# 4.13 Noise

This section discusses the effects of Project implementation on the noise environments in the vicinity of the Project Area. The following addresses the noise exposure associated with each of the three proposed phases of reclamation. Reclamation of the EMSA, Quarry pit, WMSA, Crusher/ Quarry Office Area, Surge Pile, Rock Plant, Exploration Area, and PCRA would occur according to the phasing set forth in Project Description Table 2-2.

## 4.13.1 Fundamentals of Acoustics and Vibration

### 4.13.1.1 Sound, Noise, and Acoustics

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g., air). Noise is generally defined as unwanted sound (i.e., loud, unexpected, or annoying sound). Acoustics is defined as the physics of sound. In acoustics, the fundamental scientific model consists of a sound (or noise) source, a receiver, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receiver determines the sound level and characteristics of the noise perceived by the receiver. Acoustics addresses primarily the propagation and control of sound.

### 4.13.1.2 Frequency

The number of sound pressure peaks travelling past a given point in a single second is referred to as the frequency, expressed in cycles per second or Hertz (Hz). A given sound may consist of energy at a single frequency (pure tone) or in many frequencies over a broad frequency range (or band). Human hearing is generally affected by sound frequencies between 20 Hz and 20,000 Hz (20 kHz).

### 4.13.1.3 Amplitude

The amplitude of pressure waves generated by a sound source determines the perceived loudness of that source. Sound pressure amplitude is measured in micro-Pascals (µPa). One µPa is approximately one hundred billionths (0.00000000001) of normal atmospheric pressure. Sound pressure amplitudes for different kinds of noise environments can range from less than 100 µPa to 100,000,000 µPa. Because of this huge range of values, sound is rarely expressed in terms of pressure. Instead, a logarithmic scale is used to describe sound pressure level (SPL) in terms of decibels (dB). The threshold of human hearing (near total silence) is approximately 0 dB, which corresponds to 20 µPa.

### 4.13.1.4 Addition of Decibels

Because decibels are logarithmic units, SPL cannot be added or subtracted through ordinary arithmetic means. Under the decibel scale, a doubling of sound energy corresponds to a 3 dB increase. In other words, when two sources each are producing sound of the same loudness, the resulting sound level at a given distance would be approximately 3 dB higher than one of the

sources under the same conditions. For example, if one automobile produces an SPL of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dB – rather they would combine to produce 73 dB. Under the decibel scale, three sources of equal loudness together produce a sound level of approximately 5 dB louder than one source, and 10 sources of equal loudness together produce a sound level of approximately 10 dB louder than the single source.

### 4.13.1.5 A-Weighted Decibels

**Figure 4.13-1** illustrates sound levels associated with common sound sources. The perceived loudness of sounds is dependent on many factors, including sound pressure level and frequency content. However, within the usual range of environmental sound levels, perception of loudness is relatively predictable, and can be approximated by frequency filtering using the standardized A-weighting network. There is a strong correlation between A-weighted sound levels (expressed as dBA) and community response to noise. For this reason, the A-weighted sound level has become the standard descriptor for environmental noise assessment. All noise levels reported in this section are in terms of A-weighting.

### 4.13.1.6 Human Response to Changes in Noise Levels

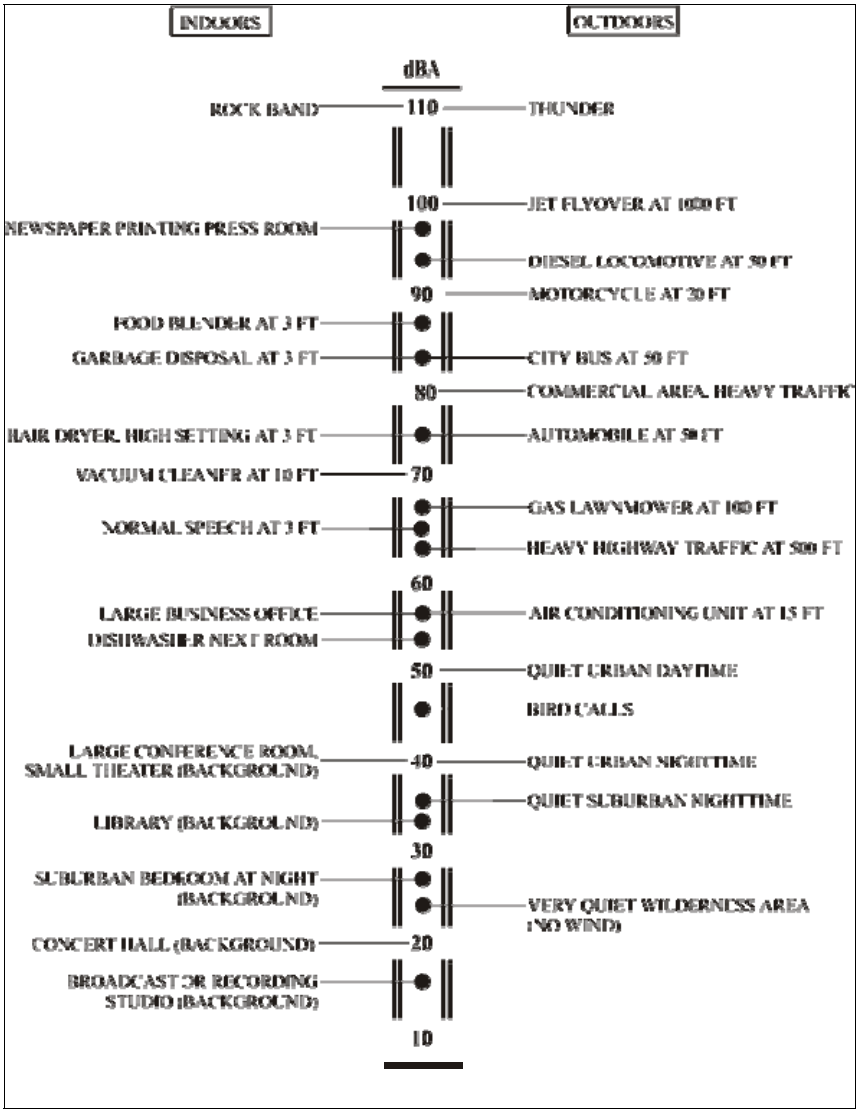
As discussed above, doubling sound energy results in a 3 dB increase in sound. However, given a sound level change measured with precise instrumentation, the subjective human perception of a doubling of loudness will usually be different than what is measured.

Under controlled conditions in a laboratory setting, the trained, healthy human ear is able to discern 1 dB changes in sound levels when exposed to steady, single-frequency ("pure-tone") signals in the mid-frequency range (1,000 Hz–8,000 Hz). In typical noisy environments, changes in noise of 1 to 2 dB are generally not perceptible. However, it is widely accepted that people are able to begin to detect sound level increases of 3 dB in typical noisy environments. Further, a 5 dB increase generally is perceived as a distinctly noticeable increase, and a 10 dB increase generally is perceived as a doubling of loudness. Therefore, a doubling of sound energy that would result in a 3 dB increase in sound pressure level generally would be perceived as barely detectable. Please refer to **Table 4.13-1**.

**TABLE 4.13-1**
**APPROXIMATE RELATIONSHIP BETWEEN INCREASES IN ENVIRONMENTAL NOISE LEVEL AND HUMAN PERCEPTION**

| Noise level increase, dB | Human perception (typical) |
|---|---|
| up to about 3 | not perceptible |
| about 3 | barely perceptible |
| about 6 | distinctly noticeable |
| about 10 | twice as loud |
| about 20 | four times as loud |

SOURCE: Edward L. Pack Associates, Inc., 2011




SOURCE: Caltrans, 2009

**Figure 4.13-1**
Decibel Scale and Common Noise Sources

## 4.13.1.7 Noise Descriptors

Noise in our daily environments fluctuates over time. Some fluctuations are minor, but some are substantial. Some noise levels occur in regular patterns, but others are random. Some noise levels fluctuate rapidly, but others slowly. Some noise levels vary widely, but others are relatively constant. Various noise descriptors have been developed to describe time-varying noise levels. The following are the noise descriptors most commonly used in environmental noise analysis, and may be applicable to this study:

- **Equivalent Sound Level ($L_{eq}$):** The $L_{eq}$ represents an average of the sound energy occurring over a specified time period. In effect, the $L_{eq}$ is the steady-state sound level

containing the same acoustical energy as the time-varying sound that actually occurs during the same period. The 1-hour, A-weighted equivalent sound level ($L_{eq}$[h]) is the energy average of A-weighted sound levels occurring during a 1-hour period.

- **Percentile-Exceeded Sound Level ($L_n$):** The $L_n$ represents the sound level exceeded "n" percentage of a specified period (e.g., $L_{10}$ is the sound level exceeded 10 percent of the time, and $L_{90}$ is the sound level exceeded 90 percent of the time).

- **Maximum Sound Level ($L_{max}$):** The $L_{max}$ is the highest instantaneous sound level measured during a specified period.

- **Day-Night Average Level ($L_{dn}$):** The $L_{dn}$ is the energy-average of A-weighted sound levels occurring over a 24-hour period, with a 10 dB penalty applied to A-weighted sound levels occurring during nighttime hours (10 p.m.-7 a.m.). The $L_{dn}$ is often noted as the DNL.

- **Community Noise Equivalent Level (CNEL):** Similar to $L_{dn}$, CNEL is the energy-average of the A-weighted sound levels occurring over a 24-hour period, with a 10 dB penalty applied to A-weighted sound levels occurring during the nighttime hours (10 p.m.-7 a.m.), and a 5 dB penalty applied to the A-weighted sound levels occurring during evening hours (7 p.m.-10 p.m.). The CNEL is usually within 1 dB of the $L_{dn}$, and for all intents and purposes, the two are interchangeable. As it is easier to compute and is referenced under the County General Plan, the $L_{dn}$ is used as the long-term noise measure in this study.

