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NOISE ASSESSMENT STUDY
RECLAMATION PLAN AMENDMENT
ENVIRONMENTAL IMPACT REPORT

LEHIGH QUARRY
SANTA CLARA COUNTY

Prepared for

Environmental Sciences Associates

Prepared by

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I. Executive Summary

This report presents the results of a noise assessment study for the Reclamation Plan Amendment Environmental Impact Report for the Lehigh Quarry in Santa Clara County. There are three main phases of the reclamation plan. Phase 1 is the reclamation of the Eastern Materials Storage Area (EMSA). Phase 2 is the reclamation of the Western Materials Storage Area (WMSA) and the backfilling of the North Quarry area. Phase 3 includes the demolition and removal of the rock plant, overland conveyor system, removal of the surge pile and re-grading of the southerly area of the site. In addition, the Permanente Creek Reclamation Area (PCRA) is included in this study.

Minor noise excesses will occur at the caretaker's residence and possibly at a small number of homes in the Cristo Rey development near the EMSA during or because of nighttime operations within approximately 1,600 ft. of the caretaker's residence. This is a small area, roughly 11.5 acres, of the overall 74 acre EMSA reclamation area. No other residences in the vicinity of the Lehigh Quarry will be noise impacted.

The reclamation of the WMSA and North Quarry backfill will produce no significant noise impacts to residences in the vicinity of the quarry. Residential areas analyzed included those of caretaker's residence, residences in the Cristo Rey development, residences above Foothill Boulevard and a residence on Montebello Road.

The demolition of the rock plant, overland conveyor and re-grading of the area will not generate significant noise impacts to residences in the vicinity of the quarry. Great separation distances and topographic shielding will reduce noise to less than significant levels.

Reclamation of PCRA will not generate significant noise impacts to the most impacted residence on Montebello Road.

Because of the closer proximity of the northeasterly portion of the EMSA to the caretaker's home, any nighttime operations of heavy equipment will result in noise excesses in relation to the Santa Clara County Noise Element and Noise Ordinance standards. Nighttime operations within a portion of the EMSA will result in maximum noise level excesses at the Cristo Rey development in the relation to the City of Cupertino Noise Ordinance standards. The noise exposures will be within the limits of the City of Cupertino Noise Element standards. The noise impacts will be temporary and will occur only during times of operations within approximately 16% of the EMSA project site.

II. Background Information on Acoustics

Noise is defined as unwanted sound. Airborne sound is a rapid fluctuation of air pressure above and below atmospheric pressure. Sound levels are usually measured and expressed in decibels (dB) with 0 dB corresponding roughly to the threshold of hearing. The decibel scale is logarithmic, whereby a sound 10 dB higher than another contains 10 times the sound energy. Decibels are combined using the equation,

$$\text{sum} = 10\log_{10}(10^{SL/10} + 10^{SL/10}).$$

The sum of two sound sources of the same level is 3 dB higher than the sound level of one of the sources. For example, 60 dB + 60 dB = 63 dB. The sum of two sound levels that are 10 dB apart is merely the higher of the two levels, that is, the lower level does not add to the higher level. For example, 50 dB + 60 dB = 60 dB.

Most of the sounds which we hear in our normal environment do not consist of a single frequency, but rather a broad range of frequencies. As humans do not have perfect hearing, environmental sound measuring instruments have a built-in electrical filter that allows the instrument's detector to replicate human hearing. This filter is called the "A-weighting" network which filters out low and very high frequencies. All environmental noise is reported in terms of A-weighted decibels, notated as dBA. All sound levels used in this report are A-weighted unless otherwise noted. Table I provides the typical human response and noise sources for A-weighted noise levels.

Although the A-weighted noise level may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise includes a mixture of noise from distant sources which create a relatively steady background noise in which no particular source is identifiable. To describe the time-varying character of environmental noise, the statistical noise descriptors, L_n , are commonly used. They are the A-weighted noise levels exceeded during n% of a stated time period. Common L_n values are the L_1 , L_{10} , L_{50} and L_{90} , i.e., those levels of noise exceeded 1%, 10%, 50% and 90% of the time. The continuous equivalent-energy level (L_{eq}) is also a common noise descriptor and is the level of a steady state noise which has the same sound energy as a time varying noise. It is often considered the average noise level.

