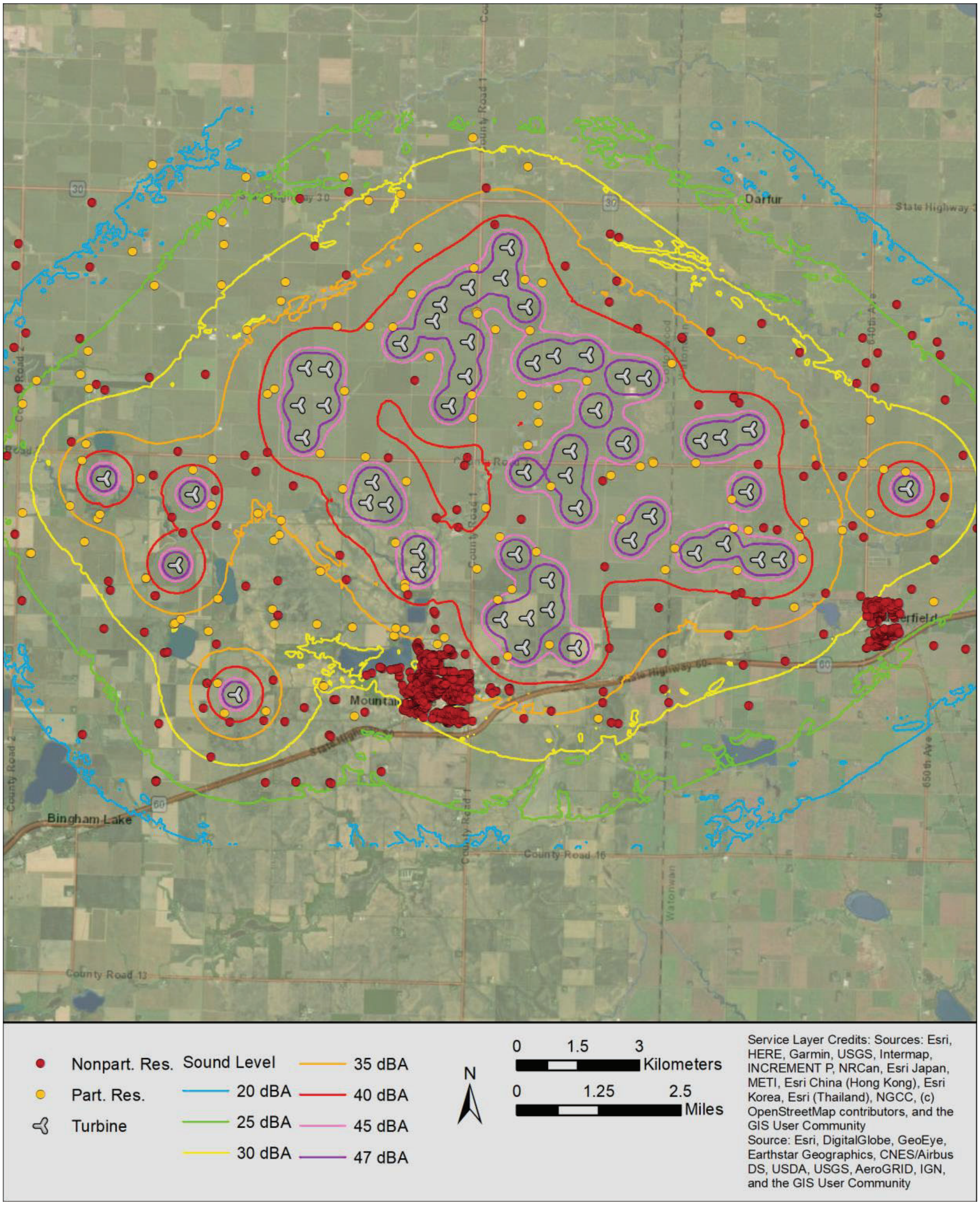

FIGURE 28: SOUND PROPAGATION MODEL RESULTS (TURBINE-ONLY SOUND LEVEL, L_{50}) VESTAS V162

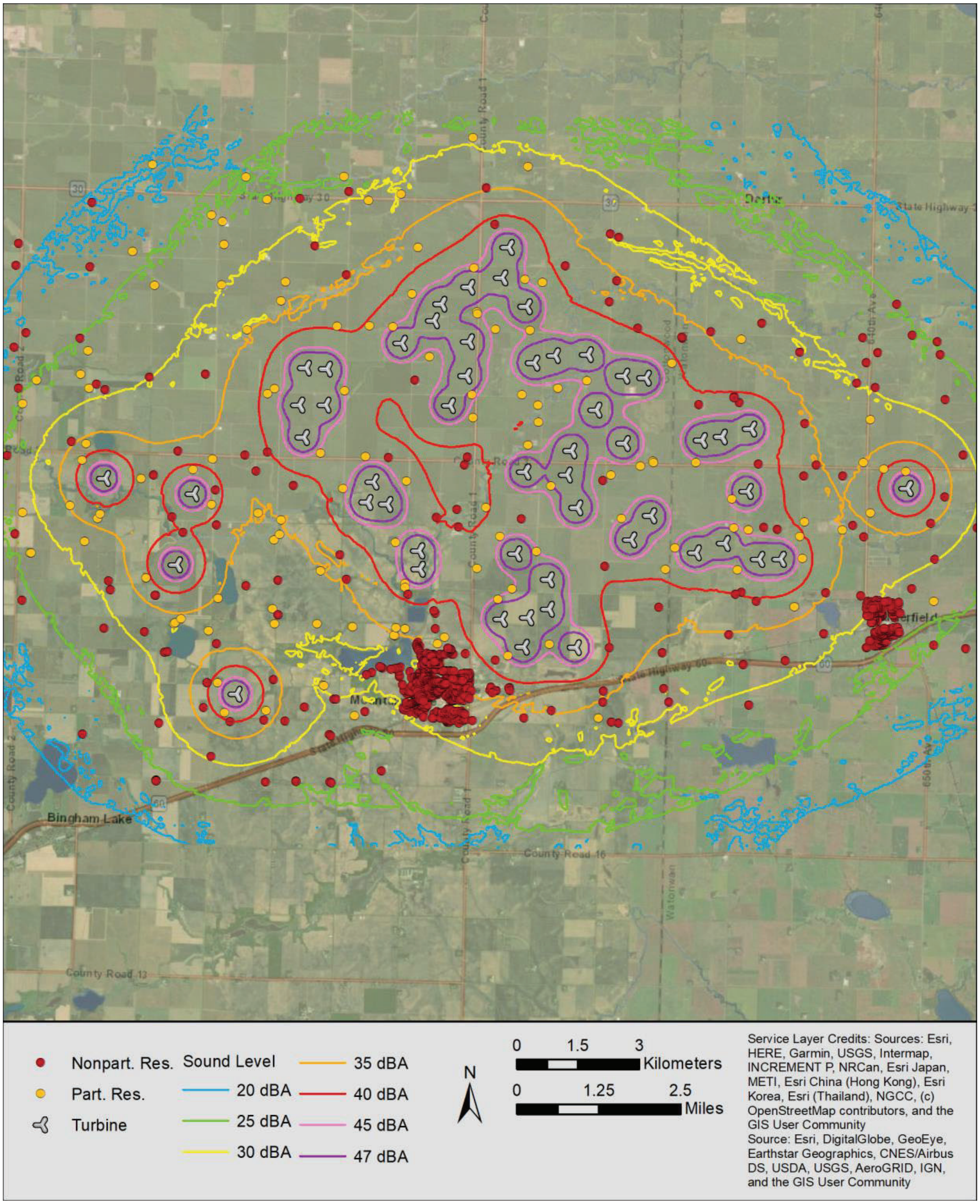

FIGURE 29: SOUND PROPAGATION MODEL RESULTS (TURBINE-ONLY SOUND LEVEL, L_{50}) GE-158 LNTE

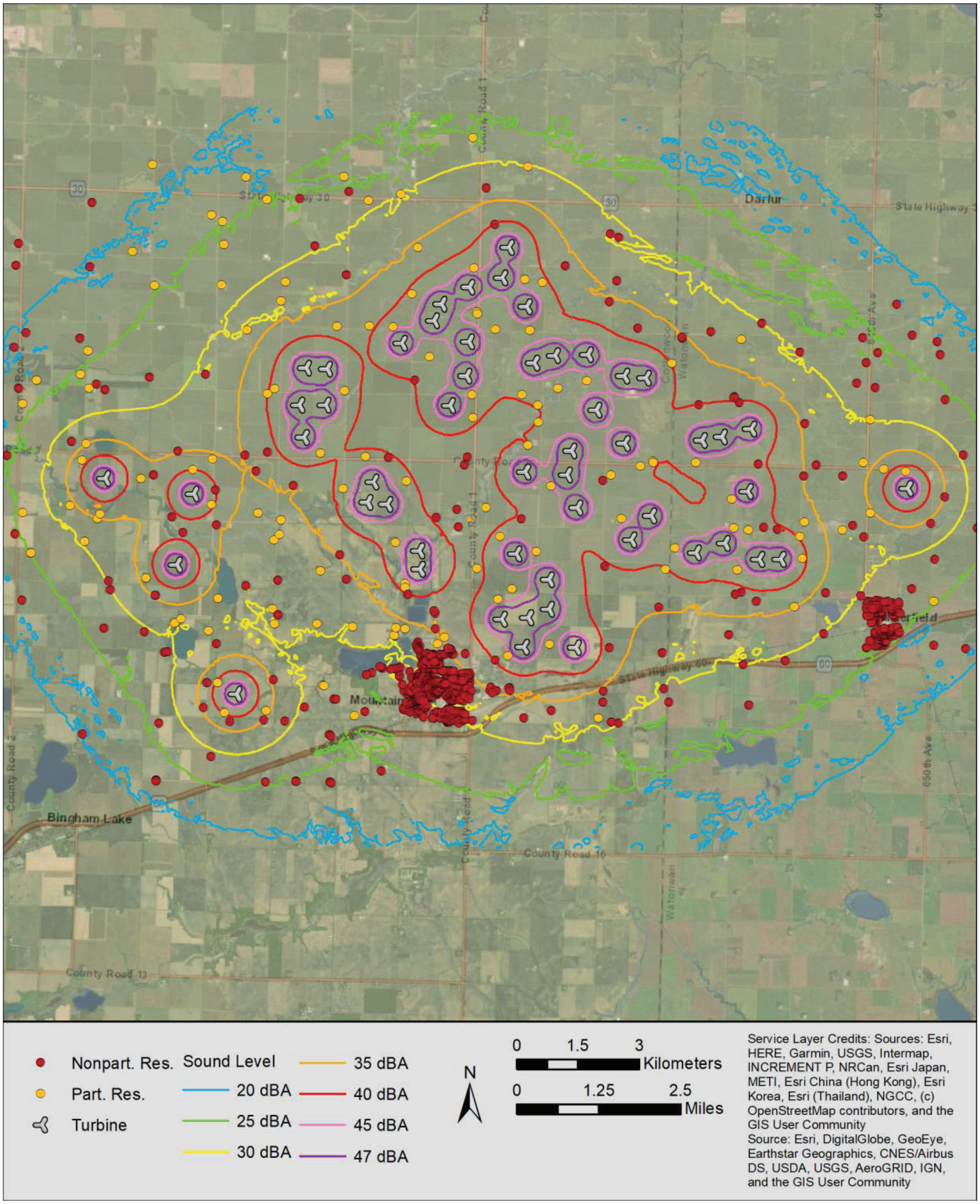

FIGURE 30: SOUND PROPAGATION MODEL RESULTS (TURBINE-ONLY SOUND LEVEL, L_{50}) NORDEX N163 LNTE

Model Results Added to Background L_{50}

If the state noise regulations are applied to the total sound level, that is background sound plus turbine sound, then the model results must be summed (logarithmically)[17] with the monitored background sound levels (L_{50}) to determine the projected cumulative sound level that could occur when the Project is operating. Background sound levels vary geospatially and temporally as do sound emission from the proposed project. As an example, and an indication of the probability of compliance should state noise regulations apply to the total level, the background monitor results from each monitor are summed with the turbine-only model results for each monitor location. This analysis is presented in Table 9 for each monitor location. As shown in the Table, the model results summed with the overall[19] nighttime L_{50} for each background monitor location are less than the 50 dBA noise standard.

TABLE 9: MODEL RESULTS SUMMED WITH MONITORED BACKGROUND SOUND LEVELS (L_{50}, dBA)

Scenario	Metric	Monitor Location				
		Monitor 1	Monitor 2	Monitor 3	Monitor 4	Monitor 5
Background Monitor Results	Overall Nighttime L_{50}	32	31	31	36	36
	Maximum 1-hr Nighttime L_{50}	60	58	49	47	44
	Minimum 1-hr Nighttime L_{50}	21	20	20	23	28
V162	Modeled Sound Level	29	46	45	45	33
	Summed with Overall Nighttime	34	46	45	46	38
GE 5.5-158 LNTE	Modeled Sound Level	30	46	45	45	33
	Summed with Overall Nighttime	34	46	45	46	38
N163 LNTE	Modeled Sound Level	28	44	43	44	31
	Summed with Overall Nighttime	33	44	43	45	37

The background L_{50} does and will vary from hour to hour, as shown in the monitor results in Section 5.0. The average overall nighttime L_{50} across all the monitor sites was 33 dBA, but there were some nighttime hours during the monitoring period when the L_{50} was above 40 dBA and as high as 60 dBA. As noted in Section 5.3, the were only a few hours at Monitors 1 and 2 when the nighttime hourly L_{50} exceeded 50 dBA, and this was due to nearby agricultural operations on one night for each monitor. Thus, in Appendix C, the model results are summed with a range of potential background L_{50} values ranging from 35 dBA to 50 dBA in 5 dB increments.

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[19] The overall nighttime L_{50} is the median sound level for all nighttime periods monitored. The hourly L_{50} will vary from hour to hour, the range of which is represented by the minimum and maximum 1-hour nighttime L_{50}.

7.0 CONCLUSION

The Big Bend Wind Project is a proposed wind power generation facility in Cottonwood and Watonwan Counties, Minnesota. The facility will include up to 53 wind turbines with a total capacity of up to 300 MW. For SPA, RSG performed a noise assessment[1] of the Project based on the preliminary turbine layout including all turbine locations and three turbine models under consideration. This is an updated noise assessment based on the most recent turbine layout and up-rated turbine models that are being considered.