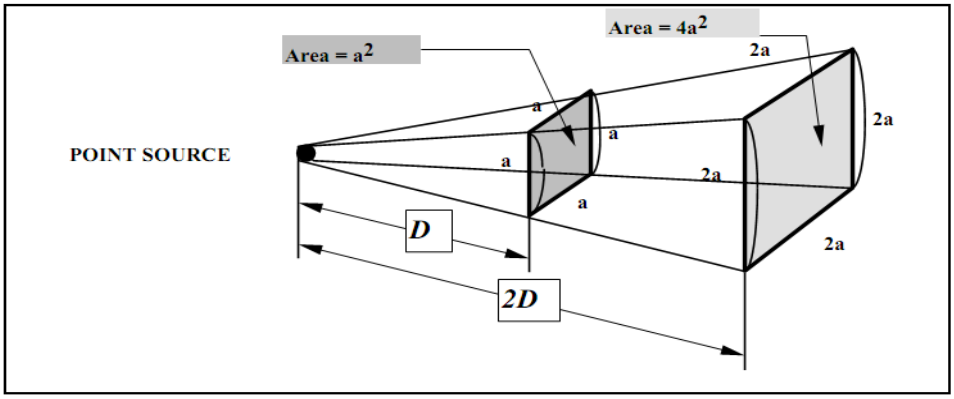
## 4.13.1.8 Sound Propagation

When sound propagates over a distance, it changes in level and frequency content. The manner in which noise reduces with distance depends on factors, including geometric spreading, ground absorption, and atmospheric effects. These factors are described in detail, below.

### *Geometric Spreading*

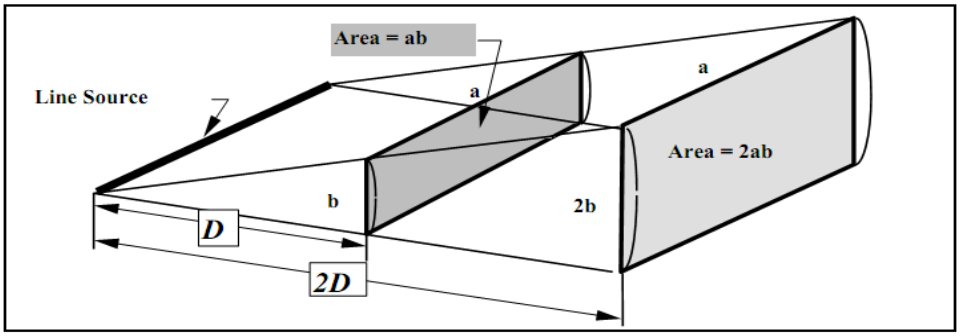
Sound from a localized source (i.e., point source) propagates uniformly outward in a spherical pattern; therefore, this type of propagation is called *spherical spreading*. The sound level generally attenuates (or decreases) at a rate of 6 dB for each doubling of distance from a point/stationary source as its energy is continuously spread out over a spherical surface (see **Figure 4.13-2**).

Roadways and highways, and to some extent moving trains, consist of several localized noise sources on a defined path, and hence are treated as "line" sources, which approximate the effect of several point sources (see **Figure 4.13-3**). Noise from a line source propagates over a cylindrical surface, often referred to as *cylindrical spreading*. Sound levels generally attenuate at a rate of 3 dB for each doubling of distance from a line source. Therefore, noise due to a line source attenuates less with distance than that of a point source with increased distance.




SOURCE: Caltrans, 2009

**Figure 4.13-2**
Point Source Spreading with Distance




SOURCE: Caltrans, 2009

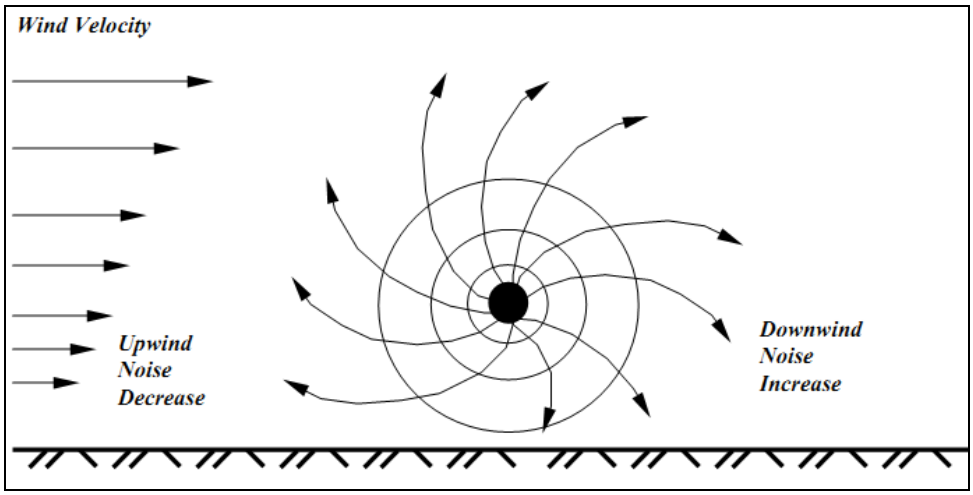
**Figure 4.13-3**
Line Source Spreading with Distance

### *Ground Absorption*

The propagation path of noise from many typical sources such as roadways to a receiver is usually very close to the ground. Noise attenuation from ground absorption and reflective-wave canceling adds to the attenuation associated with geometric spreading. Traditionally, the excess attenuation has also been expressed in terms of attenuation per doubling of distance. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receiver, such as a paved parking lot or body of water), no excess ground attenuation generally is expected. For acoustically absorptive or soft sites (i.e., sites with an absorptive ground surface between the source and the receiver, such as soft dirt, grass, or scattered bushes and trees), an excess ground-attenuation value of 1.5 dB per doubling of distance is typically expected. When added to cylindrical spreading from traffic noise sources, the excess ground attenuation results in an overall drop-off rate of 4.5 dB per doubling of distance. When added to spherical spreading (point sources), it results in overall drop-off rates of approximately 7.5 dB. These approximations generally are applicable only for receivers within 300 feet of the noise source(s), and should not be applied to sound path lengths of more than 300 feet.

### *Atmospheric Effects*

Receivers located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas receivers upwind from the source can have lowered noise levels. This is illustrated in **Figure 4.13-4**.



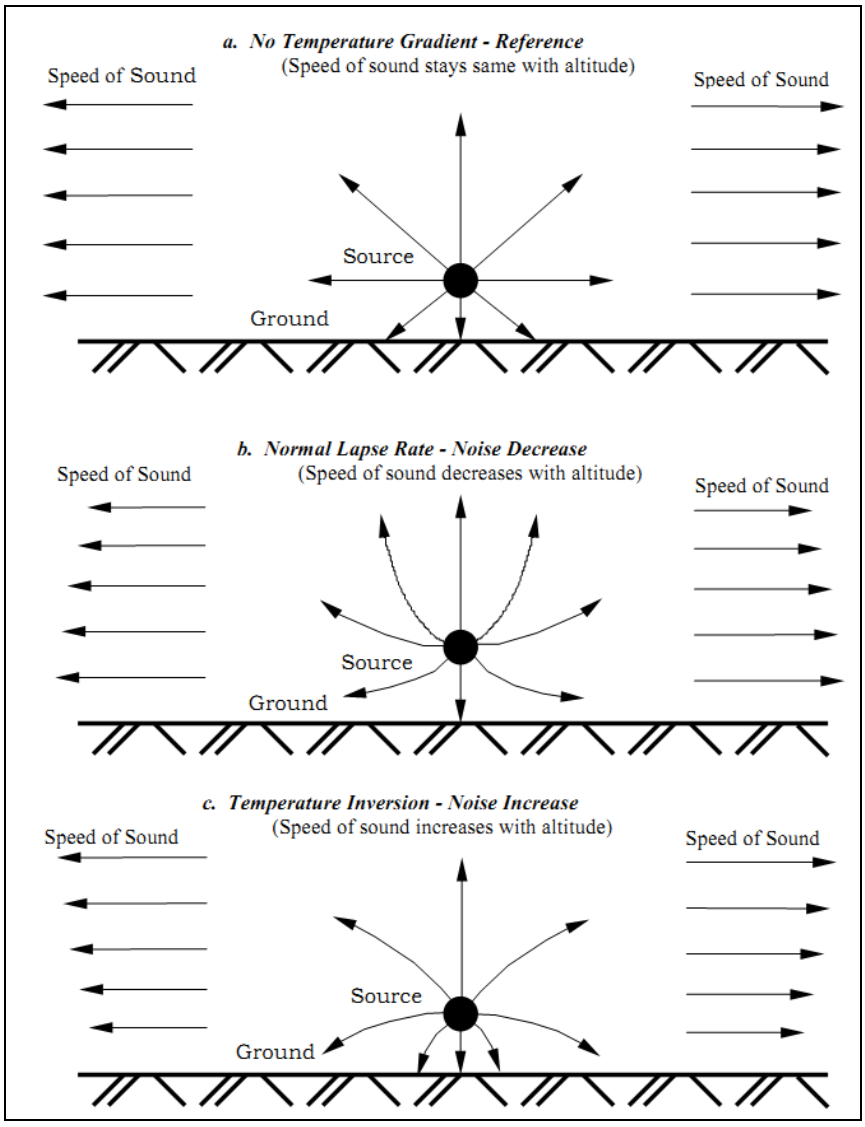

SOURCE: Caltrans, 2009

**Figure 4.13-4**
Wind Effects on Noise Levels

In addition to the enhancing effect produced by wind, sound levels can increase at large distances from the source (e.g., more than 500 feet) due to atmospheric temperature inversions (i.e., increasing temperature with elevation) or can decrease with distance from the source at a higher rate than the typical spreading loss with distance rate (see above) due to a temperature lapse condition (i.e., decreasing temperature with elevation).

