# APPENDIX F – NOISE REPORT

# Battery Energy Storage System Sound Study

## Imperial County

Le Conte Battery Storage
Project No. 110769

Final
June 2019

# Battery Energy Storage System Sound Study

prepared for

Imperial County
Le Conte Battery Storage
Imperial County, CA

Project No. 110769

Final
June 2019

prepared by

Burns & McDonnell Engineering Company, Inc.
Kansas City, Missouri

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# LIST OF ABBREVIATIONS

| Abbreviation | Term/Phrase/Name |
|---|---|
| ANSI | American National Standards Institute |
| BESS | battery energy storage system |
| Burns & McDonnell | Burns & McDonnell Engineering Company, Inc. |
| CEQA | California Environmental Quality Act |
| CNEL | Community Noise Equivalent Level |
| CSE | Centinela Solar Energy |
| dB | decibel |
| dBA | A-weighted decibels |
| EPA | Environmental Protection Agency |
| FHWA | Federal Highway Administration |
| HVAC | heating ventilation and air conditioning |
| Hz | hertz |
| $L_{90}$ | 90-percentile exceedance sound level |
| $L_{DN}$ | Day-Night sound level |
| $L_{eq}$ | equivalent-continuous sound level |
| $L_x$ | exceedance sound level |
| MVA | megavolt ampere |
| MW | megawatt |
| Project | Le Conte Battery Energy Storage System |
| SPL | sound pressure level |
| SWL | sound power level |

# 1.0 INTRODUCTION

Burns & McDonnell Engineering Company, Inc. (Burns & McDonnell) conducted a sound study for the proposed Le Conte Battery Energy Storage System (Project). The purpose of this study was to predict future noise impacts that may result during the construction or operation of the Project. This utility-scale battery energy storage system (BESS) will be capable of storing up to 125 megawatts (MW) of solar-generated power onsite at the Centinela Solar Energy (CSE) Facility.

## 1.1 Project Location

The Project will be situated on approximately three to five acres within the fence line of the existing CSE site, located at 319 Brockman Road, Calexico, CA (Figure 1-1). The proposed stand-alone Project will be located within the fence line of the CSE site on land wholly owned by CSE (Assessor's Parcel Number 052-190-041). Figure 1-2 provides an overview of the Project site plan and the immediate surrounding area. The BESS facility is proposed to be located immediately adjacent to the east side of the existing San Diego Gas & Electric Drew Switchyard within the western portion of the overall CSE project site just south of California State Route 98, west of the existing solar panels and east of the Drew Substation. The overall CSE site is bounded by Fisher Road to the north, Mandrapa Road and Westside Main Canal on the west, Rockwood Road to the east, and the Woodbine Lateral Four sits just south of the CSE southern limits. California State Route 98 bisects the overall CSE site from east to west and Brockman Road bisects the site from north to south.

## 1.2 Project Description

The proposed Project consists of the construction and operation of a BESS with up to 125 MW of electrical storage capacity to receive and store excess energy and to return this electricity to the grid at a later time when needed. The Project will be situated on approximately three to five acres within the fence line of the existing CSE site, located at 319 Brockman Road, Calexico, CA (Figure 1-2). Construction activities are expected to take approximately 12 months. Major Project components include the following: up to two buildings totaling 85,000 square feet in size (containing batteries and power conversion systems), substation, overhead electric tie line, and ancillary systems.

The primary purpose of the Project is to reliably and economically receive, store, and return up to 125 MW of electric energy to the electric grid. Charging energy will be provided from the electric grid which will include solar energy currently produced at the CSE site. The Project will electrically connect to the adjacent Drew Switchyard which is directly connected to the Imperial Valley Substation.

**Figure 1-1: Centinela Solar Energy Site**

**Figure 1-2: Proposed Le Conte Battery Energy Storage System Site**

# 2.0 ACOUSTICAL TERMINOLOGY

The term “sound level” is often used to describe two different sound characteristics: sound power and sound pressure. Every source that produces sound has a sound power level (SWL). The sound power level is the acoustical energy emitted by a sound source and is an absolute number that is not affected by the surrounding environment. The acoustical energy produced by a source propagates through media as pressure fluctuations. These pressure fluctuations, also called sound pressure levels (SPL), are what human ears hear and microphones measure.

