4.8—NOISE

This section of the subsequent environmental impact report (SEIR) describes the environmental and regulatory settings for noise and documents noise impacts, if any, that would occur as a result of the proposed project.

The information in this section is based on a peer review of an applicant-prepared study and publicly available sources. The applicant-prepared study used is *Environmental Noise Analysis, Eliot Quarry SMP-23 Reclamation Plan Amendment Project, Alameda County, California* (Bollard Acoustical Consultants 2019) (Appendix G, "Environmental Noise Analysis," of this SEIR).

Saxelby Acoustics, retained by the County, peer reviewed this analysis in April of 2019. The peer review letter report is on file with the County. The applicant revised the referenced analysis and provided a response to the peer reviewer comments, which is also on file with the County. The revision and response, located in Appendix G of this SEIR and dated October 11, 2019, adequately address the peer reviewer's comments and questions.

4.8.1 Noise Conditions at the Time of the LAVQAR EIR

The *Livermore-Amador Valley Quarry Area Reclamation Specific Plan Environmental Impact Report* (LAVQAR EIR) primarily notes high noise levels in the project area in specific areas in which mining is taking place, with heavy equipment used for extraction and processing of gravel and trucks used to transport materials off site generating the most noise. The LAVQAR EIR also notes the potential for individual equipment to generate 90dBA or greater and for overall operational noise to reach l00 dBA (Alameda County 1980: 48-49).

4.8.2 Environmental Setting

4.8.2.1 Sensitive Receptors in the Project Vicinity

The majority of proposed project reclamation activities will occur in Lake A and Lake B. For the Lake A work, which is east of Highway 84 (Isabel Avenue), noise-sensitive receptors consist of single-family residential uses along the entire northern boundary of Lake A. The residences are located along Alden Lane, Old Oak Road, Lakeside Circle, and Siena Road. On the south side of Vallecitos Road is a cluster of residences on Tolentino Court. Finally, a few large-lot residential uses are located on the south side of East Vineyard Avenue. These residences are setback approximately 300 to 500 feet from East Vineyard Avenue.

The nearest noise-sensitive receptors for Lake B work are primarily residences located on the south side of Vineyard Avenue. An exception is a small cluster of residences located on Yolanda Court. The residences on the South side of Vineyard are generally dispersed along on Ruby Hill Drive, Old Vineyard Avenue, Mingoia Street, Safreno Way, Manor Lane, Vineyard Heights Lane, and Vineyard Terrace.

4.8.2.2 Ambient Noise Environment at Nearest Sensitive Receptors

Appendix G, Section XII of the CEQA guidelines state that a project would result in a significant noise impact if it causes noise levels to exceed applicable noise standards or if it causes a substantial increase in ambient noise levels. To determine the threshold at which a project would result in a substantial noise increase, the baseline ambient conditions at potentially impacted noise-sensitive land uses must be established.

The existing ambient noise environment in the immediate project vicinity is defined primarily by local and distant traffic. Existing operations at the CEMEX facility also periodically contribute to the noise environment at the nearest sensitive receptors, but at lower levels than existing traffic noise. Little activity occurs in the Lake A area, however, as excavation operations are currently occurring within the Lakes B and J areas.

To quantify the existing ambient noise environment in the immediate project vicinity, continuous noise level measurements were conducted at the five (5) locations identified on Figure 4.8-1, "Ambient Noise Measurement Sites," during the period of September 27 to October 8, 2018. The monitoring survey sites were intended to represent the ambient noise environment at the nearest residences to the proposed project operations. CEMEX mining and processing activities were active at the Eliot facility during the noise monitoring periods.

In addition to the five noise monitoring sites indicated on Figure 4.8-1, Bollard Acoustical Consultants, Inc. (BAC) attempted to conduct monitoring within the private Ruby Hill neighborhood but was not granted access. However, traffic on Vineyard Avenue is the dominant noise source at the residences on the south side of that roadway; therefore, the data collected at Site 4 was used to project ambient noise conditions at the nearest residences within the Ruby Hill community.

Weather conditions present during the ambient noise monitoring program were typical for the season, with no anomalous conditions present which would adversely affect the validity of the survey results in describing typical ambient conditions.

Larson Davis Laboratories (LDL) Model 820, LxT and 831 precision integrating sound level meters were used for the noise level measurement survey. The meters were calibrated before and after use with an LDL Model CAL200 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all pertinent specifications of the American National Standards Institute for Type 1 sound level meters (ANSI S1.4). The numerical summaries of the ambient noise level measurements are provided in Table 4.8-1, "Statistical Summary of Ambient Noise Measurement Results CEMEX Eliot Mine Site Vicinity."

TABLE 4.8-1
STATISTICAL SUMMARY OF AMBIENT NOISE MEASUREMENT RESULTS CEMEX ELIOT MINE SITE VICINITY

Site	Date	Daytime (7 a.m. - 10 p.m.)		Nighttime (10 p.m. to 7 a.m.)		L_{dn}
		Median (L_{50})	*Maximum* (L_{max})	*Median* (L_{50})	*Maximum* (L_{max})	
1	Oct 4	46	64	43	65	47
	Oct 5	45	67	44	62	55
	Oct 6	44	68	44	61	53
	Oct 7	41	66	40	59	52
	Oct 8	43	65	42	63	51
	Averages	**44**	**66**	**43**	**62**	**52**
2	Oct 4	47	61	45	64	48
	Oct 5	41	51	43	57	52
	Oct 6	44	63	41	57	50
	Oct 7	44	62	39	56	50
	Oct 8	44	61	41	57	48
	Averages	**44**	**60**	**42**	**58**	**50**

Site	Date	Daytime (7 a.m. - 10 p.m.)		Nighttime (10 p.m. to 7 a.m.)		
		Median (L_{50})	*Maximum (L_{max})*	*Median (L_{50})*	*Maximum (L_{max})*	L_{dn}
3	Sept 27	46	68	41	61	54
	Sept 28	45	61	40	54	49
	Sept 29	44	59	41	56	50
	Sept 30	41	61	37	55	48
	Oct 1	40	60	40	55	49
	Averages	**43**	**62**	**40**	**56**	**50**
4	Sept 27	56	77	43	71	62
	Sept 28	47	75	39	70	61
	Sept 29	54	75	36	70	61
	Sept 30	51	77	34	69	62
	Oct 1	56	76	42	73	67
	Averages	**53**	**76**	**42**	**73**	**67**
5	Sept 27	46	68	41	61	54
	Sept 28	41	59	35	56	50
	Sept 29	44	68	30	58	50
	Sept 30	43	64	28	56	48
	Oct 1	46	65	35	60	52
	Averages	**44**	**65**	**34**	**58**	**51**

Source: Bollard Acoustical Consultants, Inc. 2019
Notes:
The noise measurement locations are identified on Figure 4.8-1.
Noise level data shown in this table represent averages for the periods. For a complete depiction of hourly measurement results, please refer to Appendix B of the Noise Study (see Appendix G of this SEIR).

