Appendix F

Noise Evaluation Report

ACENTECH
ACOUSTICS TECHNOLOGY VIBRATION

June 25, 2024

Joel Richardson, PE
H2M Architects + Engineers
538 Broad Hollow Road, 4th Floor East,
Melville, NY 11747

Subject: **KCE NY 31 Battery Energy Storage System Noise Reevaluation**
Shoreham, NY
Acentech Project No. J636148, Revision 2

Dear Joel,

We have revised the noise evaluation for a battery energy storage system (BESS) facility for Key Capture Energy (KCE). The Project is a proposed 50-megawatt BESS facility to be located on an approximate 2.5-acre portion of LIPA's Lilco Road Facility in Shoreham, NY. This Project is referred to by KCE as "KCE NY 31". To determine the impact of the Project, we developed an acoustic model to calculate the expected sound levels of each of the noise producing equipment at the KCE NY 31 Project property lines and nearby community receptors. The sound producing equipment includes battery storage containers, substation transformers, and air conditioning for a control house.

In this report, we have evaluated an updated site plan, BESS units, and Medium Voltage (MV) Transformers with vendor data provided by your Team.

PROJECT NOISE REQUIREMENTS

MUNICIPAL LIMITS

The local noise ordinance outlines representative sound level limits at receiving property lines being generated by sound sources based on the time of day, and the receiving property use category. A summary of these limits are provided in Table 1.

TABLE 1: *Local Maximum Permissible A-Weighted Sound Pressure Levels in dBA*

Sound Source Property District	Receiving Property: A-weighted Sound Pressure Level (dBA)			
	Residential		Commercial	Industrial
	Daytime (7:00 am to 10:00 pm)	Nighttime (10:00 pm to 7:00 am)	(all times)	(all times)
Industrial	65	50	65	75

STATE OF NEW YORK

Changes in Ambient Sound Level

The New York State Department of Environmental Conservation (NYSDEC) has published a Program Policy Memorandum entitled "Assessing and Mitigating Noise Impacts" dated 10/6/2000 and revised 2/2/2001. This document does not provide a formal regulatory fixed numerical sound limit, but provides general guidance on increases in noise levels due to stationary sources of sound:

- Increase in ambient of 0-3 dB: "No appreciable effects on receptors."

- Increase of 3-6 dB: “may have potential for adverse noise impact only in cases where the most sensitive of receptors are present.”
- Increases of more than 6 dB: “may require a closer of analysis of impact potential depending on existing sound pressure levels and the character of surrounding land use and receptors.”
- Increases of more than 10 dB: “consideration of avoidance and mitigation measures in most cases.”

The NYSDEC guide states that, “the addition of any noise source, in a non-industrial setting, should not raise the ambient noise level above a maximum of 65 dBA.

The guidance document suggests that one can assume a background sound level between 35 dBA for wilderness areas and 87 dBA for industrial settings. The guidance describes a 45 dBA ambient sound level for a “quiet, seemingly serene setting.” While this site is mostly industrial, we have identified two residential properties, and based on the surrounding properties and the local noise ordinance, we assume the nighttime ambient sound level to be 50 dBA at residential receivers and 65 dBA at commercial and industrial receivers. Based on this assumed ambient sound level, we can provide qualitative estimates of the impact of the project given the NYSDEC guidance. For this requirement, we will evaluate the sound levels at the nearest residential abutters to KCE NY 31.

Pure Tone Requirements

The NYSDEC guide provides qualitative guidance regarding sounds that produce a “pure tone” or a “discrete tone” (See section V.B.5 for definition). Section V.4 states that, “Pure tones are relatively rare in nature but, if they do occur, they can be extremely annoying.” This type of sound is of concern here because the project equipment, in particular the inverters and transformers can produce pure tones as part of the process of converting and transforming direct current (DC) power into 60 Hz alternating current (AC). The pure tones are produced at twice the line frequency and harmonics (120, 240 and 480 Hertz). The NYSDEC policy noted above also comments on the existence of pure tones but does not have specific qualitative or quantitative limitations.

NOISE COMPUTATIONS

Acentech developed an acoustic model of the proposed BESS site and surrounding neighborhood. The acoustic model was developed using Cadna/A software to estimate the contributions of various noise sources to the community sound levels. Cadna/A complies with international standard ISO 9613-2 “Attenuation of sound during propagation outdoors – Part 2: General method of calculation.” The modeled sources of noise included any sound-producing equipment as described below.

PROJECT SITE DESCRIPTION

Figure 1, attached, shows the revised site plan. We have identified three receivers in the surrounding neighborhood: an unoccupied historical home, a public beach, and a cluster of residences. The chosen residential property (R-1) is representative of the closest proximity residences to the site. Figure 2 shows the project property line and all receptors (identified R-1 through R-3). We calculated the nighttime sound level at these locations with receptor heights of 1.5 meters above the ground level.

