4.12 NOISE

The following section discusses potential noise and vibration impacts resulting from the implementation of the proposed project. The analysis is based on the review of existing resources, technical data, and applicable laws, regulations, and guidelines. The focus of the noise analysis is on the potential short-term noise impacts associated with construction activities. No long term noise impacts would occur with the proposed project.

4.12.1 Existing Conditions

4.12.1.1 Environmental Setting

Fundamentals of Environmental Noise

Noise is commonly defined as unwanted sound. Sound pressure magnitude is measured and quantified using a logarithmic ratio of pressures, the scale of which gives the level of sound in decibels (dB). Sound pressures in the environment have a wide range of values. The sound pressure level is the logarithm of the ratio of the unknown sound pressure to a reference quantity of the same kind. To account for the pitch of sounds and the corresponding sensitivity of human hearing to them, the raw sound pressure level is adjusted with an A-weighting scheme based on frequency that is stated in units of decibels (dBA). Typical A-weighted noise levels are listed in Table 4.12-1.

A given level of noise may be more or less tolerable depending on the sound level, duration of exposure, character of the noise sources, the time of day during which the noise is experienced, and the activity affected by the noise. For example, noise that occurs at night tends to be more disturbing than that which occurs during the day because sleep may be disturbed. Additionally, rest at night is a critical requirement in the recovery from exposure to high noise levels during the day. In consideration of these factors, different measures of noise exposure have been developed to quantify the extent of the effects anticipated from these activities. Some indices consider the 24 hour noise environment of a location by using a weighted average to estimate its habitability on a long term basis. Other measures consider portions of the day and evaluate the nearby activities affected by it as well as the noise sources. The most commonly used indices for measuring community noise levels are the equivalent energy level (L_{EQ}), and the day-night average noise level (L_{DN}).

- L_{EQ} (equivalent energy level) is the average acoustical or sound energy content of noise, measured during a prescribed period, such as 1 minute, 15 minutes, 1 hour, or 8 hours. It is the decibel sound level that contains an equal amount of energy as a fluctuating sound level over a given period of time.

- L_{DN} (day-night average noise level) is the average equivalent A-weighted sound level over a 24 hour period. This measurement applies weights to noise levels during nighttime hours to compensate for the increased disturbance response of people at those times. L_{DN} is the equivalent sound level for a 24 hour period with a +10 dBA weighting applied to all sound occurring between 7:00 p.m. and 7:00 a.m.

Table 4.12-1
TYPICAL A-WEIGHTED NOISE LEVELS

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	— 110 —	Rock band
Jet fly-over at 1000 feet		
	— 100 —	
Gas lawn mower at 3 feet		
	— 90 —	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	— 80 —	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	**— 70 —**	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	**— 60 —**	
		Large business office
Quiet urban daytime	**— 50 —**	Dishwasher next room
Quiet urban nighttime	**— 40 —**	Theater, large conference room (background)
Quiet suburban nighttime		
	— 30 —	Library
Quiet rural nighttime		Bedroom at night, concert
	— 20 —	
		Broadcast/recording studio
	— 10 —	
Lowest threshold of human hearing	**— 0 —**	Lowest threshold of human hearing

Source: Caltrans 2009
dBA = A-weighted decibel

The decibel level of a sound decreases (or attenuates) exponentially as the distance from the source of that sound increases. For a single point source such as a piece of mechanical equipment, the sound level normally decreases by about 6 dBA every time the distance between the source and listener is doubled (doubling of distance). Sound that originates from a linear, or "line" source such as a heavily traveled traffic corridor, attenuates by approximately 3 dBA per doubling of distance, provided that the surrounding site conditions lack ground effects or obstacles that either scatter or reflect noise. Noise from roadways in environments with major ground effects due to vegetation and loose soils may either absorb or scatter the sound yielding attenuation rates as high as 4.5 dBA for each doubling of distance. Other contributing factors that affect sound reception include meteorological conditions and the presence of manmade obstacles such as buildings and sound barriers.

Noise has a significant effect on the quality of life. An individual's reaction to a particular noise depends on many factors such as the source of the noise, its loudness relative to the background noise level, and the time of day. The reaction to noise can also be highly subjective; the perceived effect of a particular noise can vary widely among individuals in a community.

Because of the nature of the human ear, a sound must be about 10 dBA greater than the reference sound to be judged as twice as loud. In general, a 3 dBA change in community noise levels is perceivable, while 1 to 2 dBA changes generally are not perceived. Although the reaction to noise may vary, it is clear that noise is a significant component of the environment, and excessively noisy conditions can affect an individual's health and well-being. The effects of noise are often only transitory, but adverse effects can be cumulative with prolonged or repeated exposure. The effects of noise on a community can be organized into six broad categories: sleep disturbance, permanent hearing loss, human performance and behavior, social interaction of communication, extra-auditory health effects, and general annoyance.

Community noise environments are typically represented by noise levels measured for brief periods throughout the day and night, or during a 24-hour period (i.e., by L_{DN}). The one-hour period is useful for characterizing noise caused by short term events, such as operation of construction equipment or concert noise (i.e., with L_{EQ}). Community noise levels are generally perceived as quiet when the L_{DN} is below 50 dBA, moderate in the 50 to 60 dBA range, and loud above 60 dBA. Along major thoroughfares, roadside noise levels are typically between 65 and 75 dBA.