Sound is physically characterized by amplitude and frequency. The amplitude of sound is measured in decibels (dB) as the logarithmic ratio of a sound pressure to a reference sound pressure (20 micropascals). The reference sound pressure corresponds to the typical threshold of human hearing. To the average listener, a 3-dB change in a continuous broadband sound is generally considered “just barely perceptible”; a 5-dB change is generally considered “clearly noticeable”; and a 10-dB change is generally considered a doubling (or halving, if the sound is decreasing) of the apparent loudness.

Sound waves can occur at many different wavelengths, also known as the frequency. Frequency is measured in hertz (Hz) and is the number of wave cycles per second that occur. The typical human ear can hear frequencies ranging from approximately 20 to 20,000 Hz. Normally, the human ear is most sensitive to sounds in the middle frequencies (1,000 to 8,000 Hz) and is less sensitive to sounds in the lower and higher frequencies. As such, the A-weighting scale was developed to simulate the frequency response of the human ear to sounds at typical environmental levels. The A-weighting scale emphasizes sounds in the middle frequencies and de-emphasizes sounds in the low and high frequencies. Any sound level to which the A-weighting scale has been applied is expressed in A-weighted decibels, or dBA. For reference, the A-weighted sound pressure level and subjective loudness associated with some common sound sources are listed in Table 2-1.

Sound in the environment is constantly fluctuating, as when a car drives by, a dog barks, or a plane passes overhead. Therefore, sound metrics have been developed to quantify fluctuating environmental sound levels. These metrics include the exceedance sound level. The exceedance sound level, $L_x$, is the sound level exceeded during “x” percent of the sampling period and is also referred to as a statistical sound level. The equivalent noise level ($L_{eq}$) is the arithmetic average of the varying sound over a given time period and is the most common metric used to describe sound. The 90-percentile exceedance sound level, $L_{90}$, is the sound level exceeded during 90 percent of the sampling period and is commonly referred to as the background sound level with short-term spikes in sound excluded.

**Table 2-1: Typical Sound Pressure Levels Associated with Common Sound Sources**

| Sound Pressure Level (dBA) | Subjective Evaluation | Environment | |
|---|---|---|---|
| | | Outdoor | Indoor |
| 140 | Deafening | Jet aircraft at 75 feet | -- |
| 130 | Threshold of pain | Jet aircraft during takeoff at a distance of 300 feet | -- |
| 120 | Threshold of feeling | Elevated train | Hard rock band |
| 110 | -- | Jet flyover at 1,000 feet | Inside propeller plane |
| 100 | Very loud | Power mower, motorcycle at 25 feet, auto horn at 10 feet, crowd sound at football game | -- |
| 90 | -- | Propeller plane flyover at 1,000 feet, noisy urban street | Full symphony or band, food blender, noisy factory |
| 80 | Moderately loud | Diesel truck (40 mph) at 50 feet | Inside auto at high speed, garbage disposal, dishwasher |
| 70 | Loud | B-757 cabin during flight | Close conversation, vacuum cleaner |
| 60 | Moderate | Air-conditioner condenser at 15 feet, near highway traffic | General office |
| 50 | Quiet | -- | Private office |
| 40 | -- | Farm field with light breeze, birdcalls | Soft stereo music in residence |
| 30 | Very quiet | Quiet residential neighborhood | Inside average residence (without TV and stereo) |
| 20 | -- | Rustling leaves | Quiet theater, whisper |
| 10 | Just audible | -- | Human breathing |
| 0 | Threshold of hearing | -- | -- |

Source: Adapted from *Architectural Acoustics*, M. David Egan, 1988, and *Architectural Graphic Standards*, Ramsey and Sleeper, 1994.

Time-averaged noise levels are expressed by the symbol $L_{eq}$, with a specified duration. The Community Noise Equivalent Level (CNEL) is a 24-hour average, where noise levels during the evening hours of 7:00 p.m. to 10:00 p.m. have an added 5 dBA weighting, and sound levels during the nighttime hours of 10:00 p.m. to 7:00 a.m. have an added 10 dBA weighting. This is similar to the Day-Night sound level ($L_{dn}$), which is a 24-hour average with an added 10 dBA weighting on the same nighttime hours but no added weighting on the evening hours. Sound levels expressed in CNEL are always based on dBA.