The Table 4.8-1 data indicate that measured ambient noise levels were fairly consistent at the Sites 1-3, located along the northern side of Lake A. Site 4 was located 75 feet from the centerline of Vineyard Avenue whereas Site 5 was 300 feet from the centerline of that roadway. This explains why the data collected at Site 4 was considerably higher than at Site 5. When the distance between the microphone and centerline of Vineyard Road is normalized, the data collected at Sites 4 and 5 were found to be comparable.

4.8.2.3 Ambient Vibration Environment at Nearest Sensitive Receptors

Existing sources of ambient vibration in the immediate project vicinity consist of traffic on the local roadway network, aggregate processing operations at the project site, and existing excavation activities in the Lake B and Lake J areas. However, no discernible traffic or excavation-related vibration were observed at any of the nearest residential areas to the project site. As a result, existing ambient vibration levels in the project vicinity are considered to be negligible.

4.8.3 Regulatory Setting

The following sections discuss federal, state, and local regulations pertaining to noise that warrant consideration during the environmental review of the project.

4.8.3.1 Federal

Occupational Health and Safety Administration

Federal codes, primarily the Occupational Safety and Health Act of 1970 (OSHA), govern worker exposure to noise levels. These regulations would be applicable to all phases of the proposed project and are designed to limit worker exposure to noise levels of 85 dB or lower over an 8-hour period (Title 29, CFR Section 1910.95). Additionally, this regulation also establishes maximum impulse or impact noise (e.g., blasting noise) of 140 dB peak sound pressure level. Noise exposure of this type is dependent on work conditions and is addressed through a facility's Health and Safety Plan, as required under OSHA.

4.8.3.2 State

California Department of Transportation (Caltrans)

The California Department of Transportation (Caltrans) criteria applicable to damage and annoyance potential from transient and continuous vibration that is usually associated with construction activity are presented in Table 4.8-2, "Guideline Vibration Damage Potential Threshold Criteria," and Table 4.8-3, "Guideline Vibration Annoyance Potential Criteria." Equipment or activities typical of continuous vibration include: excavation equipment, static compaction equipment, tracked vehicles, traffic on a highway, vibratory pile drivers, pile-extraction equipment, and vibratory compaction equipment. Equipment or activities typical of single-impact (transient) or low-rate repeated impact vibration include: impact pile drivers, blasting, drop balls, "pogo stick" compactors, and crack-and-seat equipment (California Department of Transportation 2013).

TABLE 4.8-2
GUIDELINE VIBRATION DAMAGE POTENTIAL THRESHOLD CRITERIA

Structure and Condition	Maximum PPV (inches/second)	
	Transient Sources	*Continuous/Frequent Intermittent Sources*
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Source: California Department of Transportation, Transportation and Construction Vibration Guidance Manual (2013)
Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.
PPV = peak particle velocity.

SOURCE: BAC 2019, Noise Analysis Measurement Location Fig. 1; modified by Benchmark Resources in 2020.

NOTE: Figure is not printed to scale.

Ambient Noise Measurement Sites

ELIOT QUARRY SMP-23 SEIR

Figure 4.8-1

BENCHMARK RESOURCES

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TABLE 4.8-3
GUIDELINE VIBRATION ANNOYANCE POTENTIAL CRITERIA

Human Response	Maximum PPV (inches/second)	
	Transient Sources	*Continuous/Frequent Intermittent Sources*
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.9	0.10
Severe	2.0	0.4

Source: California Department of Transportation, Transportation and Construction Vibration Guidance Manual (2013)
Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.
PPV = peak particle velocity.

Given the relatively short-term nature of the proposed project, and to be consistent with CEQA policy for noise, project generated vibration levels should be strongly perceptible prior to the finding that a significant vibration impact will occur, not just perceptible or distinctly perceptible. Therefore, vibration thresholds of 0.9 and 0.1 inches/second are applied for transient and continuous vibration sources, respectively.

General Plan Guidelines

The State of California's General Plan Guidelines discuss how ambient noise should influence land use and development decisions. They also include a table of conditionally acceptable, normally unacceptable, and clearly unacceptable uses at different noise levels expressed in Community Noise Equivalent Level (CNEL). A conditionally acceptable designation implies new construction or development should be undertaken only after a detailed analysis of the noise reduction requirements for each land use is made and needed noise insulation features are incorporated in the design. By comparison, a normally acceptable designation indicates that standard construction can occur with no special noise reduction requirements. Local municipalities adopt these compatibility standards as part of their general plan and modify them as appropriate for their local environmental setting.

4.8.3.3 Local

Alameda County Noise Ordinance

The Alameda County noise standards are contained in the County's Noise Ordinance (County Code Section 6.60—Noise). The provisions of the County's Noise Ordinance which are germane to this evaluation are provided below:

Noise

6.60.020—Definitions.

"Construction" means construction, erection, enlargements, alteration, conversion or movement of any building, structures or land together with any scientific surveys associated therewith.

6.60.030—Noise measurement criteria.

A. Any noise measurement made pursuant to the provisions of this chapter shall be made with a sound level meter using the 'A' weighted network (scale) at slow meter response. Fast meter response shall be used for an impulsive noise. Calibration of the measurement

equipment, utilizing an acoustic calibrator, shall be performed immediately prior to recording any noise date.

