3.10 Noise

This section assesses potential noise effects from construction and operation of renewable energy projects. Specifically, this section analyzes potential noise impacts to the existing ambient noise environment due to development of renewable energy in San Luis Obispo County related to the Renewable Energy Streamlining Program (RESP or Program).

3.10.1 PHYSICAL SETTING

GENERAL INFORMATION ON NOISE

Noise is generally defined as unwanted or objectionable sound. To describe environmental noise and to assess impacts on areas sensitive to community noise, a frequency weighting measure that simulates human perception is customarily used. The frequency weighting scale known as A-weighting best reflects the human ear's reduced sensitivity to low frequencies and correlates well with human perceptions of the annoying aspects of noise. The A-weighted decibel scale (dBA) is cited in most noise criteria. A difference of more than 3 dBA is a perceptible change in environmental noise, while a 5 dBA difference typically causes a change in community reaction.

Community noise levels are closely related to the intensity of human activity and land use. Typical noise levels are provided in **Table 3.10-1**. Noise levels are generally considered low when ambient levels are below 45 dBA, moderate in the 45 to 60 dBA range, and high above 60 dBA. In wilderness areas, noise levels can be below 35 dBA. In small towns or wooded and lightly used residential areas, noise levels are more likely to be around 50 or 60 dBA. Levels around 75 dBA are more common in busy urban areas (e.g., downtown Los Angeles), and levels up to 85 dBA occur near major freeways and airports. Although people often accept the higher levels associated with very noisy urban residential and residential-commercial zones, these noise levels nevertheless are considered to be adverse to public health.

TABLE 3.10-1
NOISE LEVEL COMPARISON

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
Jet fly-over at 1,000 feet	110	Rock band
Gas lawn mower at 3 feet	100	
	90	Food blender at 3 feet
Diesel truck at 50 feet at 50 mph	80	Garbage disposal at 3 feet
Noisy urban area, daytime Gas lawn mower at 100 feet	70	Vacuum cleaner at 10 feet
Commercial area Heavy traffic at 300 feet	60	Normal speech at 3 feet
Quiet urban daytime	50	Large business office Dishwasher in next room
Quiet urban nighttime	40	Theater Large conference room (background)
Quiet suburban nighttime	30	Library
Quiet rural nighttime	20	Bedroom at night

Source: Caltrans, n.d.

Excessive noise is undesirable and may also cause physical and/or psychological damage. The amount of annoyance or damage caused by noise is dependent primarily on the amount and nature of the noise, the amount of ambient noise present before the intruding noise, and the activity of the person working or living in the area. Environmental and community noise levels rarely are of sufficient intensity to cause irreversible hearing damage, but disruptive environmental noise can interfere with speech and other communication and be a major source of annoyance by disturbing sleep, rest, and relaxation.

Noise levels from a particular source decline as distance to the receptor increases. Other factors, such as the weather and reflecting or shielding, also help intensify or reduce the noise level at any given location. A commonly used rule of thumb for roadway noise is that for every doubling of distance from the source, the noise level is reduced by about 3 dBA at acoustically "hard" locations (i.e., the area between the noise source and the receptor is nearly completely asphalt, concrete, hard-packed soil, or other solid materials) and 4.5 dBA at acoustically "soft" locations (i.e., the area between the source and receptor is normal earth or has vegetation, including grass).

Noise from stationary or point sources is reduced by about 6 to 7.5 dBA for every doubling of distance at acoustically hard and soft locations, respectively. Noise levels may also be reduced by intervening structures; generally, a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm reduces noise levels by 5 to 10 dBA. The manner in which older homes in California were constructed generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows. The exterior-to-interior reduction of newer residential units is generally 30 dBA or more.

GENERAL INFORMATION ON VIBRATION

Vibration is an oscillatory motion through a solid medium, in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. Typically, groundborne vibration generated by heavy equipment or traffic on rough roads attenuates rapidly with distance from the source of the vibration so that potential impact areas are usually confined within short distances (i.e., 200 feet or less) from the source (FTA 2006).

CARRIZO PLANNING AREA

The Carrizo Planning Area is located in the southeastern portion of the county and is largely rural and open space devoted almost exclusively to the agricultural uses of dry farming and rangeland. The planning area also encompasses the Carrizo Plain National Monument. The Carrizo Plain is crossed by State Route (SR) 58, which introduces some noise into the region. The quietest areas in San Luis Obispo County are those that are removed from major transportation-related noise corridors, urbanized areas with commercial and industrial development, and local industrial or other stationary noise sources. The Carrizo Plain is one of these representative quiet areas (SLO County 1992).

Most of the population in the Carrizo Planning Area is located in its one village area, California Valley, with a population of 356. Because noise levels are closely related to land use, California Valley and SR 58 would be expected to have the loudest ambient noise levels in the Carrizo Planning Area. As part of the Carrizo Energy Solar Farm, California Valley Solar Ranch, and Topaz Solar Farm, ambient noise measurements were taken near California Valley. The ambient noise

levels for California Valley range from between 30 to 66 dBA L_{eq} in the daytime to 24 to 50 dBA L_{eq} during nighttime hours (SLO County 2011).[1]

Sensitive Receptors

Noise-sensitive receptors are those areas of human habitation or substantial use where the intrusion of noise or vibration has the potential to adversely impact the occupancy, use, or enjoyment of the environment. The County identified residential development, schools, health care services, nursing and personal care, churches, public assembly areas, libraries and museums, hotels and motels, outdoor sports and recreation areas, and offices as noise-sensitive uses. In addition to human receptors, sensitive receptors also include wildlife.

California Valley residences, Carrisa Plains Elementary School, and other rural residences are the sensitive receptors in the Carrizo Planning Area.

NORTH COUNTY PLANNING AREA

The North County Planning Area includes most of the northern half of San Luis Obispo County. Approximately 95 percent of the North County area has land use designations of Agriculture, Rural Lands, and Open Space. These areas would be representative of quiet areas and would expect to have similar ambient noise levels as those in California Valley. Most of the planning area outside of the Highway 101 zone of influence, SR 46 zone of influence, and incorporated cities would be in this category.

The North County Planning Area is traversed east to west by SR 46 and SR 58 and is traversed north to south by Highway 101, a major source of noise in this planning area. The greatest transportation-related noise exposure would be along Highway 101, in particular in the Paso Robles and Atascadero areas. Generalized noise contours have been included in the County Noise Element, and a distance of between 800 to 1,200 feet generally characterizes the 60 dBA contour for Highway 101. The 60 dBA contours for State Routes 46 and 58 are much closer to the pavement because of the lower traffic volumes on those routes (SLO County 2012).

The Union Pacific Railroad traverses this planning area in a north–south direction. On average, four freight trains and two passenger trains pass through the county every day (SLO County 2012). There are a variety of railroad operating conditions in the county, including grade crossings, curves, grades, and congested areas in cities or unincorporated communities. Noise levels associated with the railroad in the county vary widely.

Paso Robles Municipal Airport is located north of SR 46 in this planning area and would increase the ambient noise levels surrounding it.

The primary stationary sources of noise include industrial, commercial, and agriculture operations. Examples include the Union Asphalt Batch Plant on Ramada Drive in Templeton, the Navajo Concrete Batch Plant on Ramada Drive, the Dirtman Sand and Gravel Plant on Templeton Road, all of which are in Templeton, and the Southern Pacific Milling Company Sand and Gravel Plant in Santa Margarita.