# 3.0 APPLICABLE REGULATIONS

Burns & McDonnell reviewed Federal, State, and local regulations to determine the noise limits applicable to the Project. A discussion of the regulations and summary of the applicable regulation are provided.

## 3.1 Federal

The Noise Control Act of 1972 mandated a national policy "to promote an environment for all Americans free from noise that jeopardizes their health or welfare, to establish a means for effective coordination of federal research activities in noise control, to authorize the establishment of federal noise emission standards for products distributed in commerce, and to provide information to the public respecting the noise emission and noise reduction characteristics of such products." As required by the Act, the Environmental Protection Agency (EPA) published *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* in 1974. EPA phased out the Office of Noise Abatement and Control in 1982, transferring the primary responsibility of regulating noise to state and local governments.

Congress passed the Occupational and Safety Health Act to ensure worker and workplace safety. Their goal was to make sure employers provide their workers a place of employment free from recognized hazards to safety and health, such as exposure to toxic chemicals, excessive noise levels, mechanical dangers, heat or cold stress, or unsanitary conditions (EPA, 2019).

## 3.2 State of California

The State of California finds that excessive noise is a serious hazard to the public health and welfare and that exposure to certain levels of noise can result in physiological, psychological, and economic damage. It also finds there is a continuous and increasing bombardment of noise in the urban, suburban, and rural areas. The California Noise Control Act declares that the State has a responsibility to protect the health and welfare of its citizens by the control, prevention, and abatement of noise. It is the policy of the State to provide an environment for all Californians free from noise that jeopardizes their health or welfare.

The thresholds of significance are provided for Noise in Appendix G of the California Environmental Quality Act (CEQA) Guidelines. Based on Appendix G of the CEQA Guidelines, implementation of the Project would result in a significant adverse impact if it were to:

*Cause a generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.*

## 3.3 Imperial County General Plan

Imperial County has established noise guidelines in the Noise Element of the General Plan (as revised October 6, 2015). As noted in the Imperial County General Plan, the Noise Element identifies existing and future noise sources, and defines noise sensitive land uses. The element establishes goals, objectives and procedures to protect the public from noise intrusion. Implementation of these guidelines and procedures will promote the development of noise sensitive land uses outside of noise impact zones and discourage the development of noise generating activities near noise-sensitive land uses.

### 3.3.1 Imperial County – Construction Noise Standards

As indicated in the Imperial County General Plan – Noise Element (as revised October 6, 2015), construction noise, from a single piece of equipment or a combination of equipment, shall not exceed 75 dB $L_{eq}$, when averaged over an eight (8) hour period, and measured at the nearest sensitive receptor. This standard assumes a construction period, relative to an individual sensitive receptor of days or weeks. In cases of extended-length construction times, the standard may be tightened so as not to exceed 75 dB $L_{eq}$ when averaged over a one (1) hour period. Construction equipment operation shall be limited to the hours of 7 a.m. to 7 p.m., Monday through Friday, and 9 a.m. to 5 p.m. Saturday. No commercial construction operations are permitted on Sunday or holidays.

### 3.3.2 Imperial County – Operational Noise Standards

Noise-generating sources in Imperial County are regulated by the County of Imperial Codified Ordinances, Title 9, Division 7. Noise Abatement and Control Section 90702.00 Subsection A provides acceptable sound level limits based on the property zoning. The sound level limits are depicted in Table 3-1. The sound level limits depend on the time of day and the receiving land use. The sound level limits indicated in Table 3-1 apply to noise generation from one property to an adjacent property. The sound level limit between two zoning districts (different land uses) is measured at the property line between the properties.

Noise guidelines in Imperial County have been established in the Noise Element of the General Plan (as revised October 6, 2015). These guidelines identify compatible exterior noise levels for various land use types. The Noise Element states that in the absence of a sensitive receptor, an exception or variance to the standards may be appropriate. These standards do not apply to construction noise. These standards are

intended to be enforced through the County's code enforcement program on the basis of complaints received from persons impacted by excessive noise. A noise nuisance may occur even though an objective measurement with a sound level meter is not available. In such cases, the County may act to restrict disturbing, excessive, or offensive noise which causes discomfort or annoyance to reasonable persons of normal sensitivity residing in an area.

