



SOUND LEVEL MODELING REPORT

South Street Energy Storage Project Andover Massachusetts

Prepared for:

New Leaf Energy, Inc
55 Technology Drive, Suite 102
Lowell, MA 01851

Prepared by:



Epsilon Associates, Inc.
3 Mill & Main Place, Suite 250
Maynard, MA 01754

November 18, 2024

TABLE OF CONTENTS

1.0	EXECUTIVE SUMMARY	1-1
2.0	INTRODUCTION	2-1
3.0	SOUND TERMINOLOGY	3-1
4.0	NOISE REGULATIONS	4-1
4.1	Federal Regulations	4-1
4.2	Massachusetts State Regulations	4-1
4.3	Local Regulations	4-1
5.0	EXISTING SOUND LEVELS	5-1
5.1	Baseline Sound Environment	5-1
5.2	Sound Level Measurement Locations	5-1
5.3	Measurement Methodology	5-4
5.4	Measurement Equipment	5-4
5.5	Baseline Ambient Sound Levels	5-4
5.5.1	Short-Term Sound Levels	5-4
5.5.2	Long-Term Sound Levels	5-5
6.0	MODELED SOUND LEVELS	6-1
6.1	Sound Sources	6-1
6.2	Modeling Methodology	6-1
6.3	Sound Mitigation	6-2
6.4	Sound Modeling Locations	6-2
7.0	EVALUATION	7-1
8.0	CONCLUSIONS	8-1

LIST OF FIGURES

Figure 2-1	Aerial Locus	2-2
Figure 3-1	Common Indoor and Outdoor Sound Levels	3-3
Figure 5-1	Sound Level Measurement Locations	5-3
Figure 6-1	Sound Modeling Locations	6-3
Figure 6-2	Sound Modeling Results	6-4

LIST OF APPENDICES

Appendix A	Long-Term Sound Level Measurement Data
Appendix B	MassDEP Pure Tone Evaluation

LIST OF TABLES

Table 5-1	GPS Coordinates (WGS 84) – Sound Level Measurement Locations	5-2
Table 5-2	Daytime Short-Term Ambient Measurement Summary	5-5
Table 5-3	Nighttime Short-Term Ambient Measurement Summary	5-5
Table 5-4	Daytime ¹ Background Sound Level Measurement Summary	5-6
Table 5-5	Nighttime ¹ Background Sound Level Measurement Summary	5-6
Table 6-1	Sound Level Data	6-1
Table 7-1	Sound Level Modeling Results	7-1

1.0 EXECUTIVE SUMMARY

The 1320 South Street Energy Storage Project (the Project) is a proposed energy storage facility with a capacity of approximately 12 megawatts (MW) in Andover, Massachusetts. The Project is being developed by New Leaf Energy, Inc. (New Leaf). Epsilon Associates, Inc. (Epsilon) has been retained by New Leaf to conduct a pre-construction sound level assessment for this Project.

Existing condition sound levels were measured at several locations around the Project site and an operational sound level modeling analysis was conducted for the major sound producing elements of the Project. Noise controls necessary to meet the requirements of the Massachusetts Department of Environmental Protection (MassDEP) Noise Policy were implemented and are discussed in this analysis.

Existing condition sound levels were measured for approximately eight days at two locations on the site. Three supplemental short-term measurements were also performed at additional locations near the site during both daytime and nighttime periods. The eight-day average sound level using the lowest hourly L_{90} sound level measured during each nighttime period of the program was used to establish a representative background (ambient) sound level at each location.

Mitigation was applied to the modeled sound sources in the form of equipment silencers. With the noise mitigation measures described in this report, the predicted ambient sound level increases at all residential property lines adjacent to the Project are all 6dBA or lower. In addition, the Project is not anticipated to produce any “pure tones”. Thus, with mitigation the Project will meet the requirements set forth in the MassDEP Noise Policy at residential locations.

2.0 INTRODUCTION

The proposed Project will consist of 8 energy storage containers and 3 inverters. Figure 2-1 shows the location of the Project parcel over aerial imagery as well as the proposed locations of the energy storage containers and inverters.

This report presents the findings of an ambient measurement program and a sound level modeling analysis for the Project. The Project components were modeled in CadnaA using sound data from Hithium and SMA. The modeled predicted sound levels of the Project were then added to the existing ambient sound levels of the site and these levels were assessed using the MassDEP Noise Policy. The results of this analysis are found within this report.



South Street BESS Andover, Massachusetts

3.0 SOUND TERMINOLOGY

There are several ways in which sound levels are measured and quantified. All of them use the logarithmic decibel (dB) scale. The following information defines the sound level terminology used in this analysis.

The decibel scale is logarithmic to accommodate the wide range of sound intensities found in the environment. A property of the decibel scale is that the sound pressure levels of two or more separate sounds are not directly additive. For example, if a sound of 50 dB is added to another sound of 50 dB, the total is only a 3-decibel increase (53 dB), which is equal to doubling in sound energy, but not equal to a doubling in decibel quantity (100 dB). Thus, every 3-dB change in sound level represents a doubling or halving of sound energy. The human ear does not perceive changes in the sound pressure level as equal changes in loudness. Scientific research demonstrates that the following general relationships hold between sound level and human perception for two sound levels with the same or very similar frequency characteristics¹:

- 3 dBA increase or decrease results in a change in sound that is just perceptible to the average person,
- 5 dBA increase or decrease is described as a clearly noticeable change in sound level, and
- 10 dBA increase or decrease is described as twice or half as loud.

Another mathematical property of decibels is that if one source of sound is at least 10 dB louder than another source, then the total sound level is simply the sound level of the higher-level source. For example, a sound source at 60 dB plus another sound source at 47 dB is equal to 60 dB.

A sound level meter (SLM) that is used to measure sound is a standardized instrument.² It contains “weighting networks” (e.g., A-, C-, Z-weightings) to adjust the frequency response of the instrument. Frequencies, reported in Hertz (Hz), are detailed characterizations of sounds, often addressed in musical terms as “pitch” or “tone”. The most commonly used weighting network is the A-weighting because it most closely approximates how the human ear responds to sound at various frequencies. The A-weighting network is the accepted scale used for community sound level measurements; therefore, sounds are frequently reported as detected with a sound level meter using this weighting. A-weighted sound levels emphasize middle frequency sounds (i.e., middle pitched – around 1,000 Hz), and de-emphasize low and high frequency sounds. These sound levels are reported in decibels designated as “dBA”. The C-weighting network has a nearly flat response for frequencies between 63 Hz and 4,000 Hz and is noted as dBC. Z-weighted sound levels are measured sound levels without any weighting curve and are otherwise referred to as “unweighted”. Sound pressure levels for some common indoor and outdoor environments are shown in Figure 3-1.

