3.11 NOISE

3.11.1 Definitions

Noise

Noise is generally defined as unwanted sound. Sound becomes unwanted when it interferes with normal human activities (e.g., sleep, speech, and tasks demanding cognition or coordination), disrupts tranquility, or has adverse effects on human or environmental health. Various noise descriptors are used to quantify the sound experience dependent upon different time scales and perception, which are described in greater detail below.

Sound Pressure

Sound is an air pressure fluctuation from a source through a path (i.e., air), to a receiver (i.e., human ear) (Caltrans 2009). Sound is measured on a logarithmic scale of sound pressure level known as a decibel (dB). A sound level of 0 dB corresponds to the threshold of human hearing, for those without hearing damage (Ray 2013). On average, the threshold of hearing is close to 10 dB (Caltrans 2009).

Individual dB ratings for different noise sources cannot be added directly to give the sound level for the combined noise from all sources. Instead, the combined noise level produced by multiple noise sources is calculated using logarithmic summation. For example, if one noise source produces a noise level of 80 dB, then two of the identical sources side by side would generate a combined noise level of 83 dB, or an increase of approximately 3 dB. Sound pressure levels are not a reliable indicator of loudness (Caltrans 2009).

A-Weighted Sound Level

The A-weighted sound level (dBA) is a sound pressure measurement that de-emphasizes the very low- and very high-frequency components of the sound. The de-emphasis of the very low and high frequencies mimics the frequency response of the human ear and correlates well with subjective reactions to noise (Caltrans 2009). The A-weighting therefore assists in analysis of how humans perceive and respond to sound and noise. Typical A-weighted noise levels measured for common outdoor and indoor activities are listed in Figure 3.11-1.

Noise Descriptors

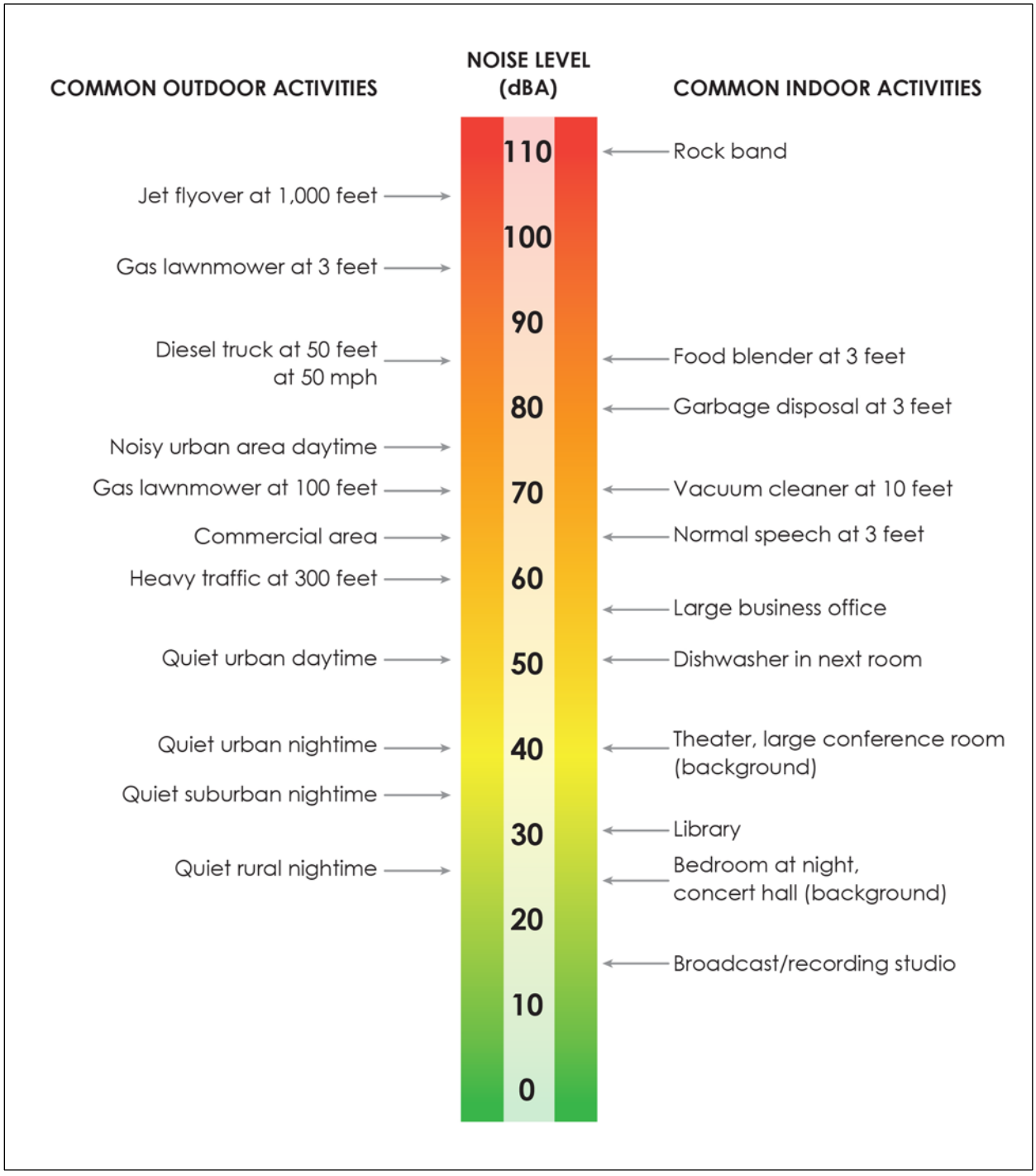
Equivalent Sound Level

Equivalent sound level (L_{eq}) is the average A-weighted sound level during the entirety of a specified period (Caltrans 2009). L_{eq} periods described in this section are 1-hour unless otherwise noted.

Maximum Sound Level

Maximum sound level (L_{max}) is the highest instantaneous noise level during a specified period. This descriptor is sometimes referred to as "peak (noise) level" (Caltrans 2009).