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[1] For simplicity, sound levels are usually best represented by an equivalent level over a given time period (L_{eq}). The L_{eq}, or equivalent sound level, is a single value for any desired duration, which includes all of the time-varying sound energy in the measurement period, usually one hour.

Agriculture operations also present stationary noise sources. Large agriculture operations are clustered around SR 46, east of Highway 101. Stationary agriculture noise sources include processing facilities; agriculture farm vehicles including tractors, trucks, mowers, and all-terrain vehicles; field operations including harvesting, mowing, and spraying; wind machines (temperature-regulating equipment); well water pumps; and pest-repellent devices.

Sensitive Receptors

Much of the development in the North County Planning Area is oriented to commuter and retirement living, service businesses, and tourism in the area around Paso Robles and Atascadero. While incorporated cities, including Paso Robles and Atascadero, would not be part of the RESP, residences near the city boundaries would be considered sensitive receptors if they were in the area affected by noise. Rural residential areas and the unincorporated communities of San Miguel, Santa Margarita, Shandon, Templeton, Creston, Garden Farms, and Heritage Village would be sensitive receptors in this planning area.

SAN LUIS OBISPO PLANNING AREA

The San Luis Obispo Planning Area is located in the central western portion of the county, inland from the Coastal Zone. It includes a compact urban center around the San Luis Obispo surrounded by open agricultural lands. Primary sources of noise include Highway 101, Highway 1, SR 227, and Los Osos Valley Road. The ambient noise along Highway 101 would be as described for the North County Planning Area.

Other larger sources of noise include Camp San Luis Obispo Airfield and San Luis Obispo County Regional Airport.

Examples of primary stationary noise sources include the Southern Pacific Milling Company Concrete Plant and Air-Vol Block, both on Suburban Road in San Luis Obispo.

Agriculture operations, in particular along Los Osos Road, would include some stationary noise sources as well, similar to those described for the North County Planning Area.

Sensitive Receptors

The primary developed area in the San Luis Obispo Planning Area is the city of San Luis Obispo, which is outside the RESP. Residences on the city boundaries may be subject to noise resulting from the Program. The unincorporated communities of Avila Beach and Los Ranchos/Edna Village and rural residences would be considered sensitive receptors in this area. Recreational areas such as the Montana de Oro State Park would also be sensitive receptors.

SOUTH COUNTY PLANNING AREA

The South County Planning Area generally consists of the land south and east of San Luis Obispo to the Santa Barbara County line, between the Coastal Zone and the Carrizo Plain. Land uses in this large area are diverse, ranging from urban and suburban development in the incorporated cities and older town sites, to rural residential and agricultural uses in the foothill and Nipomo Mesa areas, to the scenic and natural characteristics of the coastal ridges and Los Padres National Forest. The coastal ridges and the National Forest would have low ambient noise levels.

Areas surrounding Highway 101, Highway 1, and near the urban centers have higher ambient noise levels as described for the North County Planning Area. The Cold Canyon Landfill also introduces additional noise into the region.

Sensitive Receptors

Sensitive receptors in the South County Planning Area are the residences in Arroyo Grande, an incorporated city that is not part of the RESP. The unincorporated communities of Nipomo, Oceano, Black Lake, Callender/Garrett, and Los Berros along with other rural communities such as Huasna would be sensitive receptors in the planning area.

3.10.2 REGULATORY SETTING

STATE

Government Code

Government Code Section 65302(f) requires that a noise element be included as part of all city and county general plans. A summary of the required contents of a noise element is presented below.

1) A noise element shall identify and appraise noise problems in the community. The noise element shall recognize the guidelines established by the Office of Noise Control in the California Department of Health Services and shall analyze and quantify, to the extent practicable, as determined by the legislative body, current and projected noise levels for all of the following sources:

    - Highways and freeways.
    - Primary arterials and major local streets.
    - Passenger and freight railroad operations and ground rapid transit systems.
    - Commercial, general aviation, heliport, helistop, and military airport operations, aircraft over-flights, jet engine test stands, and all other ground facilities and maintenance functions related to airport operation.
    - Local industrial plants, including, but not limited to, railroad classification yards.
    - Other ground stationary sources identified by local agencies as contributing to the community noise environment.

Noise contours are to be shown for the above noise sources based on noise monitoring and accepted noise modeling techniques. The noise contours are used as a guide for designating land uses within the land use element that minimizes the exposure of community residents to excessive noise.

California Building Code

Title 24 of the California Code of Regulations contains standards for allowable interior noise levels associated with exterior noise sources (California Building Code, 1998 edition, Volume 1, Appendix Chapter 12, Section 1208A). The standards apply to new hotels, motels, dormitories, apartment houses, and dwellings other than detached single-family residences. The standards state that the interior noise level attributable to exterior sources cannot exceed 45 dBA in any

habitable room. Proposed residential structures to be located where the annual L_{dn} or CNEL exceeds 60 dBA require an acoustical analysis showing that the proposed building design would achieve the prescribed allowable interior noise standard. The noise metric (measurement period, such as hourly or daily) is either the day-night average sound level (L_{dn}) or the community noise equivalent level (CNEL), consistent with the noise element of the local general plan. Worst-case noise levels, either existing or future, are used as the basis for determining compliance with these standards (Caltrans 2002a).

LOCAL

San Luis Obispo County General Plan – Noise Element

The General Plan Noise Element identifies the major sources of noise in the county (roads, railways, airports, and stationary sources) and describes the policies and programs to reduce noise impacts. The Noise Element identifies the most significant policies as those "that limit noise exposure within noise-sensitive land uses, and performance standards for new commercial and industrial uses that might adversely impact noise-sensitive land uses." The element also describes the process for identifying when noise mitigation is required, suggests standard mitigation practices, and contains the requirements for an acoustical analysis.

San Luis Obispo County Noise Standards

The Land Use Ordinance (LUO) contains standards and requirements for reducing noise impacts on sensitive uses. These standards include the maximum allowable interior and exterior noise levels, protocols for measuring noise levels, and requirements for submitting noise studies as part of a permit application. Sections containing specific items related to noise are discussed below. Noise may also be addressed in other LUO sections not described in greater detail below; these sections are included in **Table 3.10-2.**

LUO – Permit Procedures

The Permit Application Filing and Processing chapter of the LUO (Title 22, Chapter 22.60) identifies when projects must submit a noise study. Projects are required to include a noise study as part of the application for a Site Plan Review, Minor Use Permit, or Conditional Use Permit when specified in the standards of the Noise Element (see the General Plan – Noise Element section), or if the project is adjacent to a potential noise generating use, as described in Title 22, Section 22.60.040.D.

LUO – Noise Standards

The LUO establishes acceptable exterior and interior noise levels at different times of the day in the Noise Standards section (Title 22, Section 22.10.120). Sections 22.10.120.B and 22.10.120.C of the San Luis Obispo County Noise Ordinance establish standards for acceptable exterior and interior noise levels (SLO County 2014). Section 22.10.170.A addresses earthborne vibrations. These standards are intended to protect persons from excessive noise levels, which are detrimental to the public health, welfare, and safety and contrary to the public interest because they can interfere with sleep, communication, relaxation, and the full enjoyment of one's property; contribute to hearing impairment and a wide range of adverse physiological stress conditions; and adversely affect the value of real property. It is the intent of this ordinance to protect persons from excessive levels of noise within or near residential and other specified noise-sensitive land uses.