TABLE I

The A-Weighted Decibel Scale, Human Response and Typical Noise Sources

<u>Noise Level, dBA</u>	<u>Human Response</u>	<u>Noise Source</u>	<u>Sound Level</u>
120-150+	Painfully Loud	Sonic Boom	140 dBA
100-120	Physical Discomfort	Fast Motorcycle at 20 ft.	110 dBA
		Train Horn at 50 ft.	104 dBA
		Power Mower	100 dBA
70-100	Annoying	Discotheque	98 dBA
		Diesel Pump at 100 ft.	95 dBA
		Jet Aircraft at 1000 ft.	85 dBA
		Freeway at 100 ft.	80 dBA
50-70	Intrusive	Average Traffic at 100 ft.	70 dBA
		Vacuum Cleaner	70 dBA
		Television	53 dBA
0-50	Quiet	Normal Conversation	50 dBA
		Light Traffic at 100 ft.	45 dBA
		Refrigerator	43 dBA
		Desktop Computer	38 dBA
		Whispering	35 dBA

III. Noise Standards

Santa Clara County Noise Element

The noise exposures presented herein are shown in reference to the Santa Clara County Noise Element, Ref. (a), which utilizes the Day-Night Level (DNL) 24-hour noise descriptor to define community noise impacts. The Noise Element identifies a Land Use Compatibility standard of 55 dB DNL for residential exterior living areas. The DNL uses the measured L_{eq} (hourly average) values to calculate a 24-hour time-weighted average noise exposure with a 10 decibel “penalty” to noise that is created at night (10:00 p.m. to 7:00 a.m.). The formula used to calculate the DNL is described in Appendix B.

Santa Clara County Noise Ordinance

The noise levels were evaluated against the standards of the County of Santa Clara Noise Ordinance, Ref. (b), which limits noise, not by a function of the ambient condition, but by the time of occurrence, duration and noise type. The Santa Clara County Noise Ordinance specifies a basic standard for constant (more than 30 minutes per hour of occurrence) noise, with level limit adjustments depending on the actual duration of the source. A 5 dB upward adjustment is then incorporated for zoning boundaries changes. The noise limits at the residences sharing property lines with the quarry are 5 dB higher than the standard limit.

L_n values can be applied to the corresponding noise source durations so that programmable sound meters can directly measure source noise for direct evaluation against the Noise Ordinance. The County of Santa Clara Noise Ordinance standards are shown in Table II, below.

TABLE II

Santa Clara County Noise Ordinance Limits

		Daytime (7 am - 10 pm)	Nighttime (10 pm - 7 am)
Residential Noise Standard		55 dBA	45 dBA
Zoning Boundary Adjustment (+5 dB)		60 dBA	50 dBA
<u>Adjustments for Duration</u>	<u>Ln</u>		
more than 30 min./hr.	L ₅₀	60	50
+5 dB more than 15 min./hr.	L ₂₅	65	55
+10 dB more than 5 min./hr.	L ₈	70	60
+15 dB more than 1 min./hr.	L ₂	75	65
+ 20 dB any time	L _{max}	80	70

City of Cupertino Noise Element

The City of Cupertino Noise Element, Ref. (c), utilizes the Community Noise Equivalent Level (CNEL) descriptor for residential exterior areas. The CNEL is similar to the DNL in that it is a 24-hour time-weighted average noise metric. The CNEL, however, adds a 5 decibel penalty to noise created during the evening period of 7:00 p.m. to 10:00 p.m. The Noise Element standards specify an exterior limit of 60 dB CNEL for single-family residential exterior areas, such as rear yards.