Figure 3.11-1 Common Noise Levels



Source: *(Caltrans 1998)*

Community Noise Equivalent Level/Day Evening Night Sound Level
The Community Noise Equivalent Level (CNEL), also called the Day Evening Night Sound Level, is the average A-weighted noise level during a 24-hour day, obtained after adding 5 dB to sound levels measured in the evening between 7:00 pm to 10:00 pm, and adding 10 dB to sound levels measured at night between 10:00 pm and 7:00 am. CNEL takes into account people's heightened sensitivity during the evening hours, and even more heightened sensitivity during the late night and early morning hours (Caltrans 2009).

Day/Night Average Sound Level
The day/night average sound level (L_{dn}) is the average A-weighted noise level during a 24-hour day, obtained after the addition of 10 dB from 10:00 pm to 7:00 am. The L_{dn} considers people's heightened sensitivity to noise at night. Exterior background noises and noise levels inside buildings are generally lower at night. Lower noise levels at night causes other noises to become far more noticeable because there is less background noise to drown them out (Caltrans 2009).

Noise Attenuation
Most noise sources can be classified as either point sources (i.e., stationary equipment) or line sources (i.e., roadways). Sound generated by a point source nominally diminishes (attenuates) at an approximate rate of 6 dBA for each doubling of distance away from the source. For example, a 60-dBA noise level measured at 50 feet from a point source would be approximately 54 dBA at 100 feet from the source, and 48 dBA at 200 feet from the source. Noise from a line source nominally attenuates at approximately 3 dBA per doubling of distance (US Department of Transportation 1995).

Noise Barriers and Building Insulation
Building insulation and other objects, such as vegetation, topography, and various manmade structures, can reduce noise levels that reach a receiver by serving as a barrier that deflects or absorbs sound. The exterior walls of residences and buildings typically reduce outdoor noise levels by 12 to 15 dBA if windows are open, and between 20 to 25 dBA if windows are closed, depending on the age of the structure. An acoustically well-insulated structure can provide around 35 dBA of noise attenuation when windows and doors are kept closed (Wyle Laboratories 1994).

Groundborne Vibration
Vibration is the physical manifestation of energy carried through the earth and structures. Groundborne vibration consists of rapidly fluctuating motions or waves, and has the potential to annoy people and damage buildings. Low-level vibrations can also cause irritating secondary vibration, such as a slight rattling of windows, doors, or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints due to concerns of structural damage, even though there is little risk of actual structural damage (Caltrans 2013).

Construction activities can produce varying degrees of ground vibration, depending on the equipment and methods employed. Ground vibrations from construction activities very rarely reach levels high enough to cause damage to structures, although special consideration must be

made in cases where fragile historical buildings are near the construction site. Typically, groundborne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration.

The most common descriptor used to quantify construction vibration amplitude in relation to impacts to structures is the peak particle velocity (PPV), defined as the maximum instantaneous peak velocity of the vibratory motion in inches per second. PPV is generally accepted as the most appropriate descriptor for evaluating the potential for building damage (Caltrans 2013).

Corona

The localized electric field near an energized conductor can be sufficiently concentrated to produce a small electric discharge, which can ionize air close to the conductors. This effect is called corona. Corona is associated with all energized power lines but is especially common with high-voltage transmission lines. If the intensity of the electric field at the surface exceeds the insulating strength of the surrounding air, a corona discharge occurs in the form of heat and energy dissipation. Corona can result in the production of small amounts of sound, radio noise, heat, and chemical reactions of air components.

Modern power lines are designed, constructed, and maintained so that, during dry conditions, they operate below the corona-inception voltage and generate minimal corona-related noise. Corona noise increases with humid and inclement weather, high pollution, and smoke from wildfires. Under these conditions, an audible hum and crackling noise may be heard (Parmar 2011).

3.11.2 Approach to Data Collection

The noise analysis focuses on whether the proposed project would result in significant noise or vibration impacts during construction and operation. This section incorporates data included in the Noise Study Report prepared by The RCH Group (2017) in Appendix G.