B. The exterior noise levels shall be measured at any point on the affected residential property, school, hospital, church, public library or commercial property. Where practical, the microphone shall be positioned three to five feet above the ground and away from reflective surfaces.

6.60.040—Exterior noise level standards.

A. It is unlawful for any person at any location within the unincorporated area of the county to create any noise or to allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person which causes the exterior noise level when measured at any single- or multiple-family residential, school, hospital, church, public library or commercial properties situated in either the incorporated or unincorporated area to exceed the noise level standards as set forth in Table 6.60.040A or Table 6.60.040B:

Alameda County Code Tables 6.60.040A and B are reproduced below as Table 4.8-4, "Noise Level Standards Applicable to Residential and Other Noise Sensitive Land Uses," and Table 4.8-5, "Noise Level Standards Applicable to Commercial Properties."

TABLE 4.8-4
NOISE LEVEL STANDARDS APPLICABLE TO RESIDENTIAL AND OTHER NOISE SENSITIVE LAND USES
(ALAMEDA COUNTY CODE TABLE 6.60.040A)

Category	Cumulative Number of Minutes in any one hour time period	Daytime 7 a.m. to 10 p.m.	Nighttime 10 p.m. to 7 a.m.
1	30	50	45
2	15	55	50
3	5	60	55
4	1	65	60
5	0	70	65

TABLE 4.8-5
NOISE LEVEL STANDARDS APPLICABLE TO COMMERCIAL PROPERTIES
(ALAMEDA COUNTY CODE TABLE 6.60.040B)

Category	Cumulative Number of Minutes in any one hour time period	Daytime 7 a.m. to 10 p.m.	Nighttime 10 p.m. to 7 a.m.
1	30	65	60
2	15	70	65
3	5	75	70
4	1	80	75
5	0	85	80

B. In the event the measured ambient noise level exceeds the applicable noise level standard in any category above, the applicable standard shall be adjusted so as to equal said ambient noise level:

C. Each of the noise level standards specified in Tables 6.60.040A and B shall be reduced by five dB(A) for simple tone noises, noises consisting primarily of speech or music or for recurring impulsive noises.

D. If the intruding noise source is continuous and cannot reasonably be discontinued or stopped for a time period whereby the ambient noise level can be measured, the noise level measured while the source is in operation shall be compared directly to the applicable noise level standards in Table 6.60.040A and Table 6.60.040B.

E. Notwithstanding the noise level standards set forth in this section, the noise level standard applicable to the emission of sound from transformers, regulators, or associated equipment in electrical substations shall be 60 dB(A).

6.60.070—Special provisions or exceptions.

E. Construction. The provisions of this chapter shall not apply to noise sources associated with construction, provided said activities do not take place before seven a.m. or after seven p.m. on any day except Saturday or Sunday, or before eight a.m. or after five p.m. on Saturday or Sunday.

Alameda County General Plan

The *Alameda County General Plan* Noise Element (Countywide Noise Element), adopted in 1975, provides a framework to regulate excessive noise levels and promotes compatibility of land uses with respect to noise. The Countywide Noise Element does not explicitly define the acceptable outdoor noise levels within residential areas, but it does recognize the Federal Environmental Protection Agency (EPA) noise level standards for residential land uses. The following goal contained within the *Alameda County General Plan* Noise Element pertains to the proposed project:

Countywide Policies

Goal 1: The peace, health, safety, and welfare of the residents of Alameda County require protection from excessive, unnecessary, and unreasonable noises from any and all sources in the cities and unincorporated territory.

East County Area Plan

The goals and policies in the *East County Area Plan* are intended to inform decision makers, the general public, public agencies and those doing business in the County of the County's position on land use-related issues and to provide guidance for day-to-day decision-making. The ECAP includes the following policies specific to noise, and applicable to the proposed project.

Noise

Goal : To minimize East County residents' and workers' exposure to excessive noise

Policy 288: The County shall endeavor to maintain acceptable noise levels throughout East County.

Policy 289: The County shall limit or appropriately mitigate new noise sensitive development in areas exposed to projected noise levels exceeding 60 dB based on the California Office of Noise Control Land Use Compatibility Guidelines.

City of Livermore Noise Standards

The City of Livermore noise standards which would be most applicable to the proposed project are contained in the *City of Livermore General Plan* Noise Element. The City's Land Use Compatibility Guidelines for Exterior Noise are contained in Table 9-7 of the City's Noise Element. That table establishes an exterior noise environment of 60 dB L_{dn} as normally acceptable for single-family residential uses.

Objective N-1.5—Reduce the level of noise generated by mechanical and other noise generating equipment by means of public education, regulation, and/or political action.

P1. The City shall require that industrial and commercial uses be designed and operated so as to avoid the generation of noise effects on surrounding sensitive land uses (e.g., residential, churches, schools, hospitals) from exceeding the following noise levels for exterior environments.

(a) 55 dBA L50 (7 am to 10 pm)

(b) 45 dBA L50 (10 pm to 7 am).

P4. The following sources of noise are exempt from the standard in N-1.5.P1: motor vehicles on public streets; trains; emergency equipment, vehicles, devices, and activities; temporary construction, maintenance, or demolition activities conducted between the hours of 7:00 a.m. and 8:00 p.m.

City of Pleasanton Noise Standards

The *City of Pleasanton General Plan* Noise Element establishes a noise level standard of 60 dB L_{dn} as normally acceptable for exterior spaces of residential land uses. The City of Pleasanton noise standards which would be most applicable to the proposed project are contained in the City's Municipal Code (Section 9.04 Noise Regulations). Those standards are provided below:

9.04.035 Noise Limits—Commercial or industrial use adjacent to residential zone

Any commercial or industrial use, not including a special downtown accessory entertainment use in the downtown hospitality transition area, which is located within 300 feet from any residential zone and which remains open for business at any time between the hours of 10 pm and 6 am shall adhere to the following standards of performance:

A. The noise level produced on the business premises between the hours of 10 pm and 6 am shall not exceed the residential noise standard at the property plane between the residential zoning district and the commercial zoning district.

9.04.050 Noise Limits—Industrial property.

No person shall produce or allow to be produced by any machine, animal, device or any combination of the same on commercial property, a noise level in excess of 75 dBA at any point outside the property plane unless otherwise provided in this chapter.