¹ Bies, David, and Colin Hansen. 2009. *Engineering Noise Control: Theory and Practice*, 4th Edition. New York: Taylor and Francis.

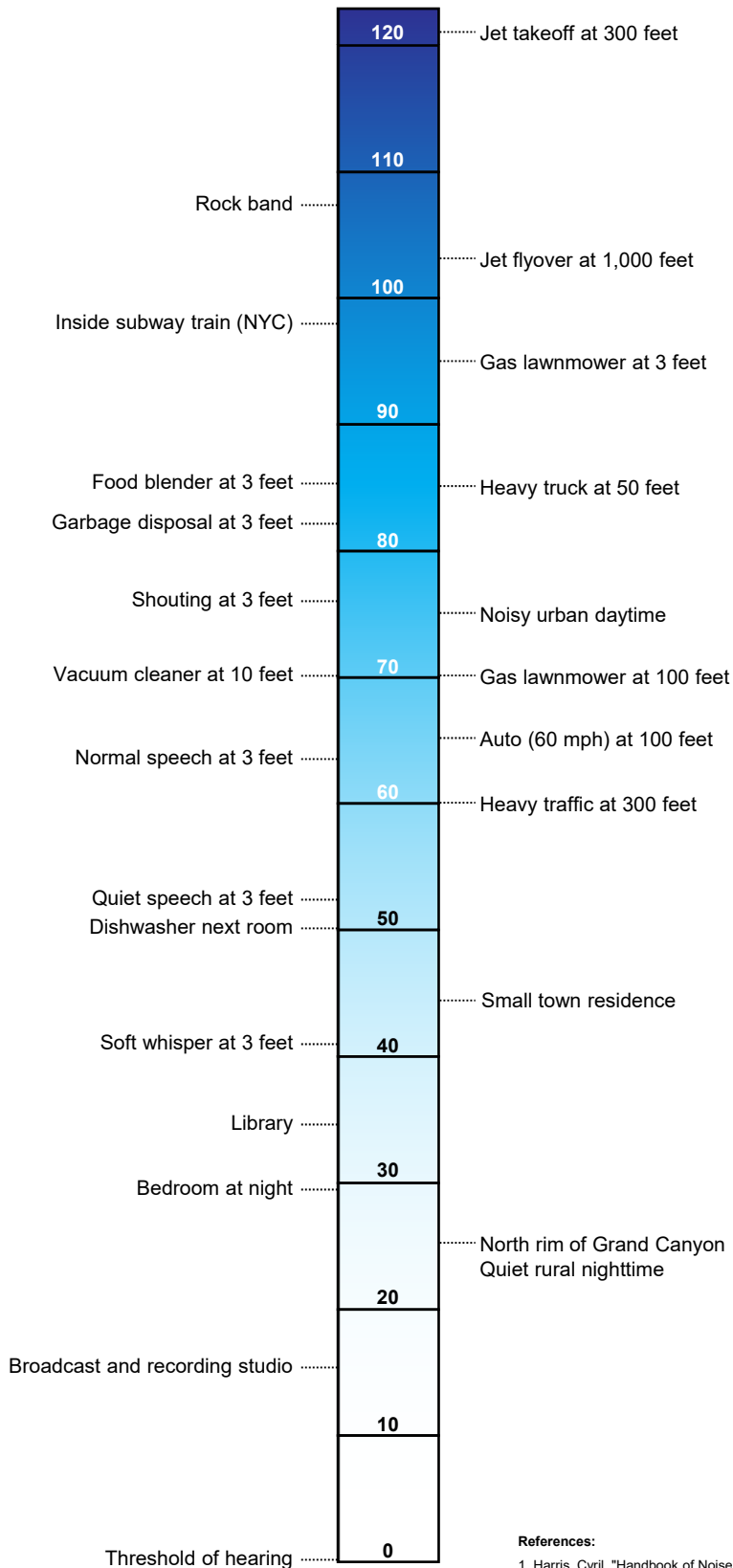
² *American National Standard Specification for Sound Level Meters*, ANSI S1.4-1983 (R2006), published by the Standards Secretariat of the Acoustical Society of America, Melville, NY.

Because the sounds in our environment vary with time they cannot simply be described with a single number. Two methods are used for describing variable sounds. These are exceedance levels and the equivalent level, both of which are derived from some number of moment-to-moment A-weighted sound level measurements. Exceedance levels are values from the cumulative amplitude distribution of all of the sound levels observed during a measurement period. Exceedance levels are designated L_n , where n can have a value between 0 and 100 in terms of percentage. Several sound level metrics that are reported in community sound monitoring are described below.

- L_{90} is the sound level exceeded 90 percent of the time during the measurement period. The L_{90} is close to the lowest sound level observed. It is essentially the same as the residual sound level, which is the sound level observed when there are no obvious nearby intermittent sound sources. The L_{90} level is used to establish the “ambient” or “background” sound level as part of the MassDEP Noise Policy.
- L_{eq} , the equivalent level, is the level of a hypothetical steady sound that would have the same energy (*i.e.*, the same time-averaged mean square sound pressure) as the actual fluctuating sound observed. The equivalent level is designated L_{eq} and is typically A-weighted. The equivalent level represents the time average of the fluctuating sound pressure, but because sound is represented on a logarithmic scale and the averaging is done with linear mean square sound pressure values, the L_{eq} is mostly determined by loud sounds if there are fluctuating sound levels.

Sound Pressure Level, dBA

COMMON INDOOR SOUNDS **COMMON OUTDOOR SOUNDS**



References:

- Harris, Cyril, "Handbook of Noise Acoustical Measurements and Noise Control", p 1-10., 1998
- "Controlling Noise", USAF, AFMC, AFDT, Elgin AFB, Fact Sheet, August 1996
- California Dept. of Trans., "Technical Noise Supplement", Oct, 1998

4.0 NOISE REGULATIONS

4.1 Federal Regulations

There are no federal community noise regulations applicable to the Project.