City of Cupertino Noise Ordinance

The City of Cupertino Municipal Code, Title 10, Section 10.48, Ref. (d), limits “maximum” operational noise levels at impacted residences from operations on a nonresidential property to 65 A-weighted decibels (dBA) during the daytime hours of 7:00 a.m. to 10:00 p.m. and 55 dBA during the nighttime hours of 10:00 p.m. to 7:00 a.m.

California Environmental Quality Act (CEQA)

The California Environmental Quality Act, Ref. (e), does not quantify noise limits. However, it identifies “substantial increase” in the noise environment as a significant noise impact. The County of Santa Clara defines a noise increase of more than 3 decibels as a substantial increase if the existing noise environment is at or over the Noise Element standard of 55 dB DNL. If the existing noise environment is below the standard, then an increase of up to 5 dB is acceptable provided that the total noise exposure does not exceed the Noise Element standard of 55 dB DNL.

In terms of the CEQA compliance checklist, the project indicates the following:

- | | |
|---|---|
| a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies? | Less Than Significant Impact with Mitigation Incorporated |
| b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels? | No impact |
| c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project? | No Impact |
| d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project? | Less Than Significant Impact with Mitigation Incorporated |
| e) For a project located within 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? | No impact |
| f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels? | No impact |

IV. Acoustical Setting

The Lehigh 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 main quarry plant area (kilns, crushers, dryers, silos and offices) ranges from approximately 600-700 ft. above sea level.

The City of Los Altos is due north of the quarry with a substantial ridge between Los Altos and the quarry. The ridge rises to approximately 1,300 above sea level and noses down to the quarry base elevation as it nears Stevens Creek Boulevard. The Gates of Heaven Cemetery and a County park are the closest uses to the quarry to the northeast. Single-family homes are adjacent to the cemetery, as is a PG & E substation. Single-family and multi-family homes are to the east, but diverge from the quarry from the northeast to the southeast as they follow the base of the hillside. The Stevens Creek Quarry is adjacent to the south. Scattered, rural homes along Montebello Ridge are to the south and southeast of the quarry property but are approximately 3,700 ft. and more from the WMSA and at least 8,000 ft. from the main concrete plant. The San Andreas Mountain Range is to the west.

A series of ridges is interposed between the residences of Cupertino and the quarry, shielding most of the quarry plant from view. All but a few of the residences are well below the tops of the ridges and do not have a view of the quarry plant. These ridges also provide significant acoustical shielding for the residential areas. A similar topographic circumstance occurs for residents of Los Altos, whereby a high ridge runs approximately southeast-northwest along the northerly boundary of the quarry. Los Altos residences are located approximately 4,000 ft. to the north of the northern quarry boundary.

There are a few homes on Montebello Road to the south-southwest of the quarry. The home nearest the quarry is located at the terminus of the public portion of Montebello Road and is approximately 3,700 ft. from the quarry boundary near the WMSA. This home has a partial view into the North Quarry area and a partial view of Sub-Area 2 of the PCRA. However, interposed ridgelines interrupt the majority of the lines of sight into the quarry area.

