3.11 Noise and Vibration

This section identifies the ambient noise environment for the VEGA 6 project area and Ramon Substation expansion area and describes applicable federal, state, and local regulations, potential project-related noise and vibration impacts, and recommended mitigation measures to avoid or reduce potential impacts of the proposed VEGA 6 project and Ramon Substation expansion. Information contained in this section for the VEGA 6 project is summarized from the *Noise Impact Assessment for the VEGA SES 6 Solar and Battery Storage Project* prepared by ECORP Consulting, Inc. This report is included in Appendix I of this EIR.

3.11.1 Existing Conditions

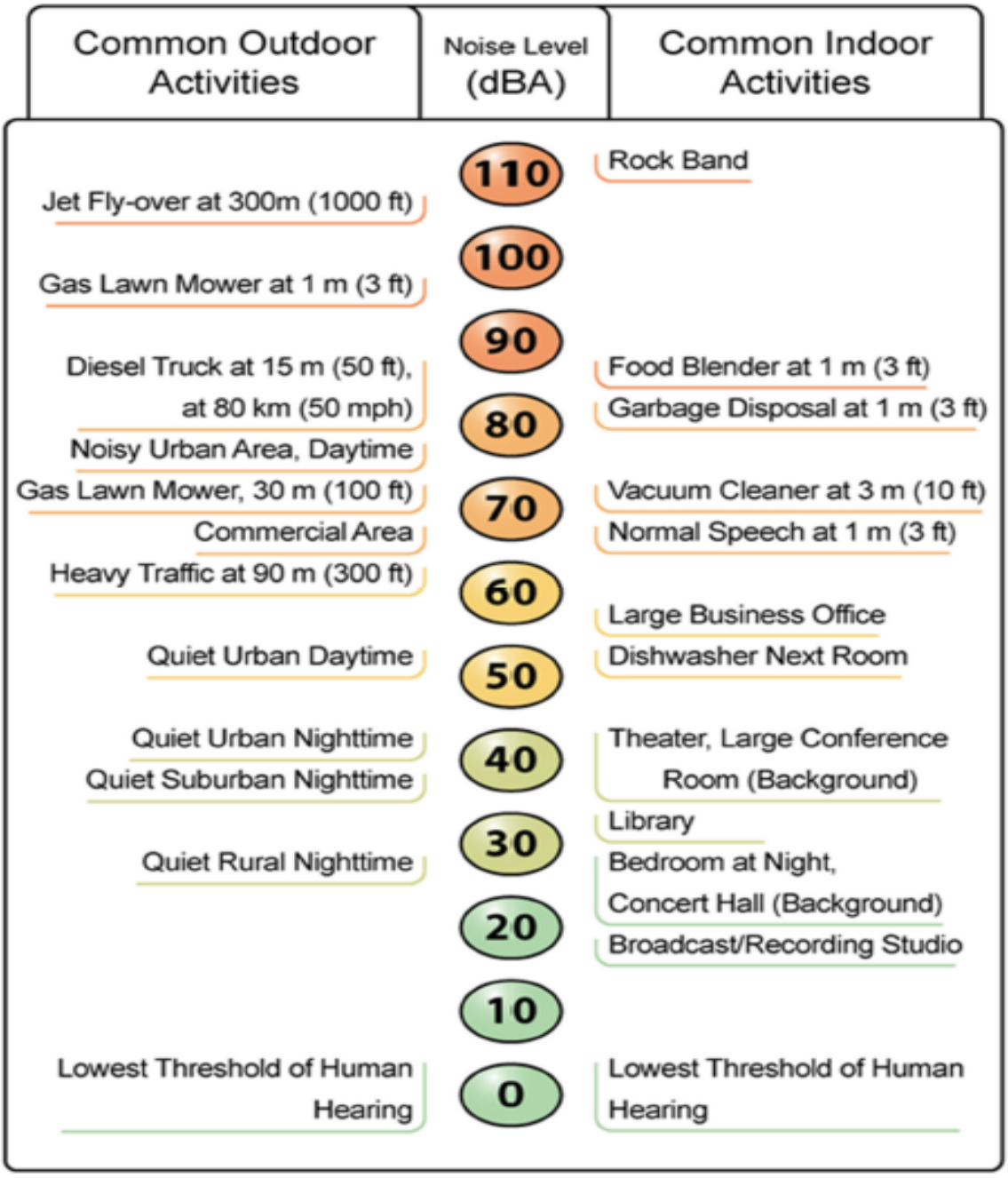
Noise is defined as unwanted sound. Pressure waves traveling through air exert a force registered by the human ear as sound. Sound, traveling in the form of waves from a source, exerts a sound pressure level (referred to as sound level), which is measured in decibels (dB), with zero dB corresponding roughly to the threshold of human hearing and 120 to 140 dB corresponding to the threshold of pain.

The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. Consequently, when assessing potential noise impacts, sound is measured using an electronic filter that de-emphasizes the frequencies below 1,000 hertz and above 5,000 hertz to imitate the human ear's decreased sensitivity to low and extremely high frequencies. This emulation of the human ear's frequency sensitivity is referred to as A-weighting and is expressed in units of dBA. Frequency A weighting follows an international standard method of frequency de-emphasis and is typically applied to community noise measurements. In practice, the specific sound level from a source is measured using a meter incorporating an electrical filter corresponding to the A-weighting curve. All noise levels reported are A-weighted unless otherwise stated.

The dB scale is logarithmic and an increase of 10 dBA is generally perceived as a doubling in loudness. For example, a 70-dBA sound is half as loud as an 80-dBA sound and twice as loud as a 60-dBA sound.

Typical noise levels associated with common noise sources are depicted in Figure 3.11-1.

Figure 3.11-1. Common Noise Levels



Source: Appendix I of this EIR

Sound Propagation and Attenuation

Noise can be generated by a number of sources, including mobile sources such as automobiles, trucks and airplanes, and stationary sources such as construction sites, machinery, and industrial operations. Sound spreads (propagates) uniformly outward in a spherical pattern, and the sound level decreases (attenuates) at a rate of approximately 6 dB for each doubling of distance from a stationary or point source. Sound from a line source, such as a highway, propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of approximately 3 dB for each doubling of distance from a line source, such as a roadway, depending on ground surface characteristics. No excess attenuation is assumed for hard surfaces like a parking lot or a body of water. Soft surfaces, such as soft dirt or grass, can absorb sound, so an excess ground-attenuation value of 1.5 dB per doubling of distance is normally assumed. For line sources, an overall attenuation rate of 3 dB per doubling of distance is assumed (Appendix I of this EIR).

Noise levels may also be reduced by intervening structures; generally, a single row of detached buildings between the receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm generally reduces noise levels by 10 to 20 dBA. However, noise barriers or enclosures specifically designed to reduce site-specific construction noise can provide a sound reduction of 35 dBA or greater. To achieve the most potent noise-reducing effect, a noise enclosure/barrier must physically fit in the available space, must completely break the “line of sight” between the noise source and the receptors, must be free of degrading holes or gaps, and must not be flanked by nearby reflective surfaces (Appendix I of this EIR).