Conclusions of the assessment are as follows:

1. Background sound levels vary around the Project site, but are slightly higher at night in the southern portion of the project area that is closer to MN-60 and the parallel rail line. The overall daytime L_{50} ranged from 36 dBA at Monitors 1 and 3 to 40 dBA at Monitors 2 and 4. The overall nighttime L_{50} ranged from 31 dBA at Monitors 2 and 3 to 36 dBA at Monitors 4 and 5.
2. Minimum 1-hour nighttime L_{50}s were between 20 and 28 dBA across the Project area, while maximum 1-hour nighttime L_{50}s were between 44 and 60 dBA. The only nighttime 1-hour L_{50}s above 50 dBA were due to nearby agricultural operations that occurred for a few hours, and hourly sound levels above 50 dBA were not a regular occurrence during the monitoring period.
3. State noise regulations require that wind power generation facilities show compliance with a nighttime limit of 50 dBA (L_{50}) and a daytime limit of 60 dBA (L_{50}) at residences.
4. Sound propagation modeling was performed in accordance with ISO 9613-2 at 969 discrete receivers modeled at a height of 4 meters above grade, with spectral ground attenuation and a ground factor of G=0.7. These modeling parameters are meant to represent the highest hourly L_{50} of the proposed facility.
5. Modeling was completed for three turbine models under consideration, the Vestas V162, the GE 158 LNTE, and the Nordex N163 LNTE. The modeled sound power level for each turbine model is provided in Appendix B.
6. Projected sound levels from the Project are less than 47 dBA at all residences. The highest projected turbine-only sound level (L_{50}) at a participating residence is 47 dBA, and the highest projected turbine-only sound level (L_{50}) at a non-participating residence is 44 dBA. The average sound level (L_{50}) across all modeled residences is 31 to 33 dBA depending on the turbine model.
7. When added to the overall nighttime L_{50} from monitored locations, sound levels remain below 50 dBA, but the background L_{50} does and will vary from hour to hour, as shown in

the monitoring results. With turbine-only sound levels less than 47 dBA, and existing background sound levels (nighttime 1-hour L50s) typically less than 50 dBA, the Project is not expected to exceed the noise regulations on a turbine-only basis, nor significantly contribute to sound levels in excess of 50 dBA.

APPENDIX A. ACOUSTICS PRIMER

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").[20] 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 31.

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.

[20] 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.

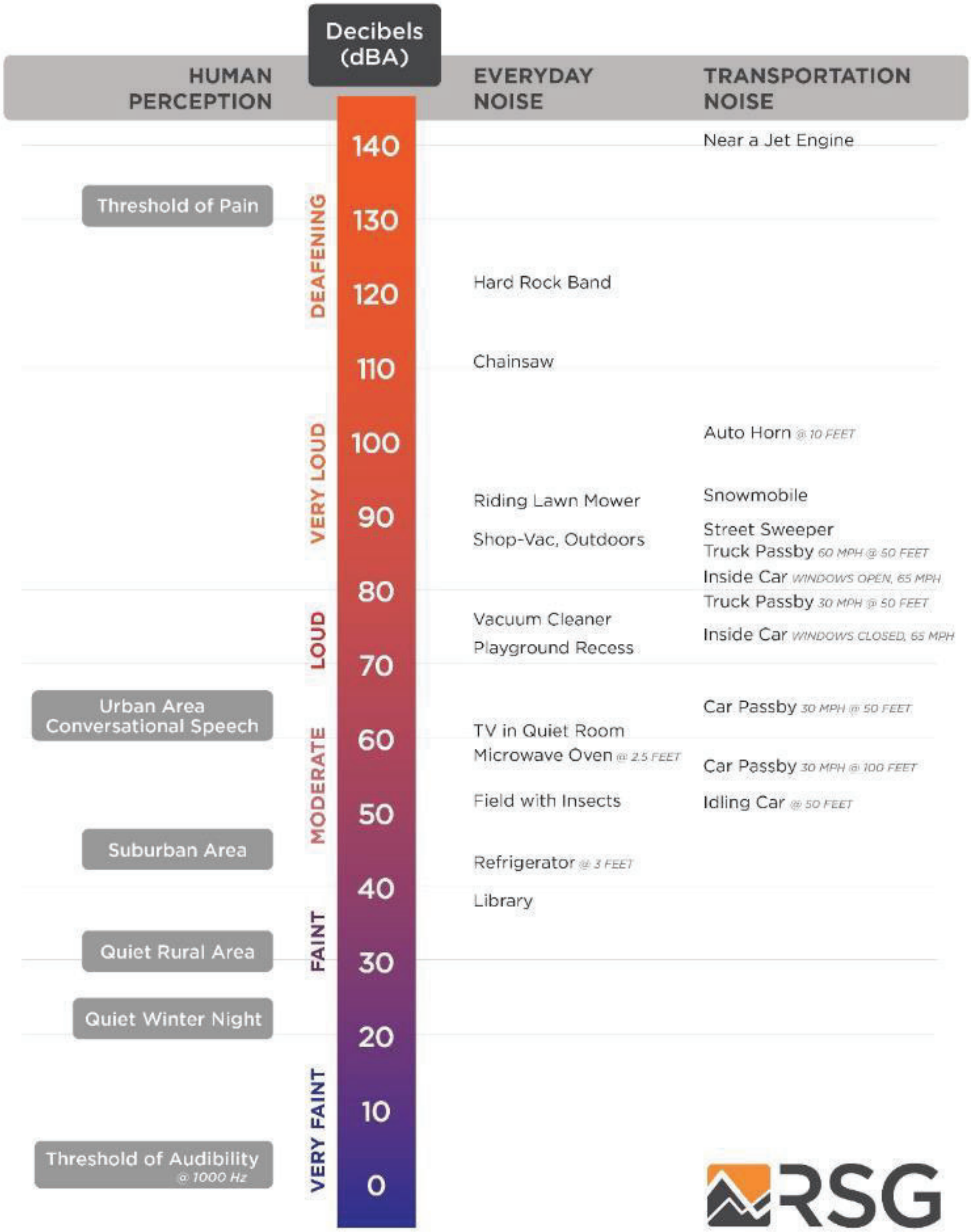

FIGURE 31: A SCALE OF SOUND PRESSURE LEVELS FOR TYPICAL SOUND SOURCES

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_A” 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.[21] The time response setting for a sound level measurement is indicated with the subscript “S” for Slow and “F” for Fast: L_S or L_F. 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_{max}”. One can define a “max” level with Fast response L_{Fmax} (1/8-second time constant), Slow time response L_{Smax} (1-second time constant), or Continuous Equivalent level over a specified time period $L_{eq\text{-}max}$.