9.04.070 Daytime Exceptions.

Any noise which does not produce a noise level exceeding 70 dBA at a distance of 25 feet under its most noisy condition of use shall be exempt from the provisions of sections 9.04.030, 9.04.040, and 9.04.060(A) of this Chapter between the hours of 8 am and 8 pm daily, except Sundays and holidays, when the exemption herein shall apply between 10 am and 6 pm.

9.04.100 Construction Daytime Exceptions.

Notwithstanding any other provision of this chapter, between the hours of 8 am and 8 pm daily, except Sunday and holidays, when the exemption shall apply between 10 am and 6 pm, construction,

alteration or repair activities which are authorized by a valid city permit shall be allowed if they meet at least one of the following noise limitations:

A. No individual piece of equipment shall produce a noise level exceeding 83 dBA at a distance of 25 feet. If the device is housed within a structure on the property, the measurements shall be made outside the structure at a distance as close to 25 feet from the equipment as possible; or

B. The noise level at any point outside of the property plane of the project shall not exceed 86 dBA.

4.8.4 Significance Criteria and Analysis Methodology

4.8.4.1 Significance Criteria

Based on Appendix G of the CEQA Guidelines, the proposed project would have a significant noise impact if it would result in:

a) generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
b) generation of excessive groundborne vibration or groundborne noise levels;
c) for a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels.

4.8.4.2 Analysis Methodology

Noise Fundamentals and Terminology

Noise is often described as unwanted sound. Sound is defined as any pressure variation in air that the human ear can detect. If the pressure variations occur frequently enough (at least 20 times per second), they can be heard and hence are called sound. The number of pressure variations per second is called the frequency of sound, which is expressed as cycles per second, called Hertz (Hz).

Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals), as a point of reference, defined as 0 dB. Other sound pressures are then compared to the reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB. Another useful aspect of the decibel scale is that changes in levels (dB) correspond closely to human perception of relative loudness. Figure 4.8-2, "Noise Levels Associated with Common Noise Sources," illustrates common noise sources associated with a range of decibel levels.

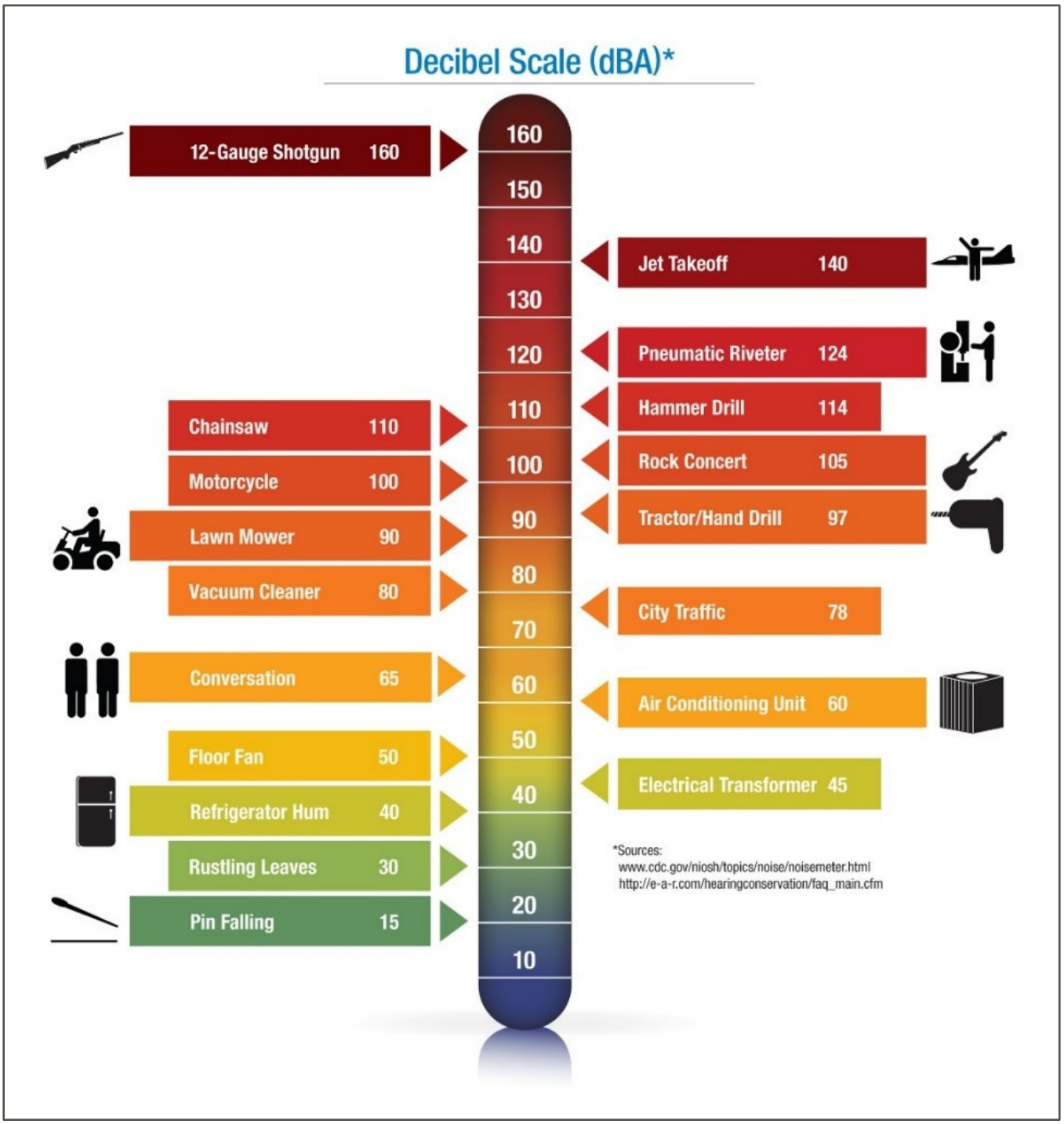
The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by weighing the frequency response of a sound level meter by means of the standardized A-weighing 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 tool of environmental noise assessment. All noise levels reported in this section are in terms of A-weighted levels in decibels.