Section 22.10.120.B – Exterior Noise Level Standards

	Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)[1]
Hourly L_{eq}	50 dBA	45 dBA
Maximum Level	70 dBA	65 dBA

Notes:
1. Applies only to uses that operate or are occupied during nighttime hours.

- *In the event the measured ambient noise level exceeds the applicable exterior noise level standard in subsection (a), the applicable standard shall be adjusted so as to equal the ambient noise level plus one dB.*
- *Each of the exterior noise level standards specified in subsection (a) shall be reduced by five dB for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises.*
- *If the intruding noise source is continuous and cannot reasonably be discontinued or stopped for a time period whereby the ambient noise level can be measured, the noise level measured while the source is in operation shall be compared directly to the exterior noise level standards.*

Section 22.10.120.C – Interior Residential Noise Level Standards

	Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
Hourly L_{eq}	40 dBA	35 dBA
Maximum Level	60 dBA	55 dBA

Notes:

- *In the event the measured ambient noise level exceeds the applicable exterior noise level standard in subsection (a), the applicable standard shall be adjusted so as to equal the ambient noise level plus one dB.*
- *Each of the exterior noise level standards specified in subsection (a) shall be reduced by five dB for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises.*
- *If the intruding noise source is continuous and cannot reasonably be discontinued or stopped for a time period whereby the ambient noise level can be measured, the noise level measured while the source is in operation shall be compared directly to the exterior noise level standards.*

Section 22.10.170.A – Vibration

Any land use conducted in or within one-half mile of an urban or village reserve line shall be operated so as to not produce detrimental earthborne vibrations perceptible at or beyond the boundary of the industrial land use producing the vibration source. Exceptions to this standard include vibrations from construction, the demolition of structures, surface mining activities or geologic exploration between 7:00 a.m. and 9:00 p.m., and vibrations from moving sources such as trucks and railroads.

The Noise Standards section (Title 22, Section 22.10.120) also contains activities which are exempt from noise standards, noise standards for various specialized pieces of equipment (including electrical substations), and a description of the proper means for measuring noise levels in evaluating compliance with the standards. Section 22.10.120.A identifies uses that are exempt from the noise standards identified in Sections B and C.

Section 22.10.120.A – Exceptions to Noise Standards

The standards presented above in Sections 22.10.120.B and 22.10.120.C are not applicable to noise generated from the following sources:

- Noise sources associated with construction, provided such activities do not take place before 7:00 a.m. or after 9:00 p.m. any day except Saturday or Sunday, or before 8:00 a.m. or after 5:00 p.m. on Saturday or Sunday.
- Noise sources associated with work performed by private or public utilities in the maintenance or modification of its facilities.

San Luis Obispo County General Plan – Conservation and Open Space Element

The Conservation and Open Space Element (COSE) addresses noise issues in association with energy production. Policies in the COSE support the use of technologies that minimize the amount of noise generated by large-scale (10 megawatt (MW) or larger) solar projects.

Summary of Local Regulations and Policies

Table 3.10-2 summarizes regulations and policies from the documents described above, including applicable noise levels, protocols for measuring noise levels, and details on when to include noise studies in permit applications. The table also identifies where policies or standards only apply to subareas or land use designations.

TABLE 3.10-2
LOCAL POLICIES AND REGULATIONS FOR NOISE

Applicable Code Section	Summary
Countywide	
Noise Element, Implementation Measure 4.4	Discretionary projects that may expose existing uses to noise levels in excess of identified standards shall submit an acoustical analysis with the project application and incorporate appropriate noise mitigation measures.
Noise Element, Implementation Measure 4.5	Noise standards and required mitigation measures may be waived if compliance with said standards and measures is not feasible, provided that noise levels are mitigated to the maximum extent feasible, at the discretion of the reviewing officer.
Noise Element, Policy 3.3.5	Noise from new stationary sources that will expose an existing noise-sensitive use to noise levels which exceed identified standards shall reduce noise levels to or below said standards.
Conservation and Open Space Element, Implementation Strategy E 6.2.1	Design large-scale commercial solar projects to minimize the effects of the project, including noise generation.
Title 22, Section 22.10.120.A	Identifies noise sources exempt from the standards provided in Title 22, Section 22.10.120.B through D.
Title 22, Section 22.10.120.B	Exterior noise levels at any noise-sensitive land uses shall not exceed the identified levels at the specified times.
Title 22, Section 22.10.120.C	Interior noise levels within any noise-sensitive land uses shall not exceed the identified levels at the specified times.
Title 22, Section 22.10.120.D.3	Specified electrical substations may not generate noise levels in excess of 50 dB from 10 p.m. to 7 a.m., or in excess of 55 dB from 7 a.m. to 10 p.m., as measured at the property line of the receiving land use.
Title 22, Section 22.30.360.D.2	Applications for electric power transmission lines shall include estimates of noise generated during various operating and weather conditions.

Applicable Code Section	Summary
Title 22, Section 22.60.040.D.6	Applications for a Site Plan Review, Minor Use Permit, or Conditional Use Permit must submit a noise study if required under the Noise Element or if the project is adjacent to a potential noise generator.
Carrizo Planning Area	
No additional policies or code specific to the Carrizo Planning Area.	
North County Planning Area	
No additional policies or code specific to the North County Planning Area.	
San Luis Obispo Planning Area	
No additional policies or code specific to the San Luis Obispo Planning Area.	
South County Planning Area	
No additional policies or code specific to the South County Planning Area.	

3.10.3 IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

Appendix G (Environmental Checklist Form) of the CEQA Guidelines and the County's environmental checklist indicate that significant noise impacts occur when the project:

1) Exposes people to noise levels in excess of standards established in local noise ordinances or general plan noise elements.

2) Causes a substantial permanent or temporary increase in noise above levels existing without the project.

3) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.

4) If located within the Airport Review designation or adjacent to a private airstrip, expose people residing or working in the project area to severe noise levels.

The threshold of significance for noise-related impacts is the exceedance of a standard as established in the County's Noise Element by any proposed development project. Noise impacts of any development project are considered significant if noise resulting from construction or operation occurs beyond the specified level and/or time frame set by the County of San Luis Obispo. Where the established standard is already exceeded, a significant increase in a noise level is taken as 1 decibel.

The Noise Element establishes standards for stationary noise sources , which is that generated by industrial facilities, including future renewable energy facilities proposed by the project. The applicable County standards for evaluating noise impacts generated from stationary noise sources are 50 dBA L_{eq} in the daytime and 45 dBA L_{eq} during nighttime hours, as determined at the property line of the receiving land use (see **Table 3.10-3**).

TABLE 3.10-3
COUNTY OF SAN LUIS OBISPO STATIONARY NOISE STANDARDS

Level	Daytime (7 am–10 pm)	Nighttime (10 pm–7 am)
Hourly average level (L_{eq}) dB	50	45
Maximum level (Max) dB	70	65
Maximum level, dB-Impulsive Noise	65	60

Source: SLO County 1992

The Noise Element also establishes noise standards to address noise created by new transportation noise sources as shown in **Table 3.10-4**. Development that generates transportation noise is required to be mitigated so as not to exceed the noise levels specified in **Table 3.10-4** within the outdoor activities areas and interior spaces of existing noise-sensitive land uses.