Fundamentals of Environmental Vibration

Vibration consists of waves transmitted through solid material. Ground-borne vibration propagates from the source through the ground to adjacent buildings by surface waves. Vibration may be comprised 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 and is measured in Hertz (Hz). The normal frequency range of most ground-borne vibration that can be felt generally starts from a low frequency of less than 1 Hz to a high of about 200 Hz.

Vibration energy spreads out as it travels through the ground, causing the vibration amplitude to decrease with distance away from the source. Ambient and source vibration are often expressed in terms of the peak particle velocity (PPV) or root mean square (RMS) velocity in inches per second (in/sec) that correlates best with human perception. The Federal Transit Administration estimates that the threshold of perception is approximately 0.0001 in/sec RMS and the level at which continuous vibrations begins to annoy people is approximately 0.001 in/sec RMS (Federal Transportation Administration [FTA] 2006).

Groundborne vibration can be a concern for nearby neighbors of a transit system route or maintenance facility, causing buildings to shake and rumbling sounds to be heard. In contrast to airborne noise, groundborne vibration is not a common environmental problem. It is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads. Some common sources of groundborne vibration are trains, buses on rough roads, and construction activities such as blasting, pile-driving and operating heavy earth-moving equipment.

4.12.1.2 Existing Noise and Vibration Sources

Noise sources can be grouped into two categories: mobile and stationary. In the County, mobile sources include vehicle traffic on highways and roads, aircraft noise from military, commercial,

and private aviation. Primary stationary sources within the County include mining, industrial, commercial, and utility land uses.

Transportation corridors, such as federal and state highways, are a major source of ambient noise within the County. Noise generated from vehicles is governed primarily by the volume, type (the mix of automobiles, trucks, and other large vehicles), and speed. The Noise Element contained in the General Plan provides an overview of general noise conditions along major roadways in the County. The predicted noise levels for the year 2020 are listed in Table 4.12-2. As shown, at a distance of 100 feet from the roadway centerline, roadway levels range from 69 to 73 L_{DN} (Inyo County 2001, as amended).

Table 4.12-2
2020 TRAFFIC NOISE LEVELS ALONG INYO COUNTY ROADWAYS

Roadway/Segment	L_{DN} at 100 feet	Distance (feet) to 70 L_{DN} Contour[a]	Distance (feet) to 65 L_{DN} Contour[a]	Distance (feet) to 60 L_{DN} Contour[a]
US 395				
Bishop	73	158	341	736
Big Pine	69	86	185	398
Independence	69	86	185	398
Lone Pine	69	86	185	398
Olancha	69	86	185	398

Source: Inyo County 2001, as amended
L_{DN} = day-night average noise level
[a] Measured from the roadway centerline.

Seven public access airports and six private airstrips are located throughout the County. These airports are not considered a substantial contributor to noise levels within the surrounding communities given their locations and current use levels. However, flyovers from China Lake NAWS and other nearby installations do affect surrounding areas. In addition to aircraft associated with the China Lake NAWS, aircraft associated with other military installations, including Fort Irwin, Nellis Air Force Base, George Air Force Base, March Air Force Reserve Base, and Edwards Air Force Base, use the station's designated airspace or use other designated flight training routes in the County (Inyo County 2001, as amended).

Western Solar Energy Group

Laws Solar Energy Development Area

Existing noise and vibration sources within the Laws SEDA includes the Bishop Airport, located approximately one mile from the Laws SEDA boundary; traffic on US 6; and potentially equipment associated with agriculture production.

Owens Lake Solar Energy Development Area

Existing noise and vibration sources within the Owens Lake SEDA primarily stems from traffic on US 136, SR 190, and SR 395.

Rose Valley Solar Energy Development Area

Existing noise and vibration sources within the Rose Valley SEDA primarily stems from traffic on US 395, with potential noise also attributed to agricultural equipment.

Pearsonville Solar Energy Development Area

Existing noise and vibration sources within the Pearsonville SEDA primarily stems from traffic on US 395, with potential noise also attributed to agricultural uses located south of the Pearsonville SEDA boundary.

Owens Valley Study Area

Existing noise and vibration sources within the OVSA includes the Bishop, Independence, and Lone Pine airports; traffic on major roads and highways, such as US 395, US 6, SR 136 and SR 168, and potentially equipment associated with agriculture production.

Southern Solar Energy Group

Trona Solar Energy Development Area

Existing noise and vibration sources within the Trona SEDA primarily stems from the Trona Airport, located within the eastern portion of the SEDA. The airport is a public use airport and consists of a landing strip and a helicopter landing pad.

Eastern Solar Energy Group

Chicago Valley Solar Energy Development Area

There are no major sources of noise or vibration currently located within the Chicago Valley SEDA; however, SR 178 is located to the west of the Chicago Valley SEDA boundary and could be a source of both noise and vibration.

Charleston View Solar Energy Development Area

There are no major sources of noise or vibration currently located within the Charleston View SEDA; however, the Hidden Hills Airport (a private airstrip) is located approximately 1.1 mile east from the Charleston View SEDA and could be a source of both noise and vibration.

