Chapter 15
Noise and Vibration

15.1 Overview

This chapter describes the existing noise environment in the vicinity of the potentially affected area, presents relevant noise and vibration regulations, identifies sensitive noise and vibration receptors that could be affected by the Proposed Project, and evaluates the potential noise and vibration impacts of the Proposed Project. Mitigation measures to avoid or reduce impacts are identified, as appropriate.

15.2 Overview of Noise and Vibration Concepts and Terminology

15.2.1 Noise

In the context of the California Environmental Quality Act (CEQA), noise can be defined as unwanted sound. Sound is characterized by various parameters, including the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). In particular, the sound pressure level is the most common descriptor used to characterize the loudness of an ambient sound level, or sound intensity. The decibel (dB) scale is used to quantify sound intensity. Because sound pressure can vary enormously within the range of human hearing, a logarithmic scale is used to keep sound intensity numbers at a convenient and manageable level. The human ear is not equally sensitive to all frequencies in the spectrum, so noise measurements are weighted more heavily for frequencies to which humans are sensitive, creating the A-weighted decibel (dBA) scale.

Different types of measurements are used to characterize the time-varying nature of sound. Below are brief definitions of these measurements and other terminology used in this chapter.

- **Decibel (dB)** is a measure of sound on a logarithmic scale that indicates the squared ratio of sound pressure amplitude to a reference sound pressure amplitude. The reference pressure is 20 micro pascals.

- **A-weighted decibel (dBA)** is an overall frequency weighted sound level in decibels that approximates the frequency response of the human ear.

- **Maximum sound level (L_{max})** is the maximum sound level measured during a given measurement period.

- **Minimum sound level (L_{min})** is the minimum sound level measured during a given measurement period.

- **Equivalent sound level (L_{eq})** is the equivalent steady-state sound level that, in a given period, would contain the same acoustical energy as a time-varying sound level during that same period.

- **Day night sound level (L_{dn})** is the energy average of the A weighted sound levels occurring during a 24-hour period, with 10 dB added to the A weighted sound levels during the period from 10:00 p.m. to 7:00 a.m. (typical sleeping hours). This weighting adjustment reflects the elevated sensitivity of individuals to ambient sound during nighttime hours.

- **Community noise equivalent level (CNEL)** is the energy average of the A-weighted sound levels during a 24-hour period, with 5 dB added to the A-weighted sound levels between 7:00 p.m. and 10:00 p.m. and 10 dB added to the A-weighted sound levels between 10:00 p.m. and 7:00 a.m.

In general, human sound perception is such that a change in sound level of 3 dB is barely noticeable, a change of 5 dB is clearly noticeable, and a change of 10 dB is perceived as doubling or halving the sound level. Table 15-1 presents approximate noise levels for common noise sources, measured adjacent to the source.

Table 15-1. Examples of Common Noise Levels

Common Outdoor Activities	Noise Level (dBA)
Jet flyover at 1,000 feet	110
Gas lawnmower at 3 feet	100
Diesel truck at 50 feet traveling 50 miles per hour	90
Noisy urban area, daytime	80
Gas lawnmower at 100 feet, commercial area	70
Heavy traffic at 300 feet	60
Quiet urban area, daytime	50
Quiet urban area, nighttime	40
Quiet suburban area, nighttime	30
Quiet rural area, nighttime	20

Source: California Department of Transportation (Caltrans) 2013

15.2.2 Vibration

Ground-borne vibration propagates from the source through the ground to adjacent buildings by surface waves. Vibration may be composed of a single pulse, a series of pulses, or a continuous oscillatory motion. The frequency of a vibrating object describes how rapidly it is oscillating, measured in Hertz (Hz). Most environmental vibrations consist of a composite, or "spectrum," of many frequencies. The normal frequency range of most ground-borne vibrations that can be felt generally starts from a low frequency of less than 1 Hz to a high of about 200 Hz. Vibration information for this analysis has been described in terms of the peak particle velocity (PPV), measured in inches per second, or of the vibration level

measured with respect to root-mean-square vibration velocity in decibels (VdB), with a reference quantity of 1 micro-inch per second.