**Table 3-1: Property Line Noise Limits**

| Column Heading 1 | Column Heading 2 | Column Heading 3 |
|---|---|---|
| Residential Zones | 7 a.m. to 10 p.m. | 50 |
| | 10 p.m. to 7 a.m. | 45 |
| Mutli-residential Zones | 7 a.m. to 10 p.m. | 55 |
| | 10 p.m. to 7 a.m. | 50 |
| Commercial Zones | 7 a.m. to 10 p.m. | 60 |
| | 10 p.m. to 7 a.m. | 55 |
| Light Industrial/ Industrial Park Zones | Anytime | 70 |
| General Industrial Zones | Anytime | 75 |
| Note: When the noise-generating property and the receiving property have different uses, the more restrictive standard shall apply. When the ambient noise level is equal to or exceeds the Property Line noise standard, the increase of the existing or proposed noise shall not exceed 3 dB $L_{eq}$. | | |

Source: Imperial County General Plan – Noise Element (as revised October 6, 2015)

### 3.3.3 Noise / Land Use Compatibility Standards

Land use compatibility refers to the acceptability of a land use in a specified noise environment. The standard includes acceptable and unacceptable community noise exposure limits for various land use categories as currently defined by the State of California. The acceptable noise exposure limits are shown in Imperial County General Plan, Noise Element, Table 7. The acceptable level for residential areas is 60 dB CNEL. When an acoustical analysis is performed, conformance of the Proposed Action with the Noise/Land Use Compatibility Guidelines is used to evaluate the potential noise impact and will provide criteria for environmental impact findings and conditions for project approval.

Per the Imperial County Noise Element (as revised in 2015), the increase of noise levels generally results in an adverse impact to the noise environment. The Noise/Land Use Compatibility Guidelines are not intended to allow the increase of ambient noise levels up to the maximum without consideration of feasible noise reduction measures. The following guidelines are established by the County of Imperial for the evaluation a of significant noise impact.

1. If the future noise level after the project is completed will be within the "normally acceptable" noise levels shown in the Noise/Land Use Compatibility Guidelines but will result in an increase of 5 dB CNEL or greater, the project will have a potentially significant noise impact and mitigation measures must be considered.

2. If the future noise level after the project is completed will be greater than the "normally acceptable" noise levels shown in the Noise/Land Use Compatibility Guidelines, a noise increase of 3 dB CNEL or greater shall be considered a potentially significant noise impact and mitigation measures must be considered.

### 3.3.4 Imperial County – Significance Determination

Imperial County Title 9, Division 7 Noise Abatement and Control Section 90702.00 Subsection A states:

> *It shall be unlawful for any person to cause noise by any means to the extent that the applicable one-hour average sound level set out in the following table is exceeded, at any location in the County of Imperial on or beyond the boundaries of the property on which the noise is produced.*

The applicable limits are provided above in Table 3-1. The Project and surrounding properties are zoned as A-2, General Agriculture; A-2-R - General Agriculture, Rural Zone; and A-3, Heavy Agriculture. The proposed Project was analyzed in accordance to the applicable sound limits established in Section 90702.00 of the Noise Ordinance of 70 dBA $L_{eq}$ for agricultural (Light Industrial/ Industrial Park Zones) at the Project property lines.

## 3.4 Applicable Noise Regulation Summary

Project construction noise, from all construction equipment, will be limited to 75 dB $L_{eq}$ averaged over an eight-hour period at the nearest sensitive receptor. Operational noise will be limited by Section 90702.00 of the Noise Ordinance. Most of the Project components will only operate during the daytime hours but a few may operate during nighttime or early morning hours (such as HVAC systems). The Project is designed to meet 70 dBA at all points along the property line, and to not exceed the Noise/Land Use Compatibility Guidelines, 60 dB CNEL, at the nearest residences.

# 4.0 AMBIENT NOISE LEVELS

Ambient measurements for the CSE project were collected by LDN Consultants on March 22, 2011[1] to determine the existing noise environment prior to the installation of the CSE photovoltaic solar generating facility which has since been constructed. The project site was vacant at the time of the measurements, and the lands surrounding the CSE project was, and still is, used for agriculture.