TABLE 3.10-4
MAXIMUM ALLOWABLE NOISE EXPOSURE – TRANSPORTATION NOISE SOURCES

Land Use	Outdoor Activity Areas[1] L_{dn}/CNEL, dB	Interior Spaces	
		L_{dn}/CNEL, dB	L_{EQ}, dB[2]
Residential (Except Temporary)	60 [3]	45	–
Bed and Breakfast, Hotels, Motels	60 [3]	45	–
Hospitals, Nursing and Personal Care	60 [3]	45	–
Public Assembly and Entertainment	–	–	35
Offices	60 [3]	–	45
Churches, Meeting Halls	–	–	45
Schools, Libraries, Museums	–	–	45
Outdoor Sports and Recreation	70	–	–

Source: SLO County 1992

Notes:

[1] *Where the location of outdoor activity areas is unknown, the exterior noise level standard shall be applied to the property line of the receiving land use.*

[2] *As determined for a typical worst-case hour during periods of use.*

[3] *For other than residential uses, where an outdoor activity area is not proposed, the standard shall not apply. Where it is not possible to reduce noise in outdoor activity areas to 60 dB L_{dn}/CNEL or less using a practical application of the best-available noise reduction measures, an exterior noise level of up to 65 dB L_{dn}/CNEL may be allowed.*

PROJECT IMPACTS AND MITIGATION MEASURES

Expose People to Noise Levels That Exceed the County Noise Ordinance Thresholds or General Plan Noise Elements (Threshold 1)

Short-Term Construction Noise

The operation of heavy equipment during the construction of infrastructure associated with future renewable energy facilities under the proposed project would result in temporary increases in noise in the immediate vicinity of individual construction sites. During construction,

noise from activities may intermittently dominate the noise environment in the immediate area of construction. Construction is performed in discrete steps, each of which has its own mix of equipment and consequently its own noise characteristics.

Typical construction noise levels vary up to a maximum of 95 dBA at 50 feet from the construction site during the noisiest construction phases. Site preparation activities for ground-mounted facilities, which include excavation and grading, tend to generate the highest noise levels because the noisiest construction equipment is earth-moving equipment. Earth-moving equipment includes excavating machinery such as backhoes, bulldozers, draglines, front loaders, and earth-moving and compacting equipment, which includes compactors, scrapers, and graders. Typical operating cycles for these types of construction equipment may involve 1 or 2 minutes of full power operation followed by 3 to 4 minutes at lower power settings. **Table 3.10-5** summarizes noise levels produced by construction equipment that is commonly used during construction projects.

TABLE 3.10-5
TYPICAL CONSTRUCTION NOISE LEVELS

Equipment	Noise Levels at 50 Feet
Front-End Loader	85 dBA
Bulldozer	85 dBA
Backhoe	80 dBA
Water Truck (or other heavy truck)	88 dBA
Generator	81 dBA
Concrete Mixer	85 dBA
Tamper/Roller	75 dBA
Crane, Mobile	83 dBA
Paver	87 dBA
Jackhammer	85 dBA
Grader/Excavator/ Scraper	85 dBA
Paver	85 dBA
Pile Driver (Impact/Vibratory)	95 dBA

Sources: FTA 2006; FHWA 2006a; EPA 1971

As shown in **Table 3.10-5**, maximum intermittent noise levels associated with construction equipment typically range from approximately 75 to 87 dBA L_{max} at 50 feet (L_{max} is the maximum A-weighted noise level recorded for a single noise). Pile driving, which is not often employed, exceeds the typical construction noise range, producing noise levels of approximately 95 dBA L_{max} at 50 feet.

Noise levels from point sources, such as construction sites, typically attenuate at a rate of about 6 dBA per doubling of distance (EPA 1971). Based on this attenuation rate and assuming a maximum noise level of approximately 95 dBA L_{eq} at 50 feet, average construction noise levels would be reduced to approximately 65 dBA L_{eq} at approximately 1,600 feet from a construction site. Predicted noise levels would vary depending on multiple factors, such as the number and

type of equipment used, equipment usage rates, area of activity, and shielding provided by intervening terrain and structures. Delivery vehicles, construction employee vehicle trips, and haul truck trips may also contribute to overall construction noise levels.

Although construction-generated noise levels would be short term, significant increases in ambient noise levels at nearby noise-sensitive land uses could potentially occur. For noise-sensitive land uses, such as residential dwellings, activities occurring during the more noise-sensitive evening and nighttime hours are of particular concern. Construction activities occurring during these more noise-sensitive hours may result in increased levels of annoyance and potential sleep disruption to occupants of nearby residential dwellings.

Long-Term Operational Noise

Future renewable energy facilities allowed under the proposed project could expose sensitive receptors to project-related noise, such as noise from electrical equipment located on-site, corona discharge noise from gen-tie lines, noise from horizontal trackers, and noise from vehicles, including vehicle maintenance. These noise levels could exceed County thresholds, depending on the location of future energy facilities, noise sources surrounding the project site, existing noise shielding, and other factors.

Impact 3-10-1 – Solar Construction and operations of proposed solar energy facilities could exceed maximum allowable noise levels established by the County. This impact is considered **less than significant (Class III)**.

Short-Term Construction Noise

Construction noise levels would be similar for both solar and wind installations, as well as for the construction of inverters and transformers, additional electrical equipment, interconnection or generation tie (gen-tie) lines, telecommunications equipment, switchgear buildings or structures, and security fencing. Construction noise typically occurs intermittently and varies depending on the nature or phase of construction (e.g., demolition and land clearing, grading and excavation, photovoltaic (PV) system installation, or wind turbine erection). Construction noise in any one particular area would be temporary and short term but would generate noise that could reach high levels for brief periods.

As previously demonstrated, the maximum intermittent noise levels associated with construction equipment typically range from approximately 75 to 87 dBA L_{max} at 50 feet, though pile driving, which is not often employed, exceeds the typical construction noise range, producing noise levels of approximately 95 dBA L_{max} at 50 feet. Potential noise impacts to sensitive receptors would vary depending on multiple factors, including the distance between construction activities and sensitive receptors. Nevertheless, such noise levels could exceed the maximum noise levels allowed under the San Luis Obispo County Noise Ordinance. However, noise sources associated with construction are exempt from the requirements of the County Noise Ordinance, provided such activities take place after 7:00 a.m. and before 9:00 p.m. on weekdays, or after 8:00 a.m. and before 5:00 p.m. on Saturdays or Sundays per County Code Section 22.10.120.A.

It is assumed that the majority of future construction activity would occur within these times. Any construction associated with future renewable energy facilities that would occur outside of these times would not be exempt from the requirements of the County Noise Ordinance and would therefore be required to demonstrate compliance. Compliance with the Noise Ordinance would be ensured by a site-specific noise analysis since this is the only way to

quantify noise levels and identify any necessary noise reduction mitigation. Since the County Code exempts construction activities from County noise requirements during times when most construction activity occurs, and any construction occurring outside of these times would need to demonstrate compliance with County noise requirements, construction-generated noise impacts would be less than significant.