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 32. 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

[21] 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 32, 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.

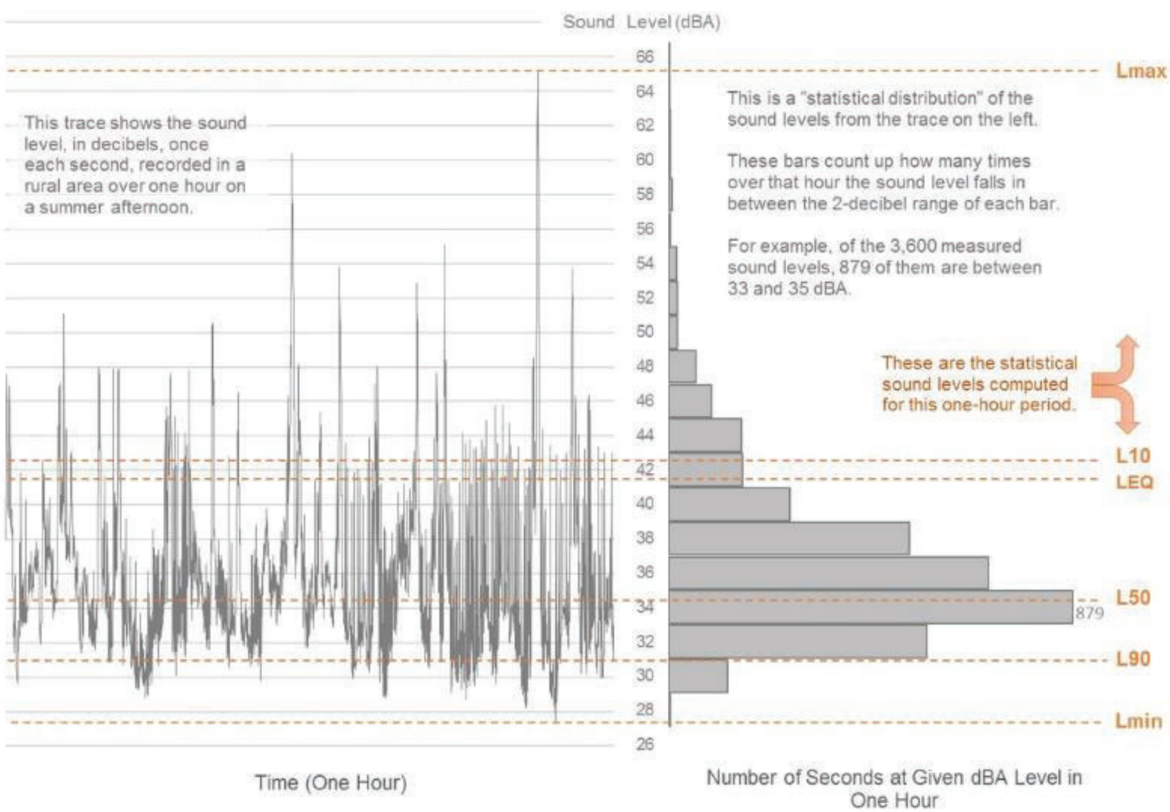

FIGURE 32: EXAMPLE OF DESCRIPTIVE TERMS OF SOUND MEASUREMENT OVER TIME

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} (pressure 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 10: SOUND PROPAGATION MODELING PARAMETERS

PARAMETER	SETTING
Ground Absorption	Spectral for all sources, mixed ground (G=0.7)
Atmospheric Attenuation	Based on 10˚ Celsius, 70% relative humidity
Structure Reflections	None
Receiver Height	4 meters for residences, 1.5 meters for grid
Search Distance	8,000 meters

[NONPUBLIC DATA HAS BEEN EXCISED...

TABLE 11: TURBINE HUB HEIGHT AND 1/1 OCTAVE BAND MODELED SPECTRA (dBZ UNLESS OTHERWISE INDICATED)

SOUND SOURCE	HUB HEIGHT	1/1 OCTAVE BAND CENTER FREQUENCY (HZ)									SUM (dBA)	SUM (dBZ)
		31.5	*63*	*125*	*250*	*500*	*1000*	*2000*	*4000*	*8000*		
V162	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
GE-158 LNTE	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
N163 LNTE[22]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

TABLE 12: MODELED TURBINE SOUND POWER LEVELS & LOCATIONS[23]

TURBINE ID	TURBINE MODEL	MODELED SOUND POWER LEVEL (dBA)	HUB HEIGHT (M)	COORDINATES (UTM NAD 83 Z15N)		GROUND ELEVATION + HUB HEIGHT (m)
				X (m)	Y (m)	
T02	GE-158 LNTE	[redacted]	117	346729	4877323	481
T03	GE-158 LNTE	[redacted]	117	345911	4877089	480
T05	GE-158 LNTE	[redacted]	117	345222	4876668	483
T07	GE-158 LNTE	[redacted]	117	347323	4876612	483
T08	GE-158 LNTE	[redacted]	117	345044	4876263	486
T09	GE-158 LNTE	[redacted]	117	345902	4875742	487
T10	GE-158 LNTE	[redacted]	117	344251	4875707	493
T15	GE-158 LNTE	[redacted]	117	348824	4875427	488
T16	GE-158 LNTE	[redacted]	117	348019	4875399	486
T17	GE-158 LNTE	[redacted]	117	347510	4875217	485
T19	GE-158 LNTE	[redacted]	117	341896	4875093	515
T20	GE-158 LNTE	[redacted]	117	342413	4875069	515

[22] At the time of this study Nordex had only provided information related to the overall sound power level (105.5 dBA). The spectrum presented here is a spectrum from a similar Nordex turbine adjusted to match the overall sound power level reported by Nordex for the proposed turbine.
[23] A map showing the location of the turbines by Turbine ID is provided in Figure 33 after this Table.

TURBINE ID	TURBINE MODEL	MODELED SOUND POWER LEVEL (dBA)	HUB HEIGHT (M)	COORDINATES (UTM NAD 83 Z15N)		GROUND ELEVATION + HUB HEIGHT (m)
				X (m)	Y (m)	
T21	GE-158 LNTE	[redacted]	117	345845	4874903	492
T22	GE-158 LNTE	[redacted]	117	349723	4874904	486
T23	GE-158 LNTE	[redacted]	117	350250	4874850	488
T24	GE-158 LNTE	[redacted]	117	341742	4874189	514
T25	GE-158 LNTE	[redacted]	117	342374	4874188	514
T26	GE-158 LNTE	[redacted]	117	345435	4874178	499
T27	GE-158 LNTE	[redacted]	117	349034	4874065	487
T28	GE-158 LNTE	[redacted]	117	352840	4873598	482
T29	GE-158 LNTE	[redacted]	117	352114	4873403	486
T30	GE-158 LNTE	[redacted]	117	341852	4873393	515
T31	GE-158 LNTE	[redacted]	117	351627	4873321	489
T32	GE-158 LNTE	[redacted]	117	349730	4873238	487
T33	GE-158 LNTE	[redacted]	117	348416	4873059	489
T34	GE-158 LNTE	[redacted]	117	348311	4872464	491
T35	GE-158 LNTE	[redacted]	117	336961	4872385	543
T36	GE-158 LNTE	[redacted]	117	343556	4872299	513
T38	GE-158 LNTE	[redacted]	117	352749	4872064	482
T39	GE-158 LNTE	[redacted]	117	343408	4871791	512
T40	GE-158 LNTE	[redacted]	117	343898	4871740	512
T41	GE-158 LNTE	[redacted]	117	348563	4871655	496
T42	GE-158 LNTE	[redacted]	117	349886	4870868	493
T43	GE-158 LNTE	[redacted]	117	352182	4870785	481
T44	GE-158 LNTE	[redacted]	117	351475	4870558	488
T45	GE-158 LNTE	[redacted]	117	347063	4870534	505
T46	GE-158 LNTE	[redacted]	117	353567	4870395	481
T47	GE-158 LNTE	[redacted]	117	353029	4870391	486
T48	GE-158 LNTE	[redacted]	117	338731	4870263	526
T49	GE-158 LNTE	[redacted]	117	344694	4870149	508
T50	GE-158 LNTE	[redacted]	117	347864	4869894	502
T51	GE-158 LNTE	[redacted]	117	347861	4869165	506
T52	GE-158 LNTE	[redacted]	117	347362	4868960	508
T53	GE-158 LNTE	[redacted]	117	346710	4868925	509
T54	GE-158 LNTE	[redacted]	117	347246	4868232	508
T55	GE-158 LNTE	[redacted]	117	348531	4868217	505

TURBINE ID	TURBINE MODEL	MODELED SOUND POWER LEVEL (dBA)	HUB HEIGHT (M)	COORDINATES (UTM NAD 83 Z15N)		GROUND ELEVATION + HUB HEIGHT (m)
				X (m)	Y (m)	
T56	GE-158 LNTE	[redacted]	117	340195	4867083	533
A01	GE-158 LNTE	[redacted]	117	346880	4878068	479
A02	GE-158 LNTE	[redacted]	117	347288	4872539	497
A03	GE-158 LNTE	[redacted]	117	339134	4872001	521
A04	GE-158 LNTE	[redacted]	117	350380	4871460	489
A05	GE-158 LNTE	[redacted]	117	344688	4870606	501
A06	GE-158 LNTE	[redacted]	117	356677	4872140	463
T02	V162	[redacted]	119	346729	4877323	483
T03	V162	[redacted]	119	345911	4877089	482
T05	V162	[redacted]	119	345222	4876668	485
T07	V162	[redacted]	119	347323	4876612	485
T08	V162	[redacted]	119	345044	4876263	488
T09	V162	[redacted]	119	345902	4875742	489
T10	V162	[redacted]	119	344251	4875707	495
T15	V162	[redacted]	119	348824	4875427	490
T16	V162	[redacted]	119	348019	4875399	488
T17	V162	[redacted]	119	347510	4875217	487
T19	V162	[redacted]	119	341896	4875093	517
T20	V162	[redacted]	119	342413	4875069	517
T21	V162	[redacted]	119	345845	4874903	494
T22	V162	[redacted]	119	349723	4874904	488
T23	V162	[redacted]	119	350250	4874850	490
T24	V162	[redacted]	119	341742	4874189	516
T25	V162	[redacted]	119	342374	4874188	516
T26	V162	[redacted]	119	345435	4874178	501
T27	V162	[redacted]	119	349034	4874065	489
T28	V162	[redacted]	119	352840	4873598	484
T29	V162	[redacted]	119	352114	4873403	488
T30	V162	[redacted]	119	341852	4873393	517
T31	V162	[redacted]	119	351627	4873321	491
T32	V162	[redacted]	119	349730	4873238	489
T33	V162	[redacted]	119	348416	4873059	491
T34	V162	[redacted]	119	348311	4872464	493
T35	V162	[redacted]	119	336961	4872385	545