Temperature inversions are a common part of the meteorological environment in California. During a temperature inversion the air temperature at the ground is cooler than that several hundred feet above the ground. These temperature inversions typically are caused when a warm, sunny day is followed by a cold, clear night. The sun warms the earth's surface during the day and generally the air temperature near the ground is higher than the air temperature at higher elevations; however, when the sun sets, the earth cools quickly by infrared radiation into space and so does the air mass at lower elevations, with the result that the air temperature at high elevations soon becomes warmer than that near the ground. The speed of sound is higher in warmer air, and this inverted temperature profile causes the sound waves in the warmer air to overtake those travelling in cooler air, thus the sound "bends" back toward the ground (see **Figure 4.13-5**).

Other factors such as air temperature, humidity, and turbulence also affect sound propagation. For instance, air temperature and humidity have a substantial effect on the rate of molecular absorption as sound travels large distances. A sound consisting primarily of middle frequencies such as speech or animal vocalization attenuates approximately 5 additional decibels for every 1,000 feet of travel with an air temperature of 70 degrees Fahrenheit and a humidity of 30 to 40 percent. This atmospheric effect is in addition to the other effects discussed above.




SOURCE: Caltrans, 2009

**Figure 4.13-5**
Effects of Temperature Gradients on Noise

## 4.13.1.9 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. There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal and is typically expressed in units of inches per second (in/sec). The PPV is most frequently used to describe vibration impacts to buildings. The root mean square (RMS) amplitude is most frequently used to describe the affect of vibration on the human body. The RMS amplitude is defined as the average of the squared amplitude of the signal. Decibel notation (VdB) is commonly used to measure RMS. The decibel notation acts to compress the range

of numbers required to describe vibration (FTA, 2006). Typically, ground-borne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration.

# 4.13.2 Setting

## 4.13.2.1 Study Area and Ambient Noise Environments

The Quarry is situated near the base of the San Andreas Mountain Range west of the City of Cupertino and south of the City of Los Altos in Santa Clara County. The base elevation of the site is between approximately 600-700 feet above sea level. The City of Los Altos is north of the site and separated from the Quarry by a substantial mountain ridge. The ridge rises to approximately 1,300 feet above sea level and noses down to the Quarry base elevation as it nears Stevens Creek Boulevard. The Stevens Creek Quarry is adjacent to the south of the Project Area. **Table 4.13-2** summarizes the measured ambient noise exposures in the vicinity of the Project Area expressed as $L_{dn}$. These measurements, with the exception of those taken at Site 4, were completed over a period of two days in 2009 by Edward L. Pack Associates, Inc., and represent the existing noise exposure at the outskirts of the eastern border of the Project Area. See **Figure 4.13-6** for the noise measurement locations relative to the Project Area and the closest noise-sensitive receptors.

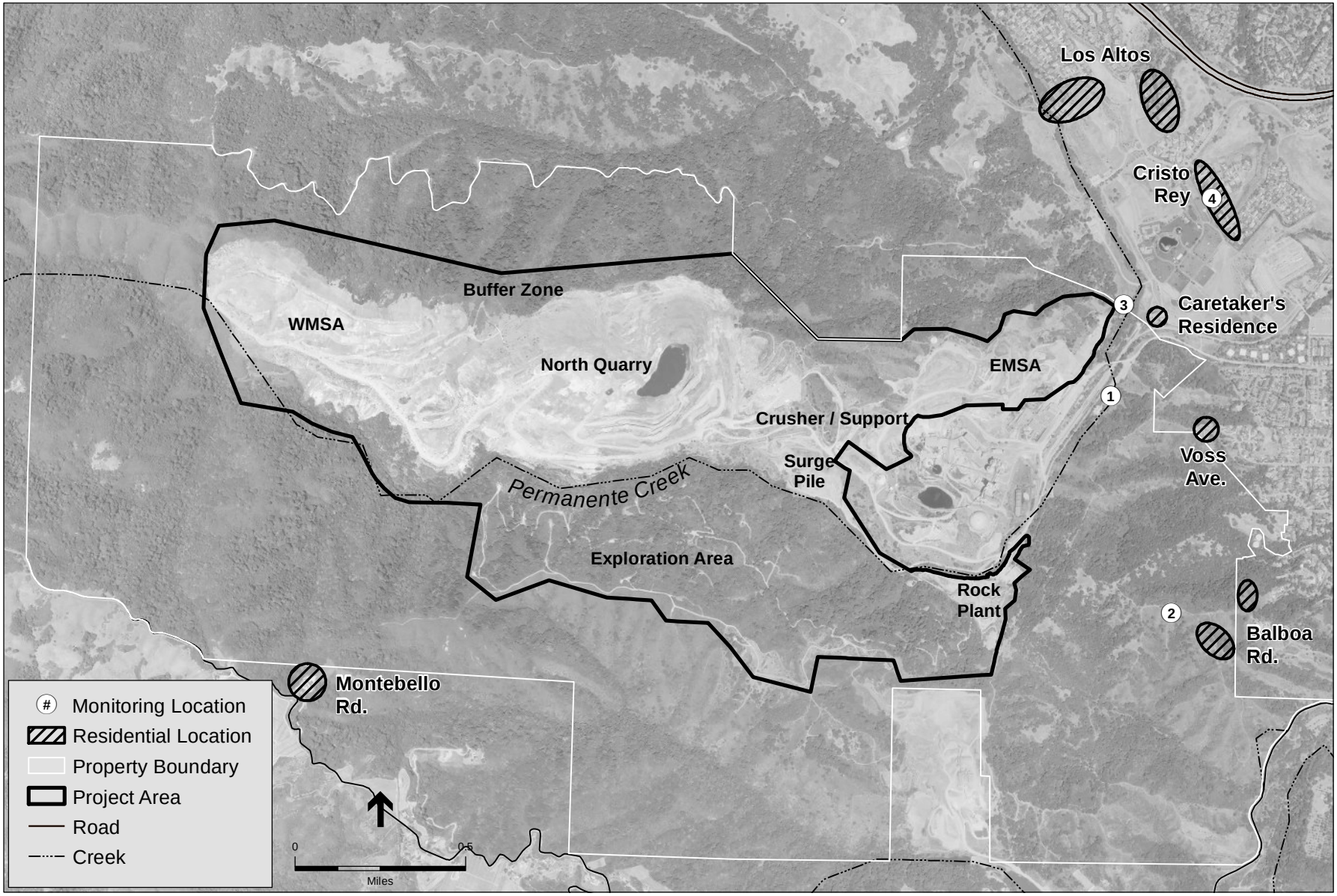
**TABLE 4.13-2**
**SUMMARY OF AMBIENT NOISE LEVEL MEASUREMENTS IN THE PROJECT VICINITY**

| Location | Noise Level, dB $L_{dn}$ |
|---|---|
| 1 –east of Project Area | 54-55 |
| 2 – southeast of Project Area | 54 |
| 3 – northeast of Project Area | 56-57 |
| 4 – Cristo Rey residential development | 49 |

NOTE: Measurements at Location 4 were completed in 1995 as part of the Cristo Rey residential development application.

SOURCE: Edward L. Pack Associates, Inc., 2011

The ambient noise level measurements summarized in Table 4.13-2 for Locations 1 through 3 were conducted to extrapolate the noise levels and noise exposures generated by the overall operations in the Project Area and nearest residential areas for evaluation relative to the County's noise standards. The noise measurements at the Cristo Rey residential location (Location 4) were made in 1995 as part of that project's development application. Based on the measured ambient noise levels presented in Table 4.13-2, existing noise levels were calculated for the other nearby residential neighborhoods. For the calculated noise levels at the nearest residential areas to the Project Area, see **Table 4.13-3**. Generally, extrapolated noise exposures at residential areas closest to the Project Area that could be the most affected by noise from the Project are in the range of 45-55 dB $L_{dn}$. These levels are typical for suburban neighborhoods. Homes directly adjacent to the major roadways in these areas experience higher noise levels.




SOURCE: SOURCE: Lehigh, 2011; ESRI, 2011

Lehigh Permanente Quarry Reclamation Plan Amendment . 211742

**Figure 4.13-6**

Sensitive Noise Receptors

**TABLE 4.13-3**
**SUMMARY OF EXTRAPOLATED AMBIENT NOISE LEVELS AT NEAREST RESIDENTIAL AREAS**

| Residential Location | Noise Level, dB $L_{dn}$ |
|---|---|
| Caretaker's Residence | 55 |
| Cristo Rey Neighborhood | 49[1] |
| Voss Avenue Neighborhood | 50 |
| Montebello Road Neighborhood | 47 |
| Balboa Road Neighborhood | 52 |

[1] The noise level at the Cristo Rey Neighborhood is a measured value, not extrapolated.

SOURCE: Edward L. Pack Associates, Inc., 2011

Ambient noise exposure in residential areas around the Project site generally is dominated by typical suburban noise sources such as traffic, aircraft over-flights, community activities, and natural sounds. Noise from existing operations at the site generally is inaudible at residences in the vicinity with the exception of a low-level "hum" from the Cement Plant kilns that is slightly noticeable at night when other background noise exposure is at its lowest. Noise from the kilns is only audible at residences that are not near any major roadways.

### 4.13.2.2 Noise-Sensitive Land Uses

Noise-sensitive land uses are defined as locations where people reside or where the presence of unwanted sound could adversely affect the use of the land. Noise-sensitive land uses typically include residences, hospitals, schools, libraries, and certain types of recreational uses. Noise-sensitive, residential receivers are found throughout the study area (see Figure 4.13-6) and are discussed below.