Long-Term Operational Noise

Typical noise sources associated with solar facility operations and maintenance may include power inverters, tracking motors on individual panels, corona discharge noise from gen tie-lines, and maintenance vehicles and activities (such as panel cleaning and repairs). For Tier 1 through Tier 3 solar electric facility (SEF) projects, it is likely that up to 3 personnel would be required to service and maintain each facility.

Based on a review of noise assessments prepared for solar development projects in Southern California, a typical power inverter generates 66 dBA L_{eq} measured at a distance of 50 feet without an enclosure. Tracking motors that tilt an array of panels (if applicable) typically generate 38 dBA L_{eq} at 50 feet. Based on these levels, the only permanent source of noise of concern from Tier 1 through 3 SEFs is that generated from power inverter and other switchgear infrastructure. Such noise would attenuate approximately 6 dB per doubling of distance and could exceed the allowable hourly L_{eq} exterior noise standards if sited in proximity to residences. (The maximum allowable noise levels generated from stationary noise sources are 50 dBA L_{eq} in the daytime and 45 dBA L_{eq} during nighttime hours, as determined at the property line of the receiving land use.) However, County Noise Element Policy 3.3.5 states that noise from new stationary sources that will expose an existing noise-sensitive use to noise levels which exceed identified standards have to reduce noise levels to or below said standards.

Therefore, solar facilities in proximity to sensitive receptors would be required to reduce the noise levels emitted from all inverters and other on-site switchgear sources. This would most likely be achieved by enclosing inverters and other on-site switchgear sources and/or siting them at such a distance from noise-sensitive land uses as to ensure compliance with the established noise standards. Compliance with Noise Element Policy 3.3.5 would be ensured in the cases that sensitive receptors are present by a site-specific noise analysis since this is the only way to quantify noise levels and identify appropriate noise reduction measures if necessary. Noise Element Implementation Measure 4.6 states that if the County Planning Director determines that a noise-sensitive land use may be exposed to noise levels exceeding County standards, notwithstanding the noise contour information in the Noise Element, an acoustical analysis meeting established County requirements would be required.

Corona noise from interconnection lines would be nominal at the lower voltages (12 kilovolt (kV), 69 kV, etc.) required for solar installations of less than 20 MW. Corona noise from transmission lines at these voltages would be less than 40 dBA. Therefore, operational noise from any necessary interconnections would not exceed the allowable noise levels in the county.

For Tier 1 through Tier 3 SEF projects, it is likely that up to 3 personnel would be required to service and maintain each facility. Panel washing requirements and frequency would depend on technologies and site conditions, but typically would occur two to four times a year. Maintenance, panel washing, and cleaning of installations would be expected to generate peak noise levels of approximately 76 dBA L_{eq} at 50 feet (FHWA 2006b). While such noise levels could exceed the maximum noise levels allowed under the San Luis Obispo County Noise Ordinance, noise generated from maintenance activity, scheduled to occur as infrequently as

two to four times of year, would be associated with noise generated during construction activity due to the type of equipment involved and its temporary nature.

As previously stated, it is expected that such activity will occur within the hours of 7:00 a.m. to 9:00 p.m. on weekdays and 8:00 a.m. to 5:00 p.m. on Saturdays or Sundays, and County Code Section 22.10.120.A exempts this source of noise from County noise standards during these times. Any such activity that would occur outside of these times would not be exempt from the requirements of the County Noise Ordinance and would therefore be required to demonstrate compliance. Compliance with the Noise Ordinance would need to be ensured by a site-specific noise analysis since this is the only way to quantify noise levels and identity any necessary noise reduction mitigation.

For these reasons, this impact is considered to be **less than significant (Class III)**.

Impact 3-10-1 – Wind Construction and operations of proposed wind energy facilities could exceed maximum allowable noise levels established by the County. This impact is considered **less than significant (Class III)**.

Short-Term Construction Noise

As previously stated, construction noise levels would be similar for both solar and wind installations. While construction noise levels could exceed the maximum noise levels allowed under the San Luis Obispo County Noise Ordinance, noise sources associated with construction are exempt from the requirements of the County Noise Ordinance, provided such activities take place after 7:00 a.m. and before 9:00 p.m. on weekdays, or after 8:00 a.m. and before 5:00 p.m. on Saturdays or Sundays per Section 22.10.120.A of the County Code. As previously stated, all construction associated with future renewable energy facilities under the proposed project is expected to occur between these times.

Any such activity that would occur outside of these times would not be exempt from the requirements of the County Noise Ordinance and would therefore be required to demonstrate compliance. Compliance with the Noise Ordinance would need to be ensured by a site-specific noise analysis since this is the only way to identify noise levels and the appropriate noise reduction mitigation if necessary. Construction-generated noise impacts would be less than significant.

Long-Term Operational Noise

Wind energy conversion systems (WECS) generate two primary types of noise: aerodynamic noise from the turbine blades passing through the air and mechanical noise from the gears and other components of the generator. Along with the wind turbine noise, typical noise sources associated with wind facilities operations and maintenance include inverter and switchgear noise. Depending on the turbine model and the wind speed, aerodynamic noise can generate a whooshing or pulsing effect. Most noise radiates perpendicular to the blades' rotation. However, since turbines rotate to face the wind, they may radiate noise in different directions each day. Whether the turbine noise is intrusive depends not only on its distribution of amplitude and frequency but also on the ambient noise levels at the affected receptor (the maximum allowable noise levels generated from stationary noise sources are 50 dBA L_{eq} in the daytime and 45 dBA L_{eq} during nighttime hours, as determined at the property line of the receiving land use), which includes meteorological conditions (primarily wind noise).

The RESP only streamlines Tier 1 WECS projects in areas of the county zoned Agriculture (AG), Rural Lands (RL), Residential, Rural (RR), Commercial, Service (CS), Industrial (IND), Open Space (OS), or Public Facilities (PF). Operational noise from small turbines mounted on the roof of a conforming use would not generate any operational noise beyond the maximum allowed at the property line of receiving sensitive land uses. Domestic roof-mounted wind turbines are estimated to generate between 35 dB and 40 dB at the source (SEAI 2014; MWEA 2014). All on-site inverter and switchgear infrastructure from streamlined Tier 1 wind energy projects would be required to be enclosed or sited to ensure compliance with County Noise Element Policy 3.3.5, which states that noise from new stationary sources that will expose an existing noise-sensitive use to noise levels which exceed identified standards has to reduce noise levels to or below said standards. Therefore, WECS facilities streamlined under the RESP would not expose people to noise levels that exceed the County Noise Ordinance thresholds or Noise Element. This impact is considered to be **less than significant (Class III).**

Impact 3-10-1 – Policy Changes Implementation of the proposed RESP could result in changes to countywide policies that could expose people to noise levels that exceed the County Noise Ordinance thresholds or General Plan measures and policies. This impact is considered **less than significant (Class III)**.

Implementation of the proposed policy changes to the General Plan would enable streamlined reviews and approvals of SEF and WECS facility projects to be achieved either through the building permit process, zoning clearance process, or site plan review process. As described above, since most construction activities would be exempted from noise standards and solar and wind facilities in proximity to sensitive receptors would be required to reduce the noise levels as required by County Noise Element Policy 3.3.5, which states that noise from new stationary sources that will expose an existing noise-sensitive use to noise levels which exceed identified standards have to reduce noise levels to or below said standards, noise impacts would be **less than significant (Class III)**.