Noise and Vibration Studies

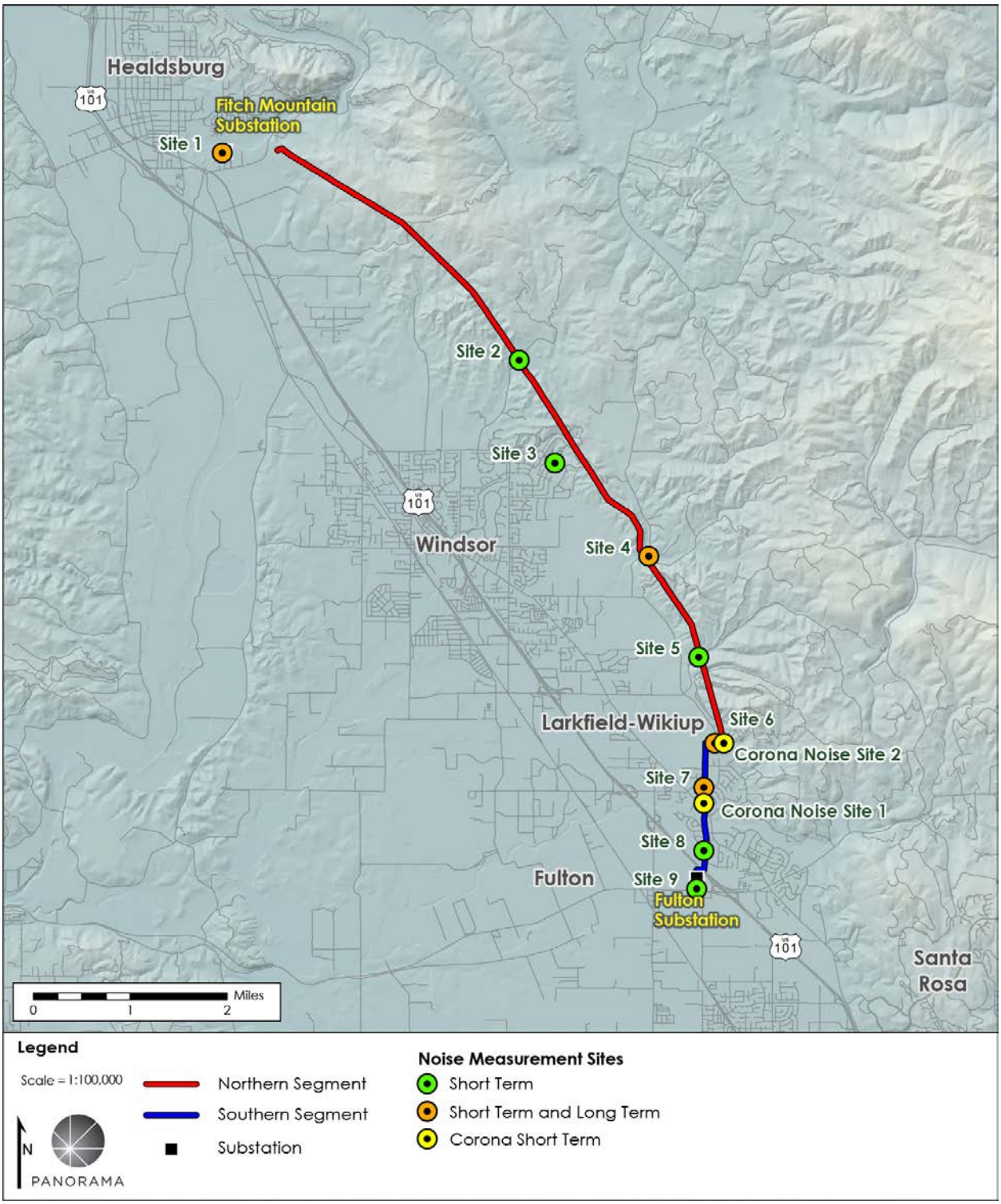
Community Noise Survey

A community noise survey was conducted to characterize the daytime and nighttime existing noise environment for the proposed project area. Noise data collection was completed on May 23 and May 26, 2016. Short-term noise measurements (10 to 20 minutes) were conducted at nine locations along the proposed alignment. Noise measurement sites were selected within towns, near residences, and in open space areas to characterize noise reflective of the current land uses along the project alignment. Figure 3.11-2 shows the location where noise measurements were recorded.

Long-Term Noise Measurements

Continuous long-term noise measurements (48-hours) were conducted at four locations (refer to Figure 3.11-2) from 12:00 am on May 24, 2016 through 12:00 am May 26, 2016. The long-term noise measurements were conducted to provide typical 24-hour noise levels for the project area.

Figure 3.11-2 Noise Measurement Locations



Sources: (ESRI 2016, The RCH Group 2017, PG&E 2016a)

Corona Noise

Short-term (10-minute) corona noise measurements were conducted in two locations (refer to Figure 3.11-2) in the Southern Segment directly under the existing 60-kV and 230-kV lines that are generally representative of the noise conditions along the entire segment. Relative humidity was measured at 56 percent during the corona noise survey.

3.11.3 Environmental Setting

Regional Setting

Ambient noise levels in the project area are influenced primarily by vehicular traffic, air traffic, and residential noises (i.e., lawnmower, traffic, music). Land uses along the project alignment are primarily residential, agricultural, open space, and commercial. The Sonoma County Airport is located approximately 2.25 miles west of the project alignment, and noise from air traffic is common in the project area.

Local Setting

Existing Noise Conditions

The main noise sources that contribute to the existing noise environment in the project study area are vehicle traffic, wind, and wildlife. Other contributing noise includes aircraft overflights, agricultural equipment, and residential noise. Noise levels in the project area where there is no human activity are relatively low.

Average daytime noise levels range from 46 dBA L_{eq} to 72 dBA L_{eq} in the Northern Segment, and from 54 dBA L_{eq} to 76 dBA L_{eq} in the Southern Segment (The RCH Group 2017). The greatest noise levels measured along the project alignment were near Bumpy Rock Quarry (79 dBA L_{max}) in the Northern Segment, and near arterial roadways such as Faught Road (96 dBA L_{max}) in the Southern Segment (The RCH Group 2017). Measurement locations from the May 2016 community noise surveys are shown in Figure 3.11-2. The ambient noise level observations are summarized in Table 3.11-1.

Table 3.11-1 Outdoor Ambient Noise Levels

Site ID [a]	Equivalent Sound Level (L_{eq}) (dBA)	Maximum Sound Level (L_{max}) (dBA)	Dominant Noise Source
Short-Term Measurements (20 minutes) [b]			
Site 1	57	63	Substation noise
Site 2	49	71	Wildlife, airplanes, and cars on Brooks Road
Site 3	46	60	Wildlife, airplanes, and people using trails
Site 4	46	79	Cars on Chalk Hill Road and Leslie Road
Site 5	53	59	Cars on Shiloh Ridge Road and tractor in field across road
Site 6	47	64	Cars on Faught Road, distant construction, insects, and birds

Site ID [a]	Equivalent Sound Level (L_{eq}) (dBA)	Maximum Sound Level (L_{max}) (dBA)	Dominant Noise Source
Site 7	57	70	Traffic on Faught Road and residential noise
Site 8	57	67	Traffic on Lavell Road, construction at school, and children at School
Site 9	63	76	Traffic on River Road
Long-Term Measurements (48 hours) [c]			
Site 1	54 – 62	79	Substation noise
Site 4	43 – 72	89	Cars on Chalk Hill Road and Leslie Road
Site 6	43 – 50	71	Cars on Faught Road, distant construction, insects, and birds
Site 7	44 – 76	96	Traffic on Faught Road and residential noise

Notes:

[a] Refer to Figure 3.11-2 for site locations.

[b] Short-term L_{eq} measurements are 20-minute intervals. All short-term measurements were taken on either Monday, May 23 or Thursday, May 26, 2016, between 10:57 am and 5:01 pm.

[c] Long-term L_{eq} measurements are the range of 1-hour intervals for each 24-hour period. All long-term measurements were taken between 12:00 am on Tuesday, May 24 and 11:59 pm on Wednesday, May 25, 2016. Dominant noise sources from short-term noise measurements were assumed to be the dominant noise sources during the long-term noise measurements since they are unattended noise measurements and they do not specifically identify noise sources.

Source: (The RCH Group 2017)

Noise-Sensitive Receptors

Noise-sensitive receptors are land uses where normal human activities could be affected by excessive noise. Noise-sensitive receptors generally include residences, schools, libraries, hospitals, places of worship, and passive recreation areas (e.g., hiking, bird watching). Businesses are generally not considered noise-sensitive receptors. Table 3.11-2 identifies the types of noise-sensitive receptors within 1,000 feet of the project alignment. Proposed work areas for the project are shown on detail maps included in Appendix A.