4.2 Massachusetts State Regulations

The MassDEP regulates noise under its Air Pollution Control regulations. In these regulations, an “air contaminant” is defined to include sound, and a condition of “air pollution” includes the presence of an air contaminant in such concentration and duration as to “cause a nuisance” or “unreasonably interfere with the comfortable enjoyment of life and property.” (310 CMR 7.00)

MassDEP’s regulations at 310 CMR 7.10 prohibit “unnecessary emissions” of noise. MassDEP Division of Air Quality Control (“DAQC”) Policy Statement 90-001 (February 1, 1990) (the “MassDEP Noise Policy”) interprets a violation of this noise regulation to have occurred if the source causes either:

- 1) An increase in the broadband sound pressure level of more than 10 dBA above the ambient, or
- 2) A “pure tone” condition.

“Ambient” is defined as the background A-weighted sound level that is exceeded 90% of the time, measured during equipment operating hours (L_{90}). A “pure tone” condition occurs when any octave band sound pressure level exceeds both of the two adjacent octave band sound pressure levels by 3 dB or more.

These noise limits are MassDEP policy and are applicable both at the Property line and at the nearest residences. As a policy and not regulation, the MassDEP has waived these limits in certain cases at property line locations where the adjacent land uses are not considered noise sensitive, such as an adjacent industrial parcel.

4.3 Local Regulations

The Town of Andover has no quantitative community noise regulations applicable to the Project.

5.0 EXISTING SOUND LEVELS

The Project is to be located at the north end of South Street, on an existing residential parcel in the Town of Andover, Massachusetts. The property is bordered by residential parcels to the south with commercial and municipal property to the north and east. The area in the immediate vicinity of the Project is zoned Industrial A.

5.1 Baseline Sound Environment

An existing sound level survey was conducted during the daytime and nighttime hours to characterize the existing “baseline” acoustical environment in the vicinity of the site. Two long-term continuous sound level monitoring stations were deployed for eight days to:

1. Establish representative A-weighted broadband ambient sound pressure levels, for evaluating requirements of the MassDEP policy limit of a 10 dBA increase due to the proposed Project; and
2. Establish representative octave-band ambient sound pressure levels to identify any existing “pure tones,” as defined by MassDEP, and evaluate whether the addition of modeled sound levels from the proposed Project to these background sound levels may introduce or exacerbate existing “pure tones” in the community.

Only measurement periods during, or affected by, precipitation were excluded from the analysis. This approach is consistent with ANSI Standard S12.18-1994 (R2009).

5.2 Sound Level Measurement Locations

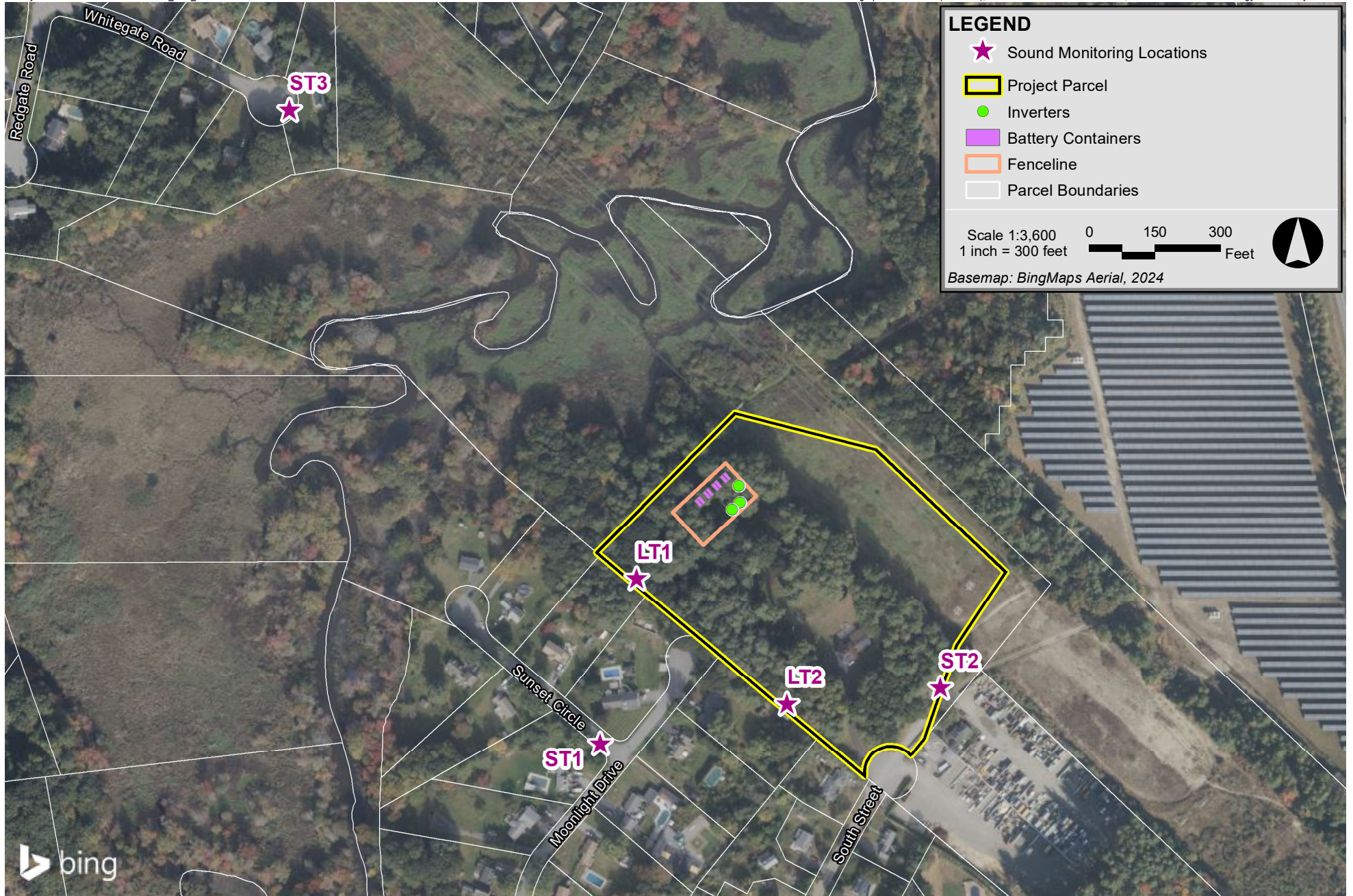
The selection of the sound level measurement locations was based upon a review of the Project site plan and the land use in the vicinity of the Project. Two long-term sound level measurement locations were selected to be representative of the closest residential property line along the southwest boundary of the Project parcel to obtain a sampling of the baseline sound environment. In addition, three short-term sound level measurement locations were selected on public land (sidewalks, public roads, etc.) near the site. These short-term sound level measurements were conducted for 20 minutes during the day and night at each of the three locations. Coordinates of the monitoring locations are presented in Table 5-1. These monitoring locations are depicted in Figure 5-1 and described below.