TURBINE ID	TURBINE MODEL	MODELED SOUND POWER LEVEL (dBA)	HUB HEIGHT (M)	COORDINATES (UTM NAD 83 Z15N) X (m)	Y (m)	GROUND ELEVATION + HUB HEIGHT (m)
T36	V162	[redacted]	119	343556	4872299	515
T38	V162	[redacted]	119	352749	4872064	484
T39	V162	[redacted]	119	343408	4871791	514
T40	V162	[redacted]	119	343898	4871740	514
T41	V162	[redacted]	119	348563	4871655	498
T42	V162	[redacted]	119	349886	4870868	495
T43	V162	[redacted]	119	352182	4870785	483
T44	V162	[redacted]	119	351475	4870558	490
T45	V162	[redacted]	119	347063	4870534	507
T46	V162	[redacted]	119	353567	4870395	483
T47	V162	[redacted]	119	353029	4870391	488
T48	V162	[redacted]	119	338731	4870263	528
T49	V162	[redacted]	119	344694	4870149	510
T50	V162	[redacted]	119	347864	4869894	504
T51	V162	[redacted]	119	347861	4869165	508
T52	V162	[redacted]	119	347362	4868960	510
T53	V162	[redacted]	119	346710	4868925	511
T54	V162	[redacted]	119	347246	4868232	510
T55	V162	[redacted]	119	348531	4868217	507
T56	V162	[redacted]	119	340195	4867083	535
A01	V162	[redacted]	119	346880	4878068	481
A02	V162	[redacted]	119	347288	4872539	499
A03	V162	[redacted]	119	339134	4872001	523
A04	V162	[redacted]	119	350380	4871460	491
A05	V162	[redacted]	119	344688	4870606	503
A06	V162	[redacted]	119	356677	4872140	465
T02	N163 LNTE	[redacted]	118	346729	4877323	482
T03	N163 LNTE	[redacted]	118	345911	4877089	481
T05	N163 LNTE	[redacted]	118	345222	4876668	484
T07	N163 LNTE	[redacted]	118	347323	4876612	484
T08	N163 LNTE	[redacted]	118	345044	4876263	487
T09	N163 LNTE	[redacted]	118	345902	4875742	488
T10	N163 LNTE	[redacted]	118	344251	4875707	494
T15	N163 LNTE	[redacted]	118	348824	4875427	489

TURBINE ID	TURBINE MODEL	MODELED SOUND POWER LEVEL (dBA)	HUB HEIGHT (M)	COORDINATES (UTM NAD 83 Z15N) X (m)	Y (m)	GROUND ELEVATION + HUB HEIGHT (m)
T16	N163 LNTE	[redacted]	118	348019	4875399	487
T17	N163 LNTE	[redacted]	118	347510	4875217	486
T19	N163 LNTE	[redacted]	118	341896	4875093	516
T20	N163 LNTE	[redacted]	118	342413	4875069	516
T21	N163 LNTE	[redacted]	118	345845	4874903	493
T22	N163 LNTE	[redacted]	118	349723	4874904	487
T23	N163 LNTE	[redacted]	118	350250	4874850	489
T24	N163 LNTE	[redacted]	118	341742	4874189	515
T25	N163 LNTE	[redacted]	118	342374	4874188	515
T26	N163 LNTE	[redacted]	118	345435	4874178	500
T27	N163 LNTE	[redacted]	118	349034	4874065	488
T28	N163 LNTE	[redacted]	118	352840	4873598	483
T29	N163 LNTE	[redacted]	118	352114	4873403	487
T30	N163 LNTE	[redacted]	118	341852	4873393	516
T31	N163 LNTE	[redacted]	118	351627	4873321	490
T32	N163 LNTE	[redacted]	118	349730	4873238	488
T33	N163 LNTE	[redacted]	118	348416	4873059	490
T34	N163 LNTE	[redacted]	118	348311	4872464	492
T35	N163 LNTE	[redacted]	118	336961	4872385	544
T36	N163 LNTE	[redacted]	118	343556	4872299	514
T38	N163 LNTE	[redacted]	118	352749	4872064	483
T39	N163 LNTE	[redacted]	118	343408	4871791	513
T40	N163 LNTE	[redacted]	118	343898	4871740	513
T41	N163 LNTE	[redacted]	118	348563	4871655	497
T42	N163 LNTE	[redacted]	118	349886	4870868	494
T43	N163 LNTE	[redacted]	118	352182	4870785	482
T44	N163 LNTE	[redacted]	118	351475	4870558	489
T45	N163 LNTE	[redacted]	118	347063	4870534	506
T46	N163 LNTE	[redacted]	118	353567	4870395	482
T47	N163 LNTE	[redacted]	118	353029	4870391	487
T48	N163 LNTE	[redacted]	118	338731	4870263	527
T49	N163 LNTE	[redacted]	118	344694	4870149	509
T50	N163 LNTE	[redacted]	118	347864	4869894	503
T51	N163 LNTE	[redacted]	118	347861	4869165	507

TURBINE ID	TURBINE MODEL	MODELED SOUND POWER LEVEL (dBA)	HUB HEIGHT (M)	COORDINATES (UTM NAD 83 Z15N)		GROUND ELEVATION + HUB HEIGHT (m)
				X (m)	Y (m)	
T52	N163 LNTE	[redacted]	118	347362	4868960	509
T53	N163 LNTE	[redacted]	118	346710	4868925	510
T54	N163 LNTE	[redacted]	118	347246	4868232	509
T55	N163 LNTE	[redacted]	118	348531	4868217	506
T56	N163 LNTE	[redacted]	118	340195	4867083	534
A01	N163 LNTE	[redacted]	118	346880	4878068	480
A02	N163 LNTE	[redacted]	118	347288	4872539	498
A03	N163 LNTE	[redacted]	118	339134	4872001	522
A04	N163 LNTE	[redacted]	118	350380	4871460	490
A05	N163 LNTE	[redacted]	118	344688	4870606	502
A06	N163 LNTE	[redacted]	118	356677	4872140	464

...NONPUBLIC DATA HAS BEEN EXCISED]

