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Sent: Tuesday, August 25, 2020 12:43 PM
To: Monroe, Pamela <Pamela.Monroe@sec.nh.gov>
Subject: AWE Sound Measurement--July 26, 2020

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Dear Ms. Monroe,

Attached is our report of measurements of AWE wind farm sound conducted on July 26, 2020 at 80 and 88 Reed Carr Road, Antrim, NH. Please let us know if you need any further information. Thank you.

Greg.

Gregory C. Tocci

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August 24, 2020

Ms. Pamela G. Monroe, *Administrator*
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Subject: Antrim Wind Energy
July 26, 2020 Measurements
80 & 88 Reed Carr Road

Dear Ms. Monroe,

Cavanaugh Tocci has been retained by the New Hampshire Site Evaluation Committee to measure sound during conditions similar to those when residents at 80 and 88 Reed Carr Road previously complained of sound produced by Antrim Wind Energy (AWE) wind turbines. AWE operating conditions were achieved during the period 6:00-10:45 PM, Sunday, July 26, 2020. Measurements were made conforming to NH Code Admin. R. Site 301.18. Measured sound level data are presented below and have been evaluated for AWE conformance with NH Code Admin. R. Site 301.14(f)(2a) limits.

Measurement Conditions

During the 6:00 PM to 10:40 PM, Sunday, July 26, 2020 sound monitoring period the following AWE operating conditions were achieved:

- Hub-height wind speeds were 7.0 m/s or higher at all turbines for the entire sound monitoring period.
- Wind direction at all turbines during measurements was between 200 to 300 degrees (North = 0 degree) and averaged between 255 and 278 degrees.
- Electrical power generation was at least 0.985 MW per turbine (8.87 MW total).
 - The 0.985 MW per turbine value corresponds to the threshold at which the turbines produce full sound power, 106.0 dBA re: 1 pW.
 - During wind turbine operations, average total electrical power generated varied between 11.4 and 28.3 MW.
 - AWE operations data is logged in 10-minute intervals. Between 6:30 PM and 7:50 PM, wind turbines T1-T4 were shutdown for varying amounts of time to limit shadow flicker. These are the furthest turbines from sound monitoring locations. Their shutting down had no measurable effect on monitoring. At all other times, except during the AWE

shutdown from 9:00 to 9:30 PM, all turbines produced 0.985 MW or more electrical power.

- Ambient temperature at the microphone locations exceeded 15 degrees F.
- There was no precipitation.

Measurements

Two Bruel & Kjaer 2250 IEC Class 1 sound level meters (Cavanaugh Tocci identified as B-1 and B-3) were used for sound level measurements. These were:

- Tripod-mounted and fitted with windscreens, and a calibration tone recorded in the data using a Bruel & Kjaer Type 4231 calibrator.
- Microphones were mounted 1.5 m above the grade and greater than 7.5 m from buildings and other reflecting surfaces. Microphones were connected to analyzers by 10-meter cables to isolate observers during measurements.
- At 80 Reed Carr Road, a Davis VantageVUE system weather station was installed and measured wind speed near the microphone during sound measurements.
- Sound level analyzers measured the following:
 - A- and C-weighted 5-min equivalent sound levels ($LA_{eq,5-min}$ and $LC_{eq,5-min}$) from which the corresponding hourly levels have been computed.
 - A- and C-weighted 5-min 10th percentile sound levels ($LAF_{10,5-min}$ measured and $LCF_{10,5-min}$ computed from one-third octave band un-weighted 10th percentile sound levels).
 - A- and C-weighted 5-min 90th percentile sound levels ($LAF_{90,5-min}$ measured and $LCF_{90,5-min}$ computed from one-third octave band un-weighted 90th percentile sound levels)
 - A-weighted 100-ms equivalent sound levels ($LA_{eq,100-ms}$)

Data Analysis

Wind Turbine Sound Limits

Appendix A of this report contains a listing of all data relevant to evaluating compliance of AWE sound at 80 and 88 Reed Carr Road with N.H. Admin. R., Site 301.14(f)(2a) which is as follows:

“With respect to sound standards, the A-weighted equivalent sound levels produced by the applicant’s energy facility during operations shall not exceed the greater of 45 dBA or 5 dBA above background levels, measured at the L-90 sound level, between the hours of 8:00 a.m. and 8:00 p.m. each day, and the greater of 40 dBA or 5 dBA above background levels, measured at the L-90 sound level, at all other times during each day, as measured using microphone placement at least 7.5 meters from any surface where reflections may influence measured

sound pressure levels, on property that is used in whole or in part for permanent or temporary residential purposes, at a location between the nearest building on the property used for such purposes and the closest wind turbine...”

Data Presentation

Appendix A data are listed in 12 columns for 80 Reed Carr Road and 13 columns for 88 Reed Carr Road. Data in these columns are as follows:

Column 1 lists 5-minute start times from 6:00 PM to 8:55 PM, July 26, 2020 in Table A-1 and A-3, and 9:00 PM to 10:30 PM in Table A-2 and A-4.

Column 2 notes the presence of identifiable transients that could eliminate the corresponding 5-minute samples from the computation of the hourly equivalent sound level ($LA_{eq,1-hr}$).

Column 3 are the measured 5-minute A-weighted equivalent sound levels ($LA_{eq,5-min}$) used to compute the hourly A-weighted equivalent sound levels ($LA_{eq,1-hr}$) in column 4.

Column 5 are the measured 5-minute C-weighted equivalent sound levels ($LC_{eq,5-min}$) used to compute the hourly C-weighted equivalent sound levels ($LC_{eq,1-hr}$) in column 6.

Columns 7 and 8 are the measured 5-minute 10th and 90th percentile A-weighted sound levels. Wind turbine sound is nominally steady, i.e. varies only a small amount during measurement intervals. The ANSI S12.9 Part 3 §6.5(b)(1) definition of “steady sound” was used to identify those 5-minute intervals when non-steady sound, mostly wind-driven foliage sound, was a significant contributor to measured levels. This test was used to identify when intrusive sound was presumed to mask steady AWE sound. The test was used by Acentech in its winter 2020 measurements and described in its May 12, 2020 report¹. The method is not cited in the NH SEC Rules, but is a recognized ANSI standard² means for identifying circumstances when otherwise steady sound may be masked by non-steady intrusive sound. In Appendix A tables, all measurement intervals are noted as “void” in column 9, i.e. the arithmetic difference between 10th and 90th percentile sound levels exceed 3 dB resulting from the presence of wind-driven foliage sound and other transient sounds, for example, vehicles on Route 9.

Columns 10 and 11 list 5-min 10th and 90th percentile C-weighted sound levels.

Column 12 presents notes regarding AWE turbine operations and indicates that all turbines were not operating during the period 9:00 PM to 9:30 PM.

Columns 13-15 at 80 Reed Carr and Columns 13-14 at 88 Reed Carr indicate when and in which 1/3 octave bands that tones occurred as defined by ANSI S12.9 Part 4 Annex C. Tones, when they occurred, were in the 5000 Hz and higher 1/3 octave bands and were produced by local insect activity.

¹ Acentech Report 482 Antrim Wind Farm—Post Construction Sound Monitoring Winter 2020 dated May 12, 2020

² ANSI S12.9 PART 3 §6.5(B)(1)

Background Sound

Originally, it was intended that background sound levels measured during the 9:00-9:30 PM period, when all AWE wind turbines were shutdown, would be subtracted from levels with turbines operating to determined wind turbine-only sound levels. It is the wind turbine-only sound levels that must conform to Site 301.14(f)(2a) limits. However, because of changes in wind-driven foliage noise, background conditions without turbines operating were noisier than later periods when turbines were operating. Hence, the turbine-off sound levels could not be used to remove background sound from data measured with turbines operating.