Vibration-Sensitive Receptors

Vibration-sensitive receptors are land uses or fragile structures that could be adversely affected by excessive groundborne vibration. Such land uses are generally consistent with noise-sensitive receptors. Structures that may be susceptible to cosmetic or structural damage from low levels of groundborne vibration include historic structures, wood or masonry buildings built before 1950, or unreinforced masonry buildings. Some vibration-sensitive structures may be located in the project area; however, the effects of groundborne vibration do not extend far from a source because vibration dissipates quickly as distance from the source increases. The only potentially sensitive land uses or structures that could be affected are located at residential properties within approximately 30 feet of work areas.

Table 3.11-2 Noise-Sensitive Receptors within 1,000 Feet of the Project Alignment

Receptor Type	Description
Southern Segment	
Residences	655 residences
Schools	Mark West Elementary School San Miguel Elementary School Tiny Treasures Preschool
Places of Worship	The Cove Fellowship
Passive Recreation Areas	Shiloh Ranch Regional Park
Northern Segment	
Residences	133 residences
Passive Recreation Areas	Shiloh Ranch Regional Park Foothill Regional Park
Fitch Mountain Substation	
Residences	95 residences

Sources: (ESRI 2016, PG&E 2016a)

3.11.4 Impact Analysis

Summary of Impacts

Table 3.11-3 presents a summary of the CEQA significance criteria used in the analysis and the impacts on noise that would occur during construction, operation, and maintenance of the proposed project.

Table 3.11-3 Summary of Proposed Project Impacts on Noise

Would the proposed project:	Potentially Significant Impact	Less than Significant Impact with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☐	☒
b) Expose persons to or generate excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c) Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐

Would the proposed project:	Potentially Significant Impact	Less than Significant Impact with Mitigation Incorporated	Less than Significant Impact	No Impact
d) Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☒	☐	☐
e) Be 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, and expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f) Be located within the vicinity of a private airstrip and expose people residing or working in the project area to excessive noise levels?	☐	☐	☒	☐

Impact Discussion

a) Would the proposed project expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	**Significance Determination**
	No impact

The CPUC has exclusive authority over the siting and design of the proposed project as the state Lead Agency under CEQA, pursuant to CPUC GO 131-D. The CPUC is not required to consider standards established in local general plans or noise ordinances when analyzing whether noise impacts for the proposed project would be significant; however, such standards and ordinances are frequently used as a basis for evaluating noise impacts because the CPUC does not have their own significance thresholds for noise.

Construction

The project is primarily located within unincorporated Sonoma County. A small portion of the project alignment is located within Foothill Regional Park, which is within the Town of Windsor boundary; however, Sonoma County has sole authority over the park, and the noise standards established in the Town of Windsor's General Plan and noise ordinance would not apply to construction activities within the park (Town of Windsor 2016). Sonoma County has not adopted a noise ordinance or noise standards for construction activities. Construction within unincorporated Sonoma County, including Foothill Regional Park within the Town of Windsor, would not expose persons to or generate noise levels in excess of standards because no applicable standards exist. No impact would occur.

Operation and Maintenance

Operation and maintenance activities for the project lines and substations would be similar in scope to existing operation and maintenance activities. Inspection and maintenance of the lines and facilities would be conducted with the same frequency as current activities and would use the same equipment. No impact would occur.

Required APMs and MMs: None

b) Would the proposed project expose persons to or generate excessive groundborne vibration or groundborne noise levels?	**Significance Determination**
	Less than significant

Excessive groundborne vibration or groundborne noise levels are considered to be vibration that may result in cosmetic or structural damage to a nearby sensitive receptors. The CPUC does not have a specific vibration threshold for cosmetic or structural damage; Federal Transit Administration (FTA) standards were used because equipment analyzed by FTA would be similar to equipment used for construction of the proposed project. FTA (2006) synthesized the various vibration references to develop construction vibration threshold criteria, as shown in Table 3.11-4. Per Table 3.11-4, the CPUC has selected the "Older Residential Structure" category as the CEQA significance threshold for minor cosmetic damage to property. The limits for minor cosmetic damage would be 0.3 inches/second PPV for continuous sources. The project would only generate continuous source vibration as no impact hammers, pavement breakers, or blasting that typifies single-source vibration would be used. The "Older Residential Structure" category was selected as the threshold because houses within the vicinity of the project work areas would either be classified as modern industrial/commercial buildings, new residential structures, or older residential structures. Even low levels of vibration have the potential to disturb residents; however, the potential to result in disturbance is not used as a threshold. Nuisance or annoyance can occur at 0.1 in/sec PPV; however, potential impacts associated with nuisance would be less than significant since the nuisance vibration would be temporary, affect very few people, and would only occur during daytime hours in residential areas when residents are less sensitive to vibration and less likely to be home.

Table 3.11-4 Vibration Thresholds for Minor Cosmetic or Structural Damage

Category	Continuous Source PPV (inches/second)
Extremely Fragile Historic Buildings, Ruins, Ancient Monuments [a]	0.08
Fragile Buildings [a]	0.10
Historic and Some Old Buildings [b]	0.25
Older Residential Structures [c]	0.30
New Residential Structures	0.50
Modern Industrial/Commercial Buildings	0.50

Category	Continuous Source PPV (inches/second)

Notes:

[a] There are no extremely fragile historic buildings, ruins, ancient monuments, or fragile buildings within the vicinity of the proposed project; therefore, this category is not relevant to the proposed project.

[b] Few, if any, structures that are susceptible to minor cosmetic damage from vibration at levels lower than 0.3 in/sec PPV are anticipated.

[c] This threshold was chosen as the CEQA significance threshold for the proposed project because it would be sufficient to protect most structures along the project alignment.

Source: (FTA 2006)

Construction

The greatest ground vibrations that would occur during construction would be produced by large bulldozers (i.e., D4/D6 Dozer) where grading is necessary, or by a vertical drill rig used to excavate foundation holes for new structures at the Fitch Mountain Substation. The maximum vibration that would be generated at 25 feet away from this equipment would be approximately 0.089 PPV (inches/second). Two residences are located approximately 30 feet from the Fitch Mountain Substation, and one residence is located approximately 20 feet from a pull site where cut-and-fill work would occur at the junction of the Southern and Northern Segments. The vibration that would be generated during construction would be below the threshold for cosmetic or structural damage (0.3 PPV). Impacts would be less than significant.