- **Location LT1** is located near the southwestern property line of the Project on the western side of the parcel. This location is approximately 250 feet northeast of a neighboring residence. This location is representative of the residences to the north of Moonlight Drive.
- **Location LT2** is located near the southwestern property line of the Project on the eastern side of the parcel. This location is approximately 150 feet east of a neighboring residence. This location is representative of the residences to the south of Moonlight Drive.

- **Location ST1** is located to the South of the Project at the intersection of Moonlight Drive and Sunset Circle. This is representative of the residential area south of the Project.
- **Location ST2** is located at the north end of South Street, near the beginning of the South Street Trail. This location is representative of the residences to the southeast of the Project.
- **Location ST3** is located in the cul-de-sac at the end of Whitegate Road to the northwest of the Project. This location is representative of the residences to the northwest of the Project.

Table 5-1 GPS Coordinates (WGS 84) – Sound Level Measurement Locations

Location	Coordinates	
	Latitude (N°)	Longitude (W°)
LT1	42.607045°	-71.179311°
LT2	42.606258°	-71.178041°
ST1	42.606011°	-71.179625°
ST2	42.606355°	-71.176742°
ST3	42.609987°	-71.182239°



South Street BESS Andover, Massachusetts

5.3 Measurement Methodology

A comprehensive sound level measurement program was developed to quantify the existing ambient sound levels around the proposed Project. The program consisted of two long-term monitoring stations as well as three short-term monitoring locations. The long-term monitoring stations collected continuous sound level data for approximately eight days from Monday, September 30, 2024 to Tuesday, October 8, 2024. The long-term monitors were generally unattended, with personal observations made by a field technician during deployment and demobilization. Short-term sound level measurements were made on Thursday, October 3, 2024 during the daytime (11:19 a.m. to 1:02 p.m.) and on Friday, October 4, 2024 during nighttime hours (12:48 a.m. to 2:09 a.m.). All short-term measurements were 20 minutes in duration.

5.4 Measurement Equipment

Two Larson Davis (LD) model 831A sound level meters, equipped with a PCB PRM831 preamplifier and a PCB 377C20 or PCB 377B02 half-inch microphone, and a manufacturer-provided wind screen, was used to collect background sound pressure level data at the long-term measurement locations. The environmental protection kit included a manufacturer-provided wind screen to reduce wind-induced noise over the microphone. One LD 831A sound level meter, equipped with a PCB PRM831 preamplifier and a PCB 377B20 half-inch microphone, and a manufacturer-provided wind screen, was used to collect background sound pressure level data at the short-term measurement locations.

A HOBO H21-USB micro-weather station (manufactured by Onset Computer Corporation) was used to continuously measure the wind speed at Location 1. The wind sensor was mounted at a height of approximately six feet above ground level and data was logged every 1-hour to be synced with the sound level measurements. This sensor has a measurement range of 0 to 45 m/s (100 mph) and an accuracy of ± 1.1 m/s (2.4 mph). The starting threshold is ≤ 1.0 m/s (2.2 mph).

All instrumentation meets the “Type 1 - Precision” requirements set forth in ANSI S1.4 for acoustical measuring devices. The measurement equipment was calibrated in the field before and after the survey with a Larson Davis CAL200 acoustical calibrator which meets the standards of IEC 942 Class 1L and ANSI S1.40. Statistical descriptors (e.g., Leq, L90, etc.) were measured for each sampling period (20-minutes for short-term and 1-hour for long-term) with octave band sound levels corresponding to the same datasets.

5.5 Baseline Ambient Sound Levels

Current sound sources in the area surrounding the proposed project site include vehicle traffic along nearby highways, overhead planes, birds, insects, rustling vegetation, and dog barking.

5.5.1 Short-Term Sound Levels

Summaries of the existing condition sound levels are shown in Tables 5-2 and 5-3 with measured daytime and nighttime sound levels from the short-term measurements, respectively. Daytime L_{90} sound levels at the short-term locations ranged from 42 to 49 dBA and nighttime L_{90} sound levels ranged from 42 to 48 dBA.

Table 5-2 Daytime Short-Term Ambient Measurement Summary

Measurement Location ID	Start Date & Time	Broad-band L ₉₀	L ₉₀ Sound Pressure Level (dB) by Octave-Band Center Frequency (Hz)									
			31.5	63	125	250	500	1k	2k	4k	8k	16k
		dBA	dB	dB	dB	dB	dB	dB	dB	dB	dB	dB
ST1	10/03/2024 12:42 PM	42	52	48	42	34	34	36	29	34	32	16
ST2	10/03/2024 12:04 PM	49	56	56	47	40	42	46	41	30	28	35
ST3	10/03/2024 11:19 AM	44	54	52	45	39	37	37	32	35	33	19

Table 5-3 Nighttime Short-Term Ambient Measurement Summary

Measurement Location ID	Start Date & Time	Broad-band L ₉₀	L ₉₀ Sound Pressure Level (dB) by Octave-Band Center Frequency (Hz)									
			31.5	63	125	250	500	1k	2k	4k	8k	16k
		dBA	dB	dB	dB	dB	dB	dB	dB	dB	dB	dB
ST1	10/04/2024 1:49 AM	42	47	47	43	36	35	37	27	36	13	14
ST2	10/04/2024 1:22 AM	48	51	49	43	40	41	45	39	37	16	28
ST3	10/04/2024 12:48 AM	47	50	47	45	39	38	39	33	43	17	17

5.5.2 Long-Term Sound Levels

A-weighted broadband (dBA) and un-weighted octave-band (dB) representative background sound levels from the long-term monitoring locations are presented in Table 5-4 and Table 5-5 for daytime (7 a.m. – 9 p.m.) and nighttime (9 p.m. – 7 a.m.) hours, respectively. Throughout the eight-day program, the daily minimum L₉₀ (1-hour) measured sound levels ranged from 43 to 50 dBA during the day and 41 to 45 dBA at night at Location 1. The daily minimum L₉₀ measured sound levels ranged from 43 to 49 dBA during the day and 40 to 45 dBA at night at Location 2.