Generate Permanent Increases in the Ambient Noise Levels in the Project Vicinity (Threshold 2)

Future renewable energy facilities allowed under the proposed project could expose sensitive receptors to permanent noise increases, such as noise from electrical equipment located on-site, corona discharge noise from gen-tie lines, noise from horizontal trackers, and noise from vehicles, including vehicle maintenance.

Impact 3-10-2 – Solar Implementation of the proposed Program could generate permanent increases in the ambient noise levels in the project vicinity. This impact is considered **less than significant (Class III)**.

As discussed above under Threshold 1, based on a review of noise assessments prepared for solar development projects in Southern California, a typical power inverter generates 66 dBA L_{eq} measured at a distance of 50 feet without an enclosure. Tracking motors that tilt an array of panels (if applicable) typically generate 38 dBA L_{eq} at 50 feet. Based on these levels, the only permanent source of noise of concern from Tier 1 through 3 SEFs is that generated from power inverter and other switchgear infrastructure. Such noise would attenuate approximately 6 dB per doubling of distance and could exceed the allowable hourly L_{eq} exterior noise standards if sited in proximity to residences. (The maximum allowable noise levels generated from stationary noise sources are 50 dBA L_{eq} in the daytime and 45 dBA L_{eq} during nighttime hours, as determined at the property line of the receiving land use.)

However, County Noise Element Policy 3.3.5 states that noise from new stationary sources that will expose an existing noise-sensitive use to noise levels which exceed identified standards have to reduce noise levels to or below said standards. Therefore, solar facilities in proximity to sensitive receptors would be required to reduce the noise levels emitted from all inverters and other on-site switchgear sources. This would most likely be achieved by enclosing inverters and other on-site switchgear sources and/or siting them at such a distance from noise-sensitive land uses as to ensure compliance with the established noise standards. Compliance with Noise Element Policy 3.3.5 would be ensured in the cases that sensitive receptors are present by a site-specific noise analysis since this is the only way to quantify noise levels. Noise Element Implementation Measure 4.6 states that if the County Planning Director determines that a noise-sensitive land use may be exposed to noise levels that exceed County standards, notwithstanding the noise contour information in the Noise Element, an acoustical analysis meeting established County requirements would be required.

Corona noise from interconnection lines would be nominal at the lower voltages (12 kV, 69 kV, etc.) required for solar installations of less than 20 MW. Corona noise from transmission lines at these voltages would be less than 40 dBA. Therefore, operational noise from any necessary interconnections would not exceed the allowable noise levels in the county.

For Tier 1 through Tier 3 SEF projects, it is likely that up to 3 personnel would be required to service and maintain each facility. Panel washing requirements and frequency would depend on technologies and site conditions, but typically would occur two to four times a year. Maintenance, panel washing, and cleaning of installations would be expected to generate peak noise levels of approximately 76 dBA L_{eq} at 50 feet (FHWA 2006b). While such noise levels could exceed the maximum noise levels allowed under the San Luis Obispo County Noise Ordinance, noise generated from maintenance activity, scheduled to occur as infrequently as two to four times of year, would be associated with noise generated during construction activity due to the type of equipment involved and its temporary nature.

As previously stated, it is expected that such activity will occur within the hours of 7:00 a.m. to 9:00 p.m. on weekdays and 8:00 a.m. to 5:00 p.m. on Saturdays or Sundays, and County Code Section 22.10.120.A exempts this source of noise from County noise standards during these times. Any such activity that would occur outside of these times would not be exempt from the requirements of the County Noise Ordinance and would therefore be required to demonstrate compliance. Compliance with the Noise Ordinance would need to be ensured by a site-specific noise analysis since this is the only way to quantify noise levels and identity any necessary noise reduction mitigation.

This impact is **less than significant (Class III)**.

Impact 3-10-2 – Wind Implementation of the proposed Program could generate permanent increases in the ambient noise levels in the project vicinity. This impact is considered **less than significant (Class III)**.

As discussed above under Threshold 1, WECS generate two primary types of noise: aerodynamic noise from the turbine blades passing through the air and mechanical noise from the gears and other components of the generator. Along with the wind turbine noise, typical noise sources associated with wind facilities operations and maintenance include inverter and switchgear noise. Depending on the turbine model and the wind speed, aerodynamic noise can generate a whooshing or pulsing effect. Most noise radiates perpendicular to the blades' rotation. However, since turbines rotate to face the wind, they may radiate noise in different directions each day. Whether the turbine noise is intrusive depends not only on its distribution of amplitude

and frequency but also on the ambient noise levels at the affected receptor (the maximum allowable noise levels generated from stationary noise sources are 50 dBA L_{eq} in the daytime and 45 dBA L_{eq} during nighttime hours, as determined at the property line of the receiving land use), which includes meteorological conditions (primarily wind noise).

The RESP only streamlines Tier 1 WECS projects in areas of the county zoned AG, RL, RR, CS, IND, OS, or PF. Operational noise from small turbines mounted on the roof of a conforming use would not generate any operational noise beyond the maximum allowed at the property line of receiving sensitive land uses. Domestic roof-mounted wind turbines are estimated to generate between 35 dB and 40 dB at the source (SEAI 2014; MWEA 2014). All on-site inverter and switchgear infrastructure from streamlined Tier 1 wind energy projects would be required to be enclosed or sited to ensure compliance with County Noise Element Policy 3.3.5, which states that noise from new stationary sources that will expose an existing noise-sensitive use to noise levels which exceed identified standards has to reduce noise levels to or below said standards. Therefore, WECS facilities streamlined under the RESP would not expose people to noise levels that exceed the County Noise Ordinance thresholds or Noise Element. This impact is considered **less than significant (Class III).**

Impact 3-10-2 – Policy Changes Changes to countywide policies resulting from implementation of the proposed Program could result in permanent increases in the ambient noise levels in the project vicinity. This impact is considered **less than significant (Class III)**.

As described above, since construction activities would be exempted from noise standards and solar and wind facilities in proximity to sensitive receptors would be required to reduce the noise levels as required by County Noise Element Policy 3.3.5, which states that noise from new stationary sources that will expose an existing noise-sensitive use to noise levels which exceed identified standards have to reduce noise levels to or below said standards, noise impacts would be **less than significant (Class III)**.

Cause a Substantial Temporary Increase in Noise Levels (Threshold 2)

The operation of heavy equipment during the construction of infrastructure associated with future renewable energy facilities under the proposed project would result in temporary increases in noise in the immediate vicinity of individual construction sites. During construction, noise from activities may intermittently dominate the noise environment in the immediate area of construction. Construction is performed in discrete steps, each of which has its own mix of equipment and consequently its own noise characteristics. Typical construction noise levels vary up to a maximum of 95 dBA at 50 feet from the construction site during the noisiest construction phases. Site preparation activities for ground-mounted facilities, which include excavation and grading, tend to generate the highest noise levels because the noisiest construction equipment is earth-moving equipment. Earth-moving equipment includes excavating machinery such as backhoes, bulldozers, draglines, front loaders, and earth-moving and compacting equipment, which includes compactors, scrapers, and graders. Typical operating cycles for these types of construction equipment may involve 1 or 2 minutes of full power operation followed by 3 to 4 minutes at lower power settings.