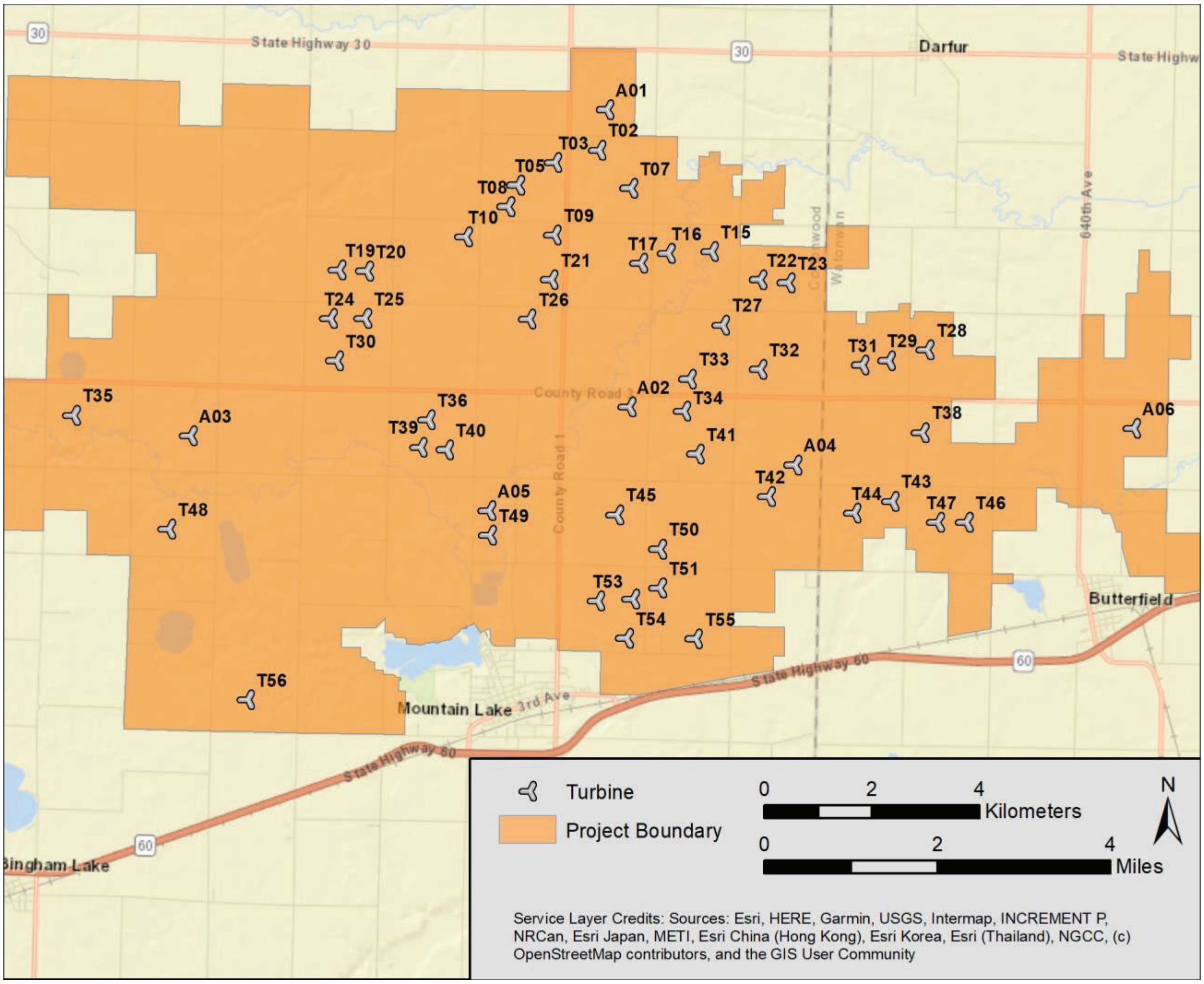

FIGURE 33: TURBINE ID MAP

APPENDIX C. RECEIVER INFORMATION

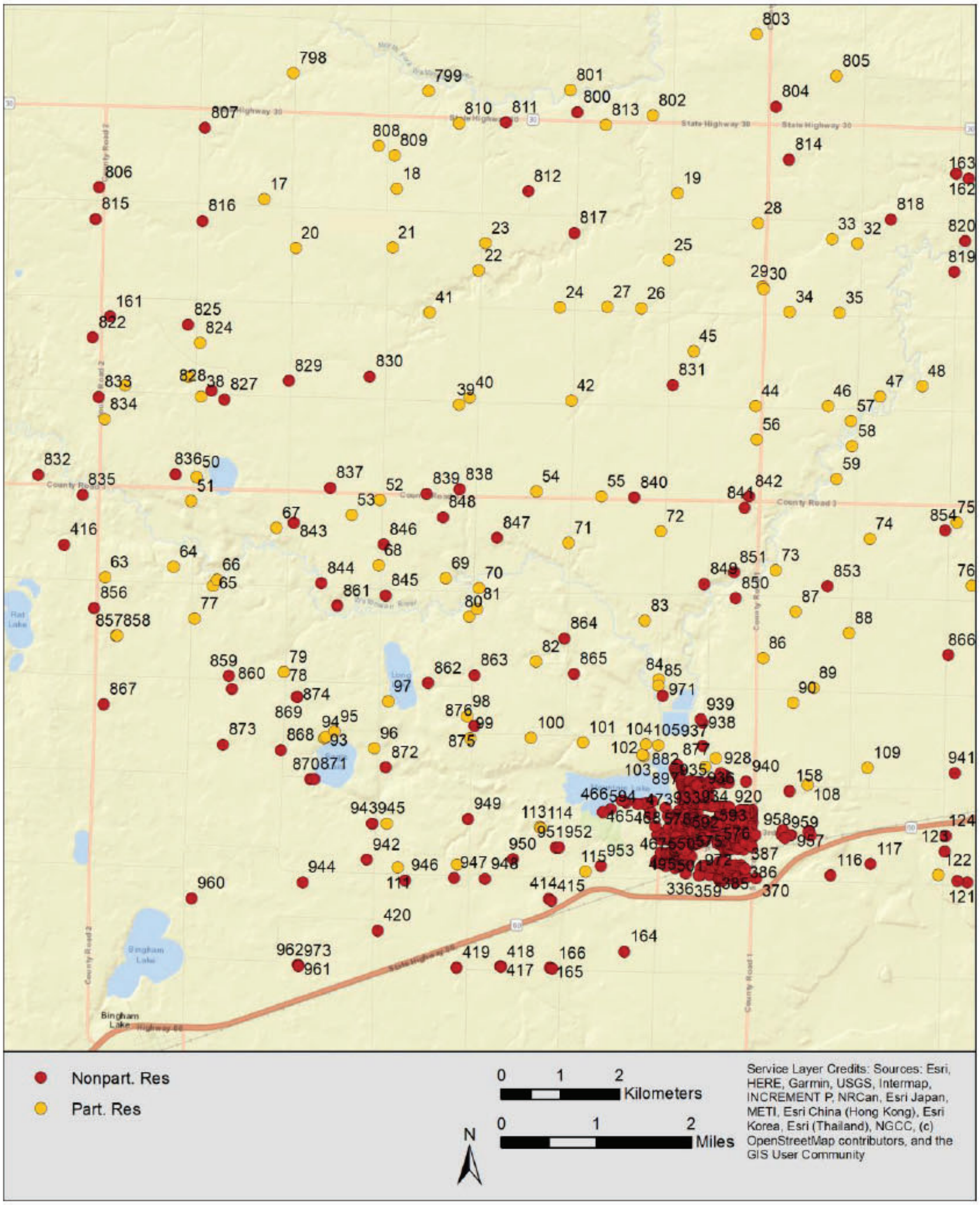

FIGURE 34: MAP OF MODELED RECEPTORS (WESTERN SECTION)

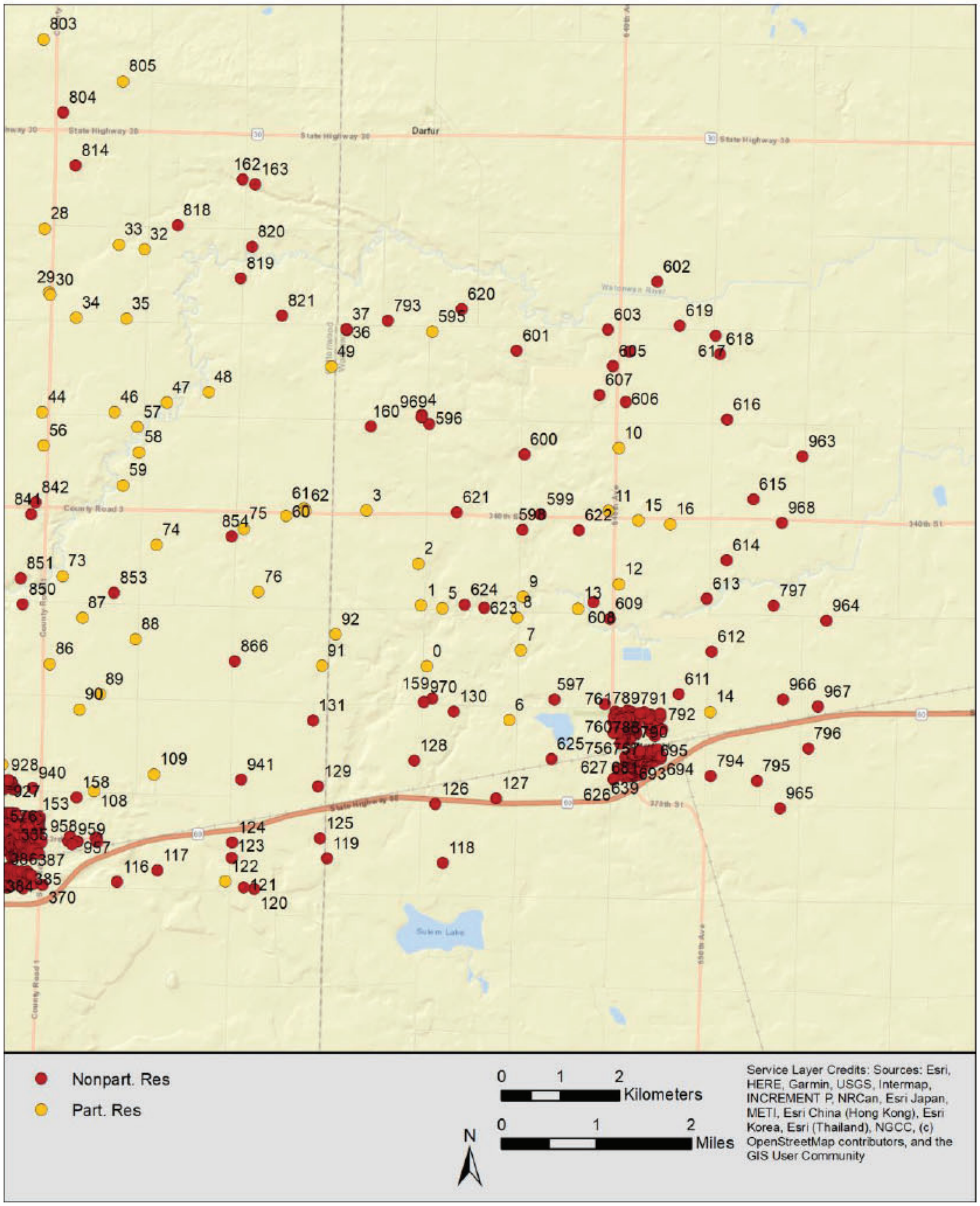

FIGURE 35: MAP OF MODELED RECEPTORS (EASTERN SECTION)