Operation and Maintenance

Operation and maintenance activities for the project lines and substation would be similar in scope to existing operation and maintenance activities. Inspection and maintenance activities would be conducted with the same frequency as current activities and would use the same equipment. No impact would occur.

Required APMs and MMs: None

c) Would the proposed project result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	**Significance Determination**
	Less than significant

The minimum change in environmental noise that is perceptible by the human ear is 3 dBA. The USEPA (1974) considers permanent noise increases at or greater than 5 dBA to be significant. The proposed project would result in a significant impact if ambient noise levels near the project alignment permanently increased by 5 dBA or greater.

Construction

Noise from construction activities would be temporary (approximately ~~3 to 5~~4 months in the Southern Segment and approximately ~~10 to 12~~8 months in the Northern Segment), and construction noise would cease after construction is completed. Construction noise would not result in a permanent increase in ambient noise levels. No impact would occur.

Operation and Maintenance

Transmission lines that are 230-kV or greater typically emit corona discharge during inclement weather and periods of dense fog, resulting in a faint hum or crackle that can be heard near the transmission line. Other factors that contribute to corona noise include surface imperfections (i.e., scratches and dings) on the conductors and the diameter, type, and bundling of the conductors. The diameter, type, and bundling of conductors affects the energy gradient and flow of electricity. Conductor wires with a lower energy gradient generally have less corona discharge than conductor wires with a higher energy gradient. The energy gradient can be reduced by installing larger conductor or by bundling two or more strands of wire together, which allows electricity to flow with less resistance, ultimately reducing the potential for corona noise.

The proposed project would involve replacing existing bundled conductor for the 230-kV transmission line in the Southern Segment with new unbundled conductor. The capacity of the new unbundled conductor would be greater than the existing bundled conductor. Audible corona noise was not detected for the existing 230-kV transmission line during the noise survey completed in May 2016, and humidity levels were 56 percent during the survey (The RCH Group 2017). Replacing bundled conductor with unbundled conductor has the potential to increase the energy gradient on the 230-kV transmission line, which could result in an increase in corona noise. However, the increased capacity of the new conductor would be expected to offset any potential increases that the unbundled line may cause. One strategy used to reduce corona noise is to replace old conductor with new conductor that has fewer surface imperfections (i.e., reconductoring) (Straumann and Weber 2010). The difference between corona noise with the existing conductor and corona noise with the new conductor would be negligible and would not exceed the 5-dBA threshold. The impact from corona noise would be less than significant.

The hum of substation transformers can be heard within the vicinity of Fitch Mountain Substation under existing conditions. Operational noises from the substation would not change noise levels in the area because of the proposed project; none of the proposed substation equipment replacements are expected to generate new operational noise. The impact from substation operational noise would be less than significant.

Inspections and maintenance activities for the project power lines and substation would be similar in scope and frequency to existing maintenance activities. The proposed project would not result in additional noise from inspections and maintenance. No impact would occur.

Required APMs and MMs: None

d) Would the proposed project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	Significance Determination
	Less than significant with mitigation

The significance of temporary or periodic noise impacts are often linked to standards established in local plans and noise ordinances. As stated under Impact a), no applicable standards or numeric thresholds for temporary noise levels have been defined by the County.

A temporary noise increase may be considered substantial without causing a significant impact, as defined under CEQA. The context of a substantial noise increase must also be considered to determine if it would result in a significant impact. Such factors include pre-project ambient noise levels, the presence or absence of noise-sensitive receptors in proximity to the noise, as well as the duration, frequency, and timing of exposure. For example, a very loud noise increase may exceed noise thresholds at an adjacent receptor, but the increase would only be a significant impact if it occurred during a sensitive time period, or for a duration that would interfere with normal human activities. Conversely, a moderate noise increase that was just above noise thresholds could be considered a significant impact if it occurred frequently over a long period of time, and would likely result in serious annoyance to persons adjacent to the proposed project that could not easily vacate the area.

Methods for addressing temporary noise impacts typically include one or a combination of the following to reduce either noise levels or the effects of temporary noise, when and where appropriate:

- Implement noise reduction measures to ensure noise levels do not exceed defined thresholds
- Avoid certain activities during sensitive periods
- Reduce the duration and frequency of exposure
- Notify and/or coordinate with receptors in advance of activities
- Temporarily relocate receptors and/or close areas that would be highly affected

The analysis below addresses the potential impacts of temporary noise increases on noise-sensitive receptors within 1,000 feet of the project alignment (refer to Table 3.11-2) during construction, operation, and maintenance of the proposed project.

Construction

Overview

Construction of the proposed project would involve the use of heavy ground-based equipment (e.g., excavators, front loaders, dump trucks, cranes, augers, etc.), as well as helicopters. Where applicable, helicopter activities are discussed separately due to the unique nature of helicopters and the noise they generate. Estimates for cumulative noise levels during construction activities at a reference distance of 50 feet are provided in Table 3.11-5. Appendix G contains a representative list of the types and quantities of equipment used to estimate cumulative noise levels.

Table 3.11-5 Estimated Cumulative Noise Levels during Construction Activities

Construction Activity	Cumulative Noise Level at 50 Feet (dBA)	
	L_{max}	1-hour L_{eq}
Ground-Based Activities		
Survey	75	71
Vegetation Clearing	81	76
Grading and Blading	82	80
Drainage Crossing Establishment	78	76
LDSP Hole Auguring	84	81
LDSP Installation	89	85
TSP Hole Auguring	84	79
TSP Installation	83	81
Guard Structure Installation at US 101 Crossing	75	77
Reconductoring (Poles and Mid-Span Locations)	83	79
Reconductoring (Pull-and-Tension Sites)	75	77
Miscellaneous Transport	83	80
Material and Equipment Staging	84	82
Cleanup and Restoration	85	82
Fitch Mountain Substation Equipment Modifications	83	83
Fitch Mountain Substation Road Paving	79	78
Helicopter Activities		
Light- or Medium-Lift Helicopter Operations [a]	90	90
Heavy-Lift Helicopter Operations [a]	108	108

Source: (FHWA 2008, TRC 2015, The RCH Group 2017)

Noise levels at 50 feet from ground-based construction activities would range from approximately 71 to 85 dBA (L_{eq}), as listed in Table 3.11-5. The loudest ground-based construction at pole work areas in the Northern Segment would be 85 dBA (L_{eq}) at 50 feet during pole replacement activities. The loudest ground-based construction in the Southern Segment would be 82 dBA (L_{eq}) at 50 feet during several different construction activities. Noise from construction at Fitch Mountain Substation would reach up to 83 dBA at 50 feet.