The broadband L₉₀ values presented in Tables 5-4 and 5-5 represent the average of the daily minimum L₉₀ sound pressure levels observed during the relevant daytime or nighttime operating periods throughout the measurement program. The octave-band values correspond to a representative time-period where the broadband value equals the average of the daily/nightly minimum L₉₀ sound levels. There is a total of 7 hours with recorded precipitation during the eight-day program. These hours were excluded from further processing in accordance with ANSI S12.18.

One-hour A-weighted broadband sound pressure level data plots from the continuous ambient monitoring stations at locations LT1 and LT2 are presented in Appendix A for the entire measurement period.

Table 5-4 Daytime¹ Background Sound Level Measurement Summary

Monitoring Location ID	L ₉₀ ²	L ₉₀ ³ Sound Pressure Level (dB) by Octave-Band (Hz)								
		31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1k Hz	2k Hz	4k Hz	8k Hz
	dBA	dB	dB	dB	dB	dB	dB	dB	dB	dB
LT1	46	56	53	41	37	39	41	32	35	34
LT2	45	55	52	41	39	40	42	32	23	20

1. 'Daytime' defined to be between the operational hours of 7 a.m. and 9 p.m.
2. Broadband L₉₀ represents the average of the minimum L₉₀ sound pressure levels observed each day of the measurement program during daytime hours.
3. Octave-band values correspond to a representative time period where the broadband value equals the average of the daily minimum L₉₀ sound levels.

Table 5-5 Nighttime¹ Background Sound Level Measurement Summary

Monitoring Location ID	L ₉₀ ²	L ₉₀ ³ Sound Pressure Level (dB) by Octave-Band (Hz)								
		31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1k Hz	2k Hz	4k Hz	8k Hz
	dBA	dB	dB	dB	dB	dB	dB	dB	dB	dB
LT1	44	54	50	38	36	37	39	29	32	34
LT2	43	54	51	36	33	36	40	33	31	23

1. 'Nighttime' defined to be between the operational hours of 9 p.m. and 7 a.m.
2. Broadband L₉₀ represents the average of the minimum L₉₀ sound pressure level observed each day of the measurement program during nighttime hours.
3. Octave-band values correspond to a representative time period where the broadband value equals the average of the nightly minimum L₉₀ sound levels.

6.0 MODELED SOUND LEVELS

6.1 Sound Sources

The primary sources of sound from the South Street Energy Storage facility will be the inverters and energy storage containers. Sound power level or sound pressure level data for this equipment was provided by New Leaf. Sound level data and source quantities are presented in Table 6-1.

Table 6-1 Sound Level Data

Sound Source	Sound Power (per unit)	Number of Units Modeled
Inverter ¹	Confidential	3
BESS Unit ²	Confidential	8

Notes: 1) SMA SCS 3950-UP-XT unit with manufacturer silencer kit.
2) Hithium LX501501 Battery Energy Storage System with manufacturer silencer kit

6.2 Modeling Methodology

The sound impacts associated with the proposed energy storage systems were predicted using the CadnaA sound level calculation software developed by DataKustik GmbH. This software uses the ISO 9613-2 international standard for sound propagation.³ The software accounts for topography, ground attenuation, multiple building reflections (if applicable), drop-off with distance, and atmospheric absorption. The CadnaA software allows for octave band calculation of sound from multiple sources as well as computation of diffraction.

Inputs and significant parameters employed in the model are described below.

- *Project Layout:* This analysis is for the layout provided to Epsilon on October 2nd, 2024. The proposed Project layout is shown in Figure 6-1.
- *Modeling Grid:* A modeling grid with 3-meter spacing was calculated for the entire region surrounding the Project. The grid was modeled at a height of 1.5 meters above ground level which is the approximate ear height of a standing adult. The resulting sound isopleths are shown in Figure 6-2.
- *Terrain Elevation:* Elevation contours for the modeling domain were imported into CadnaA which allowed for consideration of terrain shielding where appropriate. The terrain height contour elevations for the modeling domain were generated from

³ *Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation*, International Standard ISO 9613-2:1996 (International Organization for Standardization, Geneva, Switzerland, 1996).

elevation information derived from the National Elevation Dataset (NED) developed by the U.S. Geological Survey.

- *Source Sound Levels:* Sound power levels used in the modeling were described in Section 6.1. These sound power levels were provided to Epsilon by New Leaf or calculated from sound pressure levels provided by New Leaf.
- *Ground Attenuation:* Consistent with the standard, the model allows inputs between 0 (hard ground) and 1 (porous ground). Spectral ground absorption was calculated using a 0.5 for the entire Project area. An absorption of 0.5 corresponds to “mixed ground” consisting of both hard and porous ground cover. This is a conservative approach as the majority of the area is heavily vegetated.

Several modeling assumptions inherent in the ISO 9613-2 calculation methodology, or selected as conditional inputs by Epsilon, were implemented in the CadnaA model to ensure conservative results (i.e., higher sound levels), and are described below:

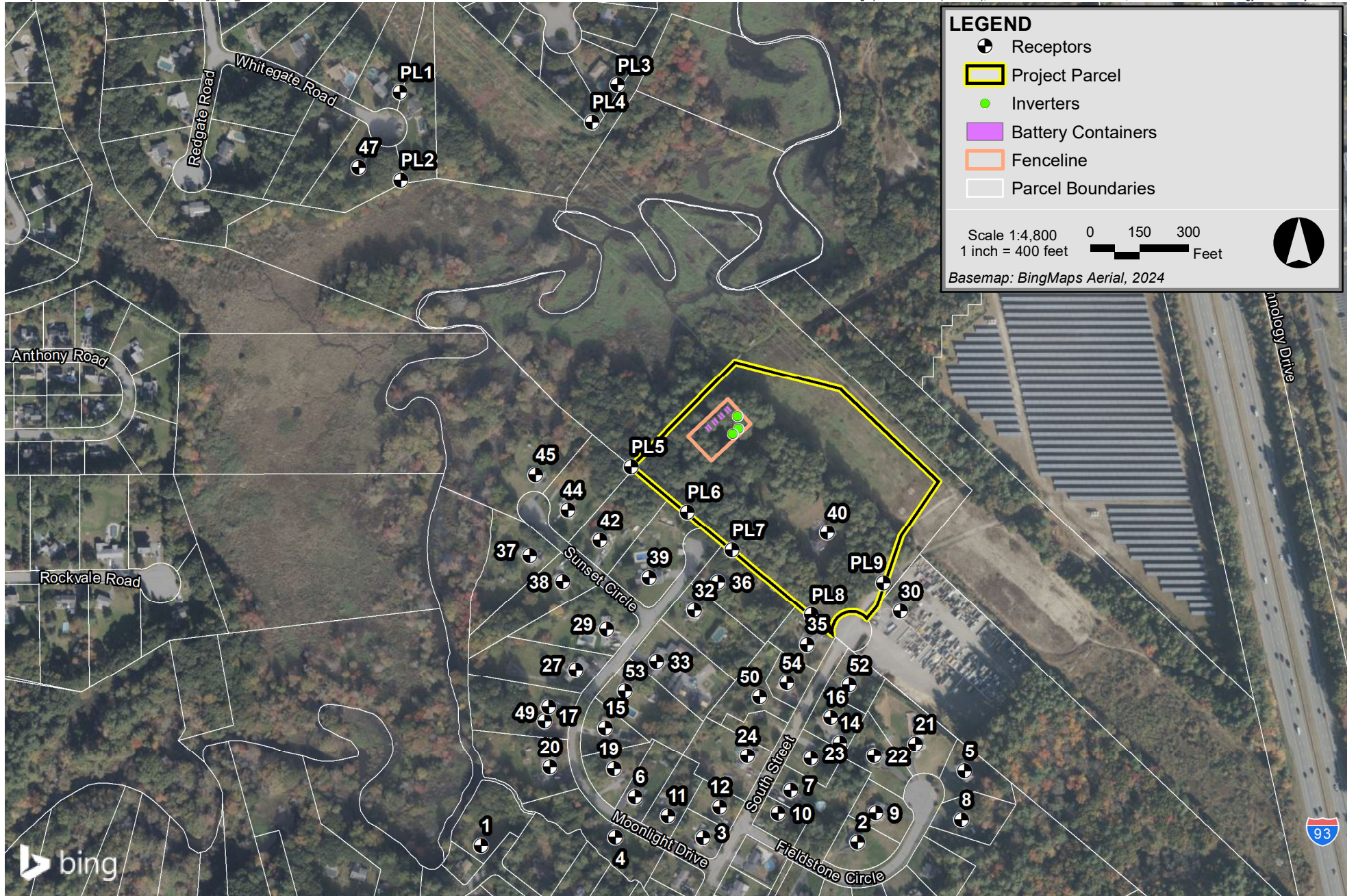
- All modeled sources were assumed to be operating simultaneously and at their maximum load corresponding to the greatest sound level impacts. Additionally, a 2 dBA uncertainty was added to all modeled sound sources.
- As per ISO 9613-2, the model assumed favorable conditions for sound propagation, corresponding to a moderate, well-developed ground-based temperature inversion, as might occur on a calm, clear night or equivalently downwind propagation.
- Meteorological conditions assumed in the model (T=10°C/RH=70%) were selected to minimize atmospheric attenuation in the 500 Hz and 1 kHz octave bands where the human ear is most sensitive.
- No additional attenuation due to tree shielding, air turbulence, or wind shadow effects was considered in the model.

6.3 Sound Mitigation

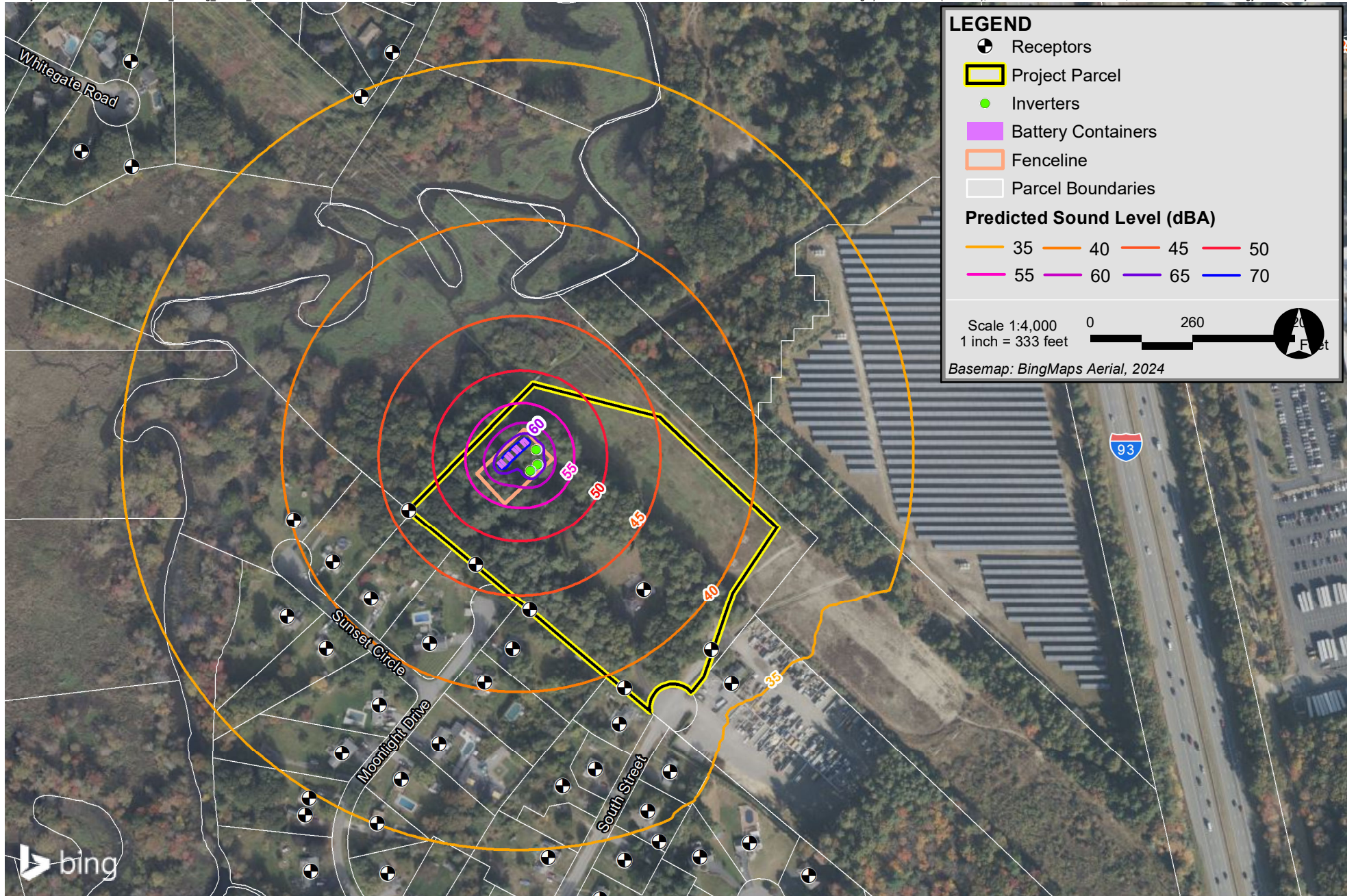
In order to meet the MassDEP Noise policy at all occupied residential property lines, certain noise mitigation methods are proposed for the Project. The manufacturers for the proposed inverters and battery containers offer silencing equipment to mitigate the sound produced by the units. The Project will utilize the respective manufacturer specified silencing equipment to reduce the sound produced by the battery containers and inverters.