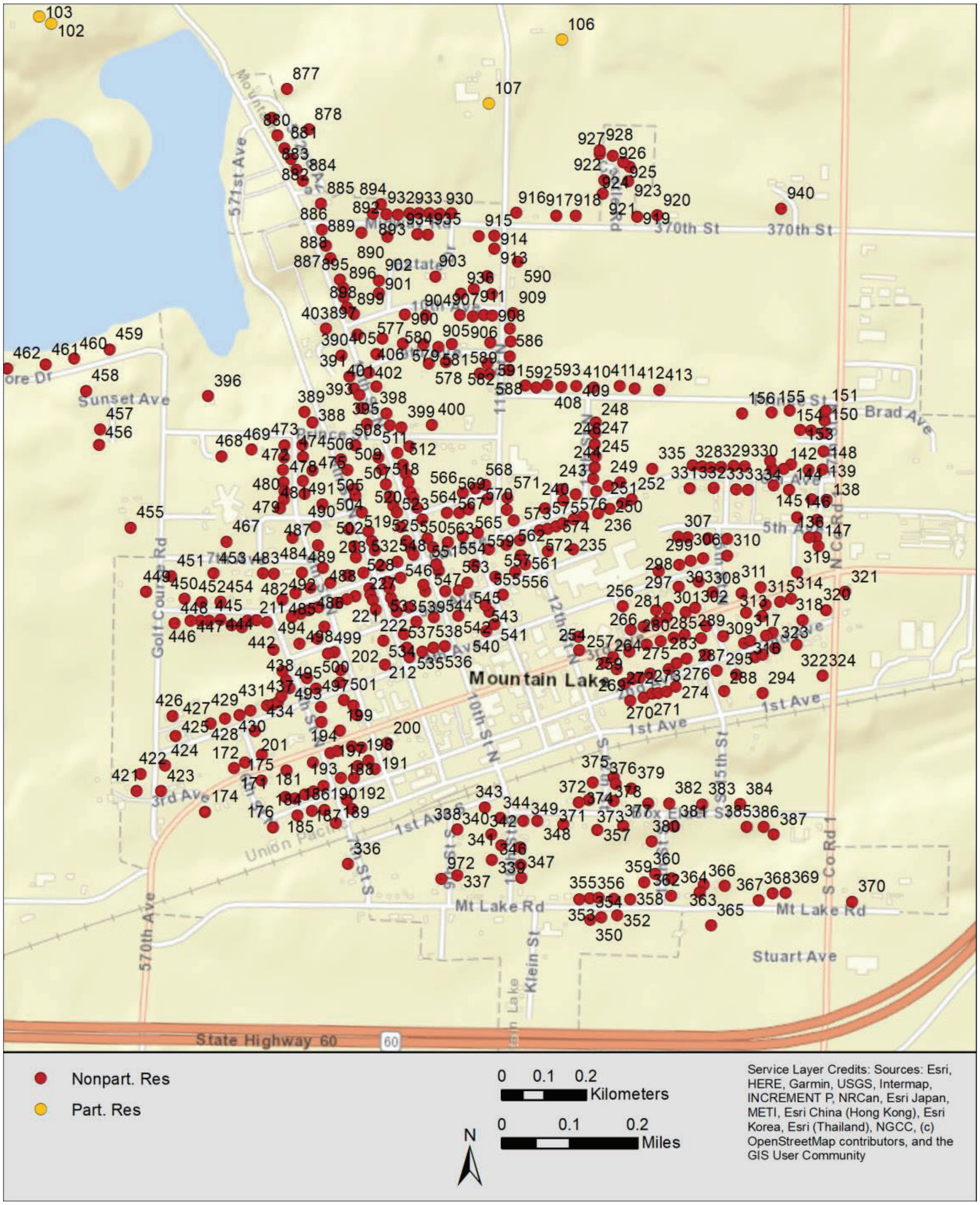

FIGURE 36: MAP OF MODELED RECEPTORS (MOUNTAIN LAKE AREA)

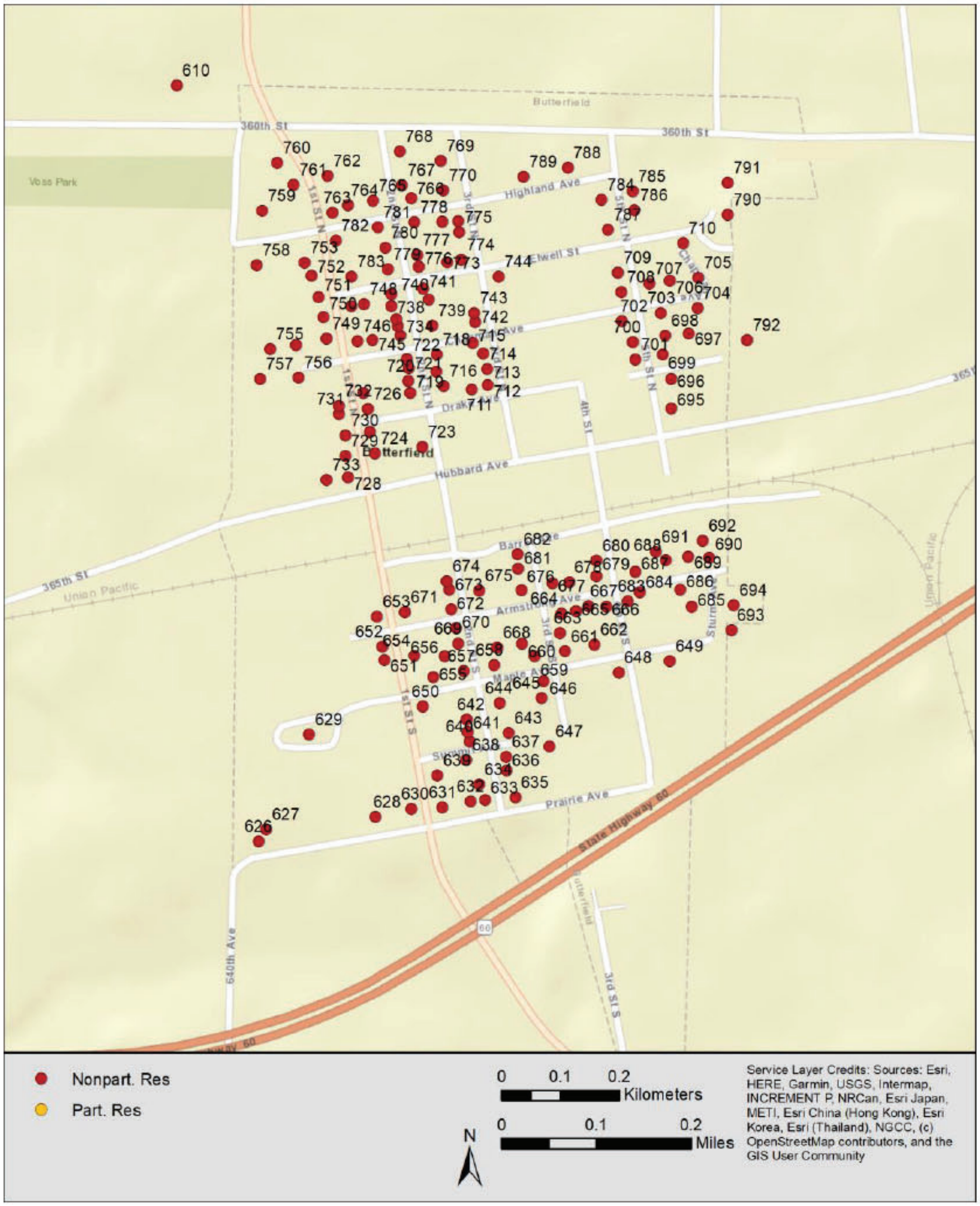

FIGURE 37: MAP OF MODELED RECEPTORS (BUTTERFIELD AREA)

TABLE 13: MODELED RECEIVER RESULTS, WITH AND WITHOUT BACKGROUND SOUND LEVELS (L_{50})

Rec. ID	Status	Vestas V162 @ 119m					GE-158 LNTE @ 117 m					Nordex N 163 LNTE @ 118m					Coordinates (UTM NAD83 Z15N)		
		Modeled Turbine-Only Sound Level (L50, dBA)	Combined Background + Modeled SPL (L50, dBA)				Modeled Turbine-Only Sound Level (L50, dBA)	Combined Background + Modeled SPL (L50, dBA)				Modeled Turbine-Only Sound Level (L50, dBA)	Combined Background + Modeled SPL (L50, dBA)						
			35 dBA Background	40 dBA Background	45 dBA Background	50 dBA Background		35 dBA Background	40 dBA Background	45 dBA Background	50 dBA Background		35 dBA Background	40 dBA Background	45 dBA Background	50 dBA Background	X (m)	Y (m)	Z (m)
0	Part.	45	45	46	48	51	45	45	46	48	51	43	44	45	47	51	352523	4870126	371
1	Part.	46	46	47	49	51	46	46	47	49	51	44	45	46	48	51	352429	4871159	374
2	Part.	46	46	47	48	51	46	46	47	49	51	44	45	46	48	51	352382	4871867	376
3	Part.	44	45	46	48	51	44	45	46	48	51	43	43	45	47	51	351503	4872768	376
4	Non-Part.	41	42	44	46	51	41	42	44	46	51	39	41	43	46	50	352444	4874389	367
5	Part.	44	45	46	48	51	45	45	46	48	51	43	43	45	47	51	352790	4871108	368
6	Part.	37	39	42	46	50	37	39	42	46	50	35	38	41	45	50	353923	4869212	371
7	Part.	43	44	45	47	51	43	44	45	47	51	41	42	44	47	51	354115	4870403	367
8	Part.	41	42	44	47	51	41	42	44	47	51	39	41	43	46	50	354060	4870950	368
9	Part.	39	40	42	46	50	39	40	42	46	50	37	39	42	46	50	354160	4871301	366
10	Part.	32	37	41	45	50	32	37	41	45	50	30	36	40	45	50	355786	4873825	353
11	Part.	35	38	41	45	50	35	38	41	45	50	33	37	41	45	50	355611	4872760	356
12	Part.	36	39	42	46	50	36	39	42	46	50	35	38	41	45	50	355788	4871518	360
13	Part.	35	38	41	45	50	35	38	41	45	50	33	37	41	45	50	355093	4871103	361
14	Part.	27	36	40	45	50	27	36	40	45	50	25	35	40	45	50	357338	4869349	358
15	Part.	40	41	43	46	50	40	41	43	46	50	38	40	42	46	50	356120	4872599	354
16	Part.	45	45	46	48	51	45	46	46	48	51	43	44	45	47	51	356660	4872537	351
17	Part.	23	35	40	45	50	24	35	40	45	50	22	35	40	45	50	337669	4877954	411

Rec. ID	Status	Vestas V162 @ 119m					GE-158 LNTE @ 117 m					Nordex N 163 LNTE @ 118m					Coordinates (UTM NAD83 Z15N)		
		Modeled Turbine-Only Sound Level (L50, dBA)	Combined Background + Modeled SPL (L50, dBA): 35 dBA Background	40 dBA Background	45 dBA Background	50 dBA Background	Modeled Turbine-Only Sound Level (L50, dBA)	Combined Background + Modeled SPL (L50, dBA): 35 dBA Background	40 dBA Background	45 dBA Background	50 dBA Background	Modeled Turbine-Only Sound Level (L50, dBA)	Combined Background + Modeled SPL (L50, dBA): 35 dBA Background	40 dBA Background	45 dBA Background	50 dBA Background	X (m)	Y (m)	Z (m)
18	Part.	27	36	40	45	50	28	36	40	45	50	26	36	40	45	50	339916	4878129	402
19	Part.	38	40	42	46	50	38	40	42	46	50	36	38	41	46	50	344680	4878049	371
20	Part.	26	36	40	45	50	27	36	40	45	50	25	35	40	45	50	338203	4877119	404
21	Part.	30	36	40	45	50	30	36	40	45	50	28	36	40	45	50	339845	4877128	410
22	Part.	34	38	41	45	50	35	38	41	45	50	33	37	41	45	50	341306	4876736	397
23	Part.	33	37	41	45	50	33	37	41	45	50	31	37	41	45	50	341423	4877202	398
24	Part.	40	41	43	46	50	40	41	43	46	50	38	40	42	46	50	342686	4876113	391
25	Part.	43	44	45	47	51	43	44	45	47	51	41	42	44	47	51	344526	4876919	377
26	Part.	46	46	47	48	51	46	46	47	48	51	44	44	45	47	51	344063	4876099	380
27	Part.	41	42	43	46	50	41	42	43	46	50	39	40	43	46	50	343489	4876121	387
28	Part.	46	46	47	49	51	46	47	47	49	52	44	45	46	48	51	346045	4877547	371
29	Part.	46	46	47	48	51	46	46	47	48	51	44	44	45	47	51	346121	4876467	371
30	Part.	46	46	47	48	51	46	46	47	48	51	44	44	45	47	51	346133	4876425	370
32	Part.	43	43	45	47	51	43	43	45	47	51	41	42	44	46	51	347732	4877194	369
33	Part.	45	46	47	48	51	46	46	47	48	51	44	44	45	47	51	347298	4877275	366
34	Part.	44	45	46	48	51	44	45	46	48	51	43	43	44	47	51	346577	4876037	372
35	Part.	45	46	46	48	51	45	46	46	48	51	43	44	45	47	51	347426	4876019	373
36	Non-Part.	37	39	42	46	50	37	39	42	46	50	36	38	41	45	50	351171	4875823	368
37	Non-Part.	37	39	42	46	50	37	39	42	46	50	35	38	41	45	50	351159	4875846	368
38	Part.	29	36	40	45	50	29	36	40	45	50	27	36	40	45	50	336591	4874598	421
39	Part.	42	42	44	47	51	42	42	44	47	51	40	41	43	46	50	340973	4874461	405
40	Part.	43	44	45	47	51	43	44	45	47	51	41	42	44	47	51	341151	4874584	403