Sandy Valley Solar Energy Development Area

Existing noise and vibration sources within the Sandy Valley SEDA primarily stems from equipment associated with agriculture production; however, the Sky Ranch Airport (a private

airstrip) is located approximately 0.9 mile southeast from the Sandy Valley SEDA and could be a source of both noise and vibration.

4.12.1.3 Noise and Vibration Sensitive Land Uses

Noise sensitive land uses include uses where an excessive amount of noise would interfere with normal activities such as residences, public and private educational facilities, hospitals, convalescent homes, hotels/motels, daycare facilities, passive recreational parks, and some biological habitats.

Vibration-sensitive land uses include facilities where vibration would interfere with operations within the building, such as vibration-sensitive research and manufacturing, hospitals with vibration-sensitive equipment, and university research operations. The degree of sensitivity to vibration depends on the specific equipment that would be affected by the vibration. Electron microscopes and high-resolution lithography equipment function within certain scientific and manufacturing tolerances that can be compromised in high vibration environments. Certain fragile older or historic buildings may be vulnerable to damage from excessive vibration. Residential uses are also sensitive to excessive levels of vibration of either a regular or an intermittent nature.

The County has a relatively small population base, with the majority of people living in small communities along US 395. Existing sensitive receptors in each SEDA and the OVSA are discussed below.

Western Solar Energy Group

Laws Solar Energy Development Area

Existing sensitive receptors within the Laws SEDA include some residences within the Laws community, as well as a group of residences along the northern border of the County approximately one mile east of US 6. There are no hospitals or other non-residence sensitive receptors within the Laws SEDA.

Owens Lake Solar Energy Development Area

Existing sensitive receptors within the Owens Lake SEDA include residences within the Keeler community, as well as residences within a quarter mile outside of the Owens Lake SEDA boundary in the community of Cartago. There are no hospitals or other non-residence sensitive receptors within the Owens Lake SEDA.

Rose Valley Solar Energy Development Area

Existing sensitive receptors within the Rose Valley SEDA include scattered residences primarily along US 395. Existing residences are also located within a quarter mile outside of the Rose Valley SEDA boundary. Relative to the boundary, residences are located to the northwest, between the communities of Grant and Olancha, and to the west, in the northern portion of the SEDA near Sage Flats Road and in the southern portion of the SEDA west of Sykes. There are no hospitals or other non-residence sensitive receptors within the Rose Valley SEDA.

Pearsonville Solar Energy Development Area

Existing sensitive receptors within the Pearsonville SEDA include some residences along US 395 in the community of Pearsonville, as well as what appears to be a single residence just south of 9 Mile Canyon Road and east of the SEDA's west boundary. There are no hospitals or other non-residence sensitive receptors within the Pearsonville SEDA.

Owens Valley Study Area

Existing sensitive receptors within the OVSA include residences, schools, hospitals, and recreation areas. The majority of sensitive receptors are located within the City of Bishop and the communities of (north to south) West Bishop, Wilkerson, Big Pine, Independence, Lone Pine, and Alabama Hills. However, existing residences are also scattered throughout the OVSA in less populated areas. Additionally, some existing residences are located within a quarter mile of the OVSA boundary; these include residences within the Laws community and a few residences west of the Alabama Hills community.

Southern Solar Energy Group

Trona Solar Energy Development Area

Existing sensitive receptors within the Trona SEDA include a few residences west of Trona Wildrose Road. Existing residences are also located within a quarter mile outside of the Trona SEDA boundary. These residences are located to the south of the SEDA and west of Trona Road, in the Pioneer Point community of San Bernardino County. There are no hospitals or other non-residence sensitive receptors within the Trona SEDA.

Eastern Solar Energy Group

Chicago Valley Solar Energy Development Area

Existing sensitive receptors within the Chicago Valley SEDA include a few residences east of Chicago Valley Road approximately a half mile north of the southern SEDA boundary. There are no hospitals or other non-residence sensitive receptors within the Chicago Valley SEDA.

Charleston View Solar Energy Development Area

Existing sensitive receptors within the Charleston View SEDA include residences to the north and south of Tecopa Road within the populated area of Calvada Springs. A few residences are also located across the California-Nevada state line and within a quarter mile outside of the SEDA boundary. There are no hospitals or other non-residence sensitive receptors within the Charleston View SEDA.

Sandy Valley Solar Energy Development Area

Existing sensitive receptors within the Sandy Valley SEDA include a few residences associated with local agriculture. Within a quarter mile outside of the SEDA boundary, existing sensitive receptors include some Nevada residences and a Clark County park, named Peace Park, which

contains the Sandy Valley Senior Center. There are no other sensitive receptors within the Sandy Valley SEDA.

4.12.1.4 Regulatory Framework

Federal Regulations

Federal Transit Administration

Although Federal Transit Administration standards are intended for federally funded proposed mass transit projects, the impact assessment procedures and criteria to assess operation and construction noise and vibration impacts included in the Federal Transit Administration's Transit Noise and Vibration Impact Assessment (FTA 2006) are routinely used for projects proposed by local jurisdictions.