The Gates of Heaven Cemetery and a County park are the closest uses to the Project Area to the northeast. Single-family residential homes are adjacent to the Gates of Heaven Cemetery. Single-family and multi-family residences are located to the east, but diverge from the site from the northeast to the southeast as they follow the base of the hillside. Scattered, rural homes along Montebello Ridge are to the south and southeast of the Project Area. These properties are approximately 3,700 feet or more removed from the WMSA. A series of mountain ridges is interposed between the majority of residences in the City of Cupertino and Project Area, shielding most of the Project Area from view. All but a few of the area residences are well below the tops of the ridges and do not have a view of the Project Area. The ridges provide substantial acoustical shielding for these residential areas. A similar topographic circumstance occurs for residents of Los Altos, whereby a high ridge runs approximately southeast to northwest along the northerly boundary of the Project Area. The closest Los Altos residences are located approximately 4,000 feet north of the northern Project Area boundary.

There are a few homes on Montebello Road to the south-southwest of the Project Area. The home nearest the Project Area is located at the terminus of the public portion of Montebello Road and is approximately 3,700 feet from the Project Area boundary near the WMSA. This home has a partial view of the Quarry pit area; however, interposed mountain ridges interrupt the majority of the sight lines into the Project Area, and provide acoustical shielding.

The EMSA is located at the northeasterly portion of the Project Area, near the site entrance from Permanente Road. The closest residence to the EMSA is a caretaker's residence located approximately 700 feet east of the EMSA, on the north side of Permanente Road. The next closest residences are approximately 2,000 feet to the east, south of Permanente Road.

## 4.13.2.3 Regulatory Setting

### *State*

The State of California requires each local government entity to include a noise element as part of its general plan. To support appropriate land use planning at the local level, Title 4 of the California Administrative Code presents guidelines that identify the noise levels that are compatible with various types of land uses. The state land use compatibility guidelines are shown in **Figure 4.13-7**.

### *Local*

As described in Chapter 2, *Project Description,* portions of the Project would be located near or would affect noise-sensitive receivers within the County and the City of Cupertino. The following summarizes the noise exposure limits applicable to the Project. These limits are found in local General Plans and codes.

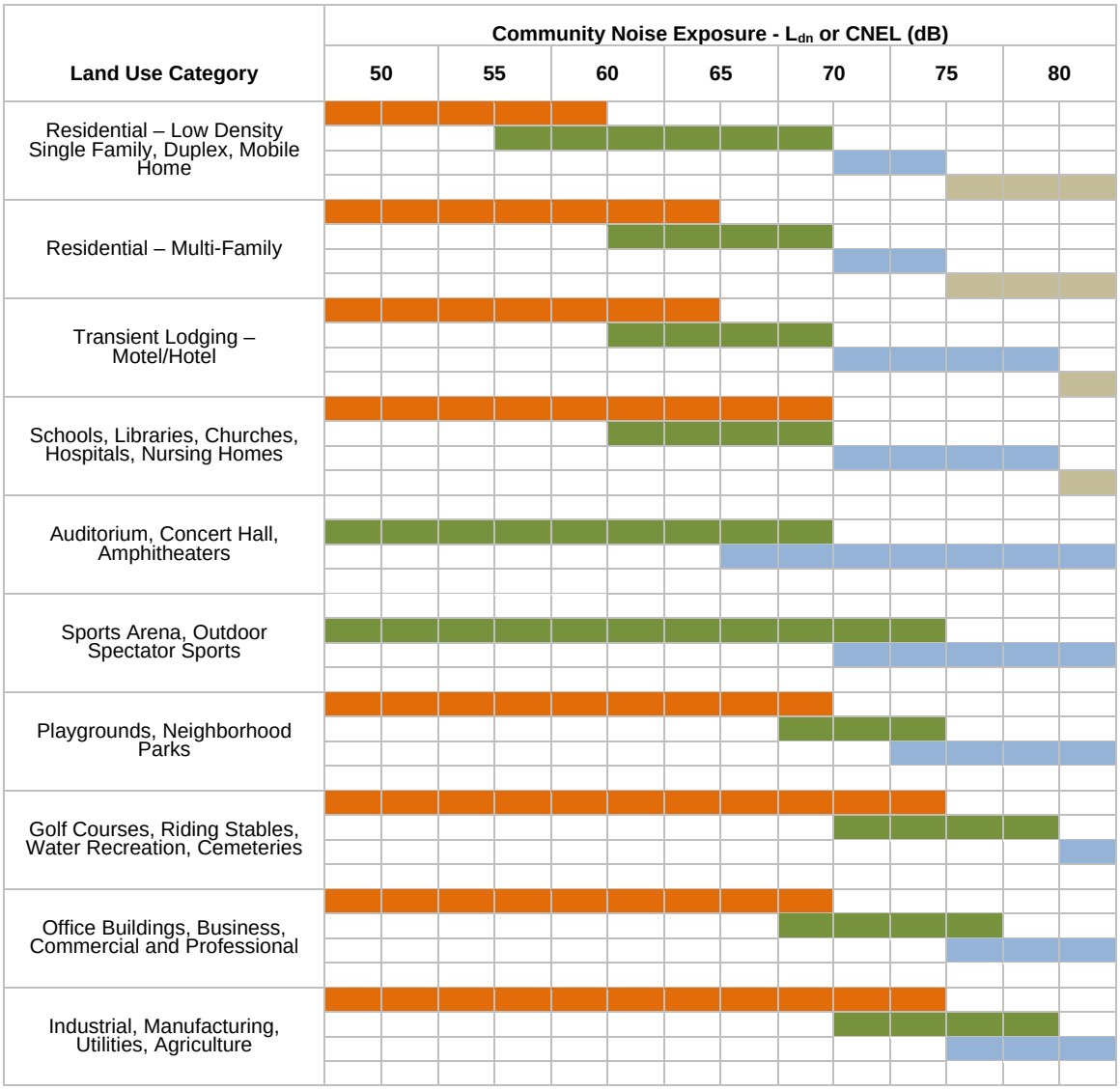
#### County of Santa Clara General Plan Health and Safety Chapter

The Public Health and Safety chapter of the County General Plan establishes a land use compatibility standard of 55 dB $L_{dn}$. This noise level limit is considered "satisfactory" for residential and other noise-sensitive uses, and is generally measured at outdoor activity areas. An interior noise exposure limit of 45 dB $L_{dn}$ is recommended for residential receivers (assuming doors and windows closed).

#### County of Santa Clara Ordinance Code

County Municipal Code §B11-152 establishes noise exposure criteria for non-transportation noise sources (i.e., stationary sources) at noise-sensitive uses. These standards are generally established for conflict resolution in established parts of the County and are appropriate for the determination of Project noise impacts. The criteria are summarized in **Table 4.13-4**.

Each of the noise exposure limits listed in Table 4.13-4 is lowered by 5 dB when addressing impulsive or tonal sources, or sources consisting primarily of speech or music. Also, if the ambient noise exposure exceeds the applicable $L_{50}$-$L_2$ criteria, then the criteria is increased in 5 dB increments to encompass the ambient noise exposure. If the $L_{max}$ exceeds the listed criteria, then the measured noise exposure is used as the applicable noise exposure limit.




| | | |
|---|---|---|
| | **Normally Acceptable** | Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements |
| | **Conditionally Acceptable** | New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice. |
| | **Normally Unacceptable** | New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirement must be made and needed noise insulation features included in the design. |
| | **Clearly Unacceptable** | New construction or development generally should not be undertaken. |

SOURCE: State of California, Governor's Office of Planning and Research, 2003. *General Plan Guidelines*

**Figure 4.13-7**
Land Use Compatibility for Community Noise Environment

**TABLE 4.13-4**
**APPLICALBE NOISE EXPOSURE LIMITS**
**COUNTY OF SANTA CLARA MUNICIPAL CODE SECTION B11-152**

| Noise Descriptor | Noise Level, dB (Assumes +5 dB Land Use Boundary Adjustment)[1] | |
|---|---|---|
| | Daytime (7 a.m.-10 p.m.) | Nighttime (10 p.m.-7 a.m.) |
| $L_{50}$ | 60 | 50 |
| $L_{25}$ | 65 | 55 |
| $L_{8}$ | 70 | 60 |
| $L_{2}$ | 75 | 65 |
| $L_{max}$ | 80 | 70 |

[1] Pursuant to County of Santa Clara Municipal Code §B11-152(a)(4), the allowable noise exposure standard has been adjusted to increase the levels by 5 dB in each category to account in the differences in land use (i.e., industrial verses residential).

SOURCE: County of Santa Clara Municipal Code, 2011

### City of Cupertino General Plan Health and Safety Element

The City of Cupertino has adopted a Health and Safety Element as part of the General Plan and has adopted a noise ordinance. Policy 6-50 of the City of Cupertino General Plan states that the Land Use Compatibility Chart of the City's Health and Safety Element and the City's Municipal Code shall be used in making land use decisions with respect to noise. The Land Use Compatibility Chart identifies an exterior noise environment of up to 60 dB $L_{dn}$ as being normally acceptable for residential uses. Therefore, if noise levels generated by the Project would cause the $L_{dn}$ at the nearest residence to exceed 60 dBA, the impact would be considered significant.

### City of Cupertino Ordinance Code

Chapter 10.48 of the City of Cupertino Municipal Code provides noise limits and definitions within the City limits, including separate limits for "Daytime" (7 a.m. to 8 p.m. on weekdays, and 9 a.m. to 6 p.m. on weekends) and "Nighttime," (8 p.m. to 7 a.m. on weekdays, and 6 p.m. to 9 a.m. on weekends). The Nighttime limit would be the most restrictive standard for the City of Cupertino. **Table 4.13-5** shows acceptable noise levels for the City. These limits would be enforceable at any time by the City of Cupertino.