The manner in which older homes in California were constructed generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows. The exterior-to-interior reduction of newer residential units is generally 30 dBA or more. Generally, in exterior noise environments ranging from 60 dBA Community Noise Equivalent Level (CNEL) to 65 dBA CNEL, interior noise levels can typically be maintained below 45 dBA, a typically residential interior noise standard, with the incorporation of an adequate forced air mechanical ventilation system in each residential building, and standard thermal-pane residential windows/doors with a minimum rating of Sound Transmission Class (STC) 28. (STC is an integer rating of how well a building partition attenuates airborne sound (Appendix I of this EIR).

Noise Descriptors

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Several rating scales have been developed to analyze the adverse effect of community noise on people. Because environmental noise fluctuates over time, these scales consider that the effect of noise on people is largely dependent on the total acoustical energy content of the noise, as well as the time of day when the noise occurs. The L_{eq} is a measure of ambient noise, while the L_{dn} and CNEL (Community Noise Equivalent Level) are measures of community noise.

The A weighted decibel sound level scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events.

Human Response to Noise

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities, including sleep, speech, recreation, and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels.

Noise environments and consequences of human activities are usually well represented by median noise levels during the day or night or over a 24-hour period. Environmental noise levels are generally considered low when the CNEL is below 60 dBA, moderate in the 60 to 70 dBA range, and high above 70 dBA. Examples of low daytime levels are isolated, natural settings with noise levels as low as 20 dBA and quiet, suburban, residential streets with noise levels around 40 dBA. Noise levels above 45 dBA at night can disrupt sleep. Examples of moderate-level noise environments are urban residential or semi-commercial areas (typically 55 to 60 dBA) and commercial locations (typically 60 dBA). Regarding increases in A-weighted noise levels (dBA), the following relationships should be noted in understanding this analysis:

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived by humans.
- Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference.
- A change in level of at least 5 dBA is required before any noticeable change in community response would be expected. An increase of 5 dBA is typically considered substantial.
- A 10-dBA change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

Existing Ambient Noise Levels

VEGA 6

The most common noise in the VEGA 6 project vicinity is produced by automotive vehicles (e.g., cars, trucks, buses, motorcycles) traversing SR-78 and the various noises associated with agricultural equipment and vehicles traversing the various county paved and unpaved roadways. Traffic moving along streets produces a sound level that remains relatively constant and is part of the minimum ambient noise level in the project vicinity.

In order to quantify existing ambient noise levels in the VEGA 6 project area, ECORP Consulting, Inc. conducted four short-term noise measurements on July 14, 2021. The noise measurement sites were representative of typical existing noise exposure within the VEGA 6 project vicinity during the daytime. The 15-minute measurements were taken between 10 a.m. and 11:40 a.m. Short-term (L_{eq}) measurements are considered representative of the noise levels throughout the day. As shown in Table 3.11-1, the existing noise levels in the project vicinity range from 39.6 to 53.3 dBA L_{eq}.

Table 3.11-1. Existing (Baseline) Noise Measurements

Location No.	Location	L_{eq} dBA	L_{min} dBA	L_{max} dBA	Time
1	Intersection of Garvey Road and Baughman Road	53.3	30.5	73.8	10:56 a.m. - 11:11 a.m.
2	North of Garvey Road and Orr Road Intersection	39.6	32.7	51.1	10:30 a.m. – 10:45 a.m.
3	Northwest Corner of Garvey Road and Buck Road Intersection	50.1	39.3	64.3	11:25 a.m. – 11:40 a.m.
4	West of Garvey Road on Shoulder, 0.5 Mile South of SR-78	45.4	30.6	58.4	10:00 a.m. – 10:15 a.m.

Source: Appendix I of this EIR

Ramon Substation Expansion

The most common noise in the vicinity of the Ramon Substation expansion area is produced by automotive vehicles (e.g., cars, trucks, buses, motorcycles) traversing local roadways. Traffic moving along roadways produces a sound level that remains relatively constant and is part of the minimum ambient noise level in the vicinity.

Noise Sensitive Land Uses

VEGA 6

Noise-sensitive land uses are generally considered to include those uses where noise exposure could result in health-related risks to individuals, as well as places where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Additional land uses such as hospitals, historic sites, cemeteries, and certain recreation areas are considered sensitive to increases in exterior noise levels. Schools, churches, hotels, libraries, and other places where low interior noise levels are essential are also considered noise-sensitive land uses.

The nearest sensitive receptors to the VEGA 6 project site are depicted in Figure 3.11-2. The nearest existing noise-sensitive land use to the project site is a single-family residence located approximately 2,725 feet north of the northeastern corner of the solar energy facility site, just south of Garvey Road (labeled 1 in Figure 3.11-2). During construction occurring off-site along the gen-tie transmission line route, the nearest sensitive receptor would be 970 feet away from the gen-tie transmission line (labeled 2 in Figure 3.11-2) (Appendix I of this EIR).

Additional sensitive receptors near the project site include the following:

- Residence located approximately 0.85 mile north of the solar facility site, north of Buck Road/Garvey Road intersection
- Residence located approximately 1 mile north of solar facility site, north of Baughman Road/Garvey Road intersection
- Residence located approximately 1.21 miles north of solar facility site, north of Orr Road/Garvey Road intersection