Windscreen Noise

5-minute average wind speed near the microphone at 80 Reed Carr Road varied between 0 m/s in the latter part of the evening to as high as 1.3 m/s (2.9 mph) with gusts as high as 5.8 m/s (13 mph) earlier on. Average windscreen generated sound³ at the microphone according to Bruel & Kjaer and Hessler *et al*⁴ would be less than 20 dBA at wind speeds of 1.3 m/s and lower. At the maximum observed wind gust speed of 5.8 m/s, the maximum sound level could be as high as 40-50 dBA.

To provide perspective, when the average wind speed reached 1.3 m/s during the 8:35 and 8:40 PM 5-min samples, the average sound level ($LA_{eq,5-min}$) reached 47 and 46 dBA, respectively, well over windscreen generated sound of 20 dBA. When wind gusts at the microphone reached 5.8 m/s within the 8:30 PM 5-min sample, the $LAF_{10,5-min}$ was 65 dBA, well over the windscreen generated sound level of 40-50 dBA. Hence, windscreen generated sound levels are well below sound in the ambient and did not contribute significantly to measured sound levels. The conclusion reached regarding windscreen generated noise at the microphone for the installation at 80 Reed Carr Road, we expect applies at the 88 Reed Carr Road microphone as well.

Note that wind speed at the microphone was not indicative of wind speeds through foliage that produced sound in the environment.

Evaluation

The following considers the data within the framework of the NH SEC Rule complicated by wind-driven foliage noise that contributed significantly to sound measured at both locations.

From the Rule, the nighttime (8:00 PM to 8:00 AM) limit is “...the *greater of 40 dBA or 5 dBA above background levels, measured at the L-90 sound level...*” The backgrounds (average measured $LAF_{90,5-min}$) measured during AWE shutdown were:

- 46 dBA at 80 Reed Carr Road corresponding to a limit of 51 dBA.

³ The term “windscreen generated noise” has been used to distinguish between wind-driven foliage sound and sound generated by wind blowing over the microphone fitted with a foam windscreen.

⁴ G.F. Hessler, D.M. Hessler, P. Brandstatt, K. Bay, “Experimental study to determine wind-induced noise and windscreen attenuation effects on microphone response for environmental wind turbine and other applications,” Noise Control Eng. J. 56(f), July-Aug 2008, pp 300-309.

- 46 dBA at 88 Reed Carr Road again, corresponding to a limit of 51 dBA

Measured sound levels ($LA_{eq,5-min}$) with AWE operating during the quieter part of the evening between 10:00 and 10:45 PM, after foliage sound subsided but still present, were:

- 42 dBA at 80 Reed Carr Road
- 40 dBA at 88 Reed Carr Road.

Owing to wind-driven foliage sound, sound levels measured without the turbines operating during the 9:00-9:30 PM shutdown were higher than with all turbines operating between 10:00 and 10:45 PM at both 80 and 88 Reed Carr Road. Hence, it is not possible to subtract the background during turbine shutdown from sound levels with all turbines operating to determine turbine-only sound levels. However, owing to the several 5-minute samples being below 40 dBA, it is highly likely that AWE turbine sound with all turbines operating at the condition when complaints occurred produced sound levels at 80 and 88 Reed Carr Road at or below 40 dBA, thus complying with the N.H. Admin. R., Site 301.14(f)(2)a rule.

In accordance with the ANSI S12.18 Part 3 §6.5(b)(1) test for steady noise, noise measured during all 5-minute samples was not steady suggesting that other non-steady sound predominated over steady AWE turbine noise in all samples.

In accordance with ANSI S12.9 Part 4 Annex C, sound during many 5-minute samples contained tonal components at frequencies of 5,000 Hz and higher, observed to be produced by insect activity.

Conclusion

Between 6:00 and 10:45 PM, Cavanaugh Tocci measured sound levels at 80 and 88 Reed Carr Road during Antrim Wind Energy operating conditions when residents previously complained of wind turbine noise. Based on these measurements, the following are concluded:

- AWE wind turbine sound is expected to be steady as defined by ANSI S12.18 Part 3 §6.5(b)(1). All 5-minute samples measured were determined to be non-steady, verifying the observation that wind-driven foliage noise was a significant contributor to all measured samples at both 80 and 88 Reed Carr Road.
- Because of wind-driven foliage noise during the AWE wind farm shutdown from 9:00-9:30 PM, turbine shutdown sound levels could not be used to remove background sound from measurements made with all turbines operating.
- However, many 5-minute samples were noted to be below 40 dBA after winds subsided. Hence, it is likely that AWE wind turbine sound during conditions when complaints occurred are less than 40 dBA. Accordingly, it is our opinion that AWE wind turbine sound likely conforms to limits of NH Code Admin. R. Site 301.14(f)(2a).