6.4 Sound Modeling Locations

The Project parcel is adjacent to residential property only on the south side of the parcel. The rest of the land around the property to the north is zoned for industrial use. Sound levels were therefore evaluated at the nearby occupied residential property lines to the south. Modeling receptor locations are shown in Figure 6-1. Sound level isopleths generated from the model are presented in Figure 6-2.



South Street BESS Andover, Massachusetts



South Street BESS Andover, Massachusetts

7.0 EVALUATION

A summary of the A-weighted broadband sound level modeling results for the sound sources associated with the Project at all modeling receptors are shown in Table 7-1. All modeled sound levels, as output from CadnaA, are A-weighted equivalent sound levels (L_{eq} , dBA). The predicted project only sound levels at all modeled receptors range from 32 dBA to 47 dBA. The existing ambient sound level was defined as the lowest measured sound level from the nighttime short-term ambient measurements of 42 dBA at ST1. This value is consistent with and more conservative than the average of the daily minimum nighttime L_{90} sound pressure levels of 43 dBA and 44 dBA presented in Table 5-5. Therefore 42 dBA was used to evaluate the modeled sound levels to the MassDEP Noise Policy. Modeled future sound levels from the Project presented in Table 7-1 are predicted to increase the existing ambient L_{90} sound levels by no more than 6 dBA at all modeled receptor locations.

Octave-band sound pressure level modeling indicates that the proposed Facility would not be anticipated to create any new “pure-tone” conditions, as defined by MassDEP, when combined with existing background sound levels at any modeled receptor locations. A nighttime pure tone evaluation is presented in Appendix B for all modeling receptors.

Table 7-1 Sound Level Modeling Results

Modeling Location	Existing Sound Level, L_{90} (dBA)	Project Only Sound Level, L_{eq} (dBA)	Total Predicted Sound Level (dBA)	Increase Above Ambient Sound Level
PL1	42	32	42	0
PL2	42	33	43	1
PL3	42	34	43	1
PL4	42	35	43	1
PL5	42	46	48	6
PL6	42	47	48	6
PL7	42	44	46	4
PL8	42	39	44	2
PL9	42	39	44	2

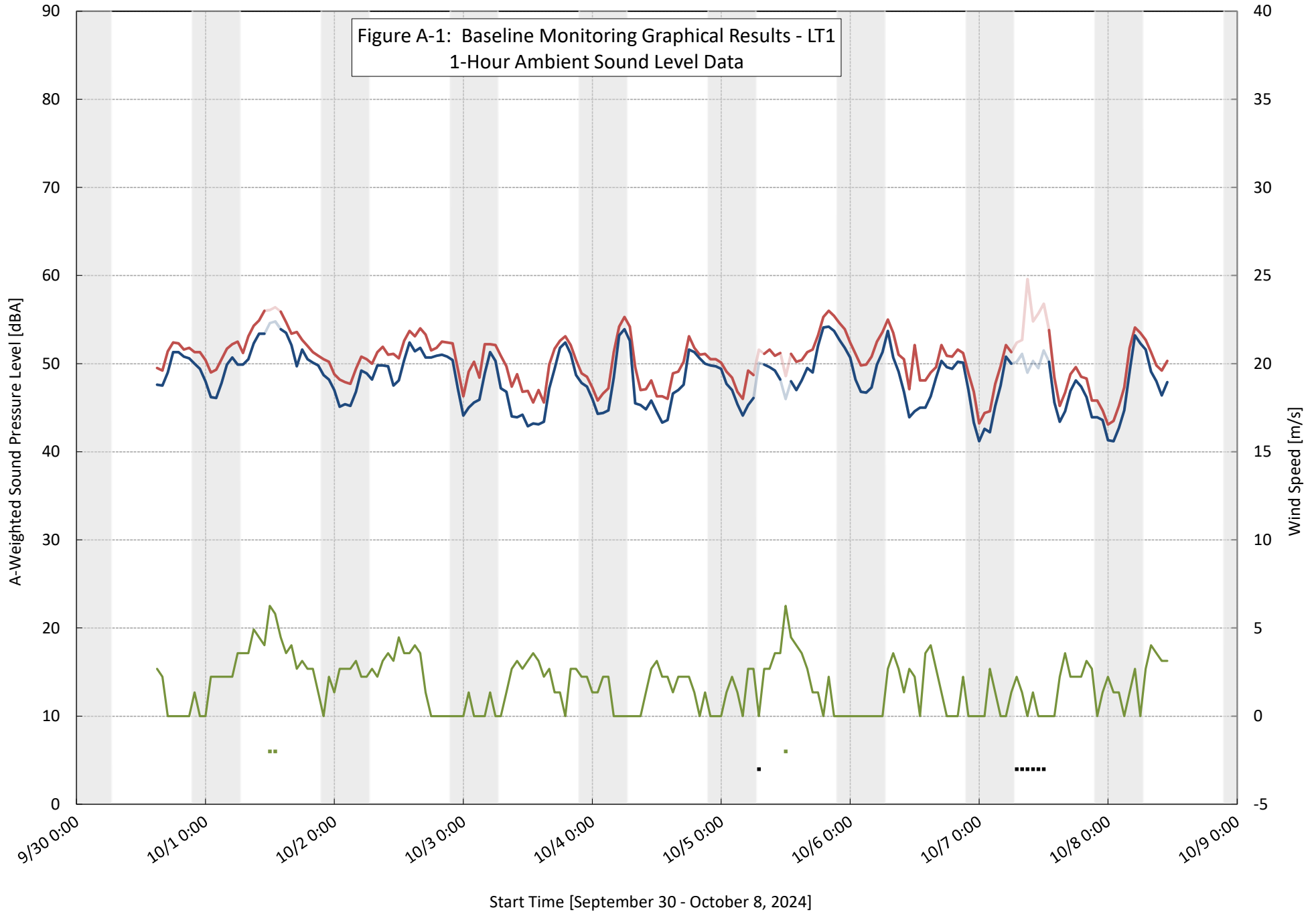
8.0 CONCLUSIONS

A sound level modeling assessment was conducted for the proposed South Street Energy Storage Project. A total of 8 energy storage containers and 3 inverters are included for this Project. Sound levels resulting from the operation of the Project were calculated at nine discrete modeling points, and isopleths were generated from a grid encompassing the area surrounding the Project using the provided layout. Results of a complete sound level assessment demonstrate that the sound levels from the mitigated Project will increase the ambient sound level by no more than 6 dBA at any residential property line. In addition, the Project is not anticipated to produce any “pure tones”. Therefore, the Project will comply with the requirements set forth in the MassDEP Noise Policy.