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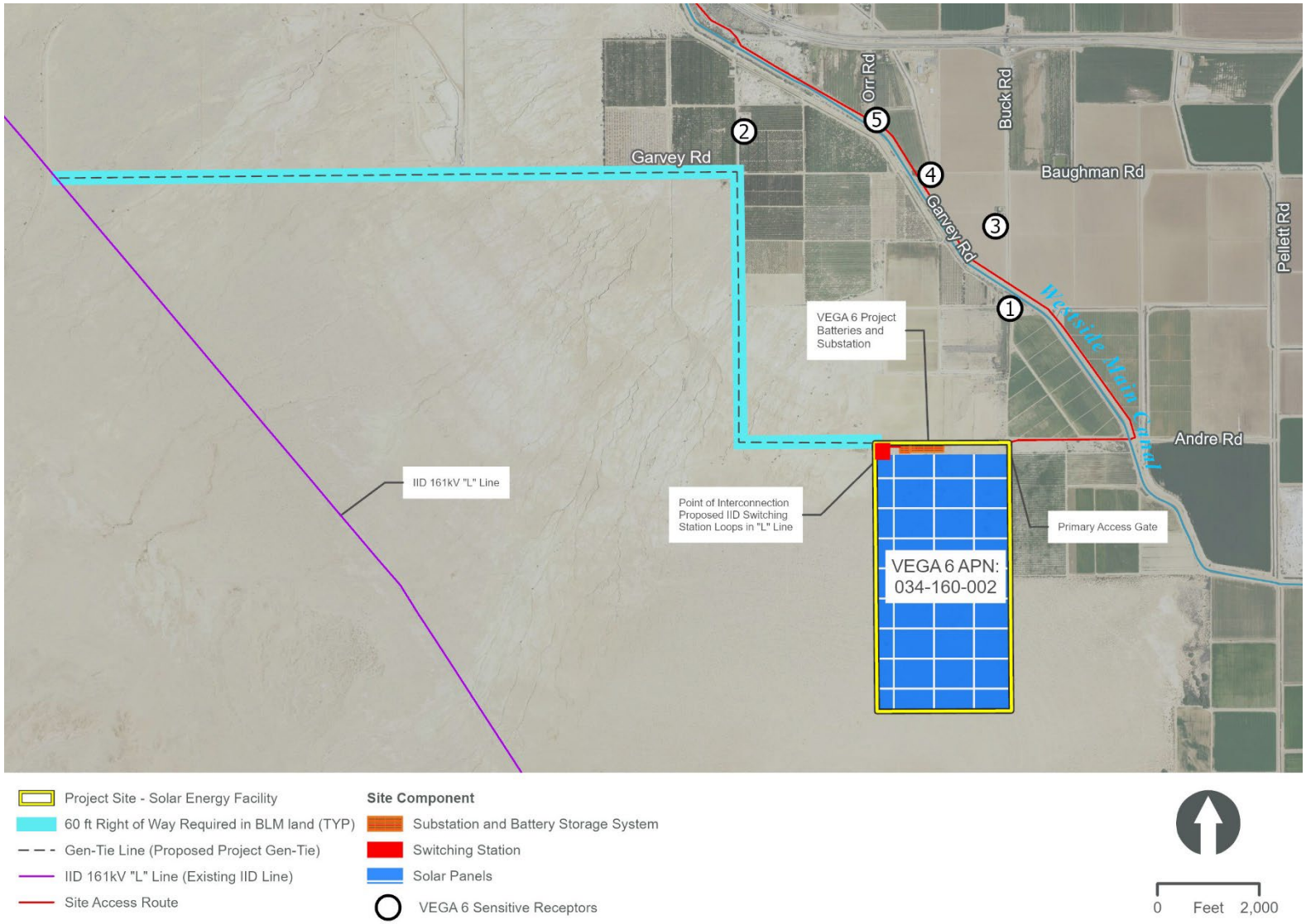
Figure 3.11-2. Nearest Sensitive Receptors to VEGA 6 Project Site



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Ramon Substation Expansion

Sensitive receptors in the vicinity of the proposed Ramon Substation expansion area are residences located west of the existing SCE Mirage Substation along Via Las Palmas and the Tri Palm Estates development along Ramon Road to the southwest. The nearest sensitive receptors to the expansion area are the single-family residences located approximately 0.2 miles to the west on Via Las Palmas.

Vibration

Vibration Sources and Characteristics

Sources of earthborne vibrations include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) or manmade causes (explosions, machinery, traffic, trains, construction equipment, etc.). Vibration sources may be continuous (e.g., factory machinery) or transient (e.g., explosions).

Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Several different methods are typically used to quantify vibration amplitude. One is the peak particle velocity (PPV); another is the root mean square (RMS) velocity. The PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave. The RMS velocity is defined as the average of the squared amplitude of the signal. The PPV and RMS vibration velocity amplitudes are used to evaluate human response to vibration.

PPV is generally accepted as the most appropriate descriptor for evaluating the potential for building damage. For human response, however, an average vibration amplitude is more appropriate because it takes time for the human body to respond to the excitation (the human body responds to an average vibration amplitude, not a peak amplitude). Because the average particle velocity over time is zero, the RMS amplitude is typically used to assess human response. The RMS value is the average of the amplitude squared over time, typically a 1- sec. period (Appendix I of this EIR).

Table 3.11-2 displays the reactions of people and the effects on buildings produced by continuous vibration levels. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Low-level vibrations frequently cause irritating secondary vibration, such as a slight rattling of windows, doors, or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage. In high-noise environments, which are more prevalent where groundborne vibration approaches perceptible levels, this rattling phenomenon may also be produced by loud airborne environmental noise causing induced vibration in exterior doors and windows.

Ground vibration can be a concern in instances where buildings shake, and substantial rumblings occur. However, it is unusual for vibration from typical urban sources such as buses and heavy trucks to be perceptible. For instance, heavy-duty trucks generally generate groundborne vibration velocity levels of 0.006 PPV at 50 feet under typical circumstances, which as identified in Table 3.11-2 is considered very unlikely to cause damage to buildings of any type.

Table 3.11-2. Human Reaction and Damage to Buildings for Continuous or Frequent Intermittent Vibration Levels

Peak Particle Velocity (inches/second)	Approximate Vibration Velocity Level (VdB)	Human Reaction	Effect on Buildings
0.006 – 0.019	64 – 74	Range of threshold of perception	Vibrations unlikely to cause damage of any type
0.08	87	Vibrations readily perceptible	Recommended upper level to which ruins and ancient monuments should be subjected
0.1	92	Level at which continuous vibrations may begin to annoy people, particularly those involved in vibration sensitive activities	Virtually no risk of architectural damage to normal buildings
0.2	94	Vibrations may begin to annoy people in buildings	Threshold at which there is a risk of architectural damage to normal dwellings
0.4 – 0.6	98 - 104	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges	Architectural damage and possibly minor structural damage

Source: Appendix I of this EIR

Common sources for groundborne vibration are planes, trains, and construction activities such as earth-moving which requires the use of heavy-duty earth moving equipment. Construction-related ground vibration is normally associated with impact equipment such as pile drivers, jackhammers, and the operation of some heavy-duty construction equipment, such as dozers and trucks. Vibration decreases rapidly with distance. Groundborne vibration levels associated with typical construction equipment at 25 feet distant are summarized in Table 3.11-3.

Table 3.11-3. Representative Vibration Source Levels for Construction Equipment

Equipment Type	Peak Particle Velocity at 25 Feet (Inches per Second)
Large Bulldozer	0.089
Caisson Drilling	0.089
Loaded Trucks	0.076
Hoe Ram	0.089
Jackhammer	0.035
Small Bulldozer/Tractor	0.003
Vibratory Roller	0.210

Source: Appendix I of this EIR

Proximity to Airports

VEGA 6

The VEGA 6 project site is not located within 2 miles of a public airport or a private airstrip. The nearest airport is the Brawley Municipal Airport located approximately 9.8 miles east of the VEGA 6 project site.

Ramon Substation Expansion

The nearest public airport is the Palm Springs International Airport located approximately 7 miles north of the Ramon Substation expansion area.

3.11.2 Regulatory Setting

This section identifies and summarizes federal, state, and local laws, policies, and regulations that are applicable to the project.

Federal

Federal regulations establish noise limits for medium and heavy trucks (more than 4.5 tons, gross vehicle weight rating) under 40 CFR, Part 205, Subpart B. The federal truck passersby noise standard is 80 dB at 15 meters from the vehicle pathway centerline. These controls are implemented through regulatory controls on truck manufacturers. In addition to noise standards for individual vehicles, under regulations established by the U.S. Department of Transportation's FHWA, noise abatement must be considered for certain federal or federally-funded projects. Abatement is an issue for new highways or significant modification of an existing freeway. The agency must determine if the project would create a substantial increase in noise or if the predicted noise levels approach or exceed the Noise Abatement Criteria.