Vibration energy dissipates as it travels through the ground, causing the vibration amplitude to decrease with distance away from the source. High-frequency vibrations reduce much more rapidly than do those characterized by low frequencies, so that in a far-field zone distant from a source, the vibrations with lower frequency amplitudes tend to dominate. Soil properties also affect the propagation of vibration. When ground-borne vibration interacts with a building, a ground-to-foundation coupling loss usually results but the vibration also can be amplified by the structural resonances of the walls and floors. Vibration in buildings is typically perceived as rattling of windows, shaking of loose items, or the motion of building surfaces. In some cases, the vibration of building surfaces also can be radiated as sound and heard as a low-frequency rumbling noise, known as ground-borne noise.

Ground-borne vibration is generally limited to areas within a few hundred feet of certain types of industrial operations and construction/demolition activities, such as pile driving. Road vehicles rarely create enough ground-borne vibration amplitude to be perceptible to humans unless the receiver is in immediate proximity to the source or the road surface is poorly maintained and has potholes or bumps. Human sensitivity to vibration varies by frequency and by receiver. Generally, people are more sensitive to low-frequency vibration. Human annoyance also is related to the number and duration of events; the more events or the greater the duration, the more annoying it becomes.

15.3 Regulatory Setting

15.3.1 Federal Laws, Regulations, and Policies

No federal laws, regulations, or policies for construction-related noise and vibration apply to the Proposed Project. However, the Federal Transit Administration's (FTA's) *Guidelines for Construction Vibration in Transit Noise and Vibration Impact Assessment* state that for evaluating daytime construction noise impacts in outdoor areas, a noise threshold of 90 dBA Leq should be used for residential areas (FTA 2006).

For construction vibration impacts, the FTA guidelines use an annoyance threshold of 80 vibration decibels (VdB) for infrequent events (fewer than 30 vibration events per day) and a damage threshold of 0.3 in/sec PPV for engineered concrete and masonry structures and 0.12 in/sec PPV for buildings extremely susceptible to vibration damage (FTA 2006).

15.3.2 State Laws, Regulations, and Policies

California requires each local government entity to implement a noise element as part of its general plan. California Administrative Code, Title 4, presents guidelines for evaluating the compatibility of various land uses as a function of community noise exposure. The state land use compatibility guidelines are listed in Table 15-2.

Table 15-2. State Land Use Compatibility Standards for Community Noise Environment

Land Use Category	Community Noise Exposure - L_{dn} or CNEL (db)						
	50	55	60	65	70	75	80
Residential – Low Density Single Family, Duplex, Mobile Homes							
Residential – Multi-Family							
Transient Lodging – Motels, Hotels							
Schools, Libraries, Churches, Hospitals, Nursing Homes							
Auditoriums, Concert Halls, Amphitheaters							
Sports Arenas, Outdoor Spectator Sports							
Playgrounds, Neighborhood Parks							
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. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.
Normally Unacceptable	New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
Clearly Unacceptable	New construction or development generally should not be undertaken.

15.3.3 Local Laws, Regulations, and Policies

The California Public Utilities Commission (CPUC) has exclusive jurisdiction over the siting and design of electric transmission facilities. Therefore, it is exempt from local land use and zoning regulations. However, CPUC General Order (G.O.) 131-D states that in locating electric transmission facilities, the public utilities shall consult with the local agencies regarding land use matters. CPUC and NEET West have been in contact with applicable local agencies for the Proposed Project, and local laws and regulations are presented here for consideration of potential impacts related to noise.

County of San Diego Guidelines for Determining Significance for Noise

The County of San Diego's (County's) *Guidelines for Determining Significance for Noise* (County of San Diego 2009a) describes noise terms and general principles, identifies federal, state, and local noise-related regulations, and recommends impact significance thresholds to be used in CEQA analyses for projects within the County. These thresholds are used in the impacts analysis and discussed in more detail in Section 15.5.1, "Criteria for Determining Significance." In general, the significance thresholds vary based on the noise source (construction vs. non-construction activities), and the receptor's land use zoning. The County's CEQA significance guidelines are based on the County's General Plan Noise Element and the County Noise Abatement and Control Ordinance.