In addition, Chapter 10.48.053 of the City Municipal Code defines standards for Grading, Construction, and Demolition as follows:

A. Grading, construction and demolition activities shall be allowed to exceed the noise limits of §10.48.040 during daytime hours; provided, that the equipment utilized has high-quality noise muffler and abatement devices installed and in good condition, and the activity meets one of the following two criteria:

   1. No individual device produces a noise level more than eighty-seven dBA at a distance of twenty-five feet (7.5 meters); or

   2. The noise level on any nearby property does not exceed eighty dBA.

**TABLE 4.13-5**
**APPLICABLE CUPERTINO CITY NOISE ORDINANCE RESIDENTIAL LIMITS**

| Allowable Duration | Maximum Noise Level at Complaint Site or Receiving Property (dBA) | |
|---|---|---|
| | Daytime | Nighttime |
| Maximum continuous noise level[1] | 65 dBA | 55 dBA |
| $L_{12.5}$ (2-hour period) | 70 dBA | not applicable |
| $L_{8.3}$ (2-hour period) | 75 dBA | not applicable |
| $L_{4.2}$ (2-hour period) | 80 dBA | not applicable |
| $L_{0.8}$ (2-hour period) | 84 dBA | not applicable |
| $L_{max}$ (2-hour period) | 85 dBA | not applicable |

1 Continuous noise sources from a nonresidential land use must not exceed 65 dBA during daytime or 55 dBA at nighttime at a neighboring sensitive receptor. For the purposes of this analysis, it is assumed that the "maximum continuous noise level" is represented by the $L_{eq}$ noise descriptor.

Notwithstanding §10.48.053A, it is a violation of this chapter to engage in any grading, street construction, demolition or underground utility work within seven hundred fifty feet of a residential area on Saturdays, Sundays and holidays, and during the nighttime period, except as provided in §10.48.030 of the Cupertino Municipal Code (Emergency Exception).

## 4.13.3 Baseline

The overall baseline for this EIR reflects the physical environmental conditions in the vicinity of the Project Area as they existed in June 2007, when the County published a NOP in connection with the Applicant's first proposed amendment of the 1985 Reclamation Plan. Ambient noise measurements first were made at or near the Project Area boundaries in the vicinity of the nearby residences in November 2009. Activities at the site at the time of the 2009 noise measurements were not materially different than those that were occurring in 2007. Consequently, the 2009 noise data are considered representative of the 2007 baseline conditions and constitute the best available data.

## 4.13.4 Significance Criteria

Consistent with the County's Environmental Checklist and Appendix G of the CEQA Guidelines, the Project would have a significant impact if it would:

a) Expose persons to or generate noise levels in excess of standards established in any applicable plan or noise ordinance, or applicable standards of other agencies;

b) Expose persons to or generate excessive ground-borne vibration or ground-borne noise levels;

c) Produce a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or

d) Produce a substantial temporary or periodic increase in ambient noise levels in the project vicinity above existing levels existing without the project.

### 4.13.4.1 Noise

Noise exposure from the Project would be considered significant if it would exceed the applicable County or City General Plan land use compatibility standards, Noise Ordinance noise exposure limits set forth above, or otherwise cause a substantial increase over ambient noise. Due to the relatively continuous nature of Project noise sources, it is expected that the County's $L_{50}$ noise exposure limits (i.e., 60 dB $L_{50}$ daytime and 50 dB $L_{50}$ nighttime) and the City's maximum continuous $L_{eq}$ noise exposure limits (i.e., 65 dB daytime and 55 dB nighttime) would be the most restrictive with respect to the Project. Therefore, only these noise exposure limits are addressed in the following analysis. Additionally, a substantial increase over ambient noise levels would occur if Project-related noise exposure would increase the ambient noise exposure by more than 3 decibels if the existing noise environment is at or over the County land use compatibility standard of 55 dB $L_{dn}$. If the existing noise environment is below the standard, then an increase of up to 5 dB is considered acceptable provided that the total noise exposure does not exceed the standard of 55 dB $L_{dn}$. These criteria are applied at the closest noise-sensitive receptors to the Project.

### 4.13.4.2 Vibration

A numerical threshold to identify the point at which a vibration impact occurs has not been identified by County standards or codes. Therefore, a peak particle velocity (PPV) threshold identified by the California Department of Transportation (Caltrans) is used in this analysis to determine the significance of vibration impacts related to adverse human reaction and risk of architectural damage to normal buildings.[1] The PPV threshold is 0.20 in/sec (Caltrans, 2004). This PPV level has been found to be annoying to people in buildings and can pose a risk of architectural damage to buildings.

## 4.13.5 Discussion of Criteria with No Impacts

As analyzed in this section, the Project would cause no impact related to significance criterion b). By contrast, the Project could cause an impact related to each of the other significance criteria; that analysis is provided in Section 4.13.6.

**b) The Project would not result in exposure of persons to or generation of excessive ground borne vibration or groundborne noise levels.**

The Project would employ conventional earth moving activities and the equipment/techniques to be used would not cause excessive groundborne vibration. For example, the use of heavy equipment, such as a large bulldozer, would generate vibration levels of up to 0.089 PPV at a distance of 25 feet. At this short distance, equipment PPV levels would be less than the significance threshold of 0.20 in/sec. No blasting would occur as part of the Project. On-site Project equipment would operate at a distance of at least 700 feet from the closest sensitive receptor location; therefore, vibration levels at the closest sensitive receptor locations would not be perceivable. No related impact would result.

[1] Architectural damage could be structural damage, such as cracking of floor slabs, foundations, columns, beams, or wells, or cosmetic architectural damage, such as cracked plaster, stucco, or tile (Caltrans, 2004).

Ground borne noise is the rumbling sound of structure surfaces caused by high vibration levels. Because implementation of the Project would not result in exposure of persons to or generation of excessive groundborne vibration, it also would not expose them to or generate excessive groundborne noise levels. Consequently, the Project would cause no impact related to groundborne noise.

## 4.13.6 Impacts and Mitigation Measures

### 4.13.6.1 Analysis Methodology

To determine the levels of noise generated by each reclamation phase and evaluate Project noise relative to County standards and applicable criteria, noise level data for each of the items of equipment specified to be used for each phase were acquired from past studies of heavy equipment operations and quarry analyses. The list of heavy equipment and the daily durations of their use for Phases 1 and 2 were obtained from the Project Air Quality Technical Analysis (Ashworth Leininger Group (ALG), 2011). Because the level of equipment activity in Phase 3 would be much lower than in Phases 1 and 2 of the Project, the ALG report did not provide a similar level of equipment usage for Phase 3. Therefore, to ensure that potential noise impacts during Phase 3 were adequately analyzed for the EIR, the list of equipment planned for Phase 3 was obtained from the 2011 Permanente Quarry Financial Assurance Estimate (EnviroMine, 2011). The daily durations of use of the equipment for Phase 3 were not included in the Financial Assurance Estimate. Therefore, due to the less intense nature of the Phase 3 activities, it is expected that Phase 3 operations utilizing heavy equipment would occur for a period of 8 hours per day during the day shift only.

Operation scenarios were developed for each piece of heavy equipment that would be associated with the Project. Multiple pieces of the same equipment type (e.g., 10 CAT 777 trucks) were distributed evenly over the given Project area to best represent overall typical operation noise exposure. Each piece of equipment was positioned to best represent worst-case noise exposure at the affected receptor locations. It is assumed that re-contouring associated with reclamation of the EMSA slopes would be completed by building the slope down from upper unshielded[2] elevations so that much of the earth/material moving equipment would be operating at upper, acoustically unshielded elevations for extended time periods rather than all equipment being located at the foot of the slopes (shielded) pushing aggregate material up. This represents a worst-case noise scenario.

Based on existing quarry operations, it is expected that work shifts would be from 6:00 a.m. to 2:30 p.m. (day shift) and 2:30 p.m. to 11 p.m. (swing shift). Equipment that would be scheduled for more than one shift was divided between the day shift and the swing shift with at least 1 hour of nighttime operation. Both shifts would have one nighttime hour within the work period (i.e., 6:00 to 7:00 a.m. and 10 p.m. to 11 p.m.).

[2] For this analysis, “unshielded” activities are those that occur in areas with direct line-of-sight to a sensitive receptor and “shielded” activities are those that occur in areas with intervening vegetation or topography between the activity and a sensitive receptor.

The analyses for reclamation Phases 1, 2, and 3 include the extrapolation of reference equipment noise level data to the specific source-to-receptor distances (assuming standard spherical divergence, -6 dB per doubling of distance) and use of the expected operational data to estimate noise exposure in terms of $L_{dn}$. These calculations were completed for scenarios with no topographic shielding (i.e., worst-case noise exposure) and with average topographic shielding. The analyses do not include the re-vegetation/re-seeding of the reclamation areas as these operations are relatively benign acoustically and do not entail the continued use of heavy equipment. The analyses represent the noise environments created during the operations that include heavy equipment from commencement through final grading of the respective areas.

During continuous excavation and earth moving operations associated with rock quarries, there is generally a quantifiable relationship between the hourly $L_{eq}$ and the statistical $L_n$ noise descriptors used in the County's Noise Ordinance ($L_2$-$L_{50}$). Specifically, for this assessment, typical heavy equipment operations in mountainous quarry settings generally produce $L_{50}$ noise exposure approximately equal to the $L_{eq}$ minus 1 dB. As mentioned above, Project-generated noise exposure in terms of the $L_{dn}$ was calculated based on the hourly $L_{eq}$ and the estimated hours of equipment operations.