Rec. ID	Status	Vestas V162 @ 119m					GE-158 LNTE @ 117 m					Nordex N 163 LNTE @ 118m					Coordinates (UTM NAD83 Z15N)		
		Modeled Turbine-Only Sound Level (L50, dBA)	Combined Background + Modeled SPL (L50, dBA)				Modeled Turbine-Only Sound Level (L50, dBA)	Combined Background + Modeled SPL (L50, dBA)				Modeled Turbine-Only Sound Level (L50, dBA)	Combined Background + Modeled SPL (L50, dBA)						
			35 dBA Background	40 dBA Background	45 dBA Background	50 dBA Background		35 dBA Background	40 dBA Background	45 dBA Background	50 dBA Background		35 dBA Background	40 dBA Background	45 dBA Background	50 dBA Background	X (m)	Y (m)	Z (m)
41	Part.	34	38	41	45	50	34	38	41	45	50	33	37	41	45	50	340476	4876025	401
42	Part.	45	45	46	48	51	45	45	46	48	51	43	44	45	47	51	342874	4874531	402
44	Part.	46	46	47	49	51	46	46	47	49	51	44	45	46	48	51	346003	4874437	382
45	Part.	44	45	46	48	51	44	45	46	48	51	42	43	44	47	51	344951	4875368	382
46	Part.	42	43	44	47	51	42	43	44	47	51	41	42	43	46	50	347229	4874434	376
47	Part.	44	45	45	48	51	44	45	45	48	51	42	43	44	47	51	348113	4874596	373
48	Part.	45	46	46	48	51	45	46	47	48	51	44	44	45	47	51	348826	4874772	374
49	Part.	42	42	44	47	51	42	42	44	47	51	40	41	43	46	50	350906	4875206	373
50	Part.	37	39	42	46	50	37	39	42	46	50	35	38	41	45	50	336518	4873233	428
51	Part.	40	41	43	46	50	40	41	43	46	50	38	40	42	46	50	336426	4872830	427
52	Part.	38	40	42	46	50	38	40	42	46	50	36	39	41	46	50	339628	4872846	407
53	Part.	42	43	44	47	51	42	43	44	47	51	40	41	43	46	50	339152	4872589	407
54	Part.	44	44	45	47	51	44	44	45	47	51	42	43	44	47	51	342284	4872991	402
55	Part.	43	44	45	47	51	43	44	45	47	51	42	42	44	47	51	343385	4872908	401
56	Part.	43	44	45	47	51	43	44	45	47	51	41	42	44	47	51	346021	4873868	385
57	Part.	42	43	44	47	51	42	43	44	47	51	40	41	43	46	50	347619	4874180	376
58	Part.	42	43	44	47	51	42	43	44	47	51	40	41	43	46	50	347637	4873755	377
59	Part.	43	44	45	47	51	44	44	45	47	51	42	43	44	47	51	347374	4873197	382
60	Part.	43	44	45	47	51	43	44	45	47	51	41	42	44	47	51	350141	4872674	375
61	Part.	42	43	44	47	51	42	43	44	47	51	40	42	43	46	50	350439	4872803	375
62	Part.	42	43	44	47	51	42	43	44	47	51	40	41	43	46	50	350460	4872763	374
63	Part.	28	36	40	45	50	28	36	40	45	50	26	36	40	45	50	334966	4871532	437
64	Part.	36	38	41	45	50	36	38	41	45	50	34	37	41	45	50	336130	4871707	431

Rec. ID	Status	Vestas V162 @ 119m					GE-158 LNTE @ 117 m					Nordex N 163 LNTE @ 118m					Coordinates (UTM NAD83 Z15N)		
		Modeled Turbine-Only Sound Level (L50, dBA)	Combined Background + Modeled SPL (L50, dBA)				Modeled Turbine-Only Sound Level (L50, dBA)	Combined Background + Modeled SPL (L50, dBA)				Modeled Turbine-Only Sound Level (L50, dBA)	Combined Background + Modeled SPL (L50, dBA)						
			35 dBA Background	40 dBA Background	45 dBA Background	50 dBA Background		35 dBA Background	40 dBA Background	45 dBA Background	50 dBA Background		35 dBA Background	40 dBA Background	45 dBA Background	50 dBA Background	X (m)	Y (m)	Z (m)
65	Part.	37	39	42	46	50	37	39	42	46	50	35	38	41	45	50	336802	4871389	431
66	Part.	38	40	42	46	50	38	40	42	46	50	36	38	41	46	50	336866	4871494	429
67	Part.	39	40	42	46	50	39	40	42	46	50	37	39	42	46	50	337877	4872372	417
68	Part.	43	43	45	47	51	43	43	45	47	51	41	42	43	46	51	339605	4871738	408
69	Part.	35	38	41	45	50	35	38	41	45	50	33	37	41	45	50	340748	4871519	401
70	Part.	35	38	41	45	50	35	38	41	45	50	33	37	41	45	50	341312	4871350	398
71	Part.	44	44	45	47	51	44	44	45	47	51	42	43	44	47	51	342830	4872120	401
72	Part.	43	44	45	47	51	43	44	45	47	51	41	42	44	47	51	344389	4872311	399
73	Part.	40	41	43	46	50	40	41	43	46	50	38	40	42	46	50	346342	4871655	390
74	Part.	47	47	47	49	52	47	47	48	49	52	45	45	46	48	51	347938	4872183	383
75	Part.	43	44	45	47	51	43	44	45	47	51	42	42	44	47	51	349417	4872460	378
76	Part.	45	46	46	48	51	45	46	46	48	51	43	44	45	47	51	349669	4871388	380
77	Part.	33	37	41	45	50	33	37	41	45	50	31	36	40	45	50	336487	4870827	431
78	Part.	39	40	42	46	50	39	40	42	46	50	37	39	42	46	50	338000	4869923	424
79	Part.	39	40	42	46	50	39	40	42	46	50	37	39	42	46	50	338000	4869923	424
80	Part.	34	38	41	45	50	34	38	41	45	50	33	37	41	45	50	341142	4870860	404
81	Part.	35	38	41	45	50	35	38	41	45	50	33	37	41	45	50	341279	4870990	403
82	Part.	35	38	41	45	50	35	38	41	45	50	33	37	41	45	50	342281	4870098	405
83	Part.	44	45	46	48	51	44	45	46	48	51	43	43	45	47	51	344122	4870798	398
84	Part.	45	45	46	48	51	45	45	46	48	51	43	44	45	47	51	344360	4869798	400
85	Part.	43	44	45	47	51	43	44	45	47	51	41	42	44	47	51	344353	4869692	397
86	Part.	41	42	44	47	51	41	42	44	46	51	39	41	43	46	50	346127	4870164	397
87	Part.	44	44	45	47	51	44	44	45	47	51	42	43	44	47	51	346682	4870947	393

Rec. ID	Status	Vestas V162 @ 119m					GE-158 LNTE @ 117 m					Nordex N 163 LNTE @ 118m					Coordinates (UTM NAD83 Z15N)		
		Modeled Turbine-Only Sound Level (L50, dBA)	Combined Background + Modeled SPL (L50, dBA)				Modeled Turbine-Only Sound Level (L50, dBA)	Combined Background + Modeled SPL (L50, dBA)				Modeled Turbine-Only Sound Level (L50, dBA)	Combined Background + Modeled SPL (L50, dBA)						
			35 dBA Background	40 dBA Background	45 dBA Background	50 dBA Background		35 dBA Background	40 dBA Background	45 dBA Background	50 dBA Background		35 dBA Background	40 dBA Background	45 dBA Background	50 dBA Background	X (m)	Y (m)	Z (m)
88	Part.	45	46	46	48	51	45	46	47	48	51	44	44	45	47	51	347586	4870582	390
89	Part.	45	45	46	48	51	45	45	46	48	51	43	44	45	47	51	346980	4869652	395
90	Part.	46	46	47	48	51	46	46	47	48	51	44	45	45	48	51	346633	4869395	397
91	Part.	42	42	44	47	51	42	42	44	47	51	40	41	43	46	50	350747	4870134	379
92	Part.	45	45	46	48	51	45	45	46	48	51	43	44	45	47	51	350980	4870668	378
93	Part.	33	37	41	45	50	33	37	41	45	50	32	37	41	45	50	338684	4868796	425
94	Part.	34	37	41	45	50	34	37	41	45	50	32	37	41	45	50	338712	4868821	425
95	Part.	34	38	41	45	50	34	37	41	45	50	32	37	41	45	50	338858	4868915	423
96	Part.	33	37	41	45	50	33	37	41	45	50	31	37	41	45	50	339533	4868625	411
97	Part.	35	38	41	45	50	35	38	41	45	50	33	37	41	45	50	339769	4869422	404
98	Part.	32	37	41	45	50	32	37	41	45	50	30	36	40	45	50	341105	4869168	409
99	Part.	32	37	41	45	50	32	37	41	45	50	30	36	40	45	50	341155	4868800	412
100	Part.	32	37	41	45	50	32	37	41	45	50	30	36	40	45	50	342192	4868804	408
101	Part.	33	37	41	45	50	33	37	41	45	50	32	37	41	45	50	343071	4868728	404
102	Part.	35	38	41	45	50	35	38	41	45	50	33	37	41	45	50	344109	4868502	402
103	Part.	35	38	41	45	50	35	38	41	45	50	33	37	41	45	50	344081	4868518	403
104	Part.	36	38	41	45	50	36	38	41	45	50	34	37	41	45	50	344140	4868696	400
105	Part.	36	38	41	45	50	36	38	41	46	50	34	38	41	45	50	344353	4868681	387
106	Part.	37	39	42	46	50	37	39	42	46	50	35	38	41	45	50	345320	4868463	391
107	Part.	36	39	42	46	50	36	39	42	46	50	35	38	41	45	50	345147	4868312	398
108	Part.	46	46	47	48	51	46	46	47	49	51	44	45	46	48	51	346879	4868012	396
109	Part.	46	46	47	48	51	46	46	47	48	51	44	44	45	47	51	347898	4868294	396
110	Part.	43	43	44	47	51	43	43	45	47	51	41	42	43	46	50	339746	4867346	419