County of San Diego General Plan

The County of San Diego General Plan's Noise Element describes the existing noise environment in the unincorporated County, identifies the noise element's uses relative to other elements of the general plan (i.e., land use), establishes noise/land use compatibility standards, and describes the County's goals for achieving the standards.

The County's General Plan establishes "acceptable," "conditionally acceptable," and "unacceptable" noise levels for various land uses throughout the County to determine land use compatibility when evaluating proposed development projects. For its most noise-sensitive land use category, single-family residences, the General Plan establishes an acceptable exterior noise (CNEL) standard of 60 dB and an interior acceptable noise standard of 45 dB. For projects within or near these residential land uses, conditionally acceptable exterior noise levels would be between 60 and 75 dBA CNEL, and a project noise analysis would be required to determine if levels could be lowered, via noise reduction measures, to the acceptable standard. Projects generating unacceptable exterior noise levels in excess of 75 dBA at sensitive receptor locations would generally not be approved (County of San Diego 2011).

To implement these noise standards, the Noise Element (County of San Diego 2011) contains the following relevant policies to noise and the Proposed Project:

- **Goal N-1: Land Use Compatibility.** A noise environment throughout the unincorporated County that is compatible with the land uses.

- **Policy N-1.1 – Noise Compatibility Guidelines.** Use the Noise Compatibility Guidelines (Table N-1) and the Noise Standards (Table N-2) as a guide in determining the acceptability of exterior and interior noise for proposed land uses.

- **Policy N-1.2 – Noise Management Strategies.** Require the following strategies as higher priorities than construction of conventional noise barriers where noise abatement is necessary:

  — Avoid placement of noise sensitive uses within noisy areas
  — Increase setbacks between noise generators and noise sensitive uses
  — Orient buildings such that the noise sensitive portions of a project are shielded from noise sources
  — Use sound-attenuating architectural design and building features

- Employ technologies when appropriate that reduce noise generation (i.e. alternative pavement materials on roadways)

- **Policy N-1.3 – Sound Walls.** Discourage the use of noise walls. In areas where the use of noise walls cannot be avoided, evaluate and require where feasible, a combination of walls and earthen berms and require the use of vegetation or other visual screening methods to soften the visual appearance of the wall.

- **Goal N-2: Protection of Noise Sensitive Uses.** A noise environment that minimizes exposure of noise sensitive land uses to excessive, unsafe, or otherwise disruptive noise levels.

- **Policy N-2.1 – Development Impacts to Noise Sensitive Land Uses.** Require an acoustical study to identify inappropriate noise level where development may directly result in any existing or future noise sensitive land uses being subject to noise levels equal to or greater than 60 CNEL and require mitigation for sensitive uses in compliance with the noise standards listed in Table N-2.

- **Goal N-3: Groundborne Vibration.** An environment that minimizes exposure of sensitive land uses to the harmful effects of excessive groundborne vibration.

- **Policy N-3.1 – Groundborne Vibration.** Use the Federal Transit Administration and Federal Railroad Administration guidelines, where appropriate, to limit the extent of exposure that sensitive uses may have to groundborne vibration from trains, construction equipment, and other sources.

- **Goal N-6: Temporary and/or Nuisance Noise.** Minimal effects of intermittent, short-term, or other nuisance noise sources to noise sensitive land uses.

- **Policy N-6.2 – Recurring Intermittent Noise.** Minimize impacts from noise in areas where recurring intermittent noise may not exceed the noise standards listed in Table N-2, but can have other adverse effects.

- **Policy N-6.3 – High-Noise Equipment.** Require development to limit the frequency of use of motorized landscaping equipment, parking lot sweepers, and other high-noise equipment if their activity will result in noise that affects residential zones.

- **Policy N-6.4 – Hours of Construction.** Require development to limit the hours of operation as appropriate for non-emergency construction and maintenance, trash collection, and parking lot sweeper activity near noise sensitive land uses.