State

The state has also established noise insulation standards for new multi-family residential units, hotels, and motels that would be subject to relatively high levels of transportation-related noise. These requirements are collectively known as the California Noise Insulation Standards (CCR, Title 24). The noise insulation standards set forth an interior standard of L_{dn} 45 dB for any habitable room. They also require an acoustical analysis demonstrating how dwelling units have been designed to meet this interior standard where such units are proposed in areas subject to noise levels greater than Ldn 60 dB. Title 24 standards are typically enforced by local jurisdictions through the building permit application process.

The State of California General Plan Guidelines, published by the OPR in 1998, also provides guidance for the acceptability of projects within specific CNEL/L_{dn} contours. The guidelines also present adjustment factors that may be used in order to arrive at noise acceptability standards that reflect the noise control goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution. The County of Imperial has utilized the adjustment factors provided and has modified the state's Land Use Compatibility standards for the purpose of implementing the Noise Element of its General Plan. Table 3.11-4 summarizes the acceptable and unacceptable community noise exposure limits for various land use categories as currently defined by the State of California. These community noise exposure limits are also incorporated into the County of Imperial General Plan Noise Element.

Local

Imperial County General Plan

The County of Imperial General Plan Noise Element identifies and defines existing and future environmental noise levels from sources of noise within or adjacent to the County of Imperial;

establishes goals and objectives to address noise impacts, and provides Implementation Programs to implement adopted goals and objectives.

Table 3.11-5 summarizes the VEGA 6 project's consistency with the applicable General Plan noise policies. While this EIR analyzes the VEGA 6 project's consistency with the General Plan pursuant to CEQA Guidelines Section 15125(d), the Imperial County Board of Supervisors ultimately determines consistency with the General Plan.

The County of Imperial has established the following interior noise standards to be considered in acoustical analyses:

- The interior noise standard for detached single family dwellings shall be 45 dB CNEL.
- The interior noise standard for schools, libraries, offices and other noise-sensitive areas where the occupancy is normally only in the day time, shall be 50 dB averaged over a 1-hour period ($L_{eq}(1)$).

Table 3.11-4. Land Use Compatibility for Community Noise Environments

Land Use Category	Community Noise Exposure – L_{dn} or CNEL (dBA)						
	50	55	60	65	70	75	80
Residential							
Transient Lodging – Motel, Hotel							
Schools, Libraries, Churches, Hospitals, Nursing Homes							
Auditorium, Concert Hall, Amphitheaters							
Sports Arena, Outdoor Spectator Sports							
Playgrounds, Neighborhood Parks							

Land Use Category	Community Noise Exposure – L_{dn} or CNEL (dBA)													
	50		55		60		65		70		75		80	
Golf Courses, Riding Stables, Water Recreation, Cemeteries														
Office Buildings, Business, Commercial and Professional														
Industrial, Manufacturing, Utilities, Agriculture														

	Normally Acceptable	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
	Conditionally Acceptable	New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design.
	Normally Unacceptable	New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirement must be made and needed noise insulation features included in the design.
	Clearly Unacceptable	New construction or development generally should not be undertaken.

Source: County of Imperial 2008

CNEL – community noise equivalent level; dBA – a-weighted decibel; L_{dn} – day-night average sound level

Table 3.11-5. Consistency with Applicable General Plan Policies

General Plan Policies	Consistency with General Plan	Analysis
Noise Element		
1. Acoustical Analysis of proposed projects. The County shall require the analysis of proposed discretionary projects, which may generate excessive noise, or which may be impacted by existing excessive noise levels.	Consistent	Under existing conditions, the ambient noise environment is characterized as relatively quiet with peak noise levels influenced by vehicular traffic and off-site agricultural operations. Given that the VEGA 6 project is not characterized as a sensitive land use, project facilities would be unaffected by existing noise levels. The project facilities would be constructed within areas zoned for agricultural use with noise levels up to 70 dBA identified as normally acceptable. Project operations are expected to produce noise levels that would not exceed County standards and, hence impacts are expected to be less than significant. This EIR provides an analysis of the potential short- and long-term noise impacts of the project. As discussed, short-term and long-term noise levels were found to be less than significant.
2. Noise/Land Use Compatibility. Where acoustical analysis of a proposed project is required, the County shall identify and evaluate potential noise/land use conflicts that could result from the implementation of the project. Projects which may result in noise levels that exceed the "Normally Acceptable" criteria of the Noise/Land Use Compatibility Guidelines shall include mitigation measures to eliminate or reduce the adverse noise impacts to an acceptable level.	Consistent	Noise levels associated with project operations would not exceed noise limits for the S-2 zone. See Section 3.11.3 Existing Conditions for additional discussion.
4. Interior Noise Environment. Where acoustical analysis of a proposed project is required, the County shall identify and evaluate projects to ensure compliance to the California (Title 24) interior noise standards and the additional requirements of this Element.	Consistent	This EIR provides an analysis of the potential short- and long-term noise impacts of the proposed VEGA 6 project. As discussed, short-term and long-term noise levels were found to be less than significant. Noise levels associated with project operations would be unlikely to exceed noise limits for the S-2 zone.

General Plan Policies	Consistency with General Plan	Analysis
5. New Noise Generating projects. The County shall identify and evaluate projects which have the potential to generate noise in excess of the Property Line Noise Limits. An acoustical analysis must be submitted which demonstrates the project's compliance.	Consistent	Please refer to above analysis for Interior Noise Environment for discussion.
6. Projects Which Generate Off-site Traffic Noise. The acoustical analysis shall identify and evaluate projects which will generate traffic and increase noise levels on off-site roadways. If the project site has the potential to cause a significant noise impact on sensitive receptors along those roadways, the acoustical analysis report shall consider noise reduction measures to reduce the impact to a level less than significant.	Consistent	As described in Chapter 2, Project Description, the project would involve a minimal number of operational related vehicle trips and therefore, is unlikely to substantially increase traffic noise levels on local roadways.

Source: County of Imperial 2015b
Note: dBA – a-weighted decibel

Construction Noise Standards

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 are required to be limited to the hours of 7:00 a.m. to 7:00 p.m., Monday through Friday, and 9:00 a.m. to 5:00 p.m. Saturday. No commercial construction operations are permitted on Sunday or holidays. In cases of a person constructing or modifying a residence for himself/herself, and if the work is not being performed as a business, construction equipment operations may be performed on Sundays and holidays between the hours of 9:00 a.m. and 5:00 p.m. Such non-commercial construction activities may be further restricted where disturbing, excessive, or offensive noise causes discomfort or annoyance to reasonable persons of normal sensitivity residing in an area.

County of Imperial Noise Ordinance

Noise generating sources in Imperial County are regulated under the County of Imperial Codified Ordinances, Title 9, Division 7 (Noise Abatement and Control). Noise limits are established in Chapter 2 of this ordinance. Under Section 90702.00 of this rule, 70 dB is the normally acceptable limit for the Industrial, Manufacturing, Utilities, and Agricultural category of land use (Table 3.11-6).