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- Except for sound produced by insects, measured sound levels did not exhibit audible tones produced by AWE wind turbines (audible tones as defined by ANSI S12.9 Part 4 Annex C) as prohibited by NH Code Admin. R. Site 301.18(h).
- Wind at the microphone fitted with foam windscreens did not generate sound contributing to measured sound levels.

* * *

Please let us know if we can provide any further detail. Thank you.

Sincerely,
CAVANAUGH TOCCI



Gregory C. Tocci, *Sr. Principal Consultant*

20019 AWE July 26 2020 Monitoring 1b

Appendix A

**Measured Sound Levels
6:00-10:00 PM, July 26, 2020
80 & 88 Reed Carr Road
Antrim, New Hampshire**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Location: Buco residence, 80 Reed Carr Rd, Antrim, NH												ANSI S12.9 Part 4 Annex C		
Date: 26-Jul-20												Sounds w/ Tonal Content		
Pre-measurement Calibration: 94.0 dB @ 1000 Hz												ANSI S12.9 Part 3(6.5)(b)(1)		
Time	Transient?	LAeq,5-min	LAeq,1-hr	LCeq,5-min	LCeq,1-hr	LAF10,5-min	LAF90,5-min	LAF10-LAF90 =<3	LCF10,5-min	LCF90,5-min	Notes	Tone in 5000 Hz 1/3 Oct Band	Tone in 6300 Hz 1/3 Oct Band	Tone in 8000 Hz 1/3 Oct Band
6:00:00 PM		44.9	44.1	59.5	56.7	47.9	39.7	void	64.9	56.8	T9 paused to limit shadow flicker			
6:05:00 PM		40.9		54.7		42.9	38.3	void	61.1	56.2	T9 paused to limit shadow flicker			
6:10:00 PM		42.1		55.2		44.5	37.8	void	61.9	56.6				
6:15:00 PM		46.3		56.5		49.7	39.5	void	63.4	57.2				
6:20:00 PM		43.8		56.2		46.1	40.1	void	63.2	57.5				
6:25:00 PM		45.7		56.6		49.2	39.8	void	63.7	58.2				
6:30:00 PM		41.6		55.7		44.7	37.3	void	62.6	56.9	T2, T3 paused to limit shadow flicker			
6:35:00 PM		43.0		58.1		45.6	36.8	void	62.6	56.0	T2, T3 paused to limit shadow flicker			
6:40:00 PM		42.4		55.2		46.0	37.3	void	62.1	55.6	T2, T3 paused to limit shadow flicker			
6:45:00 PM		40.8		54.1		42.4	36.4	void	60.9	55.7	T1-T4 paused to limit shadow flicker			
6:50:00 PM		46.6		55.8		51.5	38.7	void	62.9	56.3	T1, T2, T4 paused to limit shadow flicker			
6:55:00 PM		46.0		59.2		48.9	40.3	void	65.9	56.0	T1, T2, T4 paused to limit shadow flicker			
7:00:00 PM		44.8	44.4	57.9	56.2	47.8	41.0	void	65.4	56.5	T1 paused to limit shadow flicker			
7:05:00 PM		41.8		50.5		45.5	33.6	void	56.0	49.0				tone
7:10:00 PM		40.5		51.3		45.3	34.2	void	58.2	50.9				
7:15:00 PM		37.0		50.9		38.9	34.1	void	58.2	52.4				
7:20:00 PM		39.2		51.9		42.5	34.8	void	57.6	51.9				
7:25:00 PM		43.8		58.0		47.8	37.1	void	64.5	53.7				
7:30:00 PM		43.8		55.8		46.4	39.5	void	63.8	57.3				
7:35:00 PM		43.6		56.8		47.0	37.9	void	63.7	57.5				
7:40:00 PM		44.3		57.5		47.5	40.5	void	64.9	60.0				
7:45:00 PM		45.8		57.8		48.8	39.9	void	66.7	59.7				
7:50:00 PM		46.2		57.9		50.1	40.3	void	65.5	59.9				
7:55:00 PM		49.4		57.9		52.3	45.2	void	65.8	59.7				
8:00:00 PM		47.2	46.3	56.8	57.8	50.7	41.0	void	64.3	58.6				
8:05:00 PM		44.7		59.9		47.4	39.9	void	64.9	59.4				
8:10:00 PM		44.5		57.5		47.4	40.1	void	65.1	59.2				
8:15:00 PM		46.6		58.5		50.4	40.8	void	68.2	60.4				
8:20:00 PM		44.4		57.5		47.0	40.4	void	65.7	60.0				
8:25:00 PM		46.5		58.2		49.6	42.2	void	65.4	59.7				
8:30:00 PM		47.4		57.5		50.6	42.8	void	65.2	59.7				
8:35:00 PM		47.1		57.2		50.5	39.6	void	64.9	59.3				
8:40:00 PM		45.8		57.9		50.2	41.0	void	66.0	60.0				
8:45:00 PM		46.1		57.4		49.8	41.0	void	65.6	59.4				
8:50:00 PM		46.6		56.4		50.3	41.8	void	64.2	58.7				
8:55:00 PM		47.4		57.4		50.9	41.1	void	66.7	59.3				