San Diego County Noise Ordinance

The County's Noise Ordinance (County of San Diego 2009b), which is included in the County Code's Chapter 4, Noise Abatement and Control (Sections 36.401 through 36.435), recommends general noise level limits, establishes sound level limitations on impulsive and construction noises, and stipulates acceptable hours of operation for construction equipment. For areas zoned as residential, general agriculture, or open space lands, including the Proposed Project site, the ordinance establishes general noise level limits of 50 dB between 7 am and 10 pm, and 45 dB between 10pm and 7am. The Ordinance requires that

construction equipment only be operated between 7 a.m. and 7 p.m. and not on Sundays or holidays. Construction equipment noise is restricted to an average sound level of 75 decibels for an eight-hour period (between the allowable 7 a.m. and 7 p.m. window) measured at the boundary of the property where the noise source is located or on any occupied property where the noise is being received.

In addition to the general and construction noise limits, the ordinance establishes that impulsive noises will not exceed 82 dBA at the boundary line for properties with residential uses and 85 dBA for properties with agricultural, commercial, or industrial uses for more than 25 percent of any one-hour measurement period. The ordinance defines impulsive noise as a "single noise event or a series of single noise events, which causes a high peak noise level of short duration (one second or less), measured at a specific location. Examples include, but are not limited to, a gunshot, an explosion or a noise generated by construction equipment" (County of San Diego 2009b).

15.4 Environmental Setting

Noise sources in the County are typically transportation-related, including from automobiles, trucks, aircraft operations, and railroads. Other noise sources in the County include industrial and commercial operations, construction activities, agricultural field machinery, and temporary neighborhood noise (County on San Diego 2011). Along the Interstate 8 highway, located approximately 1.8 miles north of the Project site, ambient noise levels due to vehicular traffic range from 55 to 75 dB CNEL (County of San Diego 2011). San Diego County has numerous private airports and eight public airports, including Gillespie Field, which is located approximately 16 miles northwest of the Project site (County of San Diego 2016, TollFreeAirline 2016).

The Project site is located on unoccupied parcels of land in a remote area of San Diego County. As described in Chapter 13, *Land Use and Planning*, the site is surrounded by natural/undeveloped areas, with the exception of the Suncrest Substation, which is located near the western terminus of the Proposed Project. Land use and zoning designations for the Project site and the immediate surrounding areas, including adjacent occupied parcels, are Rural Lands (RL-80) and agriculture (A72).

Ambient noise levels at the Project site were determined by measuring noise levels over a 48-hour period in spring 2015. A Larson Davis LD 831 Sound Level Meter was placed as close to Bell Bluff Truck Trail as possible at the proposed SVC site. The Leq and CNEL noise levels at the project site were determined to be 49.8 dBA and 52.1 dBA, respectively. The Project site and surrounding area receives some surface transportation noise from vehicular traffic to/from the Suncrest Substation and San Diego Gas & Electric's (SDG&E's) water tank/pump on Bell Bluff Truck Trail, and from vehicular traffic on residential roads in the Project vicinity. Vehicular noise from Interstate 8 is not detectable at the Static VAR compensator (SVC) site (NEET West 2015).

Noise-sensitive receptor types that could be affected by excessive noise levels in the County include residential uses, hospitals, daycares and schools, and passive recreational parks. As described above, the land surrounding the Proposed Project is generally undeveloped. Residential and commercial developments are located more than a 0.5 mile to the southeast and northwest.

The distance to nearby sensitive receptors was determined from the center of the proposed SVC site to the sensitive receptor land use (building). The nearest residence to the Project site is approximately 0.62 mile to the southeast of the proposed SVC site and approximately 0.96 mile from the center of the transmission line. From the center of the proposed SVC site, the nearest property line is approximately 458 feet (parcel owned by SDG&E) and the nearest occupied property line is 856 feet (owned by the Wilson Dean Living Trust). The Cottonwood Canyon Healthcare is the nearest hospital or long-term care facility to the SVC project site at approximately 15 miles. The nearest school or daycare facility to the SVC project site is the County Treehouse Day Care, which is approximately 4.6 miles from the site.