Ambient measurements were taken at two locations on CSE property with line of site to Highland Valley Road. The noise measurements were recorded on March 22, 2011 between approximately 11:45 a.m. and 12:30 p.m. Noise measurements gathered at the Project site were taken using a Larson-Davis Model LxT Type 1 precision sound level meter, programmed, in "slow" mode, to record noise levels in "A" weighted form. The sound level meter and microphone were mounted on a tripod, five feet above the ground and equipped with a windscreen during all measurements. The sound level meter was calibrated before and after the monitoring using a Larson-Davis calibrator, Model CAL 200.

The noise measurement locations were determined based onsite access and noise impact potential. Monitoring location 1 (M1) was located roughly 50-feet from State Route 98 near the intersection of Pulliam Road. Monitoring location 2 (M2) was taken in the eastern portion of the site approximately 30-feet from Brockman Road at the intersection of Kubler Road. The results of the noise measurements are presented in Table 4-1. The noise measurements were monitored for a time period of 15 minutes each. The ambient $L_{eq}$ noise levels measured in the area of the project during the late morning and mid-day were found to be between 50-58 dBA $L_{eq}$ on the western portion of the site and the $L_{90}$ noise levels were between 35 and 36 dBA. The existing noise in the area consisted primarily of traffic and background noise from existing agricultural operations. It is assumed that ambient sound levels in the area have not significantly changed since 2011.

**Table 4-1: CSE Project Ambient Noise Levels (2011)**

| Location | Description | Time | Noise levels (dBA) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Leq | Lmin | Lmax | L10 | L50 | L90 |
| M1 | Along State Route 98 | 11:45 a.m. – 12:00 p.m. | 54.0 | 34.3 | 74.5 | 52.1 | 38.7 | 35.9 |
| M2 | Along Brockman Road | 12:15 p.m. – 12:30 p.m. | 50.8 | 33.8 | 71.1 | 51.8 | 41.6 | 37.2 |

Source: Noise Assessment Centinela Solar Energy Project, Ldn Consulting, 2011

[1] *Noise Assessment Centinela Solar Energy Project*, LDN Consultants, 2011

# 5.0 CONSTRUCTION NOISE

To estimate sound levels emitted by construction activities for the Project, Burns & McDonnell calculated the cumulative sound generated by all major construction equipment used as part of the Project. Construction activities are short-term and do not generate lasting impacts on the ambient noise levels. Noise generated by construction equipment includes haul trucks, water trucks, graders, dozers, loaders and scrapers.

The EPA has compiled data regarding the noise generating characteristics of specific types of construction equipment. Noise levels generated by heavy construction equipment at a distance of 50 feet can range from 60 dBA for a small tractor up to 100 dBA for rock breakers.

Calculations of the expected construction noise impacts were completed. The calculations are based on each piece of equipment's operational sound level and the amount of time the equipment is operating in a given day. That cumulative sound level for all equipment operating in a given day is then projected out to the nearest residence. To establish conservative, worst-case noise levels for construction operations, no topographic attenuation or barrier reductions were considered.

Construction activities are expected to take approximately 12 months. Major Project components include the following: up to two buildings totaling 85,000 square feet in size (batteries and enclosures; power conversion systems; substation and overhead electric tie line; ancillary systems).

The noise levels utilized in this analysis for construction operations are based upon the anticipated list of equipment provided by the applicant and is shown in Table 5-1 below. The construction equipment is anticipated to be spread out over the entire site. This would result in an acoustical center for the construction activities of approximately 1,000 feet from the nearest residential property.