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}) over a given time period (usually one hour). The L_{eq} is the foundation of the Day-Night Average Level noise descriptor, L_{dn}, and shows very good correlation with community response to noise.

The Day-night Average Level (L_{dn}) is based upon the average noise level over a 24-hour day, with a +10 decibel weighing applied to noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because L_{dn} represents a 24-hour average, it tends to disguise short-term variations in the noise environment. L_{dn}-based noise standards are commonly used to assess noise impacts associated with traffic, railroad and aircraft noise sources.

The following are brief definitions of terminology used in this section:

- **Sound.** A disturbance created by a vibrating object, which, when transmitted by pressure waves through a medium such as air, is capable of being detected by a receiving mechanism, such as the human ear or a microphone.
- **Noise.** Sound that is loud, unpleasant, unexpected, or otherwise unwanted.
- **Decibel (dB).** A unit-less measure of sound on a logarithmic scale.
- **Vibration Decibel (VdB).** A unit-less measure of vibration expressed on a logarithmic scale and with respect to a defined reference vibration velocity. In the U.S., the standard reference velocity is 1 micro-inch per second ($1x10^{-6}$ in/sec).
- **A-Weighted Decibel (dBA).** An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.
- **Equivalent Continuous Noise Level (L_{eq}).** also called the Energy-Equivalent Noise Level. The value of an equivalent, steady sound level which, in a stated time period (often over an hour) and at a stated location, has the same A-weighted sound energy as the time-varying sound. Thus, the L_{eq} metric is a single numerical value that represents the equivalent amount of variable sound energy received by a receptor over the specified duration.
- **Statistical Sound Level (L_n).** The sound level that is exceeded "n" percent of time during a given sample period. For example, the L_{50} level is the statistical indicator of the time-varying noise signal that is exceeded 50 percent of the time (during each sampling period); that is, half of the sampling time, the changing noise levels are above this value and half of the time they are below it. This is called the "median sound level." The L_{10} level, likewise, is the value that is exceeded 10 percent of the time (i.e., near the maximum) and this is often known as the "intrusive sound level." The L_{90} is the sound level exceeded 90 percent of the time and is often considered the "effective background level" or "residual noise level."
- **Day-Night Level (L_{dn} or DNL).** The energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the A-weighted sound levels occurring during the period from 10:00 p.m. to 7:00 a.m. This is a measure of the cumulative noise exposure in a community.
- **Community Noise Equivalent Level (CNEL).** The energy average of the A-weighted sound levels occurring during a 24-hour period, with 5 dB added to the A-weighted sound levels occurring during the period from 7:00 a.m. to 10:00 p.m. and 10 dB added to the A-weighted sound levels occurring during the period from 10:00 p.m. to 7:00 a.m.



SOURCE: BAC 2019, Noise Analysis Fig 2; modified by Benchmark Resources in 2020.
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For general community/environmental noise, CNEL and L_{dn} values rarely differ by more than 1 dB. As a matter of practice, L_{dn} and CNEL values are interchangeable and are treated as being equivalent in this assessment.

- **Sensitive Receptor.** Noise- and vibration-sensitive receptors include land uses where quiet environments are necessary for enjoyment and public health and safety. Residences, schools, motels and hotels, libraries, religious institutions, hospitals, and nursing homes are examples.

Vibration Fundamentals and Terminology

Vibration is like noise in that it involves a source, a transmission path, and a receiver. While vibration is related to noise, it differs in that noise is generally considered to be pressure waves transmitted through air, while vibration is usually associated with transmission through the ground or structures. As with noise, vibration consists of an amplitude and frequency. A person's response to vibration will depend on their individual sensitivity as well as the amplitude and frequency of the source.

Vibration can be described in terms of acceleration, velocity, or displacement. A common practice is to monitor vibration in terms of velocity in inches per second peak particle velocity (IPS, PPV) or root-mean-square (VdB, RMS). Standards pertaining to perception as well as damage to structures have been developed for vibration in terms of peak particle velocity as well as RMS velocities.

As vibrations travel outward from the source, they excite the particles of rock and soil through which they pass and cause them to oscillate. Differences in subsurface geologic conditions and distance from the source of vibration will result in different vibration levels characterized by different frequencies and intensities. In all cases, vibration amplitudes will decrease with increasing distance. The maximum rate, or velocity of particle movement, is the commonly accepted descriptor of the vibration "strength".

Human response to vibration is difficult to quantify. Vibration can be felt or heard well below the levels that produce any damage to structures. The duration of the event has an effect on human response, as does frequency. Generally, as the duration and vibration frequency increase, the potential for adverse human response increases.

According to the Transportation and Construction-Induced Vibration Guidance Manual (Caltrans 2004), operation of construction equipment and construction techniques generate ground vibration. Traffic traveling on roadways can also be a source of such vibration. At high enough amplitudes, ground vibration has the potential to damage structures and/or cause cosmetic damage. Ground vibration can also be a source of annoyance to individuals who live or work close to vibration-generating activities. However, traffic rarely generates vibration amplitudes high enough to cause structural or cosmetic damage.

Analysis Methodology

As noted previously, the CEQA guidelines state that a project would result in a significant noise impact if the project would result in a substantial increase in ambient noise levels at a sensitive receptor location. However, CEQA does not define what constitutes a "substantial" increase in noise levels.

An increase of at least 3 dB is generally recognized as the threshold for similar noise sources before most people will perceive a change in noise levels, and an increase of 6 dB is required before the change will be clearly noticeable. A 10 dB increase in noise levels is considered to be the level at which a doubling of loudness is perceived (Egan 1988: 21).

The California Department of Transportation (Caltrans) requires a project-related traffic noise level increase of 12 dB for a finding of significance. The California Energy Commission (CEC) considers project-related noise level increases between 5-10 dB significant, depending on local factors.

To assess the significance of changes in 24-hour aircraft noise exposure, the Federal Interagency Commission on Noise (FICON) has developed the graduated scale ranging from 1.5 to 5 dB shown in Table 4.8-6, "Criteria for Determining Significance of Permanent Changes in Noise Exposure." The rationale for the graduated scale used in the FICON standards is that test subject's reactions to increases in noise levels varied depending on the starting level of noise. Specifically, with lower ambient noise environments, such as those below 60 dB Ldn, a larger increase in noise levels was required to achieve a negative reaction than was necessary in more elevated noise environments.