Table 3.11-6. Imperial County Exterior Noise Standards

Land Use Zone	Time Period	Noise Level, L_{eq} 1- hour
R-1 Residential	Night (10 p.m. to 7 a.m.) Day (7 a.m. to 10 p.m.)	45 dBA 50 dBA
R-2 Residential	Night (10 p.m. to 7 a.m.) Day (7 a.m. to 10 p.m.)	50 dBA 55 dBA
R-3, R-4, and all other residential	Night (10 p.m. to 7 a.m.) Day (7 a.m. to 10 p.m.)	50 dBA 55 dBA
Commercial	Night (10 p.m. to 7 a.m.) Day (7 a.m. to 10 p.m.)	55 dBA 60 dBA
Manufacturing, other industrial, agricultural, and extraction industry	Anytime	70 dBA
Industrial	Anytime	75 dBA

Source: Imperial County Municipal Code Section 90702.00.
Note: dBA – a-weighted decibel; L_{eq} – equivalent sound level

Riverside County General Plan Noise Element

The County of Riverside has adopted a Noise Element of the General Plan to control and abate environmental noise, and to protect the citizens of the County of Riverside from excessive exposure to noise. The Noise Element specifies the maximum allowable exterior noise levels for new developments impacted by transportation noise sources such as arterial roads, freeways, airports, and railroads. In addition, the Noise Element identifies several polices to minimize the impacts of excessive noise levels throughout the community and establishes noise level requirements for all land uses. To protect County of Riverside residents from excessive noise, the Noise Element contains the following policies related to the proposed Ramon Substation expansion:

- **N 1.1:** Protect noise-sensitive land uses from high levels of noise by restricting noise-producing land uses from these areas. If the noise-producing land use cannot be relocated, then noise buffers such as setbacks, landscaping, or block walls shall be used.
- **N 1.3:** Consider the following uses noise-sensitive and discourage these uses in areas in excess of 65 CNEL:
    - Schools
    - Hospitals
    - Rest Homes
    - Long-Term Care Facilities
    - Mental Care Facilities
    - Residential Uses
    - Libraries
    - Passive Recreation Uses
    - Places of Worship
- **N 1.5:** Prevent and mitigate the adverse impacts of excessive noise exposure on the residents, employees, visitors, and noise-sensitive uses of Riverside County.

- **N 4.1:** Prohibit facility-related noise, received by any sensitive use, from exceeding the following worst-case noise levels:
    a. 45 dBA 10-minute L_{eq} between 10:00 p.m. and 7:00 a.m.;
    b. 65 dBA 10-minute L_{eq} between 7:00 a.m. and 10:00 p.m.
- **N 13.1:** Minimize the impacts of construction noise on adjacent uses within acceptable standards.
- **N 13.2:** Ensure that construction activities are regulated to establish hours of operation in order to prevent and/or mitigate the generation of excessive or adverse impacts on surrounding areas.
- **N 14.1:** Enforce the California Building Standards that sets standards for building construction to mitigate interior noise levels to the tolerable 45 CNEL limit. These standards are utilized in conjunction with the Uniform Building Code by the County's Building Department to ensure that noise protection is provided to the public. Some design features may include extra-dense insulation, double-paned windows, and dense construction materials.

Riverside County Construction Noise Standards

To control noise impacts associated with the construction of the proposed Ramon Substation expansion, the County of Riverside has established limits to the hours of operation. Section 9.52.020 of the County's Noise Regulation ordinance indicates that noise associated with any private construction activity located within one-quarter of a mile from an inhabited dwelling is considered exempt between the hours of 6:00 a.m. and 6:00 p.m., during the months of June through September, and 7:00 a.m. and 6:00 p.m., during the months of October through May. Neither the County's General Plan nor Municipal Code establishes numeric maximum acceptable construction source noise levels at potentially affected receivers for CEQA analysis purposes. Therefore, a numerical construction threshold based on the FTA *Transit Noise and Vibration Impact Assessment Manual* is used for analysis of daytime construction impacts, as discussed below.

According to the FTA, local noise ordinances are typically not very useful in evaluating construction noise. They usually relate to nuisance and hours of allowed activity, and sometimes specify limits in terms of maximum levels, but are generally not practical for assessing the impact of a construction project. Project construction noise criteria should account for the existing noise environment, the absolute noise levels during construction activities, the duration of the construction, and the adjacent land use. Due to the lack of standardized construction noise thresholds, the FTA provides guidelines that can be considered reasonable criteria for construction noise assessment. The FTA considers a daytime exterior construction noise level of 80 dBA L_{eq} as a reasonable threshold for noise sensitive residential land use.

Construction Vibration Standards

Construction activity can result in varying degrees of groundborne vibration, depending on the equipment and methods used, distance to the affected structures, and soil type. Construction vibration is generally associated with pile driving and rock blasting. Other construction equipment such as air compressors, light trucks, hydraulic loaders, etc., generates little or no ground vibration. Occasionally large bulldozers and loaded trucks can cause perceptible vibration levels at close proximity.

The County of Riverside does not have vibration standards, but the County's General Plan Noise Element does contain the human reaction to typical vibration levels. Typical vibration levels between

10 and 30 Hertz with peak particle velocity of 0.0787 inches per second (in/sec) are considered readily perceptible and above 0.1968 in/sec are considered annoying to people in buildings. Further, County of Riverside General Plan Policy N 16.3 identifies a motion velocity perception threshold for vibration due to passing trains of 0.01 in/sec over the range of one to 100 Hz.

Riverside County Airport Land Use Compatibility Plan

The Riverside County ALUCP was adopted in October 2004 and establishes policies applicable to land use compatibility planning in the vicinity of airports throughout the County containing compatibility criteria and maps for the influence areas of individual airports. The ALUCP establishes safety zones that limit building heights, restrict hazardous materials and fuel tanks, bird-attracting industries, etc., from close proximity to airport runways. Chapter 2, Countywide Policies of the ALUCP, establishes Policy 4.1.4, which identifies the maximum CNEL considered normally acceptable for new residential land uses in the vicinity of an airport as 60 dBA CNEL. Further, Policy 4.1.6 of the ALUCP identifies an interior noise level limit of 45 dBA CNEL with windows closed for residential homes affected by aircraft-related noise.

3.11.3 Impacts and Mitigation Measures

This section presents the significance criteria used for considering project impacts related to noise and vibration, the methodology employed for the evaluation, an impact evaluation, and mitigation requirements, if necessary.

Thresholds of Significance

Based on CEQA Guidelines Appendix G, project impacts related to noise and vibration are considered significant if any of the following occur:

- Generate 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.
- Generate excessive groundborne vibration or groundborne noise levels.
- For a project located in the vicinity of a private airstrip of an airport land use plan, or where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels.

Methodology

VEGA 6

Noise generated by the proposed VEGA 6 project will consist of: (1) short duration noise resulting from construction activities and (2) noise during normal facility operations. Vibration from the proposed VEGA 6 project would only result during construction. Construction activities would take place only during daytime hours. An evaluation was performed of expected noise and vibration and compared to regulatory requirements.

Predicted construction noise levels were calculated utilizing the FHWA's Roadway Construction Noise Model (2006). Groundborne vibration levels associated with construction-related activities for the project have been evaluated utilizing typical groundborne vibration levels associated with construction

equipment. Potential groundborne vibration impacts related to structural damage and human annoyance were evaluated, taking into account the distance from construction activities to nearby structures and typically applied criteria for structural damage and human annoyance (Appendix I of this EIR).