Noise levels at 50 feet from helicopter activities would range from approximately 90 to 108 dBA (L_{eq}), as listed in Table 3.11-5, depending on the type of helicopter. Light- or medium-lift helicopters would be used in the Southern and Northern Segments, and heavy-lift helicopters would only be used in the Northern Segment. Light- or medium-lift helicopters would generate

maximum noise levels of up to approximately 90 dBA at 50 feet, and heavy-lift helicopters would generate noise up to approximately 108 dBA at 50 feet.

The noise levels identified in Table 3.11-5 are for receptors at 50 feet, and would change if the distance to receptors is less than or greater than 50 feet from a work site. Halving or doubling this distance would generally increase or decrease noise levels by approximately 6 dBA, respectively. Table 3.11-6 lists the adjusted noise levels for ground-based construction activities using the distance to the closest receptors.

Daytime Activities

Construction activities would typically take place during daytime hours between 7:00 am and 7:00 pm, Monday through Sunday; however, extended work hours between 7:00 pm and 7:00 am may be required on rare and infrequent occasions, such as to complete a construction procedure that cannot be interrupted due to safety considerations. Anticipated construction activities during nighttime hours between 10:00 pm and 7:00 am are addressed separately below.

Construction at the nearest receptor would reach approximately 87 dBA (L_{eq}) in the Southern Segment and 93 dBA (L_{eq}) in the Northern Segment. Construction would occur in phases along the project alignment, and would not be focused in a single pole location for more than a few days. The most frequent and concentrated construction activities would occur at staging areas. Each staging area would be used to support construction activities at adjacent pole locations, and would not be used for more than a few months over the ~~18~~12-month construction period. Pre-construction ambient noise levels range from 54 dBA to 76 dBA (L_{eq}) in the Southern Segment and from 46 dBA to 72 dBA in the Northern Segment. Construction activities would temporarily increase noise levels at receptors above existing levels by as much as 11 to 33 dBA in the Southern Segment, and 21 to 47 dBA in the Northern Segment. Construction would be limited to daytime hours and noise would cease after construction is complete; however, noise levels may still interrupt daily activities at schools or cause substantial annoyance at sensitive receptors, resulting in a significant impact.

MM Noise-1 requires PG&E to notify all receptors at least 7 days prior to construction activities within 500 feet and to implement feasible noise control measures, such as reducing equipment idling times, ensuring vehicles are equipped with functional mufflers, positioning sound barriers between construction activities and receptors, and positioning stationary equipment away from receptors. Advanced notification would allow receptors to prepare for the potentially disruptive construction noise, such as moving the location or timing of noise-sensitive activities so they would not be substantially affected. MM Noise-1 also requires PG&E to avoid work during more sensitive morning and evening periods, and to provide receptors with the contact information for a designated Noise Coordinator. The Noise Coordinator would be responsible for responding to any noise complaints and working with construction personnel to make any reasonable adjustments in the work activities to address the problem, to the extent possible. The impact from ground-based construction equipment would be less than significant with implementation of MM Noise-1.

Table 3.11-6 Noise Levels during Construction at the Closest Noise-Sensitive Receptors

Focused Construction Areas within 1,000 feet of Receptors		Noise Level at Closest Receptor (1-hour L_{eq})			
		Residences [a]	Schools [a]	Places of Worship [a]	Passive Recreation Areas [b]
Ground-Based Activities					
Southern Segment	Staging Areas	84 dBA at 40 feet	64 dBA at 400 feet	80 dBA at 60 feet	57 dBA at 900 feet
	Pull Sites	81 dBA at 30 feet	56 dBA at 550 feet	> 1,000 feet	85 dBA at 20 feet
	Pole Work Areas [c]	87 dBA at 20 feet	79 dBA at 50 feet	71 dBA at 130 feet	87 dBA at 20 feet
Northern Segment	Staging Areas	79 dBA at 75 feet	> 1,000 feet	> 1,000 feet	90 dBA at 20 feet
	Pull Sites	81 dBA at 30 feet	> 1,000 feet	> 1,000 feet	85 dBA at 20 feet
	Pole Work Areas [c]	79 dBA at 100 feet	> 1,000 feet	> 1,000 feet	93 dBA at 20 feet
Fitch Mountain Substation	Existing Substation Fence Line	87 dBA at 30 feet	> 1,000 feet	> 1,000 feet	> 1,000 feet
Helicopter Activities [d]					
Southern Segment (Light- or Medium-Lift Only)	Helicopter LZs	90 dBA at 50 feet	72 dBA at 400 feet	> 1,000 feet	65 dBA at 900 feet
	Pole and Mid-Span Locations	90 dBA at 50 feet	82 dBA at 120 feet	67 dBA at 680 feet	~~> 1,000 feet~~> 1,000 feet
Northern Segment (Light- or Medium-Lift)	Helicopter LZs	87 dBA at 75 feet	> 1,000 feet	> 1,000 feet	84 dBA at 100 feet
	Pole and Mid-Span Locations	79 dBA at 170 feet	> 1,000 feet	> 1,000 feet	90 dBA at 50 feet
Northern Segment (Heavy-Lift)	Helicopter LZs	105 dBA at 75 feet	> 1,000 feet	> 1,000 feet	105 dBA at 75 feet
	Pole and Mid-Span Locations	97 dBA at 170 feet	> 1,000 feet	> 1,000 feet	108 dBA at 50 feet

Notes:

[a] Distances to the closest residences, schools, and places of worship are measured to the closest habitable or potentially occupied structure.

[b] Construction activities would occur as close as approximately 20 feet from trails in regional parks where people may be present.