State Regulations

California Noise Control Act of 1973

Sections 46000 through 46080 of the California Health and Safety Code, known as the California Noise Control Act of 1973, finds that excessive noise is a serious hazard to the public health and welfare and that exposure to certain levels of noise can result in physiological, psychological, and economic damage. It also finds that there is a continuous and increasing bombardment of noise in the urban, suburban, and rural areas. The California Noise Control Act declares that the state has a responsibility to protect the health and welfare of its citizens by the control, prevention, and abatement of noise. It is the policy of the state to provide an environment for all Californians free from noise that jeopardizes their health or welfare.

Local Regulations

Inyo County General Plan

Noise Element

The General Plan Noise Element includes goals and policies that regulate exposure to excessive noise (Inyo County 2001, as amended).

The goal of the Noise Element is to minimize the impact of noise on the community by identifying existing and potential noise sources and providing the policies and standards needed to keep noise from reducing the quality of life in the County. The Noise Element establishes guidelines to evaluate the compatibility of land uses and noise exposure levels, which are shown in Table 4.12-3. The goal for maximum outdoor noise levels is 60 L_{DN} for land uses generally considered to be noise sensitive (residences, transient lodging, schools, churches, and medical facilities). This level is intended to guide the design and location of future development and serve as a target for the reduction of noise in existing development. If the existing noise standards are currently exceeded, a proposed project may not increase noise levels by more than 3 dBA over ambient levels.

Table 4.12-3
INYO COUNTY GENERAL PLAN NOISE ELEMENT
NOISE LEVEL LIMITS BY LAND USE TYPE

Land Use	Normally Acceptable Maximum L_{DN}
Residential	60
Transient Lodging	60
Schools, Libraries, Churches, Hospitals	60
Sports Arenas, Outdoor Spectator Sports	55
Playgrounds, Parks	70
Office Buildings, Business Commercial and Professional	65
Mining, Industrial, Manufacturing, Utilities, Agriculture	70

Source: Inyo County 2001, as amended
L_{DN} = day-night average noise level

Applicable policies from the Noise Element that would pertain to the project include:

- Policy NOI-1.3: Limit Increases in Noise Levels from Stationary Sources. Require that new development not increase the ambient exterior noise level measured at the property line above established County noise standards, unless mitigation measures are included to reduce impacts to below County noise standards.

- Policy NOI-1.5: Implementation of Mitigation Measures. Require that proponents of new projects provide or fund the implementation of noise-reducing mitigation measures to reduce noise to required levels.

- Policy NOI-1.7: Noise Controls During Construction. Contractors will be required to implement noise-reducing mitigation measures during construction when residential uses or other sensitive receptors are located within 500 feet.

Inyo County Municipal Code

The Inyo County Municipal Code limits the generation of nuisance noise and establishes quiet hours for County parks and campgrounds at night in Chapter 12, Section 12.16.110.

4.12.2 Significance Thresholds

In order to assist in determining whether a project would have a significant effect on the environment, the State CEQA Guidelines identify criteria for conditions that may be deemed to constitute a substantial or potentially substantial adverse change in physical conditions. Specifically, Appendix G of the State CEQA Guidelines (Environmental Checklist Form) lists the following thresholds under which a project may be deemed to have a significant impact on noise if it would result in:

- Result in the exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinances, or applicable standards of other agencies.

- Result in the exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.

- Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

- Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

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

- For a project within the vicinity of a private air strip, result in the exposure of people residing or working in the project area to excessive noise levels.

The County does not have established quantitative significance thresholds to determine construction and operational impacts for noise or vibration. Therefore, to assist in determining significance, the following criteria will be used:

- Solar energy projects would have a significant impact related to construction noise if construction activities would occur within 500 feet of a sensitive receptor.

- Solar energy projects would have a significant impact related to operational noise if the ambient noise level measured at the property line of the affected use exceeds the acceptable levels outlined in Table 4.12-3, which are 60 dBA L_{DN} for noise sensitive land uses (including residences, schools, and medical facilities).

- Solar energy projects would result in a significant construction or operational vibration impact if the vibration effects result in an exceedance of 0.2 PPV (in/sec) where assessing potential damage to non-engineered timber and masonry buildings; a level of 65 vibration decibels (VdB) in buildings where excessive vibration would result in an interference of operations; or a level of 72 VdB for general annoyance assessment (FTA 2006).

4.12.3 Impact Analysis

The REGPA is designed to minimize impacts caused by noise by constraining renewable energy development throughout the County in conjunction with the General Plan's existing protection for such resources. Indirectly, individual future projects have the potential to impact sensitive receptors to noise.

The following impact analysis primarily focuses on utility scale solar energy facilities because those would result in the greatest change to the ambient environment due the potential expanse

of such facilities and the associated construction and operation activities; however, the analysis also applies to the other proposed categories of solar energy facilities, including distributed generation and community scale facilities.

The proposed REGPA also includes provisions for development of small scale solar energy facilities. However, due to their small size(e.g., small array of ground- or roof-mounted PV panels), and location (on the building or the property it serves), these developments are currently allowed throughout the County within any zoning district under ICC Title 18, and require only electrical and building permits for development. As a result, these developments are not considered to result in impacts under CEQA, and would not typically require the CEQA analysis or associated mitigation measures described in this document.