**Table 5-1: Construction Noise Levels**

| Construction Equipment | Quantity | Duty Cycle (hours/day) | Source Noise Level @ 50 feet (dBA $L_{eq}$)[a] | Cumulative Noise Level @ 50 feet (dBA $L_{eq}$-8 hour) |
|---|---|---|---|---|
| Bulldozer (247 HP) | 1 | 6 | 80 | 79 |
| Grader (187 HP) | 1 | 6 | 82 | 81 |
| Scraper (367 HP) | 2 | 6 | 86 | 88 |
| Water Truck (402 HP) | 1 | 6 | 90 | 89 |
| Compactor (80 HP) | 1 | 6 | 80 | 79 |
| Dump Truck (402 HP) | 1 | 6 | 90 | 89 |
| Loader/Backhoe (97 HP) | 1 | 6 | 87 | 86 |
| Bobcat (65 HP) | 1 | 6 | 89 | 88 |
| | | | Cumulative Construction Noise Level at 50 ft: | 95 |
| | | | Distance to Nearest Residence (ft): | 1,000 |
| | | | Construction Noise Level at Nearest Residence (dBA): | **69** |
| | | | Residential Noise Level Limit (dBA): | **75** |
| | | | **Impact at Nearest Residential Receiver?** | **NO** |

(a) Values taken from FHWA Highway Construction Noise and the HEARS database

# 6.0 TRAFFIC NOISE

To estimate sound levels emitted by the increase in traffic associated with the Project, off-site Project-related roadway noise levels were calculated using calculation methods published by the Federal Highway Administration (FHWA) and CadnaA modeling software. The model uses the traffic volume, vehicle mix, and speed to compute the equivalent noise level at distance. A calculation was used in the model which computes equivalent noise levels for each hourly time period used in the calculation of CNEL based on the average daily traffic counts and future traffic predictions. Weighting these equivalent noise levels and summing them gives the CNEL for traffic noise at a specified distance from the roadway.

Based on the County's Guidelines, Project-related roadway noise levels would be considered significant if the future noise level with the Project will be above the "normally acceptable" noise levels shown in the Noise/Land Use Compatibility Guidelines but will result in an increase of 5 dBA CNEL or greater. A noise increase of 3 dBA CNEL or greater shall be considered a potentially significant noise impact and mitigation measures would be considered.

Project construction workforce will include an average 15 people on-site, with a peak of 50 people that will occur during the excavation phase. Work hours will be between the hours of 8:00 a.m. and 5:00 p.m. Monday through Saturday. The trips generated during the excavation phase of construction were provided by KOA[2] and are estimated at 128 daily trips, inclusive of deliveries and construction truck trips. Truck trips were converted into passenger equivalent volumes using a factor of 2.0. The trips generated during the building and facilities construction phase are less than the trips for the excavation phase. The traffic increase during the excavation phase would generate the largest increase in traffic noise.

To determine if roadway noise level increases during the construction activities, the noise levels for the existing conditions were compared with the noise level increase from the Project's peak related construction traffic. The worst-case construction-related noise increases would occur when comparing the existing conditions prior to construction to the excavation phase of construction when the most workers would be present on a daily basis. To be conservative, the construction peak traffic volume was utilized. Utilizing the Project's traffic assessment (*Le Conte Battery Energy Storage Project Traffic Study* KOA, 2019), estimated sound levels at 100 feet from the road centerline were calculated for existing conditions and future conditions during construction.

[2] *Le Conte Battery Energy Storage Project Traffic Study* KOA, 2019

Table 6-1 shows the estimated noise levels for the existing traffic counts scenario. The noise levels modeled in the table do not take into account any noise barriers or topography that may affect ambient noise levels thus representing a worst-case scenario.

**Table 6-1: Existing Traffic Noise Levels**

| Roadway Segment | Existing ADT[a] | Vehicle Speeds (MPH) | Noise Level @ 100 feet (dBA CNEL) |
|---|---|---|---|
| Drew Rd - SR-098 to Fisher Rd | 321 | 55 | 48.0 |
| SR-98 - Drew Rd to Pulliam Rd | 1953 | 65 | 59.2 |

(a) ADT (average daily traffic) numbers provided by *Le Conte Battery Energy Storage Project Traffic Study* KOA, 2019

Table 6-2 shows the estimated noise levels for the future traffic counts scenario based on the Project's traffic assessment (*Le Conte Battery Energy Storage Project Traffic Study* KOA, 2019). Construction traffic trips were added to the existing daily traffic counts to estimate future traffic noise levels.

**Table 6-2: Future Traffic Noise Levels During Construction**

| Roadway Segment | Future ADT[a] | Vehicle Speeds (MPH) | Noise Level @ 100 feet (dBA CNEL) |
|---|---|---|---|
| Drew Rd - SR-098 to Fisher Rd | 404 | 55 | 49.0 |
| SR-98 - Drew Rd to Pulliam Rd | 1998 | 65 | 59.3 |

(a) Future ADT (average daily traffic) numbers estimated by the existing ADT from *Le Conte Battery Energy Storage Project Traffic Study* KOA, 2019 with future construction traffic trips added.