[c] Reconductoring would be the loudest activity at pole work areas near receptors in the Southern Segment (79 dBA). Pole installation would be the loudest activity at pole work areas near receptors in the Northern Segment (85 dBA).

[d] The proximity of helicopter flight paths to receptors would be approximately the same as pole and mid-span locations. 1-Hour L_{eq} calculations assume that a helicopter would operate constantly at one location during a given hour.

Sources: (PG&E 2016b, The RCH Group 2017, TRC 2015)

Noise from helicopter activities could have a greater effect on receptors than ground-based construction activities, depending on the type of helicopter and duration of exposure. Light- or medium-lift helicopters would generate approximately the same noise levels as the loudest ground-based equipment (90 dBA [L_{max}] at 50 feet). Light- or medium-lift helicopters would be used throughout construction in the Northern Segment and on two separate occasions in the Southern Segment, each use lasting for approximately 2 to 3 hours. Heavy-lift helicopters would generate a much greater noise level (108 dBA at 50 feet [L_{max}]), and would only be used in the Northern Segment.

Receptors near pole and mid-span locations would be exposed to substantial helicopter noise, but the duration of such exposure would be brief. In the Northern Segment, light- or medium-lift helicopters would access a single pole location up to approximately seven times per day for a total of approximately 5 days. Heavy-lift helicopters would access a single pole location up to approximately seven times in total, which would generally occur on the same day. Helicopters would hover at pole locations for approximately 1 minute or less during each trip. In the Southern Segment, only one light- or medium-lift helicopter would only be used for 2 to 3 hours in total on two separate occasions. Helicopter noise levels would be louder than ground-based construction equipment and may be more noticeable due to the aerial position, but the effect of the noise on receptors adjacent to pole locations would be similar. MM Noise-1 would mitigate the effects of noise on receptors near pole and mid-span locations to less-than-significant levels; however, such impacts could remain significant on schools in the Southern Segment if helicopter activities disrupted classroom instruction. MM Noise-2 requires PG&E to coordinate with schools prior to any helicopter activities within 500 feet, and schedule helicopter activities to occur outside of instructional periods. The impact on receptors adjacent to pole and mid-span locations would be less than significant with MM Noise-1 and MM Noise-2.

Receptors near helicopter LZs, flight paths, and touch down areas, would be exposed to substantial helicopter noise for longer periods than pole and mid-span locations because helicopter activities would be more concentrated at these locations. The locations of proposed helicopter LZs and potential touch down areas are identified in Appendix A. Specific touch down areas and flight paths would be determined at the time of construction. To ensure receptors near helicopter activities receive adequate notice, MM Noise-3 requires PG&E to notify receptors within 500 feet at least 30 days prior to helicopter activities. Advanced notification would allow receptors to prepare for the potentially disruptive helicopter noise, such as moving the location, or timing of noise-sensitive activities so they would not be substantially affected. MM Noise-3 also limits the distance and frequency helicopters would operate near adjacent receptors, and requires minimum set-back distances from receptors for helicopter landing and hovering. The impact on receptors adjacent to helicopter LZs, flight paths, and touch down areas would be less than significant with MM Noise-1 and MM Noise-3.

Noise from construction activities near and within regional parks could temporarily affect passive recreation by disturbing the tranquility of such areas. Disturbing the tranquility of passive recreation areas could disturb recreationalists; however, there are many alternative recreational areas in the region where construction would not be occurring and recreationists

could easily vacate the area to avoid substantial disturbance. The impact would be less than significant.

Nighttime Activities

A noise increase at residences between 10:00 pm and 7:00 am could interrupt normal sleeping activities. As explained previously, extended work hours between 7:00 pm and 7:00 am may be required on rare and infrequent occasions to complete a construction activity that cannot be interrupted due to safety considerations. The only planned construction activity between 10:00 pm and 7:00 am would occur at the US 101 crossing, where guard structures would be installed and removed on two separate nights. Noise levels during installation and removal of guard structures at US 101 would reach approximately of 68 dBA (L_{eq}) at the closet residential dwelling located approximately 150 feet to the east. Insulated exterior walls of modern structures typically reduce outdoor noise levels by approximately 25 dBA or greater. Indoor noise levels during guard structure installation and removal would be approximately 43 dBA. Freeway noise in the area generates approximately 65 dBA at 150 feet (Sonoma County 2008). Noise from construction at the US 101 crossing would not be substantially louder than freeway noise at a distance of 150 feet. The impact would be less than significant.

Operation and Maintenance

Maintenance activities for the alignment and substations would be similar in scope and frequency to existing maintenance activities. Temporary noise during operation and maintenance would be approximately the same for the reconductored lines as it is for the existing lines. No impact would occur.

Required APMs and MMs: MM Noise-1, MM Noise-2, and MM Noise-3

e) Would the proposed project be 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, and expose people residing or working in the project area to excessive noise levels?	**Significance Determination**
	No impact

No public airports or public use airports are located within 2 miles of the project area. When measuring from the closest point of the project alignment (Fulton Substation), the Charles M. Schulz – Sonoma County Airport is approximately 2.3 miles away. The Northern Segment varies from approximately 3 to 6.5 miles from the airport. The entire project area is outside of the primary referral area boundary for the Charles M. Schulz – Sonoma County Airport identified in the Sonoma County Comprehensive Airport Land Use Plan (Sonoma County 2016). No impact would occur.

Required APMs and MMs: None

f) Would the proposed project be located within the vicinity of a private airstrip and expose people residing or working in the project area to excessive noise levels?	Significance Determination
	Less than significant

No private airstrips are located within the vicinity of the proposed project. A helipad is located approximately 0.4 mile southeast of Fulton Substation at Sutter Santa Rosa Regional Hospital. While construction personnel would work in the project area within the vicinity of the Sutter Santa Rosa Regional Hospital, aircraft noise levels from helicopters at a distance of 0.4 mile would be greatly attenuated (approximately 57 dBA). The community noise survey included a measurement location near Fulton Substation (Table 3.11-1 and Figure 3.11-2), and did not identify air traffic as a contributing noise at this location. The noise impact from air traffic out of Sutter Santa Rosa Regional Hospital on project workers would be less than significant.