15.5 Impacts Analysis

15.5.1 Criteria for Determining Significance

The Proposed Project would have a significant effect related to noise if it would meet any of the following conditions:

A. Exposure of persons to or generation of noise levels in excess of standards established in a local general plan or noise ordinance or in the applicable standards of other agencies.

B. Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels.

C. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

D. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

E. For a project located within an airport land use plan area, or, where such a plan has not been adopted, within 2 miles of a public airport or public-use airport, exposure of people residing or working in the project area to excessive noise levels.

F. For a project within the vicinity of a private airstrip, exposure of people residing or working in the project area to excessive noise levels.

San Diego County Noise Significance Thresholds

San Diego County's noise significance thresholds are based on the County's general plan and the County's noise ordinance, and are designed to assist in addressing the State CEQA Guidelines Appendix G criteria related to noise (see above). The County thresholds are as follows:

Criterion 1) Expose noise-sensitive land uses to exterior noise levels of 60 dB CNEL or an increase of 10 dB CNEL over the pre-existing noise; or to interior noise levels of 45 dB CNEL.

Criterion 2) Generate construction-related noise greater than 75 dB for an eight-hour period between 7am and 7pm at the property line of the property where

the noise source is located or on any occupied property where the noise is being received;

Criterion 3) Generate impulsive maximum sound levels of 85 dB at the boundary line of the property where the noise source is located or on any occupied property where the noise is received, for 25 percent of the minutes in an hour (15 minutes per hour).

Criterion 4) Create non-construction noise in excess of a one-hour average 50 dB between 7am and 10pm, or in excess of a one-hour average 45 dB between 10pm and 7am at defined residential, open space, or agricultural zoning areas, including the local zoning A-72.

Criterion 5) Result in occasional or infrequent ground-borne vibration levels of 0.010 inches/second root-mean-square (rms), or occasional or infrequent ground-borne noise levels of 43 dBA.

In addition, although not San Diego County thresholds, the FTA's (2006) building damage threshold of peak particle velocity (PPV) greater than 0.12 inches/second and the FTA's ground-borne vibration annoyance threshold of 80 VdB were considered in the analysis.

15.5.2 Methodology

Project construction noise impacts were assessed by applying the FTA's *Transit Noise and Vibration Impact Assessment* (FTA 2006) recommended methodology. This methodology assumes that the two loudest pieces of construction equipment would operate simultaneously at the same location under full power, assuming the following:

- full power operation for a full 1-hour,
- there are no obstructions to the noise travel paths,
- typical noise levels from construction equipment are used, and
- all pieces of equipment operate at the center of the project site.

Using these assumptions, the noise levels at specific distances can be obtained using the following equation:

$$L_{eq}(equip) = EL_{50ft} - 20log_{10}(D/50)$$

Where:

Leq (equip) = the noise emission level at the receiver at distance D over 1 hour

EL50ft = noise emission level of a particular piece of equipment at a reference distance of 50 feet

D = the distance from the receiver to the piece of equipment in feet

To add the two loudest pieces of equipment together, the following equation applies:

$$L_{total} = 10\ log_{10}(10^{\frac{L1}{10}} + 10^{\frac{L2}{10}})$$

Where:

Ltotal = the noise emission level of two pieces of equipment combined

L1 = the noise emission level of equipment type 1

L2 = the noise emission level of equipment type 2

Noise levels from the Proposed Project's noise-generating construction equipment were estimated at the Proposed Project's nearest sensitive receptor location and occupied property parcel boundary by using the FTA reference guide (FTA 2006). SDG&E's property (APN 523-030-130) boundary is closer to the proposed SVC site (approximately 458 feet away) than the residential occupied property boundary (approximately 856 feet); however, this property does not contain any sensitive receptors/uses. Calculated noise levels resulting from the Proposed Project were compared to the significance criteria identified in Section 15.5.1, *Criteria for Determining Significance*.