In order to estimate the worst-case operational noise levels that may occur at the nearest noise-sensitive receptor, onsite operational noise levels have been calculated with the SoundPLAN 3D noise model (which predicts noise propagation from a noise source based on the location, noise level, and frequency spectra of the noise sources as well as the geometry and reflective properties of the local terrain, buildings, and barriers), coupled with noise measurements that were taken by ECORP at an existing solar energy generation facility. Specifically, ECORP conducted a 30-minute reference noise measurement within the IVC solar generation facility in Imperial County with a Larson Davis SoundExpertLxT precision sound-level meter, which satisfies the American National Standards Institute for general environmental noise measurement instrumentation. This reference measurement identified an ambient noise environment of 47.1 dBA at the existing solar energy generation facility (see Attachment D). Therefore, a noise level of 47.1 dBA was employed as the reference noise level in the SoundPLAN 3D noise model to determine noise-level propagation associated with project operations.

Ramon Substation Expansion

Noise generated by the proposed Ramon Substation expansion will consist of: (1) short duration noise resulting from construction activities and (2) noise during normal facility operations. Vibration from the proposed VEGA 6 project would only result during construction. Construction activities would take place only during daytime hours. An evaluation was performed of expected noise and vibration and compared to regulatory requirements.

Impact Analysis

Impact 3.11-1 Would the project generate 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?

VEGA 6

CONSTRUCTION

Onsite Solar and Battery Storage Facilities Construction Noise

Construction noise associated with the proposed VEGA 6 project would be temporary and would vary depending on the nature of the activities being performed. Noise generated from the proposed VEGA 6 project would primarily be associated with the operation of off-road equipment for onsite construction activities as well as construction vehicle traffic on area roadways. Construction noise typically occurs intermittently and varies depending on the nature or phase of construction (e.g., land clearing, grading, excavation, paving). Noise generated by construction equipment, including earth movers, pile drivers, and portable generators, can reach high levels. Typical operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Other primary sources of acoustical disturbance would be random incidents, which would last less than one minute (such as dropping large pieces of equipment or the hydraulic

movement of machinery lifts). During construction, exterior noise levels could negatively affect sensitive land uses in the vicinity of the construction site (Appendix I of this EIR).

The nearest sensitive receptor is located approximately 2,725 feet north of the northeastern corner of the solar energy facility site project site. As previously described, the County's General Plan Noise Element states construction equipment operation shall be limited to the hours of 7:00 a.m. to 7:00 p.m., Monday through Friday, and 9:00 a.m. to 5:00 p.m. on Saturdays. No commercial construction operations are permitted on Sundays or holidays. 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-hour period, and measured at the nearest sensitive receptor. This standard, established by the County to prevent physical and mental damage consistent with exposure to excessive noise, assumes a construction period, relative to an individual sensitive receptor of days or weeks.

The anticipated short-term construction noise levels generated for the necessary construction equipment during the onsite solar and battery storage facility component of the proposed VEGA 6 project are presented in Table 3.11-7. As shown in Table 3.11-7, no individual or cumulative pieces of construction equipment would exceed the 75 dBA Imperial County construction noise standard during any phase of construction at the nearest noise-sensitive receptor. Therefore, the proposed VEGA 6 project would not generate a substantial temporary increase in ambient noise levels in the vicinity of the VEGA 6 project site in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies during construction. Impacts would be less than significant.

Table 3.11-7. Construction Average Noise Levels at the Nearest Receptor – Solar/Battery Storage Facility

Combined Equipment	Construction Noise Level (dBA L_{eq}) at:		
	Estimated Exterior Construction Noise Level at Nearest Residence	Construction Noise Standards	Exceed Standards?
Site Preparation	52.9	75	No
Grading	53.5	75	No
Construction	53.4	75	No
Paving	51.8	75	No

Source: Appendix I of this EIR

Gen-Tie Transmission Line Construction Noise

Construction noise associated with the VEGA 6 project's gen-tie transmission line route would be temporary and would vary depending on the nature of the activities being performed. Noise generated would primarily be associated with the operation of off-road equipment for construction activities as well as construction vehicle traffic on area roadways.

Nearby noise-sensitive land uses consist of a scattering of single-family residential units located north and east of the gen-tie line route, with the closest residence located along Garvey Road, approximately 970 feet north of the gen-tie line route. As previously described, the County's General Plan Noise Element states construction equipment operation shall be limited to the hours of 7:00 a.m. to 7:00 p.m., Monday through Friday, and 9:00 a.m. to 5:00 p.m. on Saturdays. No commercial construction operations are permitted on Sundays or holidays. Construction noise, from a single piece of equipment or a combination of equipment, shall not exceed 75 dB Leq, when averaged over an eight-hour period, and measured at the nearest sensitive receptor.

The anticipated short-term construction noise levels generated for the necessary construction equipment during the gen-tie line component of the proposed VEGA 6 project are presented in Table 3.11-8. As shown in Table 3.11-8, construction of the gen-tie line would not exceed the significance threshold of 75 dBA at the nearest sensitive receptor. Therefore, the proposed VEGA 6 project would not generate a substantial temporary 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 during construction. Impacts would be less than significant.

Table 3.11-8. Construction Noise Levels at Nearest Receptor – Gen-Tie Line

Combined Equipment	Estimated Exterior Noise Level at Nearest Sensitive Receptor (970 feet)	Construction Noise Standards (dBA L_{eq})	Exceed Standards?
Grading	55.1	75	No
Construction	65.4	75	No

Source: Appendix I of this EIR

OPERATION

Off-Site Traffic Noise

Project operations would result in minimal additional traffic on adjacent roadways. The only visitors to the site would be that of repair or maintenance workers, whose presence at the site would only be necessary infrequently. Up to two to three people would be contracted (part-time) to perform all routine and emergency operational and maintenance activities. Such activities include inspections, equipment servicing, site and landscape clearing, and periodic washing of the PV modules if needed (up to two times per year) to maintain power generation efficiency. According to the *Caltrans Technical Noise Supplement to the Traffic Noise Analysis Protocol*, doubling of traffic on a roadway is required to result in an increase of 3 dB (outside of the laboratory, a 3-dBA change is considered a just-perceivable difference) (Appendix I of this EIR). The proposed VEGA 6 project would not result in a doubling of traffic, therefore, its contribution to existing traffic noise would not be perceptible.