Table A-1. Measured sound levels—6:00-9:00 PM, July 26, 2020 80 Reed Carr Road

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Date: 26-Jul-20		ANSI S12.9 Part 3(6.5)(b)(1)									ANSI S12.9 Part 4 Annex C Sounds w/ Tonal Content			
Time	Transient?	LAeq,5-min	LAeq,1-hr	LCeq,5-min	LCeq,1-hr	LAF10,5-min	LAF90,5-min	LAF10-LAF90 =<3	LCF10,5-min	LCF90,5-min	Notes	Tone in 5000 Hz 1/3 Oct Band	Tone in 6300 Hz 1/3 Oct Band	Tone in 8000 Hz 1/3 Oct Band
9:00:00 PM		42.0	45.7	50.0	56.1	44.7	38.3	void	60.5	44.5	Shutdown begins			
9:05:00 PM		44.8		52.6		47.9	40.2	void	58.8	46.0	Shutdown			
9:10:00 PM		47.1		51.0		50.1	42.3	void	60.7	47.1	Shutdown			
9:15:00 PM		49.0		56.1		52.0	43.1	void	67.1	46.3	Shutdown			
9:20:00 PM		47.1		53.7		50.4	42.1	void	60.9	45.2	Shutdown	tone		
9:25:00 PM		47.4	46.7	55.1		50.3	42.8	void	64.5	46.1	Shutdown	tone		
9:30:00 PM		44.8		47.4		47.8	40.7	void	53.8	44.1	Shutdown	tone		
9:35:00 PM		44.2		57.1		46.5	40.1	void	64.5	49.1	Shutdown	tone		
9:40:00 PM		44.4		57.6		46.4	40.9	void	65.2	58.5	Shutdown	tone		
9:45:00 PM		44.5		57.9		46.1	41.3	void	64.6	59.2	Shutdown	tone		
9:50:00 PM		45.6		60.9		48.7	40.6	void	66.4	59.7	T4 has faulted between 21:37 to 21:49	tone		
9:55:00 PM		42.8		57.1		44.8	39.5	void	64.8	59.6		tone		
10:00:00 PM		42.4	42.1	57.2	57.2	44.1	39.2	void	64.3	59.5		tone		
10:05:00 PM		42.1		56.9		44.1	39.5	void	64.4	59.3		tone		
10:10:00 PM		42.7		58.5		46.7	37.4	void	65.6	59.7				
10:15:00 PM		39.0		57.3		41.0	36.4	void	64.6	59.1				
10:20:00 PM		40.3		56.4		42.4	36.8	void	64.1	58.9				
10:25:00 PM		40.8		56.8		42.3	38.0	void	64.2	58.9		tone		
10:30:00 PM		41.9		57.7		44.6	38.8	void	65.5	58.8		tone		
10:35:00 PM		44.2		56.5		48.0	39.0	void	64.3	58.1		tone		
10:40:00 PM		43.1		57.2		46.1	39.0	void	64.0	58.3				