The three Project phases would occur sequentially with no overlap. Phase 1 would begin with Project approval and would end in approximately 2020; Phase 2 would end in approximately 2025; and Phase 3 would end in approximately 2030. Due to the phasing of reclamation activities and the general locations for Project work relative to the closest noise-sensitive uses, a given receptor would not be expected to be adversely affected by work completed for multiple reclamation phases.

**Impact 4.13-1: Operations associated with reclamation during Phase 1 would exceed County noise standards and increase ambient noise levels at noise-sensitive uses in the vicinity. (*Less than Significant Impact with Mitigation Incorporated*)**

A summary of the heavy equipment operations for reclamation Phase 1 of the Project is presented in **Table 4.13-6**. Included in the table are the $L_{eq}$ values, normalized to a distance of 100 feet from the equipment. The equipment noise levels were acquired from several sources as referenced in the table and below. The raw noise level data for the various items of equipment were acquired at various distances. Standard spherical divergence calculations were performed to normalize the data to a distance of 100 feet. Also included in the table are the daily use hours for each piece of equipment and the expected "typical" shielding offset applied for intervening Project-area topography. Discussions of the estimated reclamation Phase 1 noise levels that would occur at the closest residences follow the table.

### Caretaker's Residence

A noise exposure assessment was completed for the caretaker's residence located north of the EMSA (see Figure 4.13-6 for the location of the caretaker's residence). Unshielded operations associated with reclamation in the EMSA area would be expected to produce a noise exposure of approximately 61 dB $L_{eq}$, 60 dB $L_{50}$, and 61 dB $L_{dn}$. This noise exposure would exceed the County's nighttime limit of 50 dB $L_{50}$ and the land use compatibility standard of 55 dB $L_{dn}$. Operations below

**TABLE 4.13-6**
**SUMMARY OF RECLAMATION PHASE 1 EQUIPMENT, OPERATION USE HOURS, AND REFERENCE NOISE LEVELS USED IN PROJECT NOISE ASSESSMENT**

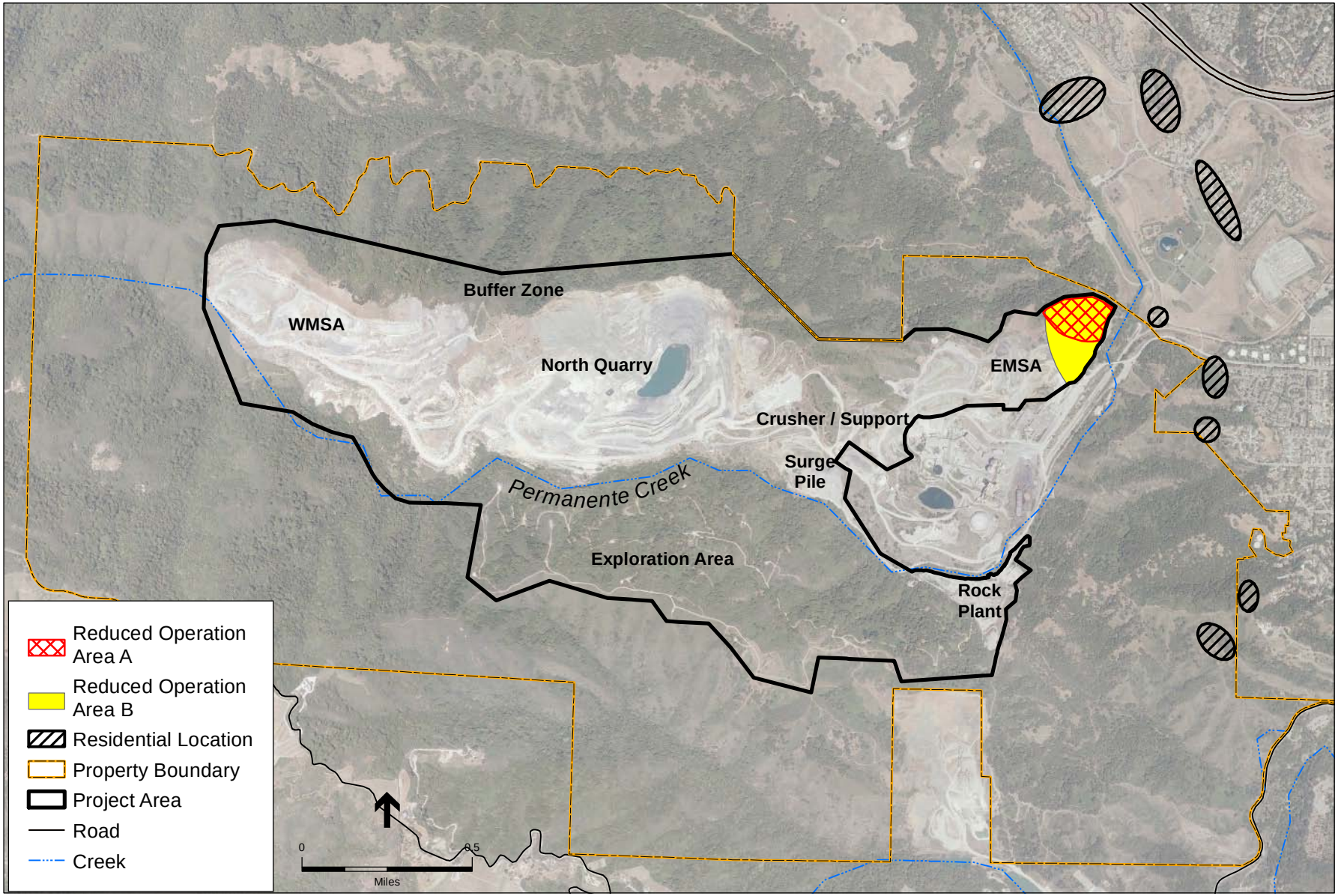
| Equipment No., Make, and Model Type | Daily Use Hours | Reference Noise Level at 100 Feet (dB $L_{eq}$) |
|---|---|---|
| Three CAT D10 Bulldozers | 11 | 75 |
| One CAT 345 Excavator | 8 | 64 |
| 2 CAT 16 Motor Graders | 7 | 71 |
| 1 CAT 785 Mining Truck | 12 | 74 |
| 8 CAT 777 Off-Road Haul Trucks | 13 | 72 |
| 3 CAT 740 Articulated Trucks | 7 | 68 |
| 1 CAT 824 Bulldozers | 4 | 68 |
| 3 CAT 992 Front-End Loaders | 9 | 72 |
| 1 CAT 988 Front-End Loader | 4 | 70 |
| 2 CAT 773 Water Trucks | 8 | 70 |
| 1 Holland Dozer Trap Conveyor | 16 | 68 |

SOURCES: Edward L. Pack Associates, Inc., 2011;Ashworth Leininger Group, 2011; EnviroMine Inc., Permanente Financial Assurance Estimate, 2011

560 feet of elevation would be shielded by intervening topography, resulting in noise exposure of approximately 54 dB $L_{eq}$, 53 dB $L_{50}$ and 53 dB $L_{dn}$. The $L_{50}$ noise exposure would still be expected to exceed the County's nighttime noise exposure limit, resulting in a significant impact.

For comparison to ambient conditions, the Project-generated noise exposures were added to the existing ambient noise exposure at the residence and the difference was calculated. An increase of 3 dB or less relative to the ambient noise level is considered a less-than-significant impact. Operations at elevations greater than 560 feet (see the highlighted noise impact "Area A" identified in **Figure 4.13-8**) would result in a total combined noise level of 62 dB $L_{dn}$ and would be expected to result in increases in the noise exposures at the caretaker's residence of more than 3 dB, and would be considered a significant impact related to increase in noise exposure.

In addition to non-sensitive receptors, Project activities associated with Phase 1 would likely be audible at the PG&E Trail in the Rancho San Antonio Preserve/Park, which is located approximately 0.25 mile (1,320 feet) from the nearest boundary of the EMSA. Most of the PG&E trail is topographically shielded from the quarry with the exception of one segment of several hundred feet where the EMSA storage area is visible to the south. Based on estimated Project noise levels at the caretaker's residence, which is 700 feet from the EMSA, Project noise levels at the PG&E Trail would be up to approximately 55 dB $L_{eq}$. The County General Plan has a noise standard of 55 dBA $L_{dn}$ for parks and open space areas; there are no standards for parks and open space areas under the County Noise Ordinance. Based on a noise exposure of 55 dBA $L_{eq}$ and the short duration in which trail users would be exposed to quarry noise, this noise level would not be expected to cause a significant noise impact to recreational users of the PG&E Trail.




SOURCE: SOURCE: Lehigh, 2011; ESRI, 2011

Lehigh Permanente Quarry Reclamation Plan Amendment . 211742

**Figure 4.13-8**

Reduced Operation Areas

### Cristo Rey Residential Development

A noise exposure assessment was completed for the closest residential receptors in the Cristo Rey residential development (in the City of Cupertino) east of the EMSA (see Figure 4.13-6 for the location of the Cristo Rey residential area). Unshielded operations associated with reclamation activities in the EMSA area would be expected to produce a noise exposure of approximately 55 dB $L_{eq}$, 54 dB $L_{50}$, and 55 dB $L_{dn}$. This noise exposure may be expected for operations at elevations above 615 feet, and would not exceed the applicable City of Cupertino noise exposure limits. Project-related noise exposure would be approximately 51 dB $L_{eq}$, 50 dB $L_{50}$, and 50 dB $L_{dn}$ for operations at elevations below 615 feet. This noise exposure also would satisfy the applicable City of Cupertino criteria. Therefore, noise exposure associated with operations would result in a less-than-significant impact relative to local standards.