L_{eq} noise levels at the two nearest sensitive receptor locations were determined using the equations provided above. The two loudest pieces of equipment were determined to be a rock drill and a scraper. These pieces of equipment have reference noise levels of 98 dBA and 89 dBA at a distance of 50 feet. The loudest construction activity was determined to be blasting, which has a noise reference level of 94 dBA (L_{max}) at 50 feet (FHWA 2016). It was assumed that other construction equipment would not be operated during blasting activities. Estimated CNEL values were calculated by inputting the Project's estimated L_{eq} during construction hours and the measured existing ambient L_{eq} at the Project site during non-construction hours into a CNEL calculator (NoiseMeter 2016). It was assumed that the existing CNEL near the Project site is the same at the nearest residence.

Ground-borne vibration-related human response impact levels were calculated using the occasional or infrequent thresholds identified in Criterion 5 of the County's thresholds, described in Section 15.5.1. Potential impacts on buildings or structures in the project vicinity were determined based on the FTA reference guide (FTA 2006). The vibration analysis assumed that the equipment with the greatest vibration potential would have vibration sound levels similar to those of an impact hammer (also known as a hoe ram) and that blasting activities would be considered separately. Ground-borne noise-related human responses were evaluated qualitatively.

The operation-related noise assessment was performed similar to the construction-related noise approach where the two loudest pieces of equipment at the Project site were considered. Estimated noise-levels associated with potential operational equipment were based on those provided by NEET West (2015). A qualitative approach was used to analyze impacts associated with other operation or maintenance-related components (e.g., infrequent maintenance vehicle trips) of the Proposed Project. The qualitative analysis considered distances to sensitive receptors, project information and design, and duration of maintenance or other activities. Noise calculations are detailed in Appendix J, *Noise Data*.

15.5.3 Environmental Impacts

Impact NOISE-1: Exposure of Persons to or Generation of Noise Levels in Excess of Applicable Standards (Less than Significant with Mitigation)

The Proposed Project would generate noise associated with construction activities. This noise would be temporary and would cease once construction is complete. Operational noise sources would include the proposed SVC's electrical equipment, and maintenance-related vehicle traffic.

Construction

The Proposed Project's construction activities would include the use of conventional earthwork and grading equipment, as detailed in Chapter 2, *Project Description*. Additionally, in areas where bulldozers or backhoes are not able to remove the material, scraping, ripping, drilling, hammering, cutting, and/or low-energy, localized blasting may be used to break up the material. The two loudest pieces of equipment to be used during Project construction would be a rock drill and scraper. Use of this equipment would be anticipated to result in noise levels of 73.8 dBA at the nearest occupied property line and 62.2 dB at the nearest residence. This would translate to a CNEL of 60.9 dB at the nearest residence.

These anticipated noise levels are below the County's Criterion 2 threshold of 75 dB for construction-related noise, but slightly above the County's Criterion 1 threshold of 60 dB CNEL exterior noise for noise-sensitive land uses, a potentially significant impact. To reduce noise generated during construction activities, the Proposed Project would implement **Mitigation Measure NOI-1**. This mitigation measure would require the construction contractor to use temporary sound barriers between portions of construction sites and sensitive land uses, and to notify residences or noise-sensitive land uses within 500 feet of the construction site. Implementation of Mitigation Measure NOI-1 would be anticipated to reduce Project construction noise below applicable County standards.

Blasting-related noise levels would be approximately 69 dBA at the occupied property line and approximately 58 dBA at the nearest residence. This would translate to a CNEL value of 58.4 dB at the nearest residence. Since the blasting-related noise reference level is less than the loudest potential construction equipment (i.e., rock drill), noise due to blasting would be less than that generated by use of the rock drill. Blasting noise also would be reduced through implementation of Mitigation Measure NOI-1 and would be anticipated to below County thresholds.

In summary, with implementation of Mitigation Measure NOI-1, Project construction activities would not be anticipated to result in noise levels exceeding San Diego County's standards. Therefore, this impact would be less than significant with mitigation.