The County routinely reviews all development proposals for environmental impacts. Therefore, all future solar energy projects would be evaluated on a project-specific basis to assess specific noise-related impacts against the program-level analysis contained in this PEIR. Applicable mitigation measures identified in this PEIR would be implemented for the individual project, as well as any additional mitigation or design measures identified in the noise analysis conducted for the project.

4.12.3.1 Exposure of Persons to or Generation of Noise Levels in Excess of Established Standards

The utility scale solar energy projects have the potential to generate new sources of noise that may affect surrounding land uses. Stationary source generated noise associated with solar developments include equipment noise, washer stations, power generators, maintenance activities, transmission line maintenance noise, and corona noise. Because specific details regarding the placement of individual solar projects is not available at this time, potential operational noise impacts are discussed at a programmatic level and would be similar for each SEDA and the OVSA.

Off-site vehicular noise would also be generated from operations and maintenance personnel commuting to the solar energy development sites (see Section 4.12.3 regarding potential operational traffic-related noise impacts).

Equipment Noise

During operation of solar developments, on-site noise sources could include pad-mounted inverters and transformers, substation transformers, and tracker array motors and dryers/blowers. Typical noise levels associated with on-site equipment are illustrated in Table 4.12-4.

Table 4.12-4
TYPICAL OPERATION EQUIPMENT NOISE EMISSION LEVELS

Equipment	Distance from Equipment (feet)	Noise Level (dBA)
Pad-mounted inverters	6	77
Substation transformers	5	72
Transformers	5	60
Dryers/blowers	50	43
Tracker Array Motors	50	37

Source: San Diego County 2014
dBA = A-weighted decibel

Washer Station Noise

Periodic washing of solar trackers would be required to optimize efficiency. Washing of the trackers generally occurs during evening and nighttime hours, or between sunset and sunrise, when all trackers are aligned in a westerly direction (i.e., overnight storage position). Depending on the size of the solar development, trackers washing could take several consecutive days to complete; however, trackers washing would likely only be required once every 6 to 8 weeks. Additionally, during trackers washing times, project tracker systems would not be operational (i.e., trackers in stored position), and power inverters would have limited operations due to limited or no sunlight. Therefore, it is expected that neither tracker nor inverter noise would occur while the trackers washing operation is in progress; this means the trackers washing may be assessed by itself as an overnight noise source, and that it would not add to project-related noise exposure during the day (i.e., normal operating period). Noise associated with washing activities would vary depending on the type of equipment used. One option would be the IPC Eagle Wash Station, which generates noise levels of 99 dBA at 9 feet (County of San Diego 2014).

Generator Noise

Solar developments would likely require back-up generators to be used in the event of power loss from the electricity distribution grid. Generators would be used very infrequently, only when power is not available from the electricity grid and the tracking systems need to be repositioned in response to an identified pending storm condition. Multiple generators could be provided per site, for redundancy, but only one would be used at any one time. It is estimated that a generator would be used a total of 20 minutes for the repositioning of the tracking systems in this scenario. The noise level from an enclosed diesel powered generator, for example the Generac SD600, would be 79 dBA at 23 feet (County of San Diego 2014). Transformers, inverters, and tracker blowers would not be in operation while the generator is being used; consequently the generator noise may be considered and evaluated without the noise from these components. Conversely, noise from the trackers would occur simultaneously as noise from the generator.

Transmission Line Noise

In order to minimize impacts associated with new facility construction, the 2013 REGPA focused the development areas along the existing LADWP transmission systems and along the conceptual Valley Electric Association system. The SEDAs in the County's western region and the OVSA would only utilize existing transmission facilities in the County, however SEDAs in the southern and eastern region may require new transmission lines. This is most notable for the Charleston SEDA, which would require a transmission line crossing into Nevada.

New transmission lines could consist of buried cable and/or above-ground cable strung between towers. Buried cable would not require routine maintenance once installed, due to protection provided by placing the cable underground; infrequent activity along the buried portion of the line could occur in response to emergency situations. For the above ground portion of the line, maintenance and repair activities would include both routine preventive maintenance and emergency procedures conducted to maintain system integrity, as well as vegetation clearing.

If no vehicle access exists, the maintenance crew and material are flown in by helicopter, which could be a potential periodic noise source to surrounding uses, depending on the flight path and location of nearby noise sensitive receptors. However, noise generated by maintenance activities associated with maintenance of a new transmission line or gen-tie line (including vegetation trimming, equipment maintenance and repair activities, and helicopter inspections and maintenance activities) would be periodic and short-term in nature.

Corona Noise

Solar developments would include electrical equipment and transmission lines which represent a potential source of corona noise. Corona noise is the audible noise created when energy dissipates from electrical conductive equipment. Corona noise does not apply to other on-site transmission equipment that would be installed underground. As energy dissipates from electrical conductive equipment, some of the energy causes local pressure changes that result in audible noise, or in radio or television interference. The audible corona noise generated by corona discharge is characterized as a hissing or crackling sound that may be accompanied by a hum.