Noise levels from point sources, such as construction sites, typically attenuate at a rate of about 6 dBA per doubling of distance (EPA 1971). Based on this attenuation rate and assuming a maximum noise level of approximately 95 dBA L_{eq} at 50 feet, average construction noise levels would be reduced to approximately 65 dBA L_{eq} at approximately 1,600 feet from a construction site. Predicted noise levels would vary depending on multiple factors, such as the number and

type of equipment used, equipment usage rates, area of activity, and shielding provided by intervening terrain and structures. Delivery vehicles, construction employee vehicle trips, and haul truck trips may also contribute to overall construction noise levels. Although construction-generated noise levels would be short term, significant increases in ambient noise levels at nearby noise-sensitive land uses could potentially occur. For noise-sensitive land uses, such as residential dwellings, activities occurring during the more noise-sensitive evening and nighttime hours are of particular concern. Construction activities occurring during these more noise-sensitive hours may result in increased levels of annoyance and potential sleep disruption to occupants of nearby residential dwellings.

Impact 3-10-3 – Solar Implementation of the proposed Program could cause a temporary or periodic increase in ambient noise in the project vicinity. This impact is considered **less than significant (Class III)**.

Tier 1 SEF construction activities would include drilling, hammering, installation, and other activities, but they would be confined to the built environment footprint or a nearby laydown area. Rooftop construction would likely take one to two weeks, although the construction time and size of the workforce is directly related to the size of the roof and system. Temporary maximum noise levels during these activities are expected to range between 74 dBA to 88 dBA at 50 feet (FHWA 2006b).

Larger Tier 2 and Tier 3 solar facilities would require relatively flat sites, which may necessitate substantial grading depending on the existing topography. Thus, grubbing, clearing, and site grading is assumed across the entirety of an area required for Tier 2 and Tier 3 SEFs. Heavy equipment may also be required to construct foundations, panel mounts, and other on-site electrical infrastructure. The use of heavy equipment and larger site grading activities would typically generate maximum noise levels between 74 dBA to 88 dBA at 50 feet or approximately 83 dBA at 50 feet from the center of the equipment activity (FHWA 2006b). Such noise levels could exceed the maximum noise levels allowed under the San Luis Obispo County Noise Ordinance.

However, noise sources associated with construction are exempt from the requirements of the County Noise Ordinance, provided such activities take place after 7:00 a.m. and before 9:00 p.m. on weekdays or after 8:00 a.m. and before 5:00 p.m. on Saturdays or Sundays per Section 22.10.120.A of the County Code. It is expected that construction activity would occur within these times. Any construction associated with future renewable energy facilities that would occur outside of these times would not be exempt from the requirements of the County Noise Ordinance and would therefore be required to demonstrate compliance. Compliance with the Noise Ordinance would be ensured by a site-specific noise analysis since this is the only way to quantify noise levels and identify any necessary noise reduction mitigation. Since the County Code exempts construction activities from County noise requirements during times when most construction activity occurs, and any construction occurring outside of these times would need to demonstrate compliance with County noise requirements, construction-generated noise impacts would be **less than significant (Class III)**.

Impact 3-10-3 – Wind Implementation of the proposed Program could cause a temporary or periodic increase in ambient noise in the project vicinity. This impact is considered **less than significant (Class III)**.

Based on the types of construction activities associated with Tier 1 WECS projects, peak noise levels are expected to be approximately 76 dBA L_{eq} at 50 feet (FHWA 2006b). Such noise levels could exceed the maximum noise levels allowed under the San Luis Obispo County Noise

Ordinance. However, noise sources associated with construction are exempt from the requirements of the County Noise Ordinance, provided such activities take place after 7:00 a.m. and before 9:00 p.m. on weekdays, or after 8:00 a.m. and before 5:00 p.m. on Saturdays or Sundays per Section 22.10.120.A of the County Code. It is expected that the majority of future construction activity would occur within these times. Any construction associated with future renewable energy facilities that would occur outside of these times would not be exempt from the requirements of the County Noise Ordinance and would therefore be required to demonstrate compliance.

Compliance with the Noise Ordinance would be ensured by a site-specific noise analysis since this is the only way to quantify noise levels and identify any necessary noise reduction mitigation. Since the County Code exempts construction activities from County noise requirements during times when most construction activity occurs, and any construction occurring outside of these times would need to demonstrate compliance with County noise requirements, construction-generated noise impacts would be **less than significant (Class III)**.

Impact 3-10-3 – Policy Changes Implementation of the proposed Program could result in changes to countywide policies that could cause a temporary or periodic increase in ambient noise in the project vicinity. This impact is considered **less than significant (Class III)**.

As discussed above for solar and wind facilities, noise sources associated with construction are exempt from the requirements of the County Noise Ordinance, provided such activities take place after 7:00 a.m. and before 9:00 p.m. on weekdays or after 8:00 a.m. and before 5:00 p.m. on Saturdays or Sundays per Section 22.10.120.A of the County Code. It is expected that construction activity would occur within these times. Any construction associated with future renewable energy facilities that would occur outside of these times would not be exempt from the requirements of the County Noise Ordinance and would therefore be required to demonstrate compliance.

Compliance with the Noise Ordinance would be ensured by a site-specific noise analysis since this is the only way to quantify noise levels and identify any necessary noise reduction mitigation. Since the County Code exempts construction activities from County noise requirements during times when most construction activity occurs, and any construction occurring outside of these times would need to demonstrate compliance with County noise requirements, construction-generated noise impacts would be **less than significant (Class III)**.

Exposure of Persons to or Generation of Excessive Groundborne Vibration or Groundborne Noise Levels (Threshold 3)

The effects of ground vibration can vary from no perceptible effects at the lowest levels, to low rumbling sounds and detectable vibrations at moderate levels, to slight damage to nearby structures at the highest levels. At the highest levels of vibration, damage to structures is primarily architectural (e.g., loosening and cracking of plaster or stucco coatings) and rarely results in structural damage. The effects of ground vibration are influenced by the duration of the vibration and the distance from the vibration source.

There are no federal, state, or local regulatory standards for vibration. However, various criteria have been established to assist in the evaluation of vibration impacts. For instance, the California Department of Transportation (Caltrans) has developed vibration criteria based on human perception and structural damage risks. For most structures, Caltrans considers a peak-particle velocity (ppv) threshold of 0.2 inches per second to be the level at which architectural

damage (i.e., minor cracking of plaster walls and ceilings) to normal structures may occur. Below 0.10 inches per second, there is virtually no risk of architectural damage to normal buildings. In terms of human annoyance, continuous vibrations in excess of 0.1 inches per second ppv are identified by Caltrans as the minimum level perceptible level for ground vibration. Short periods of ground vibration in excess of 0.2 inches per second ppv can be expected to result in increased levels of annoyance to people in buildings (Caltrans 2002b).

Impact 3-10-4 – Solar Construction activity associated with the proposed Program could create groundborne vibration in discrete locations throughout the county. This impact is **less than significant** (**Class III**).

Typically, groundborne vibrations generated by man-made activities attenuate rapidly with distance from the source of the vibration. Man-made vibration issues are therefore usually confined to short distances (i.e., 500 feet or less) from the source (FTA 2006). While on-site construction equipment use (primarily grading activities) and heavy truck trips may produce short-term groundborne vibration, such vibration would only be of concern at any existing sensitive receptor structures located within 500 feet of the source.