Table A-2. Measured sound levels—9:00-10:30 PM, July 26, 2020 80 Reed Carr Road

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Location: Morrison, 88 Reed Carr Road												ANSI S12.9 Part 4 Annex C	
Date: 26-Jul-20												Sounds w/ Tonal Content	
Pre-measurement Calibration: 93.7 dB @ 1000 Hz												ANSI S12.9 Part 3(6.5)(b)(1)	
Time	Transient?	LAeq,5-min	LAeq,1-hr	LCeq,5-min	LCeq,1-hr	LAF10,5-min	LAF90,5-min	LAF10-LAF90 = <3	LCF10,5-min	LCF90,5-min	Notes	Tone in 6300 Hz 1/3 Oct Band	Tone in 8000 Hz 1/3 Oct Band
6:00:00 PM		42.5	43.9	54.8	55.7	45.0	39.8	void	61.6	56.6	T9 paused to limit shadow flicker		tone
6:05:00 PM		43.3		54.5		46.3	39.9	void	61.1	56.0	T9 paused to limit shadow flicker		tone
6:10:00 PM		42.0		54.4		44.4	39.4	void	61.1	56.3			tone
6:15:00 PM		47.3		57.7		49.9	41.3	void	64.8	57.3			tone
6:20:00 PM		45.3		56.7		48.6	42.2	void	65.4	58.2			tone
6:25:00 PM		43.5		56.2		46.1	39.5	void	65.2	57.7			tone
6:30:00 PM	x										T2, T3 paused to limit shadow flicker		
6:35:00 PM		40.5		54.6		43.2	36.7	void	62.5	55.1	T2, T3 paused to limit shadow flicker		tone
6:40:00 PM		41.0		54.7		43.9	37.6	void	61.7	55.5	T2, T3 paused to limit shadow flicker		tone
6:45:00 PM		44.3		54.7		44.5	38.9	void	62.9	55.8	T1-T4 paused to limit shadow flicker		tone
6:50:00 PM		44.0		57.0		46.9	40.2	void	66.9	56.5	T1, T2, T4 paused to limit shadow flicker		tone
6:55:00 PM		44.9		55.6		47.5	41.5	void	63.6	56.6	T1, T2, T4 paused to limit shadow flicker		tone
7:00:00 PM		46.4	46.0	57.2	58.3	49.6	40.5	void	64.8	56.9	T1 paused to limit shadow flicker		
7:05:00 PM		42.2		52.0		45.7	38.3	void	61.1	49.5			tone
7:10:00 PM		39.6		49.9		41.6	36.6	void	57.0	49.8			tone
7:15:00 PM		38.3		53.2		40.4	35.5	void	58.7	51.5			tone
7:20:00 PM		45.7		55.5		46.7	37.8	void	65.4	51.9			tone
7:25:00 PM		44.4		56.1		48.4	39.1	void	63.6	52.9			tone
7:30:00 PM		46.8		62.0		50.6	41.2	void	68.8	57.4			tone
7:35:00 PM		43.7		55.6		47.1	39.4	void	63.6	57.1			
7:40:00 PM		45.7		60.1		49.2	40.6	void	70.0	59.8			
7:45:00 PM		46.7		57.5		51.1	40.1	void	65.6	59.4			
7:50:00 PM		49.2		60.6		51.9	41.2	void	71.0	60.0			
7:55:00 PM		50.2		62.4		53.8	43.4	void	71.0	60.0			
8:00:00 PM		46.1	47.1	57.0	60.5	49.7	41.8	void	64.4	58.4			
8:05:00 PM		46.1		61.7		48.8	41.9	void	67.2	59.6			
8:10:00 PM		45.9		58.7		49.2	39.6	void	69.2	59.9			
8:15:00 PM		47.2		57.7		51.0	41.4	void	65.2	60.2			
8:20:00 PM		46.7		60.7		50.1	42.1	void	70.4	60.7			
8:25:00 PM		48.7		64.6		52.7	41.3	void	68.0	60.1			
8:30:00 PM		48.3		62.6		51.1	43.6	void	73.4	60.0			
8:35:00 PM		48.5		59.8		52.5	42.4	void	70.3	59.6			
8:40:00 PM		46.3		58.7		49.1	42.5	void	67.8	59.9			
8:45:00 PM		46.0		58.6		49.2	41.4	void	67.7	59.9			
8:50:00 PM		48.6		60.8		52.1	41.9	void	69.7	59.6			
8:55:00 PM		45.1		58.2		48.0	41.7	void	68.5	59.4			