Slight irregularities or water droplets on the conductor and/or insulator surface accentuate the electric field strength near the conductor surface, making corona discharge and the associated audible noise more likely. Therefore, audible noise from transmission lines is generally a foul weather (wet conductor) phenomenon or occurs briefly when dew collects on the transmission lines. Corona noise is relative to the capacity of the transmission line. Studies conducted for a 500kV double-circuit transmission line near Serrano Substation in Anaheim Hills, when humidity was greater than 80 percent and temperatures were in the range of 60°F (conditions contributing to high corona noise), resulted in a noise level of 46 dBA directly under the transmission tower (Veneklasen Associates, Inc. 2004). Beyond 100 feet of the transmission line, the corona noise dropped to 42 dBA.

The County receives approximately 6.1 inches of precipitation a year (USA.com 2014). Because the amount of precipitation per year would be minimal, corona events would be rare and

intermittent. New gen-tie lines would involve installation of polymer (silicon rubber) insulators on any new transmission line connections. This material is hydrophobic (repels water) and minimizes the accumulation of surface contaminants such as soot and dirt, which in turn reduces the potential for corona noise to be generated at the insulators. With consideration of these standard practices, noise from coronal discharge would not represent a substantial increase in noise levels in the vicinity of the solar development site. Impacts from corona noise would be minimal.

Summary

The REGPA proposes new General Plan policies and implementation measures to encourage and direct the type, siting, and size of future renewable energy development within the County. The project includes the following Noise Implementation Measure as part of the Public Safety Element of the General Plan:

1. Work with developers and other agencies to minimize noise from Renewable Energy Solar Facility development.

Based on the above discussion, development of solar energy projects have the most potential of generating operational noise that would exceed noise levels in the General Plan Noise Element would be from equipment noise, washer stations, power generators, and maintenance activities.

Noise impacts would be dependent on the size, location, and proximity to noise sensitive land uses. However, since details regarding specific projects are unknown at this time, impacts are considered potentially significant.

4.12.3.2 Exposure of Persons to or Generation of Excessive Groundborne Vibration or Groundborne Noise Levels

Construction Impacts

The potential effect of vibration on buildings located in the vicinity varies depending on soil type, ground strata, and construction characteristics of the receiver building(s). In most cases, the primary concern regarding construction vibration relates to damage, but excessive vibration can result in annoyance to nearby residences.

On-site vibration generation could occur from the construction of solar PV panel structure piles, which would be mechanically vibrated into the ground using special equipment. Typical vibration levels associated with construction equipment are provided in Table 4.12-5. The nearest equipment category that would be equivalent to the PV panel structure pile driving would be cassion drilling (LADWP 2013). Heavy equipment (e.g., caisson drilling) generates vibration levels of 0.089 inch per second PPV and a RMS of 87 VdB at a distance of 25 feet (FTA 2006).

Table 4.12-5
TYPICAL VIBRATION VELOCITIES FOR CONSTRUCTION EQUIPMENT

Equipment	PPV at 25 feet (inch/second)	RMS at 25 feet (VdB)
Pile driving (impact)	0.644	104
Pile driving (sonic)	0.170	93
Vibratory roller	0.210	94
Large bulldozer	0.089	87
Caisson drilling	0.089	87
Loaded trucks	0.076	86

Source: FTA 2006
PPV = peak particle velocity
RMS = root mean square

Off-site activity, including construction-related delivery trucks and construction worker vehicles, has the potential to expose vibration-sensitive land uses located near the delivery route to excessive vibration. Loaded trucks generate vibration levels of 86 VdB at a distance of 25 feet.

Vibration dissipates rapidly with distance and given the rural nature of the County, vibration generated from the types of construction-related equipment and trucks that would be typically expected for construction of solar project would not be expected to occur within a range that would exceed the FTA building damage threshold level of 0.2 inch per second PPV for non-engineered timber and masonry buildings or the threshold of 65 VdB for vibration-sensitive uses, or 72 VdB for general annoyance.

Should pile driving or other impact-intensive equipment be necessary, further analysis would be required. However, considering the types of equipment expected for solar development projects, impacts associated with groundborne vibration would be considered less than significant.

Operational Impacts

Heavy-duty trucks traveling to solar energy facilities for routine inspection and maintenance activities could generate vibrations. However, such vehicular movements would generate similar vibration levels as existing traffic conditions and would only be periodic. As a result, operation of solar developments would not normally be anticipated to increase the existing vibration levels. Thus, operational vibration impacts are considered less than significant.

4.12.3.3 Permanent Increase in Ambient Noise Levels

Permanent increases in ambient noise levels in surrounding areas would result from noise generated in relation to solar development operations and maintenance. Stationary noise sources would be regulated by the noise limits within the County Noise Element and are discussed in Section 4.12.3.1.

Another potential Project-related source of noise that may affect ambient noise levels would be related to operations and maintenance personnel commuting to conduct periodic maintenance of

the solar facilities. The number of operations and maintenance personnel would be dependent on the size of solar development; however, typically, solar developments do not require a substantial number of operations and maintenance personnel and associated trips would be relatively few (it would take a doubling of vehicle trips to increase noise levels along roadways by 3 dBA). Implementation of the proposed project would periodically increase traffic noise; however, because of the relatively low anticipated number of trips, traffic noise levels are not expected to substantially increase. Impacts would therefore be less than significant.