Table 6-3 shows the estimated noise level increase due to the expected future traffic counts. As shown in the last column of the table, the Project does not create short-term noise increases during construction of more than 5 dBA CNEL on either roadway segment. The noise levels are below the 60 dBA CNEL at 100 feet from roadway and in the "normally acceptable" category. No sensitive receptors would be directly impacted by construction traffic noise due to the proposed Project's construction traffic.

**Table 6-3: Increase in Traffic Noise Levels**

| Roadway Segment | Existing Noise Level @ 100 feet (dBA CNEL) | Future Noise Level @ 100 feet (dBA CNEL) | Increase in Noise Level (dBA CNEL) | County Noise Increase Threshold (dBA CNEL) | Potential Impact? |
|---|---|---|---|---|---|
| Drew Rd – SR-098 to Fisher Rd | 48.0 | 49.0 | 1.0 | 5 | No |
| SR-98 – Drew Rd to Pulliam Rd | 59.2 | 59.3 | 0.1 | 5 | No |

# 7.0 BESS OPERATIONAL NOISE

To estimate sound levels generated by the Project, Burns & McDonnell calculated the combined sound levels of the operational equipment included as part of the Project. The Project cumulative sound levels were calculated based on sound level data provided by LS Power Development.

For the sound level calculations, conservative assumptions were made. Reflections and shielding were not considered for sound encountering physical structures. Sound levels near the Project could be influenced by sound shielding from physical structures onsite (i.e. the battery building). The area surrounding the Project has mild elevation changes, which can scatter and absorb the sound waves. Terrain and surface effects, such as ground absorption, were not included in the calculation. These assumptions would likely overpredict offsite sound levels. However, they were included as a conservative measure.

## 7.1 Project Sound Sources

The BESS will receive and store excess energy generated by the CSE and to return this electricity to the grid at a later time when needed. Though the batteries themselves do not generate a significant amount of noise, the inverters, transformers, and heating ventilation and air conditioning (HVAC) equipment associated with the BESS will. The major sound emitting components included within the Project are expected to be the 2.5-megawatt (MW) inverters, 2.5-megavolt-ampere (MVA) transformers, rooftop HVAC units, substation HVAC units, and the substation step-up transformer. The major BESS and substation equipment sources of noise are listed below in Table 7-1, with their estimated sound levels.

**Table 7-1: Major Equipment Sound Levels**

| Source | Number of Sources | Sound Pressure Level (dBA) | Notes |
|---|---|---|---|
| BESS Equipment | | | |
| 2.5 MW Inverter | 56 | 80 | SPL at 3 feet |
| 2.5 MVA Transformer | 56 | 62 | SPL at 5 feet |
| Rooftop HVAC Unit | 40 | 85 | SPL at 3 feet |
| Substation Equipment | | | |
| Step-up Transformer | 1 | 87 | SPL at 5 feet |
| Substation HVAC Unit | 2 | 67 | SPL at 10 feet |

*dBA – A-weighted decibels, MW – megawatt, MVA – megavolt ampere, SPL – sound pressure level, HVAC – heating ventilation and air conditioning

## 7.2 Operational Noise Levels

The worst-case property line noise levels would occur at the property line nearest the operational noise sources. For the BESS, this location is approximately 450 feet to the west along Mandrapa Road. For the Substation, this location is approximately 400 feet to the north along Highway 98. Currently the adjacent properties are zoned for agricultural uses, which are limited to the Light Industrial sound level limit of 70 dBA. Sound levels were also analyzed at the nearest residence – 1,000 feet to the northwest of the BESS building – for the Residential nighttime sound level limit of 60 dB CNEL. The results of the calculated noise levels are shown below in Table 7-2 and Table 7-3.

To determine the cumulative noise levels at the property line, the noise levels from the transformers, inverters, and HVAC equipment were all combined and propagated out to the nearest property line without any shielding from the proposed buildings. The addition of the substation property line sound level (49.3 dBA) and the BESS (59.4 dBA) provide a cumulative noise levels for the Project of 59.8 dBA at the property line. The cumulative sound level at the nearest residence is approximately 59.6 dB CNEL. Both are below their respective sound level requirements.