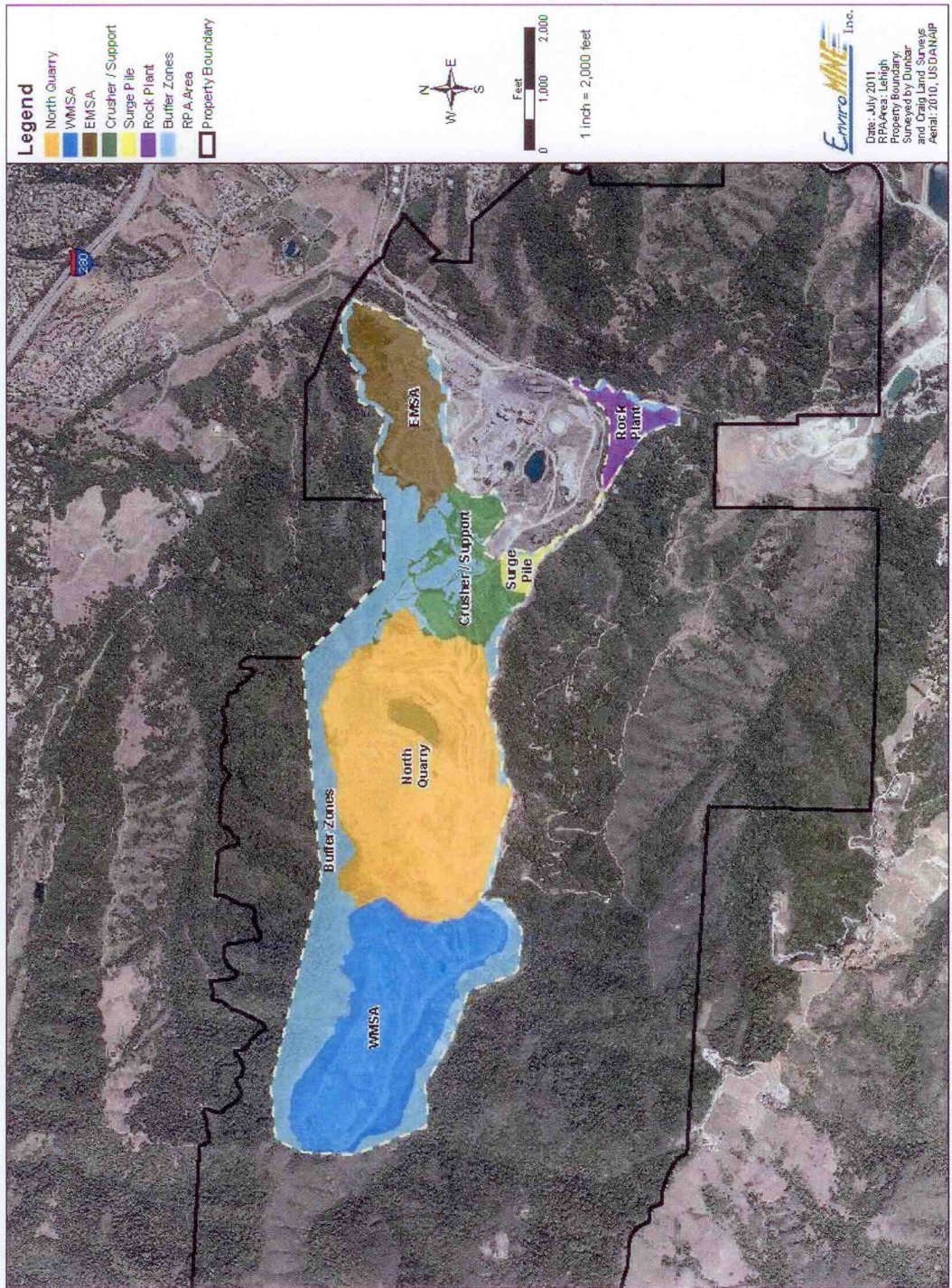
The Eastern Materials Storage Area is located at the northeasterly portion of the greater quarry site, near the entrance to the property from Permanente Road. The existing elevation of the EMSA ranges from approximately 540 ft. to 850 ft. above sea level, with the lowest area at the northeasterly tip of the site, closest to the caretaker's home and the Cristo Rey development.

The Western Materials Storage Area and North Quarry are located from the center of the quarry extending westward into the mountains. The North Quarry ranges in elevation from approximately 1,170 ft. to 1,885 ft. above sea level. The WMSA ranges in elevation from approximately 1,520 to 1,840 above seal level.

The surge pile, overland conveyors and rock plant are located in the southeasterly area of the greater quarry.

The locations of the main phase areas of the RPA area are shown on the following satellite image, Figure 1, which is included in the Reclamation Plan Amendment report, Ref. (f), as Figure 3.3-1.