Appendix A

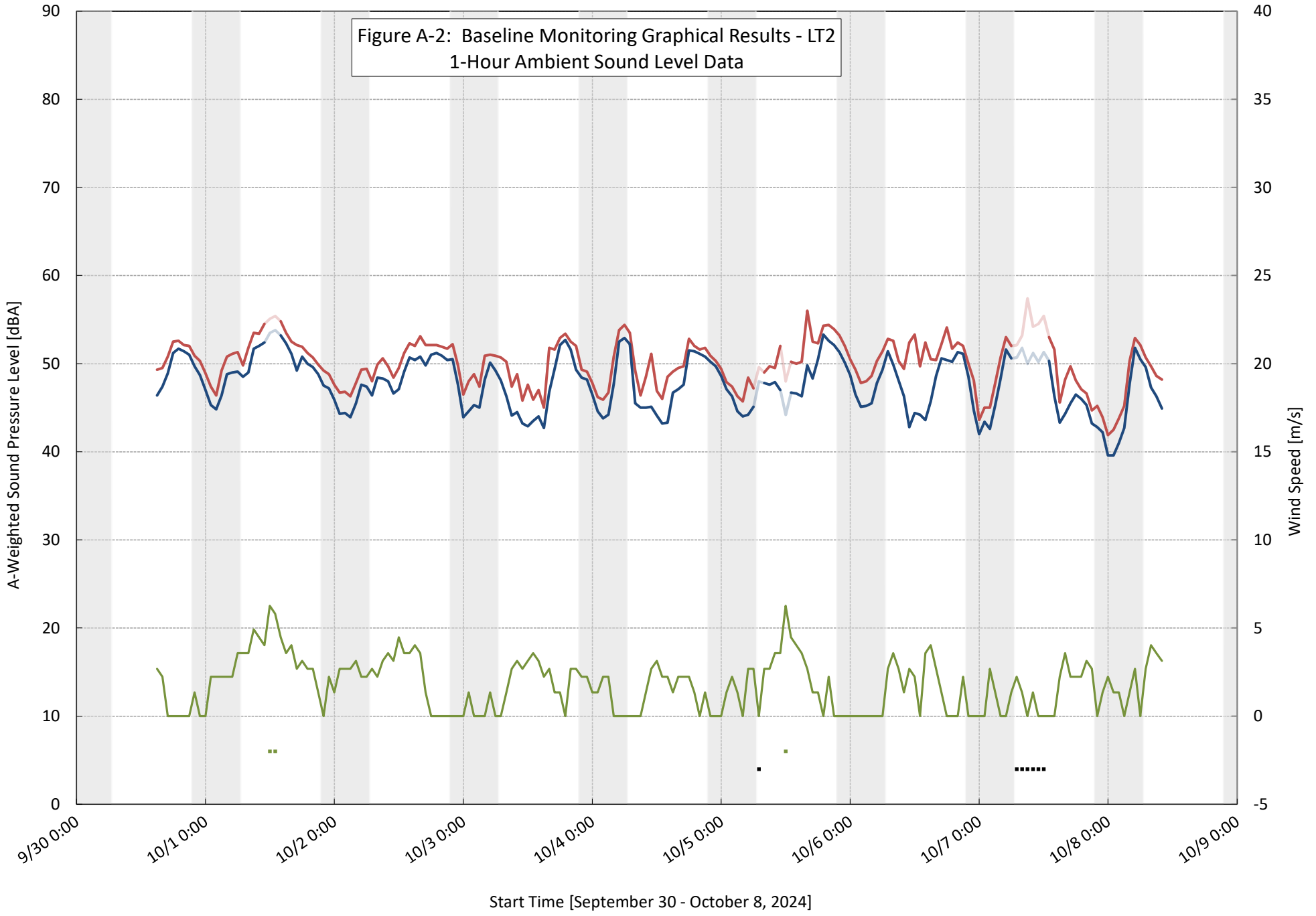
Long-Term Sound Level Measurement Data

Figure A-1: Baseline Monitoring Graphical Results - LT1
1-Hour Ambient Sound Level Data



— Leq Measured — Leq Valid — L90 Measured — L90 Valid ■ Precipitation ■ High Wind — Ground Level Wind Speed

Figure A-2: Baseline Monitoring Graphical Results - LT2
1-Hour Ambient Sound Level Data



— Leq Measured — Leq Valid — L90 Measured — L90 Valid ■ Precipitation ■ High Wind — Ground Level Wind Speed

Appendix B

MassDEP Pure Tone Evaluation

Compliance Evaluation - MassDEP Pure Tone - Nighttime (+2 dBA)

Modeling Receptor ID	ID Description	Assigned Ambient Location	Octave Band Center Frequency (Hz) by Total Predicted Noise Level (dB)										Pure Tone?
			31.5	63	125	250	500	1000	2000	4000	8000	16000	
PL1	Residential Property Line	LT1	54	51	43	37	38	39	30	32	34	23	No
PL2	Residential Property Line	LT1	54	51	44	38	38	39	31	32	34	23	No
PL3	Residential Property Line	LT1	54	51	45	38	38	39	31	33	34	23	No
PL4	Residential Property Line	LT1	54	51	46	38	38	39	31	33	34	23	No
PL5	Residential Property Line	LT1	56	55	55	46	43	41	38	39	34	23	No
PL6	Residential Property Line	LT1	56	55	55	46	43	41	39	40	34	23	No
PL7	Residential Property Line	LT2	55	54	53	43	41	41	37	38	25	15	No
PL8	Residential Property Line	LT2	55	53	49	39	39	41	35	34	23	15	No
PL9	Residential Property Line	LT2	55	52	48	39	39	41	35	33	23	15	No