**Table 7-2: Battery Energy Storage System Sound Levels**

| Source | Number of Sources | Single Source Noise Level | Cumulative Sources Noise Level | Distance to Property Line (ft) | Reduction due to Distance (dBA $L_{eq}$) | Resultant Noise Level at Property Line (dBA $L_{eq}$) | Sound Level Standard (dBA) | Impact? (Yes/No) |
|---|---|---|---|---|---|---|---|---|
| 2.5 MW inverters | 56 | 80 dBA @ 3.3 ft | 97.5 dBA @ 3.3 ft | 450 | 42.7 | 54.8 | 70 | -- |
| 2.5 MVA transformers | 56 | 62 dBA @ 5 ft | 79.5 dBA @ 5 ft | 450 | 39.1 | 40.4 | 70 | -- |
| Rooftop HVAC Units | 40 | 85 dBA @ 3 ft | 101.0 dBA @ 3 ft | 450 | 43.5 | 57.5 | 70 | -- |
| **Battery Energy Storage System Total Sound Level at Property Line (Mandrapa Rd):** | | | | | | **59.4** | **70** | **No** |
| **Battery Energy Storage System Total CNEL Sound Level at Nearest Residence (1,000 ft)[a]:** | | | | | | **59.2** | **60** | **No** |

(a) CNEL calculation assumes the Project is operating at its maximum sound level for a continuous 24-hour period.

**Table 7-3: Substation Sound Levels**

| Source | Number of Sources | Single Source Noise Level | Cumulative Sources Noise Level | Distance to Property Line (ft) | Reduction due to Distance (dBA $L_{eq}$) | Resultant Noise Level at Property Line (dBA $L_{eq}$) | Sound Level Standard (dBA) | Impact? (Yes/No) |
|---|---|---|---|---|---|---|---|---|
| Step-up transformer | 1 | 87 dBA @ 5 ft | 87.0 dBA @ 5 ft | 400 | 38.1 | 48.9 | 70 | -- |
| Substation HVAC | 2 | 70 dBA @ 10 ft | 73.0 dBA @ 10 ft | 400 | 32.0 | 38.0 | 70 | -- |
| **Substation Total Sound Level at Property Line (Highway 98):** | | | | | | **49.3** | **70** | **No** |
| **Substation Total CNEL Sound Level at Nearest Residence (800 ft)[a]:** | | | | | | **49.9** | **60** | **No** |

(a) CNEL calculation assumes the Project is operating at its maximum sound level for a continuous 24-hour period.

# 8.0 INSIGNIFICANT SOURCES OF PROJECT NOISE

Noise can be generated by corona off of transmission lines. The corona affect is a phenomenon associated with the electrical ionization of the air that occurs near the surface of the energized conductor and suspension hardware due to very high electric field strength. This is audible power line noise that is generated from electric corona discharge, which is usually experienced as a random crackling or hissing sound. The amount of corona produced by a transmission line is a function of the voltage of the line, the diameter of the conductors, the locations of the conductors in relation to each other, the elevation of the line above sea level, the condition of the conductors and hardware, and the local weather conditions.

The BESS will connect to the step-up substation and will utilize the existing transmission lines once connected to the grid. Therefore, there are no anticipated changes to the transmission line corona affect noise as a result of the Project.

# 9.0 CONCLUSION

Burns & McDonnell conducted a sound study for the proposed Le Conte Battery Energy Storage System. The study predicts future noise impacts that may result during the construction and operation of the Project. This utility-scale BESS will be capable of storing up to 125 MW of solar generated power onsite at the CSE Facility. Noise calculations were completed for the Project to estimate sound level impacts from the Project sound sources at the property line and nearest residence.

The significant noise sources associated with the Project include the HVAC equipment, transformers, and inverters. Noise calculations were completed for the Project sound sources. Overall sound levels for the equipment were provided by LS Power Development. The noise calculations demonstrate that sound levels generated by the construction and operation of the Project, as designed, would not exceed the Imperial County General Plan sound level limits at the Project property line or at the nearest residence.

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