For comparison to ambient conditions, the Project-generated noise exposures were added to the existing ambient noise exposure at the residences and the difference was calculated. Operations at elevations greater than 615 feet would result in a total combined noise level of 56 dB $L_{dn}$ and would be expected to result in noise exposure increases of more than 5 dB relative to the 49 dB $L_{dn}$ ambient noise level measurement at Site 4 (see the ambient noise level measurement results in Table 4.13-2, above), and would be considered a significant impact associated with increase in noise exposure.

### End of Voss Avenue (East of Quarry)

A noise exposure assessment was completed for the closest residential receptors to the east of the quarry on Voss Avenue in the City of Cupertino (see Figure 4.13-6 for the location of the Voss Avenue residential area). Noise exposure from unshielded operations was calculated to be approximately 34 dB $L_{eq}$, 33 dB $L_{50}$, and 34 dB $L_{dn}$. This noise exposure would be well below the applicable City of Cupertino noise exposure limits, and would not be expected to contribute significantly to noise exposure increases above the ambient. Therefore, this noise exposure impact is considered less than significant.

### Impact Summary

**Table 4.13-7** summarizes the Project-related noise exposure that would occur at the caretaker's residence compared to the applicable County noise exposure criteria and the Project-related noise exposure that would occur at the Cristo Rey development and the Voss Avenue residences relative to the City of Cupertino noise exposure criteria. In addition, **Table 4.13-8** summarizes the increases in ambient noise levels that would occur at the subject residences.[3] It should be noted that the Project noise levels summarized in Tables 4.13-7 and 4.13-8 would cease at the end of Phase 1 in approximately 2020 (approximately nine years in duration), as there would be no further heavy equipment activity at the EMSA.

[3] The effects of the atmosphere (including wind, temperature, and inversions) on perceived noise levels at a receptor are relatively negligible over long periods of time and occur during specific times of the day and times of year. The variation in the noise levels at receptor locations both near and far from the quarry would be inconsequential in relation to the variation of noise due to the varying operations within the Project Area.

**TABLE 4.13-7**
**SUMMARY OF RECLAMATION PHASE 1 NOISE LEVELS COMPARED TO LOCAL STANDARDS**

| | $L_{eq}$[1] | $L_{50}$[2] | $L_{dn}$[3] |
|---|---|---|---|
| Daytime Limit | 65 | 60 | 55/60 |
| Nighttime Limit | 55 | 50 | |
| Shielded Operations | | | |
| Caretaker's Residence | 54 | **53** | 53 |
| Cristo Rey Residences | 51 | 50 | 50 |
| Voss Avenue Residences | 25 | 24 | 25 |
| Un-Shielded Operations | | | |
| Caretaker's Residence | 61 | **60** | **61** |
| Cristo Rey Residences | **55** | 54 | 55 |
| Voss Avenue Residences | 34 | 33 | 34 |

1 $L_{eq}$ limits are applicable to residences in City of Cupertino.
2 $L_{max}$ limits are applicable to residences in the County of Santa Clara.
3 $L_{eq}$ limits are presented for County of Santa Clara/City of Cupertino.

NOTES: The caretaker's residence is in an unincorporated area of the County, while the Cristo Rey development and the Voss Avenue homes are in the City of Cupertino. Bold numbers represent an exceedance of the applicable standard.

SOURCE: Edward L. Pack Associates, Inc., 2011

**TABLE 4.13-8**
**SUMMARY OF RECLAMATION PHASE 1 $L_{DN}$ NOISE LEVEL INCREASES**

| Receptor | Ambient | Project-Generated Noise | | Total (Ambient + Project) Noise Exposure | | Change in dB |
|---|---|---|---|---|---|---|
| | | Shielded | Unshielded | Shielded | Unshielded | |
| Caretaker's Residence | 55 | **53** | 61 | 57 | 62 | +2/**+7** |
| Cristo Rey Residences | 50 | 50 | 55 | 53 | 56 | +3/**+6** |
| Voss Avenue Residences | 50 | 25 | 34 | 50 | 50 | 0 |

NOTES: Bold numbers represent a significant increase compared to ambient levels.

SOURCE: Edward L. Pack Associates, Inc., 2011

At the caretaker's residence north of the EMSA, Project-related noise exposure would be expected to exceed the nighttime $L_{50}$ criterion of 50 dB and also would be expected to exceed the 3 dB $L_{dn}$ increase criterion compared to ambient levels due to operations above an elevation of 560 feet. In addition, Project-related noise exposure associated with operations above 615 feet would result in an increase in the ambient noise level of more than 5 dB $L_{dn}$ at the closest residents of the Cristo Rey development. To reduce the nighttime $L_{50}$ and the $L_{dn}$ increase at the closest residential receptors to reclamation Phase 1 operations, the following mitigation measures are proposed.

**Mitigation Measure 4.13-1a:** The Applicant shall prohibit all heavy equipment operations in the northeasterly 11.5 acres of the EMSA (as shown in Figure 4.13-8) during nighttime hours (i.e., between 10:00 p.m. to 7:00 a.m.).

**Mitigation Measure 4.13-1b:** The Applicant shall either: (1) limit all operations in the EMSA within 1,600 feet of the caretaker's residence (as shown in Figure 4.13-8) to no more than one 8-hour shift per day, or (2) submit evidence establishing to the County's satisfaction that there are legally-binding restrictions precluding any occupancy of the caretaker's residence during the entirety of Phase 1 of the Project.

**Impact after Mitigation:** The implementation of these mitigation measures would reduce Project-related noise exposures to levels that would comply with applicable local standards. In addition, as presented in **Table 4.13-9**, the mitigation measure would reduce Project-related noise levels due to activities at Reduced Operation Areas A and B (see Figure 4.13-8) so that the total noise exposure at the nearest sensitive receptors would not exceed the noise level increase significance criteria. The impact would be mitigated to a less-than-significant level.

**TABLE 4.13-9**
**SUMMARY OF RECLAMATION PHASE 1 $L_{DN}$ NOISE LEVEL INCREASES FOLLOWING IMPLEMENTATION OF MITIGATION MEASURES 4.13-1a AND 4.13-1b**

| Receptor | Ambient | Project-Generated Noise | | Total (Ambient + Project) Noise Exposure | | Change in dB |
|---|---|---|---|---|---|---|
| | | Shielded | Unshielded | Shielded | Unshielded | |
| Caretaker's Residence | 55 | 49 | 56 | 56 | 58 | +1/+3 |
| Cristo Rey Residences | 50 | 46 | 51 | 51 | 53 | +1/+3 |
| Voss Avenue Residences | 50 | 19 | 19 | 50 | 50 | +0/+0 |

SOURCE: Edward L. Pack Associates, Inc., 2011

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**Impact 4.13-2: Operations associated with reclamation during Phase 2 would increase ambient noise levels at noise-sensitive uses in the vicinity. (*Less than Significant Impact*)**

A summary of the heavy equipment that would be required for reclamation during Phase 2 is presented in **Table 4.13-10**. Included in the table are $L_{eq}$ values normalized to a distance of 100 feet from the equipment. The equipment noise levels were acquired from several sources as referenced in the table and below. The raw noise level data for the various items of equipment were acquired at various distances. Standard spherical divergence calculations were performed to normalize the data to a distance of 100 feet. Also included in the table are the daily use hours for each piece of equipment and the expected "typical" shielding offset applied for intervening Project Area topography.

**TABLE 4.13-10**
**SUMMARY OF PHASE 2 EQUIPMENT, OPERATION USE HOURS, AND REFERENCE NOISE LEVELS USED IN PROJECT NOISE ASSESSMENT**

| Equipment No., Make, and Model Type | Daily Use Hours | Reference Noise Level at 100 Feet (dB $L_{eq}$) |
|---|---|---|
| 3 CAT D11 Tractors | 14 | 76 |
| 1 CAT D8T Tractor | 8 | 66 |
| 1 CAT 345 Excavator | 8 | 68 |
| 2 CAT 16 Graders | 4 | 71 |
| 8 CAT 777 Off-Road Haul Trucks | 6 | 72 |
| 3 CAT 740 Articulated Trucks | 8 | 68 |
| 1 CAT 824 Bulldozer | 7 | 68 |
| 3 CAT 992 Front-End Loaders | 6 | 72 |
| 1 CAT 988 Front-End Loader | 8 | 70 |
| 2 CAT 773 Water Trucks | 5 | 70 |
| 4 Holland Dozer Trap Conveyors | 16 | 68 |

SOURCES: Edward L. Pack Associates, Inc., 2011; Ashworth Leininger Group, 2011; EnviroMine Inc., Permanente Financial Assurance Estimate, 2011

A noise exposure assessment was completed for the closest residences on the end of Montebello Road west of the WMSA. **Table 4.13-11** summarizes the Project-related noise exposure that would occur at the Montebello Road residences compared to the applicable County noise exposure criteria. In addition, **Table 4.13-12** summarizes the increase in ambient noise levels that would occur at the Montebello Road residences. It should be noted that the Project noise levels summarized in Tables 4.13-11 and 4.13-12 would be limited to the duration of Phase 2, which would be from 2021 to 2025 (approximately five years in duration). Unshielded operations associated with reclamation in the WMSA area above 800 feet in elevation would be expected to produce a noise exposure of approximately 51 dB $L_{eq}$, 50 dB $L_{50}$, and 50 dB $L_{dn}$. This noise exposure would satisfy the County's nighttime limit of 50 dB $L_{50}$ and land use compatibility standard of 55 dB $L_{dn}$. Operations shielded by Project-area topography would produce lower noise levels at the receptors, and also would satisfy the applicable noise exposure criteria. The associated impact would be less than significant.