Table A-3. Measured sound levels—6:00-9:00 PM, July 26, 2020 88 Reed Carr Road

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Date: 26-Jul-20		ANSI S12.9 Part 3(6.5)(b)(1)										ANSI S12.9 Part 4 Annex C Sounds w/ Tonal Content	
Time	Transient?	LAeq,5-min	LAeq,1-hr	LCeq,5-min	LCeq,1-hr	LAF10,5-min	LAF90,5-min	LAF10-LAF90 =<3	LCF10,5-min	LCF90,5-min	Notes	Tone in 6300 Hz 1/3 Oct Band	Tone in 8000 Hz 1/3 Oct Band
9:00:00 PM		44.2	44.4	51.0	56.1	48.3	38.3	void	61.2	45.3	Shutdown begins		
9:05:00 PM		45.7		52.7		49.2	40.1	void	60.2	45.9	Shutdown		
9:10:00 PM		46.4		54.0		48.7	42.8	void	65.9	47.1	Shutdown		
9:15:00 PM		45.9		52.1		48.8	40.8	void	63.1	44.9	Shutdown		
9:20:00 PM		46.0		48.7		49.4	41.0	void	56.3	45.4	Shutdown		
9:25:00 PM		46.2	45.8	60.8		48.4	39.1	void	64.4	44.8	Shutdown		
9:30:00 PM		43.7		53.8		46.4	37.4	void	62.1	43.7	Shutdown	tone	
9:35:00 PM		42.0		56.6		45.1	38.1	void	64.4	48.5	Shutdown		
9:40:00 PM		40.1		56.6		42.5	36.7	void	64.3	58.1	Shutdown		
9:45:00 PM		42.9		57.4		46.5	38.4	void	66.0	59.3	Shutdown		
9:50:00 PM		42.1		57.3		45.7	37.1	void	65.0	59.6	T4 has faulted between 21:37 to 21:49	tone	
9:55:00 PM		42.0		58.5		45.9	38.0	void	66.6	59.7		tone	
10:00:00 PM		41.9	40.4	58.1	56.8	44.7	38.2	void	65.5	59.3		tone	
10:05:00 PM		39.7		56.9		41.8	37.0	void	65.4	58.9		tone	
10:10:00 PM		41.2		57.1		44.5	37.9	void	64.6	59.5		tone	
10:15:00 PM		39.5		57.4		41.2	37.5	void	64.8	59.6		tone	
10:20:00 PM		39.5		56.3		41.8	36.5	void	63.9	59.0		tone	
10:25:00 PM		38.2		56.1		39.9	35.7	void	63.3	58.4			
10:30:00 PM		42.3		57.1		46.1	37.4	void	65.4	58.3			
10:35:00 PM		38.5		56.2		41.1	36.0	void	63.4	57.2		tone	
10:40:00 PM		40.6		55.8		42.6	37.3	void	63.4	58.0		tone	

Table A-4. Measured sound levels—9:00-10:30 PM, July 26, 2020 80 Reed Carr Road