Rec. ID	Status	Vestas V162 @ 119m: Modeled Turbine-Only Sound Level (L50, dBA)	Vestas V162 @ 119m: Combined Background + Modeled SPL (L50, dBA)				GE-158 LNTE @ 117 m: Modeled Turbine-Only Sound Level (L50, dBA)	GE-158 LNTE @ 117 m: Combined Background + Modeled SPL (L50, dBA)				Nordex N 163 LNTE @ 118m: Modeled Turbine-Only Sound Level (L50, dBA)	Nordex N 163 LNTE @ 118m: Combined Background + Modeled SPL (L50, dBA)				Coordinates (UTM NAD83 Z15N)		
			35 dBA Background	40 dBA Background	45 dBA Background	50 dBA Background		35 dBA Background	40 dBA Background	45 dBA Background	50 dBA Background		35 dBA Background	40 dBA Background	45 dBA Background	50 dBA Background	X (m)	Y (m)	Z (m)
111	Part.	42	43	44	47	51	42	43	44	47	51	40	41	43	46	50	339927	4866608	423
112	Part.	38	40	42	46	50	38	40	42	46	50	36	38	41	45	50	340942	4866660	417
113	Part.	30	36	40	45	50	31	36	40	45	50	29	36	40	45	50	342343	4867290	403
114	Part.	30	36	40	45	50	31	36	40	45	50	29	36	40	45	50	342365	4867276	404
115	Part.	29	36	40	45	50	29	36	40	45	50	27	36	40	45	50	343118	4866540	408
116	Non-Part.	34	38	41	45	50	34	38	41	45	50	33	37	41	45	50	347271	4866472	395
117	Non-Part.	35	38	41	45	50	35	38	41	45	50	34	37	41	45	50	347952	4866662	398
118	Non-Part.	28	36	40	45	50	29	36	40	45	50	27	36	40	45	50	352799	4866793	386
119	Non-Part.	31	36	40	45	50	31	36	41	45	50	29	36	40	45	50	350835	4866871	392
120	Non-Part.	32	37	41	45	50	32	37	41	45	50	30	36	40	45	50	349596	4866355	394
121	Non-Part.	32	37	41	45	50	32	37	41	45	50	31	36	40	45	50	349422	4866374	394
122	Part.	33	37	41	45	50	33	37	41	45	50	31	37	41	45	50	349103	4866475	394
123	Non-Part.	35	38	41	45	50	35	38	41	45	50	33	37	41	45	50	349213	4866873	392
124	Non-Part.	36	39	41	46	50	36	39	41	46	50	34	38	41	45	50	349228	4867141	396
125	Non-Part.	32	37	41	45	50	32	37	41	45	50	30	36	40	45	50	350713	4867207	390
126	Non-Part.	32	37	41	45	50	32	37	41	45	50	30	36	40	45	50	352670	4867794	383
127	Non-Part.	31	36	41	45	50	31	37	41	45	50	29	36	40	45	50	353699	4867885	376
128	Non-Part.	35	38	41	45	50	35	38	41	45	50	33	37	41	45	50	352311	4868532	383
129	Non-Part.	34	37	41	45	50	34	37	41	45	50	32	37	41	45	50	350682	4868084	386

Rec. ID	Status	Vestas V162 @ 119m					GE-158 LNTE @ 117 m					Nordex N 163 LNTE @ 118m					Coordinates (UTM NAD83 Z15N)		
		Modeled Turbine-Only Sound Level (L50, dBA)	Combined Background + Modeled SPL (L50, dBA)				Modeled Turbine-Only Sound Level (L50, dBA)	Combined Background + Modeled SPL (L50, dBA)				Modeled Turbine-Only Sound Level (L50, dBA)	Combined Background + Modeled SPL (L50, dBA)						
			35 dBA Background	40 dBA Background	45 dBA Background	50 dBA Background		35 dBA Background	40 dBA Background	45 dBA Background	50 dBA Background		35 dBA Background	40 dBA Background	45 dBA Background	50 dBA Background	X (m)	Y (m)	Z (m)
130	Non-Part.	39	41	43	46	50	39	41	43	46	50	38	40	42	46	50	353023	4869360	377
131	Non-Part.	37	39	42	46	50	37	39	42	46	50	35	38	41	45	50	350592	4869202	386
132	Non-Part.	37	39	42	46	50	37	39	42	46	50	35	38	41	45	50	346440	4867166	399
133	Non-Part.	37	39	42	46	50	37	39	42	46	50	35	38	41	45	50	346470	4867238	398
134	Non-Part.	36	38	41	45	50	36	38	41	45	50	34	38	41	45	50	345927	4867324	399
135	Non-Part.	36	38	41	45	50	36	38	41	45	50	34	37	41	45	50	345925	4867282	400
136	Non-Part.	36	38	41	45	50	36	38	41	45	50	34	37	41	45	50	345907	4867282	400
137	Non-Part.	36	38	41	46	50	36	38	41	46	50	34	38	41	45	50	345913	4867372	398
138	Non-Part.	36	39	41	46	50	36	39	41	46	50	34	38	41	45	50	345950	4867371	398
139	Non-Part.	36	39	42	46	50	36	39	42	46	50	35	38	41	45	50	345940	4867443	397
140	Non-Part.	36	39	42	46	50	36	39	42	46	50	34	38	41	45	50	345907	4867442	397
141	Non-Part.	36	39	41	46	50	36	39	41	46	50	34	38	41	45	50	345865	4867455	398
142	Non-Part.	36	39	41	46	50	36	39	41	46	50	34	38	41	45	50	345847	4867444	398
143	Non-Part.	36	38	41	46	50	36	38	41	46	50	34	38	41	45	50	345820	4867444	398
144	Non-Part.	36	38	41	45	50	36	38	41	46	50	34	38	41	45	50	345860	4867395	398
145	Non-Part.	36	38	41	45	50	36	38	41	45	50	34	38	41	45	50	345824	4867406	398
146	Non-Part.	36	38	41	45	50	36	38	41	45	50	34	37	41	45	50	345879	4867329	399
147	Non-Part.	36	38	41	45	50	36	38	41	45	50	34	37	41	45	50	345930	4867261	400

Rec. ID	Status	Vestas V162 @ 119m					GE-158 LNTE @ 117 m					Nordex N 163 LNTE @ 118m					Coordinates (UTM NAD83 Z15N)		
		Modeled Turbine-Only Sound Level (L50, dBA)	Combined Background + Modeled SPL (L50, dBA)				Modeled Turbine-Only Sound Level (L50, dBA)	Combined Background + Modeled SPL (L50, dBA)				Modeled Turbine-Only Sound Level (L50, dBA)	Combined Background + Modeled SPL (L50, dBA)						
			35 dBA Background	40 dBA Background	45 dBA Background	50 dBA Background		35 dBA Background	40 dBA Background	45 dBA Background	50 dBA Background		35 dBA Background	40 dBA Background	45 dBA Background	50 dBA Background	X (m)	Y (m)	Z (m)
148	Non-Part.	37	39	42	46	50	37	39	42	46	50	35	38	41	45	50	345942	4867487	396
149	Non-Part.	37	39	42	46	50	37	39	42	46	50	35	38	41	45	50	345944	4867530	396
150	Non-Part.	37	39	42	46	50	37	39	42	46	50	35	38	41	45	50	345945	4867560	396
151	Non-Part.	37	39	42	46	50	37	39	42	46	50	35	38	41	45	50	345946	4867582	395
152	Non-Part.	37	39	42	46	50	37	39	42	46	50	35	38	41	45	50	345912	4867536	396
153	Non-Part.	37	39	42	46	50	37	39	42	46	50	35	38	41	45	50	345886	4867537	396
154	Non-Part.	37	39	42	46	50	37	39	42	46	50	35	38	41	45	50	345861	4867583	395
155	Non-Part.	36	39	42	46	50	36	39	42	46	50	35	38	41	45	50	345819	4867579	396
156	Non-Part.	36	39	41	46	50	36	39	41	46	50	34	38	41	45	50	345748	4867576	396
157	Non-Part.	36	38	41	46	50	36	39	41	46	50	34	38	41	45	50	345815	4867464	398
158	Non-Part.	42	43	44	47	51	42	43	44	47	51	40	41	43	46	50	346580	4867902	395
159	Non-Part.	41	42	43	46	50	41	42	43	46	50	39	40	42	46	50	352621	4869576	376
160	Non-Part.	42	43	44	47	51	42	43	44	47	51	40	41	43	46	50	351577	4874192	382
161	Non-Part.	22	35	40	45	50	22	35	40	45	50	20	35	40	45	50	335051	4875960	428
162	Non-Part.	33	37	41	45	50	33	37	41	45	50	31	37	41	45	50	349402	4878386	368
163	Non-Part.	33	37	41	45	50	33	37	41	45	50	31	36	41	45	50	349614	4878299	368
164	Non-Part.	26	35	40	45	50	27	36	40	45	50	24	35	40	45	50	343773	4865177	408
165	Non-Part.	25	35	40	45	50	26	36	40	45	50	24	35	40	45	50	342515	4864903	416