Project Operations Noise Sources

The main stationary operational noise associated with the VEGA 6 project would be from the proposed transformers, inverters, substation, and gen-tie line. The main stationary operational noise associated with the offsite gen-tie line would be Corona Discharge. Corona is the electrical breakdown of the air into charged particles, which may result in audible noise. During Corona activity, the transmission line sometimes generate a small amount of sound energy. Audible noise generated by Corona discharge is typically described as a crackling or humming sound. Audible Corona noise levels for a typical 230-kV line are approximately 25 dBA at locations within approximately 25 feet of the power line corridor, or 51.1 dBA at the source (Appendix I of this EIR). Project operations have been calculated using the SoundPLAN 3D noise model. As previously stated, a noise level of 47.1 dBA was employed as the reference noise level in the SoundPLAN 3D noise model to determine noise-level propagation associated with the project operations. The results of this model can be found in Appendix I of this EIR. Table 3.11-9 and Figure 3.11-3 shows the predicted project noise levels at the nearest noise-sensitive land uses in the project vicinity, as predicted by SoundPLAN. As shown in Table 3.11-9, the VEGA 6 project's operational noise would not exceed the County's daytime or nighttime standards. Therefore, impacts would be less than significant.

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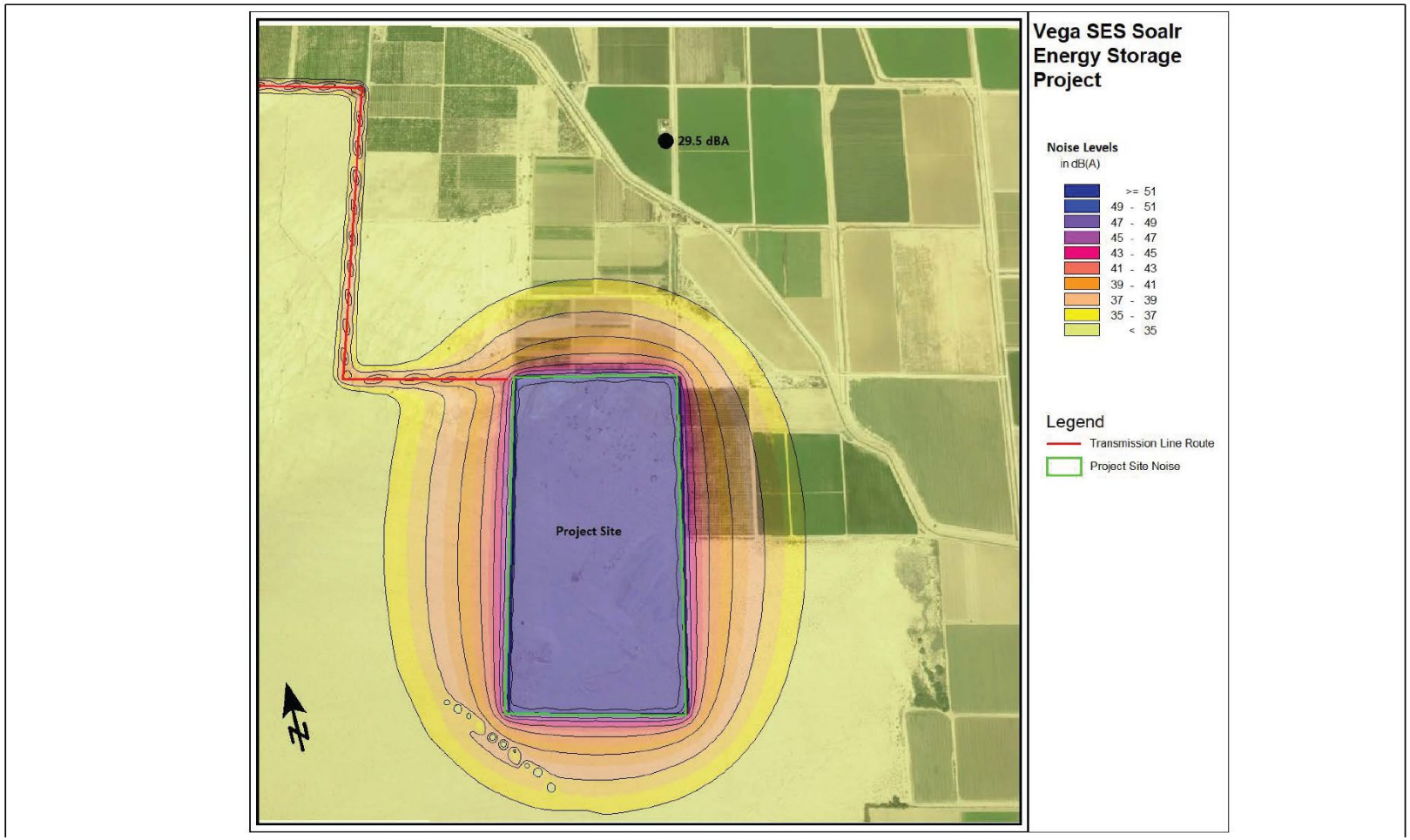
Figure 3.11-3. SoundPLAN Noise Map – Modeled Operational Noise Levels



Source: Appendix I of this EIR

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Table 3.11-9. Modeled Operational-Noise at Nearest Sensitive Receptor

Location	Modeled Noise Attributed to Project (L_{eq} dBA)	County Daytime Standard (L_{eq} dBA)	County Nighttime Standard (L_{eq} dBA)	Exceed Standard?
1) Residence located north of project site, across aqueduct from Buck Road/Garvey Road intersection	29.5	50.0	45.0	No

Source: Appendix I of this EIR

Ramon Substation Expansion

CONSTRUCTION

Construction noise, although temporary, can be a source of concern for sensitive receptors, such as nearby residences. The construction of the Ramon Substation expansion is estimated to take 180 working days and would begin in 2024. Construction of the proposed expansion will require the use of heavy equipment that may be periodically audible at off-site locations. Received sound levels will fluctuate, depending on the construction activity, equipment type, and distance between noise source and receiver. Additionally, sound from construction equipment will vary dependent on the construction phase and the number and class of equipment at a location at any given time.

The noisiest activities for the proposed expansion would be during the site clearing and grading phases when graders, loaders, and dozers would be used. The construction equipment associated with these activities would generate noise levels of up to 85 dBA Lmax at 50 feet. Although unlikely, two pieces of construction equipment could operate at their maximum noise level simultaneously. For every doubling of acoustic energy the noise level, measured in dBA, increases by 3. Therefore, two pieces of equipment, each operating at a noise level of 85 dBA, would generate a noise level of 88 dBA Lmax at 50 feet. Sound spreads (propagates) uniformly outward in a spherical pattern, and the sound level decreases (attenuates) at a rate of approximately 6 dB for each doubling of distance from a stationary or point source. The nearest sensitive receptors to the expansion area are the single-family residences located approximately 0.2 miles (1,056 feet) to the west on Via Las Palmas. Due to the distance of the nearest sensitive receptor (1,056 feet) and sound level attenuation with distance, construction noise would not exceed FTA's daytime exterior construction noise level of 80 dBA L_{eq}. Furthermore, Section 9.52.020 of the Riverside County's Noise Regulation ordinance indicates that noise associated with any private construction activity located within one-quarter of a mile from an inhabited dwelling is considered exempt between the hours of 6:00 a.m. and 6:00 p.m., during the months of June through September, and 7:00 a.m. and 6:00 p.m., during the months of October through May. The proposed Ramon Substation expansion's potential noise impacts during construction would be less than significant.

OPERATION

The proposed transformers at the substation will generate only minimal operational noise and anticipated to be similar to existing operations. Operation and cooling fans may emit noticeable noise within the enclosed substation. However, no sensitive noise receptors are located immediately adjacent to the substation site. Therefore, a less than significant impact is identified for this issue area.