Required APMs and MMs: None

3.11.5 Required Applicant Proposed Measures and Mitigation Measures

MM Noise-1: General Construction Noise

PG&E shall implement the following procedures for all construction activities:

- **Public Notice.** Noise-sensitive receptors (e.g., residences and officials for schools, places of worship, and parks) within 500 feet of work areas shall be provided written notice at least 7 days prior to beginning construction to inform them of the scheduled construction activities and potential noise disruptions. The notice shall describe procedures for submitting any noise complaints during construction, including a phone number for submitting such complaints.
- **Mufflers and Maintenance.** Construction equipment shall be properly equipped with feasible noise control devices (e.g., mufflers) and properly maintained in good working order.
- **Idling.** Vehicles and equipment shall only idle when necessary.
- **Stationary Equipment.** Stationary equipment (i.e., compressors and generators) shall be positioned as far away from sensitive receptors as practicable, and equipped with engine-housing enclosures.
- **Sensitive Periods.** To the extent practicable, construction activities that have a high likelihood of resulting in a noise nuisance for residents in the vicinity shall not be scheduled during sensitive morning or evening periods (7:00 am to 9:00 am, and 7:00 pm to 10:00 pm), to limit the potential for noise nuisance. Nighttime work between the hours of 10:00 pm and 7:00 am shall not occur, with the exception of installing and removing guard structures at the US 101 crossing.
- **Noise Complaints.** A Construction Noise Coordinator shall be designated to be responsible for responding to any local complaints about construction noise. The Construction Noise Coordinator shall determine the likely cause of the complaint and ensure that reasonable adjustments in the work activities are made to address the problem, to the extent possible. The phone number for noise complaints shall be clearly posted at key work areas in public locations, such as at the entrances to staging areas. Noise complaints shall be addressed within 1 week. PG&E shall provide monthly reports to CPUC that include a record of any complaints received with a description of the likely cause and how the complaint was resolved.

Applicable Locations: All project areas within 500 feet of noise-sensitive receptors

Performance Standards and Timing:

- **Before Construction:** (1) Receptors within 500 feet are provided adequate notice, (2) Construction Noise Coordinator is designated, and (3) Noise complaint phone number is adequately posted at key work areas
- **During Construction:** (1) Equipment is equipped with mufflers and adequately maintained, (2) Stationary equipment is positioned appropriately and equipped with engine-housing enclosures,

(3) Loud construction activities are scheduled outside of sensitive periods to the extent practicable, and (4) Noise complaints are adequately addressed and reported to CPUC

- **After Construction:** N/A

MM Noise-2: Schools

PG&E shall coordinate with school administrators for Mark West Elementary School and San Miguel Elementary School prior to helicopter activities within 500 feet to determine the schedule for noise-sensitive periods, defined as but not limited to instructional periods when school is in session. PG&E shall schedule helicopter activities, within these distances, when school is not in session (i.e., before or after instructional periods). PG&E shall provide CPUC with a summary of coordination efforts, including the names and contact information for school administrators who were consulted, the locations of noise-sensitive facilities, and the schedules used to determine the least disruptive timing for construction to occur.

Helicopter activities within 500 feet of noise-sensitive school facilities shall not occur during the school day, unless school administrators agree to shorter distances in writing.

Applicable Locations: Where project helicopter activities would occur within 500 feet of a school, including flight paths

Performance Standards and Timing:

- **Before Construction:** (1) PG&E coordinates with school administrators and (2) Construction activities are scheduled to occur when school is not in session
- **During Construction:** Helicopter activities within 500 feet of schools during the school day does not occur
- **After Construction:** N/A

MM Noise-3: Helicopter Activities

PG&E shall implement the following procedures for helicopter activities:

- **Public Notice.** Residences and places of worship (e.g., The Cove) within 500 feet from any location where helicopter activities may occur, including flight paths if applicable, shall be provided written notice at least 30 days prior to beginning helicopter activities to inform them of the schedule for helicopter use and potential noise disruptions. Methods for receptors to reduce noise in structures shall be included in the notice (i.e., closing doors and windows facing the alignment). The notice shall describe procedures for submitting any noise complaints during construction and provide a phone number for submitting such complaints, as required by MM Noise-1.
- **Flight Paths.** Helicopter flight paths shall be planned along routes that would result in the least noise exposure possible to receptors. If helicopter noise complaints are received, work crews will attempt to adjust the flight paths to reduce noise exposure to the complainant, without substantially increasing noise exposure to other receptors.
- **Helicopter Hovering.** Light/medium lift helicopters shall not operate closer than 50 feet from any receptors. Heavy lift helicopters shall not operate closer than 400 feet from receptors, unless actively working at pole locations along the alignment. Helicopters may operate closer than these distances if all affected receptors agree in writing to a shorter distance. Prior to reducing the minimum distance from receptors, PG&E shall provide the CPUC with the names, contact information, and written agreements for all affected persons within the applicable distances. The written agreements shall clearly identify the anticipated helicopter noise levels, daily schedule, and duration of helicopter activities in the vicinity.
- **Helicopter LZs.** Helicopter LZs within staging areas shall be positioned as far as possible from receptors. Helicopter LZs shall not be positioned closer than 500 feet from any receptor. Helicopter LZs for heavy lift helicopters shall not be positioned closer than 4,000 feet from schools. Helicopters may land closer than these distances if all affected receptors agree in writing to allow a shorter distance.

• **Helicopter Touch Down.** Helicopter touch down shall not occur in the Southern Segment or within 500 feet of receptors in the Northern Segment. Helicopter touch down may occur closer than these distances if all affected receptors agree in writing to allow a shorter distance.
Applicable Locations: Where project helicopter activities would occur within 500 feet of a receptor, including flight paths, and where heavy lift helicopters would land within 4,000 feet of a school
Performance Standards and Timing: • **Before Construction:** (1) Receptors within 500 feet of helicopter activities are provided adequate notice, and (2) PG&E provides the CPUC with adequate documentation of notification and coordination requirements • **During Construction:** (1) Helicopter flight paths and LZs are positioned to limit noise exposure to adjacent receptors, (2) Helicopter activities in the Southern Segment do not disrupt school instruction or regularly scheduled church service, and (3) Any helicopter noise complaints are adequately addressed and reported to CPUC • **After Construction:** N/A

3.11.6 References

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