4.12.3.4 Temporary or Periodic Increase in Ambient Noise Levels

Implementation of the proposed project would result in a temporary or periodic increase in ambient noise levels related to construction equipment, activities, and vehicles. Other periodic noise increases associated with maintenance equipment or vehicles are discussed within Sections 4.12.3.1 and Section 4.12.3.3, respectively.

Noise impacts from construction activities occurring within a project site would be dependent on the type, location, and duration of the noise-generating construction activities, and the distance to noise sensitive land uses. As discussed in Section 4.12.1, existing noise sensitive land uses are located throughout the SEDAs and the OVSA; however, the majority of the land within these locations is undeveloped with no noise sensitive receptors nearby.

Construction activities would be limited to 7 a.m. and 7 p.m., Monday through Saturday. Resulting construction noise would be temporary and short term as construction occurs intermittently and varies depending on the nature or phase of construction (e.g., site preparation, grading, development of staging areas and site access roads, and solar tracker array assembly and installation).

Standard Construction Equipment

Construction of solar energy developments could involve a number of construction activities, including clearing and grubbing of existing vegetation; grading necessary for construction of access roads and tracker foundations; trenching for electrical collection system and communication lines; installation of a small concrete footing at each pair of inverters; construction of an overhead “trunk line” for the collection system leading to a substation; and construction of a substation and an operations and maintenance building. During the peak of construction, a typical day would likely include the transportation of trackers (delivered in sections by conventional trailer trucks), movement of heavy equipment, and transportation of materials including delivery of water by trucks.

The Charleston View SEDA could require a new transmission line that would traverse across state lines. Construction of the transmission line could involve clearing and grubbing of the existing vegetation; grading necessary for transmission pole foundations; trenching for any buried portions of the transmission line; and stringing of the transmission cable.

Construction activities would occur during the County’s allowable hours of operation. Construction equipment would include standard equipment such as graders, scrapers, backhoes, loaders, cranes, dozers, water trucks, portable generators and air-compressors, and miscellaneous trucks. The maximum noise level ranges for various pieces of construction equipment at a

distance of 50 feet are depicted in Table 4.12-6. Construction noise would be temporary and short-term as construction occurs intermittently and varies depending on the nature or phase of construction. Construction equipment would also be spread out over the entire construction site.

Table 4.12-6
TYPICAL CONSTRUCTION EQUIPMENT
NOISE EMISSION LEVELS

Equipment Type	Noise Level at 50 feet (dBA L_{EQ})
Air compressor	81
Backhoe	85
Concrete pump	82
Concrete vibrator	76
Crane	88
Dozer	87
Generator	78
Loader	84
Paver	88
Pneumatic tools	85
Water pump	76
Power hand saw	78
Shovel	82
Trucks	88
Rock drill	81

Source: FTA 2006
dBA = A-weighted noise level
L_{EQ} = equivalent energy level

Vibratory Pile Drivers

Trackers would be installed on steel masts which would be installed to a necessary depth using a vibration pile driver. The exact equipment that would be used is not known, however, it is anticipated that the size and type of equipment necessary would generate a maximum noise level of approximately 85 to 90 dB at a distance of 50 feet (LADWP 2013).

Pre-Drilling for Mast Emplacement

In areas with intact bedrock within the necessary depth of the ground surface, vibratory driving methods alone would not be capable of emplacing the mast to the design depth. If necessary, the construction process would include pre-drilling of a pilot hole with slightly smaller diameter than the mast, followed by insertion of the mast using the vibratory driver. Pilot hole drilling and emplacement of the mast with vibratory driver would not typically occur on the same day. Pilot holes would be drilled by one crew using the rock drill, the vibratory driver crew would be directed to an area once the pilot hole drilling within that area was completed (drilling takes about twice the time as the vibratory emplacement, so it is not efficient to have the vibratory rig

following along behind the rock drilling). As shown in Table 4.12-6, a rock drill produces 81 dBA at a distance of 50 feet.

Construction Traffic Noise

Heavy-duty trucks used for deliveries, material and/or equipment hauling, and construction worker trips would temporarily result in noise increases along delivery routes. However, noise impacts associated with worker vehicles and delivery trucks would be short-term and would only occur during daytime hours.

Summary

The County does not provide noise limits for construction noise; however Policy NOI-1.7 requires that contractors implement noise reduction measures if construction is located within close proximity to noise sensitive land uses. Therefore, if construction of solar energy projects or the transmission line are located within 500 feet of a residence or noise sensitive land use and do not include noise-reducing measures, impacts would be potentially significant.

4.12.3.5 Exposure of People Residing or Working in the Project Area to Excessive Noise Levels Related to Public Airports or Private Airstrips

Implementation of the proposed project would result in the development of solar energy projects and the associated employment of operations and maintenance personnel. No sensitive receptors or airports/airstrips are proposed as part of the project. As discussed in Section 4.12.1, several public airports exist inside or within two miles of a SEDA and the OVSA. However, because operations and maintenance personnel would infrequently be on site, the proximity to an airport or airstrip would not expose workers to excessive noise levels. Therefore, noise impacts related to airports and airstrips would be less than significant.