Mitigation Measure(s)

VEGA 6

No mitigation measures are required.

Ramon Substation Expansion

No mitigation measures are required.

Impact 3.11-2 Would the project generate excessive groundborne vibration or groundborne noise levels?

VEGA 6

CONSTRUCTION

Construction on the VEGA 6 project site would have the potential to result in varying degrees of temporary groundborne vibration, depending on the specific construction equipment used and the operations involved.

Construction-related ground vibration is normally associated with impact equipment such as pile drivers, jackhammers, and the operation of some heavy-duty construction equipment, such as dozers and trucks. Pile drivers would be necessary during project construction. Vibration decreases rapidly with distance and it is acknowledged that construction activities would occur throughout the project site and would not be concentrated at the point closest to sensitive receptors. Groundborne vibration levels associated with typical construction equipment at 25 feet distant are summarized in Table 3.11-3.

The County of Imperial does not regulate vibrations associated with construction. However, a discussion of construction vibration is included for full disclosure purposes. For comparison purposes, the Caltrans recommended standard of 0.2 inch per second PPV with respect to the prevention of structural damage for older residential buildings is used as a threshold. This is also the level at which vibrations may begin to annoy people in buildings. Consistent with FTA recommendations for calculating construction vibration, construction vibration was measured from the center of the project site (Appendix I of this EIR). The nearest structure of concern to the construction site, with regard to groundborne vibrations, is an abandoned building located 1,282 feet from the VEGA 6 project site boundary.

Table 3.11-10 presents the expected project related vibration levels from the nearest structure (1,282 feet from VEGA 6 project site boundary). As shown in Table 3.11-10, vibration as a result of project construction activities would not exceed 0.2 PPV at the nearest structure. Therefore, project construction would not exceed the recommended Caltrans threshold, and impacts would be considered less than significant.

Table 3.11-10. Construction Vibration Levels at Nearest Structure

Receiver PPV Levels (in/sec)[1]					Peak Vibration	Threshold	Exceed Threshold?
Large Bulldozer, Caisson Drilling, & Hoe Ram	Loaded Trucks	Jackhammer	Pile Driver	Vibratory Roller			
0.0002	0.0002	0.0001	0.0004	0.0006	0.0006	0.2	No

Source: Appendix I of this EIR

Notes: [1]Based on the Vibration Source Levels of Construction Equipment on Table 5-5 of Appendix I of EIR. Distance to the nearest structure of concern is approximately 1,282 feet measured from project site boundary.

OPERATION

Project operations would not include the use of any large-scale stationary equipment that would result in excessive vibration levels. Therefore, no groundborne vibration impacts would occur during operation of the VEGA 6 project.

Ramon Substation Expansion

CONSTRUCTION

The proposed Ramon Substation expansion's construction activities have the potential to generate low levels of groundborne vibration as the operation of heavy construction equipment (graders, dozers, etc.) generates vibrations that propagate though the ground and diminishes in intensity with distance from the source. As such, the existing sensitive uses (i.e., nearby residences) located near the expansion area could be exposed to excessive groundborne vibration or groundborne noise levels during the project's construction activities. Site ground vibrations from construction activities very rarely reach the levels that can damage structures, but they may be perceived in buildings very close to a construction site. No pile-driving or blasting activities would be required for construction of the proposed project components. The various PPV for several types of construction equipment, along with their corresponding root mean square (RMS) velocities (in vibration decibels [VdB]), that can generate perceptible vibration levels are identified in Table 3.11-11. Based on the information presented in Table 3.11-1, vibration velocities could reach as high as approximately 0.089 inch-per-second PPV at 25 feet from the source activity, depending on the type of construction equipment in use. This corresponds to an RMS velocity level of 87 VdB at 25 feet from the source activity. The construction equipment used for the Ramon Substation expansion would generally consist of off-road construction equipment such as dozers, graders, and scrapers. As shown in Table 3.11-1, even at 100 feet, the vibration from equipment such as a large bulldozer would be 0.011, which is considered to be barely perceptible under Caltrans' criteria. Therefore, because the nearest off-site sensitive receptor to the project site is 1,056 feet away, the vibration levels at this nearest receptor would be attenuated and would not exceed any of Caltrans' vibration criteria related to building damage or human perception/annoyance. As such, vibration impacts would be less than significant.

Table 3.11-11. Vibration Source Levels for Construction Equipment

	Approximate PPV (in/sec)					Approximate RMS (VdB)				
Equipment	25 Feet	50 Feet	60 Feet	75 Feet	100 Feet	25 Feet	50 Feet	60 Feet	75 Feet	100 Feet
Large Bulldozer	0.089	0.031	0.024	0.017	0.011	87	78	76	73	69
Caisson Drilling	0.089	0.031	0.024	0.017	0.011	87	78	76	73	69
Loaded Trucks	0.076	0.027	0.020	0.015	0.010	86	77	75	72	68
Jackhammer	0.035	0.012	0.009	0.007	0.004	79	70	68	65	61
Small Bulldozer	0.003	0.001	0.0008	0.0006	0.0004	58	49	47	44	40

Source: FTA, 2018.

OPERATION

Long-term operation is not anticipated to result in perceptible levels of groundborne vibration or groundborne noise. Therefore, a less than significant impact would occur.

Mitigation Measure(s)

VEGA 6

No mitigation measures are required.

Ramon Substation Expansion

No mitigation measures are required.

Impact 3.11-3 For a project located in the vicinity of a private airstrip of an airport land use plan, or where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

VEGA 6

The VEGA 6 project site is not located within 2 miles of a public airport or a private airstrip. As previously mentioned, the nearest airport is Brawley Municipal Airport located approximately 9.8 miles east of the VEGA 6 project site. As identified in the Imperial County Airport Land Use Compatibility Maps, the VEGA 6 project site is located outside of the noise contours of the Brawley Municipal Airport. Therefore, the VEGA 6 project would not expose people to excessive airport noise levels and no impact is identified.

Ramon Substation Expansion

The nearest public airport is the Palm Springs International Airport located approximately 7 miles north of the Ramon Substation expansion area. According to the Noise Compatibility Contours for the Palm Springs International Airport, the Ramon Substation expansion area is located outside of the noise contours of the Palm Springs International Airport. Therefore, the proposed Ramon Substation expansion would not expose people to excessive airport noise levels and no impact is identified.

Mitigation Measure(s)

VEGA 6

No mitigation measures are required.

Ramon Substation Expansion

No mitigation measures are required.

3.11.4 Decommissioning/Restoration and Residual Impacts

Decommissioning/Restoration

If at the end of the PPA term, no contract extension is available for a power purchaser, no other buyer of the energy emerges, or there is no further funding of the project, the project will be decommissioned and dismantled. Decommissioning or restoration of the project site would use similar equipment to what was evaluated in the construction noise and vibration analysis. Adhering to the County's construction hours would reduce the noise and vibration impacts to below a level of significance.

Residual

Adhering to the County's construction hours would reduce the noise and vibration impacts to below a level of significance.

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