Figure 3.3-1 Quarry Components



V. Descriptions of the Reclamation Plan Operations

EMSA – Phase 1

The Eastern Materials Storage Area is located at the eastern end of the RPA are and is the main storage area for quarry overburden material. The EMSA will be accepting overburden material until 2015, after which, reclamation of the EMSA will begin.

The reclamation of the EMSA will consist of re-grading the area to result in more natural slope contours, replanting vegetation and ripping or discing compacted surfaces, as necessary, for re-vegetation of the area.

The heavy equipment planned for use in the EMSA reclamation plan include:

- 3 CAT D10R track bulldozers,
- 1 CAT 345D excavator,
- 2 CAT 16 graders,
- 1 CAT 785 mining truck,
- 8 CAT 777 mining trucks,
- 3 CAT 740 articulated haul trucks,
- 1 CAT 824 wheel dozer,
- 3 CAT 992 wheel dozers,
- 1 CAT 988 wheel dozer,
- 2 CAT 773 water trucks.

Completion of the reclamation of the EMSA is expected in 2020.

WMSA/North Quarry Backfill – Phase 2

The Western Materials Storage Area is located at the westerly end of the quarry property. The North Quarry is situated near the physical center of the quarry property between the WMSA and the crusher/support area.

The backfilling of the North Quarry will commence upon completion of the extraction of materials from the North Quarry. Materials from the WMSA will be brought into the North Quarry via conveyor systems and haul trucks. These materials will be graded into the slopes to tie into the slopes created during Phase 1. The North Quarry will be graded to achieve a more natural contour and replanted.

In addition to the movement of storage materials from the WMSA into the North Quarry, some materials currently in the WMSA are valuable and will be extracted from the backfill materials for processing at the rock plant or cement plant.

The heavy equipment planned for use in the WMSA/North Quarry backfilling reclamation plan include:

- 3 CAT D11T track bulldozers,
- 1 CAT D8T track bulldozer,
- 1 CAT 345D excavator,
- 2 CAT 16 graders,
- 8 CAT 777 mining trucks,
- 3 CAT 740 articulated haul trucks,
- 1 CAT 824 wheel dozer,
- 3 CAT 992 wheel dozers,
- 1 CAT 988 wheel dozer,
- 2 CAT 773 water trucks.

Completion of the reclamation of the WMSA and North Quarry backfill is expected in 2025.

Surge Pile/Overland Conveyor/Rock Plant Removal – Phase 3

Upon completion of Phase 2 when the North Quarry has been filled, Phase 3 will commence, which includes the re-vegetation of the WMSA. Phase 3 will involve, primarily, the removal of stationary quarry equipment and the surge pile. The overland conveyor system which transports quarry materials to the rock crushers and rock plant, along with the crushers/support area and the rock plant itself will be demolished and removed from the site.

The heavy equipment planned for the Phase 3 demolition process includes,

- 3 CAT 330 excavators (with shears, grapples and breakers),
- 1 CAT 320 excavator,
- 1 CAT 996 wheel dozers,
- 1 Grove RT-635 crane,
- 14 CAT 777 mining trucks,
- 1 CAT D9 track dozer,
- 1 CAT D8 track dozer,
- 2 Hitachi EX1900-6 track excavators.

The demolition and removal of the surge pile, conveyors and rock plant are expected to take a short period of time (less than several months). Rough grading of the area is expected to last approximately 2 years. The entire Phase 3 process is expected to be completed by 2030.

Permanente Creek Reclamation Area

In addition to the above three main phases of the overall reclamation of EMSA, WMSA and rock plant removal, the reclamation of a smaller area along Permanente Creek is included with this RPA.

The PCRA is a 23 acre area that will be subdivided into seven subareas (1-7). The area is located to the south of the WMSA and North Quarry 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 will 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 will be done manually. The reclamation of the PCRA will be performed over the Phase 1 and Phase 2 operations as access to parts of the PCRA will not be available until portions of the Phase 1 and Phase 2 commence or are completed.