However, the FICON standards were developed to evaluate permanent changes in 24-hour noise exposure related to aircraft noise. Therefore, their use as criteria for assessing temporary impacts related to construction activities is considered overly conservative (BAC 2019). A more appropriate threshold for assessing the significance of changes in short-term noise exposure would be temporary doubling of loudness, or 10 dB, which is more consistent with Caltrans and CEC criteria.

TABLE 4.8-6
CRITERIA FOR DETERMINING SIGNIFICANCE OF PERMANENT[1] CHANGES IN NOISE EXPOSURE

Ambient Noise Level Without Project, L_{dn}	Increase Required for Significant Impact
Less than 60 dB	+5.0 dB or more
60 to 65 dB	+3.0 dB or more
Greater than 65 dB	+1.5 dB or more

Notes
1. For temporary changes in noise exposure, such as those resulting from construction-related activities unrelated to ongoing operations, a 10 dB increase is considered the threshold of significance.
2. Source: Federal Interagency Committee on Noise (FICON)

The proposed reclamation activities related to water diversion and conveyance improvements in Lake A, and the realignment of the ADV, are considered construction-related activities as they are not related to the long-term excavation or processing operations at the project site. As noted above, construction-related activities are exempt from the local noise standards in the City of Livermore and Alameda County provided the construction activities occur during certain hours and days of the week which are considered to be less noise-sensitive. For sensitive receptors located in the City of Pleasanton, construction noise levels at any point outside of the property plane shall not exceed 86 dBA.

The Alameda County and City of Livermore noise standards, which would be most applicable to the proposed project, are expressed in terms of hourly statistical descriptors (L_n) for both daytime and nighttime periods. The City of Pleasanton noise standards utilize maximum (L_{max}) noise level limits. As a result, the approach to noise impact assessment for the proposed project is to apply the City of Livermore's noise standards at noise-sensitive receptors located within the City of Livermore, and to apply the City of Pleasanton's noise standards at noise-sensitive receptors located within the City of Pleasanton.

For the assessment of noise impacts related to CEQA criteria, 10 dB is added to the ambient noise measurement results shown in Table 4.8-1. The Table 4.8-1 data indicate that existing median daytime ambient noise levels at the nearest residences to the north of the project area, within the City of

Livermore, were generally in the mid 40 dB L50 range (44 dB L50 on average). As a result, this analysis applies a noise criterion of 54 dB L50 at those residences between the hours of 7 am and 10 pm. During the hours of 10 pm to 7 am, measured median ambient noise levels at the Livermore residences on the north side of Lake A averaged 42 dBA L50. As a result, this analysis applies a noise criterion of 52 dB L50 at those residences between the hours of 10 pm and 7 am.

The residences located in closer proximity to Vineyard Avenue experience higher noise levels of approximately 53 dB L50 during the daytime hours of 7 am – 10 pm (Site 4 of Table 4.8-1). As a result, this analysis applies a noise criteria of 63 dB L50 at those residences between the hours of 7 am and 10 pm. During the hours of 10 pm to 7 am, measured median ambient noise levels at Site 4 averaged 42 dB L50. As a result, this analysis applies a noise criteria of 52 dB L50 at the residences on the south side of Vineyard Road (both City of Pleasanton and Livermore), between the hours of 10 pm and 7 am.

For the assessment of noise impacts relative to CEQA significance criteria for temporary construction activities, a 10 dB increase over baseline ambient conditions is considered significant.

In addition to applying the applicable cities of Pleasanton and Livermore and the County noise standards to the proposed project, CEQA requires that noise impacts be assessed relative to ambient noise levels that are present without the project. As a result, ambient noise surveys were conducted, and comparisons of project to no-project noise levels were used to assess noise impacts (in addition to comparison to Alameda County, City of Livermore, and City of Pleasanton noise standards). Specifically, single-event maximum (L_{max}) noise levels and hourly median (L50) noise levels, both with and without the proposed project, were compared so that the assessment of noise impacts was based on an assessment of project-generated noise in short-term fluctuations in the ambient noise environment.

When impacts are deemed significant, mitigation measures are identified to avoid or minimize the impact. Some of the mitigation measures are based on specific agency guidelines and performance standards and may also be conditions of permits or other approvals ultimately required for the project.

4.8.5 Project Impacts and Mitigation Measures

4.8.5.1 LAVQAR EIR Impact Analysis

Under the LAVQAR EIR, noise impacts were determined to be less than significant with implementation of mitigation. The LAVQAR EIR recognizes that noise impacts would occur as a result of mining operations and use of city streets for transportation of haul trucks and construction vehicles, for example. However, the LAVQAR EIR notes the incremental increase in noise resulting from reclamation as compared to the 90 dBA or greater estimate from mining activity is not considered significant (Alameda County 1980: 49).

The approved project includes the following mitigation measures relevant to impacts to mineral resources:

- Reduction of noise at the source can be accomplished by proper maintenance of equipment and usage of newer equipment. Newer trucks, for example, are quieter than old trucks because of recent noise emission standards. Use of quieter trucks will increase over the life of the Reclamation Plan as older trucks are replaced. (Alameda County 1980: 49)

Project Revisions

The proposed project would not include mining activities as those are vested activities and not subject to discretionary approval. Reclamation activities would result in similar or reduced levels of noise as reclamation activities under the 1981 project and would occur during the same hours evaluated under the 1981 project. Truck traffic hauling materials from the site would be replaced by truck traffic hauling fill and stream restoration materials (rock) to the site. As outlined in the analysis below, the proposed project's maximum noise generation would fall below the 90 dBA or greater estimate for mining and reclamation noted in the LAVQAR EIR.

Changed Circumstances

Since 1981, new residential subdivisions have been developed to the north of Lake A (e.g., Pulte Oaks and Kristopher Ranch) and to the south of Lake B (e.g. Ruby Hills). SMP-23 was originally approved when this property was zoned agricultural and was within the jurisdiction of the County. Over the years, the property was annexed to the City of Livermore, the zoning was changed to residential, and the houses were built adjacent to Lake A. These land uses are changed circumstances that could create a new or increased significant impact regarding noise and vibration.