EQUIPMENT SOUND LEVELS

Table 2 provides the sound power level (L_w) for the Project sound-producing equipment. Spectral data for some equipment was based on previous project experience. The tonal character of the actual equipment used in this project will depend on the specific equipment selections. The sound-producing equipment at the Project includes:

- Fifty-three (53) battery storage Tesla model MP2-XL containers (i.e., the BESS units). The manufacturer provided 1/3-octave band sound power levels and overall sound pressure levels at 1 meter for various duty cycles. We calculated the octave band sound power levels to use in our acoustic model using the sound pressure data measured at 1 meter. Fourteen (14) Medium Voltage Transformers (MVT) with 4800 kW rating, by Prolec. The manufacturer provided an overall sound pressure level at 1 meter. We calculated the octave band sound power levels to use in our acoustic model using the sound pressure data measured at 1 meter.
- One (1) auxiliary load transformer (ALT). We have assumed a transformer with a NEMA TR-1 maximum noise level of 60 dBA at 100% load, an average sound pressure level rating at 2 meters. We estimated octave band sound power levels based on our prior project experience and engineering knowledge.
- One (1) substation transformer (SST). We have assumed a transformer with a NEMA TR-1 maximum noise level of 85 dBA at 100% load, an average sound pressure level rating at 2 meters. We estimated octave band sound power levels based on our prior project experience and engineering knowledge.
- One (1) HVAC unit: Marvair ComPac. The HVAC unit located on the substation control house is equipped with a silencer to reduce sound levels. Manufacturer provided overall sound pressure level at various distances. We calculated an overall sound power level for this device based on that data and estimated octave band levels.

TABLE 2: Equipment Octave Band Sound Power Level (dB re: 1 pW)

Equipment	Octave Band Center Frequency (Hz)									Overall Sound Power (dBA)
	31.5	63	125	250	500	1,000	2,000	4,000	8,000	
	Sound Power Level (dB re 1 Pico watt)									
BESS Unit	75	72	69	79	77	79	78	74	63	84
MVT (4800 kW)	68	68	70	65	65	59	54	49	42	65
ALT (1.25 MVA)	63	63	65	60	60	54	49	44	37	60
SST (100 MW)	102	102	104	99	99	93	88	83	76	99
Control House HVAC	96	93	90	87	84	81	78	75	72	87

RESULTS

We calculated the project only sound levels at each receiver, summarized in Table 3. Figure 2 shows the 45 to 65 dBA sound contours for night operation at a height of 1.5 m above the ground. The orange line shows the project property line. The 50 dBA contour crosses the property line in the east and west directions, but the abutting properties in these directions are zoned for commercial and industrial use, which would be subject to 65 dBA and 75 dBA sound limits under representative local sound level limits, respectively. Figure 2 shows that we are not predicting any exceedances over 45 dBA at the historical home property line to the south. We are also not predicting any exceedances over 45 dBA at the public beach or residential property lines in the other directions surrounding the project site.

TABLE 3: Acoustic Model Results vs. Local Noise Limits

Receptor	Receiving Property	Local Nighttime Sound Level Limit (dBA)	Calculated Project Only Sound Level (dBA)	Difference: Nighttime Limit – Calculated Sound Level (dBA)*
R-1	Residential Property	50	33	-17
R-2	Historical Home	50	40	-10
R-3	Public Beach	50	34	-16

** Negative values are compliant with the nighttime noise limit*

STATE OF NEW YORK

Changes in Ambient Sound Levels

The project sound levels are combined with the assumed ambient sound level to determine the future sound levels. We then determined the increase over ambient at the receptor locations. The ambient sound level and "Project Only" sound pressure levels add logarithmically. This evaluation is given in Table 4. The increase over ambient can be compared to the guidance provided by NYSDEC. Table 4 shows that an increase greater than 3 dB is not expected at any receptor location. The NYSDEC guidelines state that an increase less than 3 dB will have "No appreciable effects on receptors".

TABLE 4: Acoustic Model Results vs. State of New York Guidelines

Receptor	Assumed Ambient (dBA)*	Calculated Project Only Sound Level (dBA)	Combined Future Sound Level[1] (dBA)	Expected Increase over Ambient[2] (dB)
R-1	50	33	50	0
R-2		40	50	0
R-3		34	50	0

** Per NYSDEC Program Policy Memorandum (noted above)*

Pure Tone Analysis

We have examined the calculated octave band sound pressure level data for the existence of pure tones. The equipment source levels show potential for pure tone conditions. We use a process that defines pure tones when the sound pressure level in one octave band exceeds the levels in the two adjacent octave bands by 3 dB or more. Using that methodology, we have identified pure tones in the project-only predicted octave band sound pressure levels. We then added the project sound levels to the assumed ambient sound levels in octave bands equivalent to 50 dBA. When these sound pressure levels are combined with the project-only sound levels, we find that the ambient sound will mask the pure tone condition.