Ambient noise conditions at these residences are lower than those in the Cupertino and Los Altos neighborhoods due to reduced traffic activity. Still, project-generated noise exposures that would result in a total combined noise level of 52 dB $L_{dn}$ would not be expected to increase the existing noise environment (i.e., 47 dBA) by more than 5 dB. As noted above, the estimated period of Phase 2 reclamation activities and noise exposure to these residences would be approximately five years in duration. An increase of 5 dB or less in the noise environment is considered a less-than-significant impact. Therefore, this impact is considered less than significant.

**Mitigation:** None required.

**TABLE 4.13-11**
**SUMMARY OF RECLAMATION PHASE 2 NOISE LEVELS COMPARED TO LOCAL STANDARDS**

| | $L_{eq}$ | $L_{50}$ | $L_{dn}$ |
|---|---|---|---|
| Daytime Limit | --- | 60 | 55 |
| Nighttime Limit | --- | 50 | |
| Shielded Operations | | | |
| Montebello Road Residences | 41 | 40 | 40 |
| Un-Shielded Operations | | | |
| Montebello Road Residences | 51 | 50 | 50 |

NOTES: There is no $L_{eq}$ standard applicable to the County of Santa Clara. The Montebello Road residences are in an unincorporated area of the County.

SOURCE: Edward L. Pack Associates, Inc., 2011

**TABLE 4.13-12**
**SUMMARY OF RECLAMATION PHASE 2 $L_{DN}$ NOISE LEVEL INCREASES**

| Receptor | Ambient | Project-Generated Noise | | Total (Ambient + Project) Noise Exposure | | Change in dB |
|---|---|---|---|---|---|---|
| | | Shielded | Unshielded | Shielded | Unshielded | |
| Montebello Road Residences | 47 | 40 | 50 | 48 | 52 | +2/+5 |

SOURCE: Edward L. Pack Associates, Inc., 2011

### Impact 4.13-3: Operations associated with reclamation Phase 3 may be audible at noise-sensitive uses in the vicinity. (*Less than Significant Impact*)

Heavy equipment operations for reclamation Phase 3 are summarized in **Table 4.13-13**. Included in the table are the $L_{eq}$ values normalized to a distance of 100 feet from the equipment. The equipment noise levels were acquired from several sources as referenced in the table and below. The raw noise level data for the various items of equipment were acquired at various distances. Standard spherical divergence calculations were performed to normalize the data to a distance of 100 feet. Also included in the table are the daily use hours for each piece of equipment and the expected "typical" shielding offset applied for intervening Project-area topography. Because of the limited amount of activity during Phase 3, it is expected that this equipment would operate only during the daytime shift.

A noise exposure assessment was completed for Phase 3, which would occur from 2026 to 2030, for the closest residences at the end of Balboa Road to the southeast of the Project Area closest to the Rock Plant, approximately 4,000 to 4,600 feet from the reclamation work area. **Table 4.13-14** summarizes the Project-related noise exposure that would occur at the Balboa Road residences

**TABLE 4.13-13**
**SUMMARY OF PHASE 3 EQUIPMENT, OPERATION USE HOURS, AND REFERENCE NOISE LEVELS USED IN PROJECT NOISE ASSESSMENT**

| Equipment No., Make, and Model Type | Daily Use Hours | Reference Noise Level at 100 Feet (dB $L_{eq}$) |
|---|---|---|
| 1 CAT 330 Excavator Steel Shear | 8 | 68 |
| 1 CAT 330 Excavator Grapple | 8 | 68 |
| 1 CAT 330 Excavator Breaker | 8 | 68 |
| 1 CAT 320 Excavator with Bucket | 8 | 68 |
| 1 CAT 966 Utility Loader | 8 | 70 |
| 1 Grove RT-635 Crane | 8 | 69 |
| 2 CAT 777 Off-Road Haul Trucks | 8 | 72 |

SOURCES: Edward L. Pack Associates, Inc., 2011;Ashworth Leininger Group, 2011; EnviroMine Inc., Permanente Financial Assurance Estimate, 2011

**TABLE 4.13-14**
**SUMMARY OF ROCK PLANT/CONVEYOR DEMOLITION PHASE 3 NOISE LEVELS COMPARED TO LOCAL STANDARDS**

| | $L_{eq}$ | $L_{50}$ | $L_{dn}$ |
|---|---|---|---|
| Daytime Limit | --- | 60 | 55 |
| Nighttime Limit | --- | 50 | |
| Shielded Operations | | | |
| Balboa Road Residences | 36 | 35 | 36 |

NOTES: There is no $L_{eq}$ standard applicable to the County. The Balboa Road residences are in an unincorporated area of the County.

SOURCE: Edward L. Pack Associates, Inc., 2011

compared to the applicable County noise exposure criteria. Project-related noise exposure was calculated to be approximately 36 dB $L_{eq}$, 35 dB $L_{50}$, and 32 dB $L_{dn}$, and would be expected to satisfy the applicable County noise exposure criteria and the associated impact would be less than significant.

**Table 4.13-15** summarizes the increase in ambient noise levels that would occur at the Balboa Road residences. Ambient noise exposure at the Balboa Road residences is estimated to be approximately 52 dB $L_{dn}$. In this case, Project-related noise exposure is approximately 20 dB $L_{dn}$ below the ambient, and although noise levels may be audible at the nearest residential locations, the levels would not add significantly to the existing noise environment. This impact is considered less than significant.

**Mitigation:** None required.

**TABLE 4.13-15**
**SUMMARY OF ROCK PLANT/CONVEYOR DEMOLITION PHASE 3 $L_{DN}$ NOISE LEVEL INCREASE**

| Receptor | Ambient | Project-Generated Noise | Total Noise Exposure | Change in dB |
|---|---|---|---|---|
| | | Shielded | Shielded | |
| Balboa Road Residences | 52 | 32 | 52 | 0 |

SOURCE: Edward L. Pack Associates, Inc., 2011

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**Impact 4.13-4: Operations within the Permanente Creek Reclamation Area may be audible at noise-sensitive uses in the vicinity. (*Less than Significant Impact*)**

The Permanente Creek Reclamation Area (PCRA) is a 23-acre area that will be subdivided into seven sub-areas (1 through 7). The area is located to the south of the WMSA and Quarry pit and is at a lower elevation than most of the RPA area. Because of the steep topography of the PCRA, most of the reclamation work would be done by hand. One excavator with a "sheep's foot" attachment is planned for use in the PCRA to complete slope stability and erosion control. Revegetation would be done manually. The reclamation of the PCRA would be performed over the Phase 1 and Phase 2 operations as access to parts of the PCRA would not be available until portions of the Phase 1 and Phase 2 commence or are completed.

A noise exposure assessment was completed for the closest residences on Montebello Road west of the PCRA. **Table 4.13-16** summarizes the Project-related noise exposure that would occur at the Montebello Road residences compared to the applicable County noise exposure criteria. The PCRA work would be mostly shielded from view at the most impacted Montebello Road residence with the exception of a portion of Sub-Area 2, where there is a line-of-sight between the home and the topography of the PCRA. As indicated in Table 4.13-16, the Project-related $L_{50}$ and $L_{dn}$ noise exposure would be less than the County noise exposure criteria. In addition, the levels would not add significantly to the existing noise environment. This impact is considered less than significant.

**TABLE 4.13-16**
**SUMMARY OF RECLAMATION PHASE 2 NOISE LEVELS COMPARED TO LOCAL STANDARDS**

| | $L_{eq}$ | $L_{50}$ | $L_{dn}$ |
|---|---|---|---|
| Daytime Limit | --- | 60 | 55 |
| Nighttime Limit | --- | 50 | |
| Shielded Operations | | | |
| Montebello Road Residences | 18 | 17 | 17 |
| Un-Shielded Operations | | | |
| Montebello Road Residences | 32 | 31 | 31 |

NOTES: There is no $L_{eq}$ standard applicable to the County. The Montebello Road residences are in an unincorporated area of the County.

SOURCE: Edward L. Pack Associates, Inc., 2011

# 4.13.7 Alternatives

## 4.13.7.1 Alternative 1: Complete Backfill Alternative

Alternative 1 would result in the use of additional heavy equipment at the EMSA associated with returning approximately 4.8 million cubic yards of overburden from the EMSA to the Quarry pit during Phase 2. This alternative would eliminate an existing topographic feature (the EMSA) that shields some of the noise generated within the site from being audible at off-site residences. Consequently, the additional heavy equipment activity required to excavate and remove the EMSA, combined with removal of the feature that would help shield nearby residences from equipment noise, would likely result in greater noise impacts to the caretaker's residence and the Cristo Rey development than would occur under the Project.

## 4.13.7.2 Alternative 2: Central Materials Storage Area Alternative

The reclamation activities associated with Alternative 2 would be similar to the activities under the Project, except that under this alternative, overburden materials in the Quarry pit would be moved to new, more-distant locations within the Quarry instead of to the EMSA. Because the CMSA would be located adjacent to the western side of the EMSA, and would be lower in elevation than the existing height of the EMSA, the reclaimed EMSA would likely shield equipment activity within the CMSA from off-site residential receptors on the valley floor. Therefore, Alternative 2 would likely reduce noise effects relative to the Project because overburden storage (and therefore subsequent reclamation) would occur farther from sensitive receptors.

## 4.13.7.3 No Project Alternative

The No Project Alternative would extend the time period in which surface mining activities occur within the Project Area and delay final reclamation conditions by approximately 7 years. Because the No Project Alternative would not involve additional overburden storage at the EMSA, but instead would involve reclamation of the currently existing (smaller) EMSA, noise impacts related to the proximity of the EMSA to sensitive receptors would be lessened. Also, since quarrying operations would occur at a lower average rate compared to the Project, the No Project Alternative would result in lessened overall noise levels, albeit over a longer period of time.

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