4.12.4 Level of Significance before Mitigation

Based on the analyses in Section 4.12.3, future utility scale, distributed generation, and community scale solar energy facility projects under the REGPA could result in potentially significant impacts related to: (1) exposure of persons to or generation of noise levels in excess of established standards during project operations; and (2) temporary or periodic increases in ambient noise levels during construction. These impacts require mitigation to ensure impacts are reduced to the maximum extent feasible.

Due to the shorter construction period and less equipment and personnel vehicles associated with operation due to their smaller sizes, distributed generation and community scale facilities would generally be expected to result in less severe impacts to geology and soils when compared with utility scale facilities; however, the severity of the impact would ultimately depend on the sensitive receptors present. Small scale projects are typically considered to result in no impacts under CEQA.

4.12.5 Mitigation Measures

Noise mitigation measures have been developed for solar energy development projects producing more than 20 MW of electricity for off-site use (utility scale) and would be implemented to mitigate adverse noise impacts. As previously mentioned, small scale solar energy projects are considered to result in no impacts under CEQA; however, all individual solar energy facility project applications (including small scale, community scale, and distributed generation) shall be reviewed by the County, and the need for implementation of the following mitigation measures shall be determined based on the professional judgment of a qualified county planner, pursuant to ICC Title 21 and State CEQA Guidelines. For example, community scale solar developments (i.e., roof- or ground-mounted PV panels for a specific community's use) may be determined by a qualified county planner to have no potential noise-related impacts and would not require a noise study or implementation of the noise mitigation measures listed in this section. In such cases, the County shall document that no impacts to geology and soils would occur and no mitigation measures are necessary in lieu of the noise study required in Mitigation Measure NOI-1.

If a proposed distributed generation or community scale solar development project is determined by the County to have the potential to result in noise impacts, then the following mitigation measures shall be implemented as determined necessary by the qualified county planner. The County will review future solar energy development proposals to determine if they meet the requirements of Section 15162 of the State CEQA Guidelines; projects that do not meet the requirements may require additional CEQA analysis prior to approval. Similar to proposed distributed generation and community scale solar energy projects, small scale solar project applications undergo County review, and implementation of additional CEQA review and/or mitigation measures shall be at the discretion of a qualified county planner.

As described above in Sections 4.12.3 and 4.12.4, implementation of solar energy projects under the REGPA could result in potentially significant impacts related to noise. Accordingly, the following mitigation measures are provided to address those issues, and include applicable BMPs and related information from REAT's Best Management Practices and Guidance Manual (REAT 2010). Implementation of these measures would reduce the severity of identified impacts to geology and soils, and may reduce them to below a level of significance in most cases.

MM NOI-1: Prepare technical noise report for solar facilities proposed within 500 feet of noise sensitive land uses.

If a proposed utility scale solar energy project resulting from implementation of the REGPA is within 500 feet of a residence or other noise sensitive land use, prior to issuance of a Major Use Permit, a site-specific noise technical report will be prepared and approved by the County. The technical report will verify compliance with all applicable County laws, regulations, and policies during operation of the solar project, including that noise levels would not exceed the relevant thresholds described in the General Plan Noise Element (60 dBA L_{DN} for noise sensitive land uses such as residences, schools, transient lodging and medical facilities). The site specific noise technical report will include project specifications, applicable noise calculations, project design features, applicable BMPs and related information from the REAT's Best Management Practices

and Guidance Manual (REAT 2010), and mitigation measures applicable to the project. The technical noise report will address operational related noise sources, as well as noise from the use of generators during an emergency. The technical report will calculate specific anticipated noise and vibration levels from operations in accordance with County standards and provide specific mitigation when noise levels are expected to exceed County standards.

MM NOI-2: Implement construction noise reduction measures.

If utility scale solar development resulting from implementation of the REGPA is proposed within 500 feet of a residence or other noise sensitive receptor, the following measures, in addition to applicable BMPs and related information from REAT's Best Management Practices and Guidance Manual (REAT 2010), shall be implemented to reduce construction noise to the extent feasible:

- Whenever feasible, electrical power will be used to run air compressors and similar power tools.
- Equipment staging areas will be located as far as feasible from occupied residences or schools.
- All construction equipment, fixed or mobile, shall be equipped with properly operating and maintained mufflers.
- Stationary equipment shall be placed such that emitted noise is directed away from sensitive noise receptors.
- Stockpiling and vehicle staging areas shall be located as far as practical from occupied dwellings.

MM NOI-3: Prepare a Helicopter Noise Control Plan.

In the event that a utility scale solar project site would have limited access and would require the use of helicopters during operation or maintenance of a facility, the County shall prepare a Helicopter Noise Control Plan that indicates where helicopters would be used and the frequency and duration for such use. The plan shall demonstrate compliance with the noise level limits within the County Noise Element for helicopter noise to properties within 1,600 feet of proposed helicopter use locations.

4.12.6 Significant Unavoidable Adverse Impacts

Based on the implementation of Mitigation Measures NOI-1 through NOI-3, all identified utility scale project-related impacts associated with noise would be avoided or reduced below a level of significance, with no significant unavoidable adverse impacts.