Mitigation Measure NOI-1: Construction-Noise Mitigation Plan

NEET West and/or its contractors shall develop and implement a construction-noise mitigation plan in close coordination with adjacent noise-sensitive land uses so that construction activities can be scheduled to minimize noise disturbance. The plan must be approved by the CPUC prior to the initiation of construction activities. The

construction-noise mitigation plan shall consider the following available controls to reduce construction-noise levels to as low as practicable.

- Equip all internal combustion-driven equipment with mufflers that are in good condition and appropriate for the equipment.

- Construct temporary sound barriers using plywood or similar material bearing the same sound attenuating effectiveness as plywood between portions of the construction sites and sensitive receptors. These temporary sound barriers, which could also consist of construction grade sound blankets/curtains, should be at least 12 feet in height. Sound barriers shall be used during activities involving use of a rock drill, scraper, and/or blasting.

- Residences or noise-sensitive land uses within 500 feet of the construction site should be notified in writing of construction at least seven (7) days prior to the onset of construction activities. A "construction liaison" contact person should be designated in the notifications; he/she would be responsible for responding to any local complaints about construction noise. The liaison would determine the cause of the noise complaints (e.g., starting too early, bad muffler, etc.) and institute reasonable measures to correct the problem. The phone number of the liaison should be conspicuously posted at the construction site.

Operation

Operation of the proposed SVC would include the use of electrical equipment, including but not limited to capacitors, transformers, reactors, and a heating, ventilation, and air conditioning unit (HVAC). Each of these equipment types could generate sound levels ranging from 67 to 87 dB at 1 meter from the source (NEET West 2015). The two loudest pieces of equipment would be the transformer and HVAC unit, which would each potentially result in a noise level of 87 dB at 1 meter. Operation of this equipment would result in approximate noise levels of 41.7 dB at the nearest occupied property line and 30 dB at the nearest residence. As shown in Appendix J, if the operational equipment was operated for a 24-hour period it would result in a CNEL of approximately 56.5 dB at the residence. This is less than the County's CNEL threshold of 60 dB and less than a 10 dB increase over the existing CNEL of 52.1 dB. Therefore, this operation noise would be less than significant. Project maintenance and repair-related activities would consist of infrequent vehicle trips to the site, and would not be anticipated to generate substantial noise. Therefore, this impact would be less than significant.

Impact NOISE-2: Expose Persons to Excessive Ground-borne Vibration or Ground-borne Noise Levels (Less than Significant with Mitigation)

Potential ground-borne vibration levels caused by Project construction activities are shown in Table 15-3. Both the nearest residence and occupied property boundary to the project site would not be located within the FTA human annoyance vibration threshold's distance (43 feet from the impact hammer site or 232 feet from the blast site). In addition, the Project's ground-borne vibration levels would be below the County threshold of 0.010 inches/second root-mean-square (rms) at the occupied project boundary as shown in Table 15-3. Thus, the

Project would not be anticipated to result in groundborne vibration-related impacts on human response.

Table 15-3. Construction Equipment and Vibration Distance

Equipment	PPV at 25 ft.	Distance to PPV of 0.12 in./sec.	Noise Vibration Level at 25 ft.	Distance to FTA Ground-borne Vibration-related Human Impact of 80 VdB	RMS Value of Project Activity (inches/second)
Impact hammer	0.089 in./sec.	20.5 feet	87 VdB	43 feet	0.00011
Construction Method	PPV at 25 ft.	Distance to PPV of 0.12 in./sec.	Noise Vibration Level at 50 ft.	Distance to FTA Ground-borne Vibration-related Human Impact of 80 VdB	RMS Value of Project Activity (inches/second)
Blasting	N/A	N/A	100 VdB	232 feet	0.0014

Notes: The vibration impact threshold of 80 VdB is the federal vibration annoyance threshold. The rms ground-borne vibration level corresponds to the San Diego County Criterion #5.

Source: FTA 2006; San Diego County 2009a; Appendix J.