County Code Section 22.10.170.A states that any land use conducted in or within one-half mile of an urban or village reserve line needs to be operated so as to not produce detrimental earthborne vibrations perceptible at or beyond the boundary of the industrial land use producing the vibration source. Exceptions to this standard include vibrations from construction and the demolition of structures, between 7:00 a.m. and 9:00 p.m., and vibrations from moving sources such as trucks and railroads. Any construction associated with future renewable energy facilities that would occur outside of these times would not be exempt from the requirements of Section 22.10.170.A and would therefore be required to demonstrate compliance.

Compliance with the Section 22.10.170.A would be ensured by a site-specific noise analysis since this is the only way to quantify groundborne vibration levels and identify any necessary noise reduction mitigation. Since the County Code exempts construction activities from Section 22.10.170.A during times when most construction activity occurs, and any construction occurring outside of these times would need to demonstrate compliance with County requirements, potential groundborne vibration impacts would be **less than significant (Class III)**.

Impact 3-10-4 – Wind Construction activity associated with the proposed Program could create groundborne vibration in discrete locations throughout the county. This impact is **less than significant** (**Class III**).

As previously stated, County Code Section 22.10.170.A states that any land use conducted in or within one-half mile of an urban or village reserve line needs to be operated so as to not produce detrimental earthborne vibrations perceptible at or beyond the boundary of the industrial land use producing the vibration source. Exceptions to this standard include vibrations from construction and the demolition of structures, between 7:00 a.m. and 9:00 p.m., and vibrations from moving sources such as trucks and railroads. Any construction associated with future renewable energy facilities that would occur outside of these times would not be exempt from the requirements of Section 22.10.170.A and would therefore be required to demonstrate compliance.

Compliance with Section 22.10.170.A would be ensured by a site-specific noise analysis since this is the only way to quantify groundborne vibration levels and identify any necessary noise

reduction mitigation. Since the County Code exempts construction activities from Section 22.10.170.A during times when most construction activity occurs, and any construction occurring outside of these times would need to demonstrate compliance with County requirements, potential groundborne vibration impacts would be **less than significant (Class III)**.

Impact 3-10-4 – Policy Changes Implementation of the proposed Program could result in changes to countywide policies that could cause create groundborne vibration in discrete locations throughout the county. This impact is considered **less than significant (Class III)**.

As discussed above for solar and wind facilities, noise sources associated with construction are exempt from the requirements of the County Noise Ordinance, provided such activities take place after 7:00 a.m. and before 9:00 p.m. per Section 22.10.170.A of the County Code. It is expected that construction activity would occur within these times. Any construction associated with future renewable energy facilities that would occur outside of these times would not be exempt from the requirements of Section 22.10.170.A and would therefore be required to demonstrate compliance. Compliance with Section 22.10.170.A would be ensured by a site-specific noise analysis since this is the only way to quantify groundborne vibration levels and identify any necessary noise reduction mitigation.

Since the County Code exempts construction activities from Section 22.10.170.A during times when most construction activity occurs, and any construction occurring outside of these times would need to demonstrate compliance with County requirements, potential groundborne vibration impacts would be **less than significant (Class III)**.

If Located Within the Airport Review Designation or Adjacent to a Private Airstrip, Expose People Residing or Working in the Project Area to Severe Noise Levels (Threshold 4)

Paso Robles Municipal Airport is located north of State Route 46 in the North County Planning Area. Camp San Luis Obispo Airfield and San Luis Obispo County Regional Airport are located in the San Luis Obispo Planning Area.

Impact 3-10-5 – Solar Implementation of the proposed Program could result in structures located within the Airport Review designation or adjacent to a private airstrip, exposing people residing or working in the project area to severe noise levels. This impact is considered **less than significant (Class III)**.

No projects identified in the RESP involve airport improvements, and none of the projects would result in the development or relocation of sensitive land uses that would result in increased exposure to aircraft noise levels. In addition, the project does not propose any changes in air traffic patterns. In terms of workers, it is likely that up to 3 personnel would be required to service and maintain each facility for Tier 1 through Tier 3 SEF projects. Activities such as panel washing requirements and frequency would depend on technologies and site conditions, but typically would occur two to four times a year. Due to the infrequency of worker activity, workers would not be exposed to severe noise levels from aircraft. For these reasons, **less than significant (Class III)** impacts due to aircraft operations and related noise levels would occur.

Impact 3-10-5 – Wind Implementation of the proposed Program could result in structures located within the Airport Review designation or adjacent to a private airstrip, exposing people residing or working in the project area to severe noise levels. This impact is considered **less than significant (Class III)**.

No projects identified in the RESP involve airport improvements, and none of the projects would result in the development or relocation of sensitive land uses that would result in increased exposure to aircraft noise levels. In addition, the project does not propose any changes in air traffic patterns. For these reasons, **less than significant (Class III)** impacts due to aircraft operations and related noise levels would occur.

Impact 3-10-5 – Policy Changes Implementation of the proposed Program could result in structures located within the Airport Review designation or adjacent to a private airstrip, exposing people residing or working in the project area to severe noise levels. This impact is considered **less than significant (Class III)**.

No projects identified in the RESP involve airport improvements, and none of the projects would result in the development or relocation of sensitive land uses that would result in increased exposure to aircraft noise levels. In addition, the project does not propose any changes in air traffic patterns. For these reasons, **less than significant (Class III)** impacts due to aircraft operations and related noise levels would occur.

CUMULATIVE IMPACTS

Renewable energy projects streamlined by the RESP would primarily generate noise during construction. Potential cumulative noise impacts to sensitive receptors would vary depending on multiple factors, including the distance between construction activities and sensitive receptors, the size of the construction project, and the number of construction projects occurring in the same vicinity at the same time.

Noise sources associated with construction are exempt from the requirements of the County Noise Ordinance, provided such activities take place after 7:00 a.m. and before 9:00 p.m. on weekdays or after 8:00 a.m. and before 5:00 p.m. on Saturdays or Sundays per Section 22.10.120.A of the County Code. It is expected that future construction activity would occur within these times. Any construction associated with future renewable energy facilities that would occur outside of these times would not be exempt from the requirements of the County Noise Ordinance and would therefore be required to demonstrate compliance. Compliance with the Noise Ordinance would be ensured by a site-specific noise analysis since this is the only way to quantify cumulative noise levels and identify any necessary noise reduction mitigation.

As discussed above under Threshold 1, County Noise Element Policy 3.3.5 states that noise from new stationary sources that will expose an existing noise-sensitive use to noise levels which exceed identified standards have to reduce noise levels to or below said standards. Therefore, solar facilities in proximity to sensitive receptors would be required to reduce the noise levels emitted from all inverters and other on-site switchgear sources.

Domestic roof-mounted wind turbines would also be required to ensure compliance with County Noise Element Policy 3.3.5. In addition, County Noise Element Policy 3.3.6 states that the County shall consider implementing additional mitigation measures where new development may result in cumulative increases of noise on noise-sensitive land uses. The County enforces compliance with all County noise standards through Noise Element Implementation Measure 4.6, which states that if the County Planning Director determines that a noise-sensitive land use may be exposed to noise levels that exceed County standards, notwithstanding the noise contour information in the Noise Element, an acoustical analysis meeting established County requirements would be required. Overall, the Program would not result in significant noise impacts and similarly would not result in a considerable contribution to a cumulative noise impact.

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