[1] Obtained by logarithmic addition of "Assumed Ambient" and "Calculated Project Only" sound levels in dBA.
[2] Obtained by subtraction of the "Assumed Ambient" from "Combined Future Sound Levels" in dB.

CONCLUSIONS

Project noise levels will not exceed the representative local nighttime residential noise limit of 50 dBA at nearby noise-sensitive residences while BESS units are operating. The assumed background sound level is 50 dBA for all receptors. We estimate that the Project noise levels at residential receptors will be negligible, and at no time do we expect an overall ambient noise level above 65 dBA at the property line or at any receptors.

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Please contact me directly if you have any questions or comments regarding this report at mbahtiarian@acentech.com or 617-499-8058.

Sincerely,

Michael Bahtiarian
Principal

Abbie Snyder
Consultant

Cc: Alex Odom, Marc Newmark (Acentech)

FIGURE 1: KCE NY 31 Revised Project Site Plan

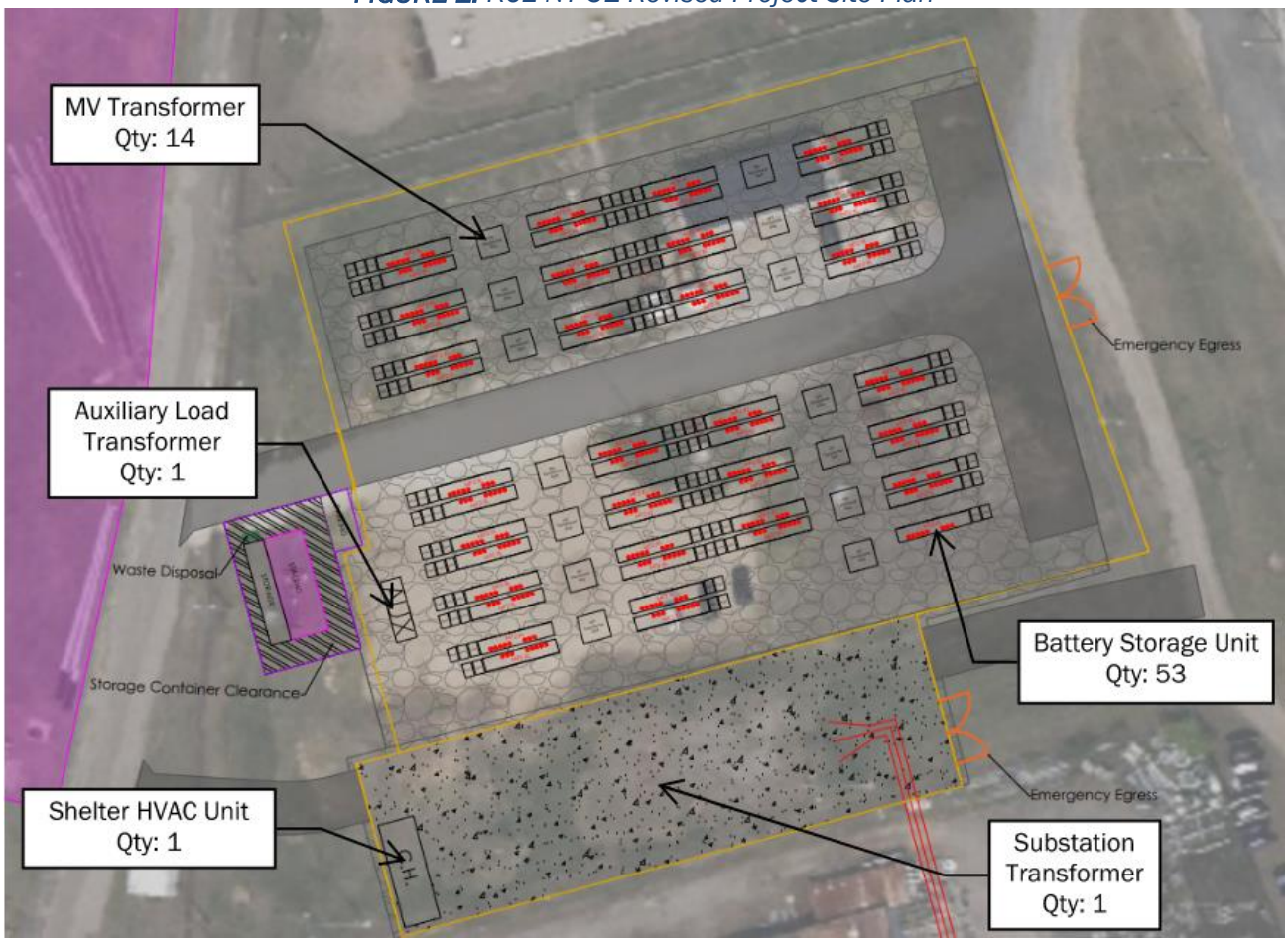

FIGURE 2: Sound Contours from 45 to 65 dBA in 5 dB intervals.
Municipal limit is 50 dBA (blue-gray) Contour. Property line shown in orange.