New Information

No new information of substantial importance is available that was not known and could not have been known with the exercise of reasonable diligence at the time the LAVQAR EIR was adopted.

Significance Determination

Based on project revisions and changed circumstances that may create a new or increased significant impacts, the County has amplified and augmented the analysis contained in the LAVQAR EIR. This evaluation is provided in the following impact analysis.

4.8.5.2 Subsequent Environmental Analysis

Impact 4.8-1: Construction Noise Impacts Relative to Locally Adopted Noise Standards

As noted in the project description, different activities are proposed within the Lake A and Lake B reclamation areas as follows:

Lake A Area: Lake A reclamation will include installation of a surface water diversion from the ADV to Lake A, conversion of a berm that is currently located in Lake A to a small island to allow water to flow across the lake, installation of a water conveyance pipeline from Lake A to future Lake C (located northwest), and an overflow outlet to allow water to flow back into ADV when Lake A water levels are high to prevent flooding in the localized area. These components are considered to be short-term construction activities rather than long-term operational activities.

Lake B Area: Lake B reclamation will include installation of a pipeline turn-out from Lake A, a water pipeline conduit to future Lake C, and an overflow outlet to allow water to flow back into ADV when Lake B water levels are high. The final bottom elevation of Lake B is proposed at 150 feet above mean sea level (msl), in order to maximize the available aggregate resource. The proposed project includes realignment and restoration of an approximately 5,800 linear foot reach of the ADV. The proposed ADV realignment will result in an enhanced riparian corridor that flows around, rather than through (as currently anticipated in SMP-23), Lake B. These components are considered to be short-term construction activities rather than long-term operational activities.

The proposed reclamation operations would involve relatively minor earthmoving and construction activities in Lake A, with more intensive earthmoving to occur in the Lake B area as part of the ADV realignment. The proposed earthmoving operations and installation of pipelines would not result in any fundamental changes to existing operations (e.g., mining methods, processing operations, production levels, truck traffic, or hours of operation).

According to information provided by the project applicant, the most significant noise generating equipment to be utilized for the proposed project would consist of the following:

- Caterpillar Model 330 and 349 Excavators
- Caterpillar Model 966 Front Loaders
- Caterpillar Model 623 Scraper
- Caterpillar Model 14H Motor Grader
- Caterpillar Model 815 & 825 Compactors
- Caterpillar D10 Dozer

To quantify the noise generation of equipment identified above, reference data contained within the Federal Highway Administration Roadway Construction Noise Model (RCNM) was utilized. The equipment was assigned to the approximate closest point of proximity to existing residences where it will be in operation during the various phases of the proposed project, and estimated offsets were applied to account for shielding by intervening topography and differences between median (L_{50}) values and maximum (L_{max}) values.

Specifically, median (L50) levels were assumed to be 10 dB below maximum noise levels reported in the RCNM. This assumption is based on the fact that the mobile equipment will vary in terms of both distance from the locations where the noise standards are applicable and in terms of percentage of the hour during which the equipment will operate at the highest sound output.

In addition, shielding by intervening topography was estimated to be between 5 and 10 dB depending on the extent by which intervening topography is expected to intercept line of sight between the project noise sources and nearby sensitive receptors. These shielding offsets are based on the fact that the majority of the proposed reclamation operations would occur below grade at positions which would not be visible from the nearest sensitive receptors, particularly sensitive receptors to the south of Vineyard Avenue.

The noise levels were then projected to the locations of the nearest residences. Table 4.8-7, "Maximum Noise Generation of Construction Equipment" presents the maximum noise levels generated by the various types of project-related earth-moving equipment to be used during the proposed project. Table 4.8-8, "Predicted Noise Levels for Various Project-Related Components at Nearest Residences Eliot Quarry SMP-23 Reclamation Plan Amendment Project," shows the predicted noise levels at the nearest potentially affected residences for the various aspects of the project.

TABLE 4.8-7
MAXIMUM NOISE GENERATION OF CONSTRUCTION EQUIPMENT

Equipment Type	Maximum Noise Level (L_{max}) at 50 feet, dBA
Compactor	83
Dozer	82
Excavator	81
Loader	79
Motor Grader	83
Pad Drum Roller	80
Scraper	84

Source: FHWA Roadway Construction Noise Model

As noted previously, the realignment of the ADV, the ADV to Lake A Diversion, and the installation of conduits and pipelines fall under the category of temporary construction components of the overall proposed project as they are not associated with long-term, ongoing operation of the CEMEX facility. Both Alameda County and the City of Livermore exempt construction activities from the provisions of their local noise standards provided those activities occur during the hours of 7 am and 8 pm (Livermore) and 8 am – 8 pm (Alameda County). The City of Pleasanton applies a construction noise standard of 86 dBA at any point outside of the property plane.

As indicated in Table 4.8-8, noise generated by construction activities would be a maximum of 68 dB, thus satisfactory relative to the City of Pleasanton 86 dBA standard applicable at the property plane of the proposed project during daytime hours.

In addition, construction noise is exempt from the requirements of the Alameda County and City of Livermore noise standards provided construction activities are limited to the hours of 7 am – 8 pm, Monday through Friday, and 8 am – 8 pm on Saturday or Sunday. However, if construction activities were to occur during nighttime hours after 8 pm, such activities would not be exempt from the local noise standards and the applicable nighttime noise level standards would be exceeded at the residences to the south of Vineyard Avenue. As a result, this nighttime noise impact is considered potentially significant. This impact would be reduced to less than significant with implementation of Mitigation Measure 4.1-1, "Hourly Limitation of Construction Activities," which is described in Section 4.1, "Aesthetics and Visual Resources," of this SEIR.

Level of Significance: Potentially significant.

Mitigation Measure 4.1-1: Daily Limitation of Construction Hours
(see Section 4.1, "Aesthetics and Visual Resources," of this SEIR)

All construction activities shall be limited to the hours of 7 am – 7 pm Monday through Friday, and 8 am – 5 pm on Saturday and Sunday.

Significance after Mitigation: Less than significant.