No buildings would occur within the PPV building structural impact threshold distance from the impact hammer's activities. A similar building vibration reference level (PPV) is not readily available for blasting (FTA 2006). In general, vibration impacts on structures are not anticipated to be significant because there are no sensitive buildings (e.g., research and manufacturing facilities with special vibration constraints, buildings where people normally sleep, etc.) within immediate proximity to the Project site. Vibration impacts to the existing Suncrest Substation, however, could be possible for the Project construction activities that may occur in close proximity to the existing substation (e.g., possible blasting during installation of the riser pole and intermediate pole). It may be possible that ground-borne vibration from blasting or other activities near the existing substation could disrupt sensitive instruments or controls, or possibly damage structures.

To ensure these concerns are adequately addressed, the Proposed Project would implement **Mitigation Measure HAZ-2**, which would require preparation and implementation of a blasting plan. As described in Chapter 11, *Hazards and Hazardous Materials,* the blasting plan would include a pre-blast survey for structures within 1,000 feet from the identified blast site; advanced notification to owners of identified structures prior to commencement of blasting; and provisions to monitor and assess compliance with the air-blast, ground vibration, and peak particle velocity requirements, and ensure compliance with criteria established in Chapter 3 (Control of Adverse Effects) in the Blasting Guidance Manual of the U.S. Department of Interior Office of Surface Mining Reclamation and Enforcement. With implementation of this mitigation measure, potential vibration impacts from Project construction would be less than significant.

Ground-borne noise from at-grade or open excavation construction activities is rarely a concern because the air-borne noise from the activity would likely dominate the noise environment. While not likely, some ground-borne noise from underground Project construction activity, such as scraping, could occasionally be audible; however, this ground-borne noise would be temporary and of short duration as the construction activity moves along the project alignment. Project construction activities, including blasting activities, would not be anticipated to exceed the ground-borne noise threshold identified in the County's Criterion 5 (43 dBA).

Overall, construction and operation of the Proposed Project would not conflict with applicable standards, and would be less than significant with mitigation.

Impact NOISE-3: Cause a Substantial Temporary or Permanent Increase in Ambient Noise Levels (Less than Significant)

Construction

As described in Impact NOISE-1, Project construction activities would potentially generate noise levels at the nearest residence to the proposed SVC site of 62.2 dBA L_{eq} and 60.9 dB CNEL. This CNEL level would be less than 10 dB greater than the existing measured CNEL of 52.1 dB and would be within the conditionally acceptable range for residential land uses identified by state land use compatibility standards (see Table 15-2) and the County of San Diego General Plan. In addition, the use of diesel-powered construction equipment would be temporary and episodic, affecting only a single nearby receptor (residence) for a limited period. Construction activities would be generally conducted in compliance with the construction hour limits (7 a.m. to 7 p.m.) defined in the County's noise ordinance, although certain time-sensitive activities and/or activities which are not noise-intensive may occur outside these hours. The performance of time-sensitive activities outside of the construction hour limits would not be anticipated to result in a significant impact due to the infrequent nature of these activities and the anticipated CNEL levels associated with the two loudest pieces of construction equipment. Therefore, the temporary increases in ambient noise levels associated with the Proposed Project's construction would be less than significant.

Operation

Operational noise sources would include operation of on-site electrical equipment and periodic maintenance-related vehicle traffic. As described in Impact NOISE-1, the Proposed Project's electrical equipment operation would be anticipated to result in approximate noise levels of 41.7 dB at the nearest occupied property line and 30 dB at the nearest residence. These noise values would be less than the County's Criterion 1 and 4 thresholds. The minor, infrequent traffic associated with Proposed Project's maintenance activities would not substantially change the permanent ambient noise levels at nearby sensitive receptors. Therefore, this impact would be less than significant.

Impact NOISE-4: Potential to Expose People Residing or Working in the Project Site to Excessive Noise Levels due to Proximity to a Public Airport or Public-Use Airport or Private Airstrip (No Impact)

The Project is not located within 2 miles of any private or public airports. Therefore, it would not expose people working at the site to excessive noise levels from any airport activities. Therefore, no impact would occur.

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