TABLE 4.8-8
PREDICTED NOISE LEVELS FOR VARIOUS PROJECT-RELATED COMPONENTS AT NEAREST RESIDENCES ELIOT QUARRY SMP-23 RECLAMATION PLAN AMENDMENT PROJECT

Operation	Receiver Location	Approximate Distance to Nearest Receiver, feet	Predicted Maximum Noise Level at Receiver L_{max} dBA	Predicted Median Noise Level at Receiver L_{50} dBA
Realign Arroyo del Valle	CEMEX Southern Property Plane	100	68	64
	Pleasanton Residences South of Vineyard Avenue	250	60	56
	Livermore Residences South of Vineyard Avenue	1,400	45	41
	Livermore Residences North of Lake A	2000	42	38
Arroyo del Valle to Lake A Diversion	CEMEX Southern Property Plane	300	60	54
	Pleasanton Residences South of Vineyard Avenue	3,500	39	33
	Livermore Residences South of Vineyard Avenue	400	58	52
	Livermore Residences North of Lake A	1,000	50	44
Install Conduits and Pipelines	CEMEX Southern Property Plane	1,000	53	49
	Pleasanton Residences South of Vineyard Avenue	2,000	47	43
	Livermore Residences South of Vineyard Avenue	3,500	42	38
	Livermore Residences North of Lake A	250	65	61

Source: FHWA Roadway Construction Noise Model with inputs from BAC and distance scaling from aerial imagery.

Impact 4.8-2: Construction Noise Impacts Relative to Existing Ambient Conditions

Despite the finding in Impact 4.8-1 that construction noise impacts relative to locally adopted noise standards would be less than significant after implementation of mitigation measure MM 4.1-1 (see Section 4.1), construction noise impacts are also evaluated relative to changes in ambient conditions. The threshold for a finding of a significant temporary noise impact relative to construction activities is 10 dB above ambient conditions.

As indicated in Table 4.8-1, ambient noise levels at the nearest residences to the north of Lake A in the City of Livermore are approximately 44 dBA L_{50} and 63 dB L_{max} during daytime hours. As a result, the threshold of significance for those residences for short-term construction noise would be 54 dB L_{50} and 73 dB L_{max}.

According to Table 4.8-8, predicted construction noise levels at the residences on the north side of Lake A would range from 42 to 65 dB L_{max} and 38 to 61 dB L_{50}. The predicted noise levels would satisfy the maximum (L_{max}) noise level criteria for all aspects of the project construction. In addition, predicted median (L_{50}) noise levels would be satisfactory at the northern residences during the construction activities related to the realignment of the Arroyo Del Valle and Arroyo Del Valle to Lake A diversion. These impacts are considered less-than-significant relative to baseline ambient conditions at the residences on the north side of Lake A.

However, the predicted median noise level of 61 dB L_{50} at the northern residences during the conduit and pipeline installation would exceed the 54 dB L_{50} project standard of significance by 7 dB. As a result, this impact is considered potentially significant relative to baseline ambient conditions at the residences on the north side of Lake A. Mitigation Measure 4.1-1 (see Section 4.1) and Mitigation Measures 4.8-1a and 4.8-1b, "Notice of Activities" and "Mufflers," are provided to reduce construction noise impacts relative to ambient conditions to a less than significant level.

At the nearest residences located on the south side of Vineyard Avenue, Table 1 Indicates that the ambient noise levels are approximately 53 dBA L_{50} and 76 dB L_{max} during daytime hours. As a result, the threshold of significance for those residences for short-term construction noise would be 63 dB L_{50} and 86 dB L_{max}.

According to Table 4.8-8, predicted construction noise levels at the residences on the south side of Vineyard Avenue would range from 39 to 60 dB L_{max} and 33 to 56 dB L_{50}. The predicted noise levels are well below the maximum (L_{max}) and median (L_{50}) noise level criteria for all aspects of the project construction. As a result, construction noise impacts at the residences located south of Vineyard Avenue are predicted to be less-than-significant relative to ambient conditions.

Level of Significance before Mitigation: Potentially significant.

Mitigation Measures:

Mitigation Measure: *Implement Mitigation Measure 4.1-1, "Hourly Limitation of Construction Activities" (see Section 4.1, "Aesthetics and Visual Resources," of this SEIR)*

Mitigation Measure 4.8-1a: *Notice of Activities*

All residences within 500 feet of the conduit and pipeline installation components of the proposed project should be provided notice of the pipeline installation schedule and informed that short-term periods of elevated daytime ambient noise levels could occur during that period.

Mitigation Measure 4.8-1b: *Mufflers*

All mobile equipment shall be fitted with mufflers consistent with manufacturers recommendations & shall be well maintained.

Significance after Mitigation: Less than significant.

Impact 4.3-3: Construction Vibration Impacts Relative to Existing Ambient Conditions

The typical vibration levels generated by construction equipment to be used in the proposed reclamation activities is presented in Table 4.8-9, "Vibration Source Levels for Construction Equipment," at various distances.

TABLE 4.8-9
VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

Equipment	Maximum PPV (inches/second)				
	PPV at 25 feet	PPV at 50 feet	PPV at 75 feet	PPV at 100 feet	PPV at 175 feet
Vibratory roller	0.210	0.074	0.040	0.026	0.011
Large bulldozer	0.089	0.032	0.017	0.011	0.005
Loaded trucks	0.076	0.027	0.015	0.010	0.004
Small bulldozer	0.003	0.001	0.001	0.000	0.000

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual (2018)
PPV = peak particle velocity.

The vibration data shown in Table 4.8-9 indicate that heavy equipment vibration levels dissipate rapidly with distance.

The nearest residences to the proposed reclamation areas would be 150 feet or more from the earthmoving equipment. As indicated in Table 4.8-9, at distances of 100 feet or more vibration levels are expected to be below 0.03 inches/second. As noted in the criteria section, the threshold for annoyance resulting from project construction is 0.1 inches/second and the threshold for damage to structures is 0.3 inches/second (for older residences). The predicted vibration levels of 0.03 inches/second at the nearest residence is below these thresholds for annoyance and damage to structures. As a result, this impact is less than significant.

Level of Significance: Less than significant.

Mitigation Measure: None required.

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