The RPA Phase 1 and Phase 2 operations and equipment were provided in the Air Quality Technical Analysis, Ref. (g). The Phase 1 operations are reported to operate for approximately 16 hours (two 8-hour shifts – day and swing) per day. The shifts are reported to run from 6:00 a.m. to 2:30 p.m. and 2:30 p.m. to 11:00 p.m.

Because of the large physical areas in which the heavy equipment will be operating, the great distances from the noise sources (heavy equipment) to the receptor locations (surrounding residences) and topographic shielding, each of the three Phases can be analyzed individually as each phase would affect separate residential locations. For instance, Phase 1 will affect the caretaker's home and homes in the Cristo Rey development to the north of the quarry. Phase 2 would primarily affect homes along Montebello Road and Phase 3 would affect homes to the southeast of the quarry, particularly the home at the end of Balboa Road.

Each of these three is addressed separately in this study and will not have an overlapping or cumulative effect. Of the analyzed receptor locations, the caretaker's residence and the Montebello Road residence are in Santa Clara County. The Cristo Rey development and the home on Voss Avenue are in the City of Cupertino.

Precise information regarding the exact location of any piece of equipment at any given time is not available, or even known. Thus, we estimate that operations involving several identical pieces, such as the CAT 777 trucks, will disperse the equipment over the operational area. We are also assuming that re-contouring slopes will be done by building the slopes down from the upper elevations such that much of the earth/material moving equipment will be operating at upper (unshielded) elevations at times rather than all equipment being located at the foot of the slopes (shielded) building slopes up. This scenario represents a worst-case noise scenario.

The RPA operational noise levels and noise exposures were evaluated against the standards of the Santa Clara County Noise Element, the Santa Clara County Noise Ordinance, the City of Cupertino Noise Element and the City of Cupertino Noise Ordinance. The Santa Clara County Noise Ordinance limits noise levels over various lengths of time. The City of Cupertino Noise Ordinance has basic daytime and nighttime decibel level limits. The operational noise exposure impacts were evaluated against the standards of CEQA, which does limit the noise levels, but compares the project noise exposures to the existing ambient noise exposures at any given sensitive receptor location (residences).

Ambient noise measurements at or near the quarry property boundaries in the vicinity of the nearby residences were made in November 2009. The quarry noise levels and noise exposures for each of four monitoring locations to the north, northeast and southeast of the quarry were provided in a noise monitoring report prepared for the County of Santa Clara, Ref. (h). One of the four noise monitoring locations included in the previous study (Stevens Creek Boulevard) is not germane to this study and is not included herein.

VI. Ambient Sound Levels

Table III provides the measured noise exposures at each of the noise monitoring locations and the noise exposures extrapolated to the nearest quarry property boundary.

TABLE III				
Lehigh Quarry Generated Ambient Noise Exposures, dB DNL/CNEL				
Location	Measurement Location		Property Boundary	
	Day 1	Day 2	Day 1	Day 2
1 – N.E of Plant	55	54	55	54
2 – SE of Plant	54	54	52	50
3- North of Plant	56	57	38	38
4. – Cristo Rey Res.*	49	49		

* Measurements made April 25-26, 1995

Ambient noise measurements at the caretaker’s home were not made as Edward L. Pack Associates, Inc. was instructed that the home was not a residential dwelling at the time. Noise measurements also were not made along Montebello Road as these homes are too far away from the quarry to be a concern.

The focus of the previous ambient noise level study was to determine the noise levels and noise exposures generated by the overall quarry operations at the quarry property boundaries for an evaluation against the Santa Clara County noise standards. Ambient noise measurements were not made at residential locations (with the exception of along Stevens Creek Boulevard to address truck traffic noise).

The noise measurements at the Cristo Rey residential location were made in 1995 as part of that project's development application, Ref. (i). During the 2009 study, visits were made to several residential areas to determine the audibility of quarry operations. Visits to the caretaker's home and to the home at the end of Montebello Road were made during the course of this analysis, which revealed that quarry noise was not audible along Montebello Road or at the caretaker's home.

Generally, the noise exposures at the residential areas closest to the quarry that could be the most noise impacted sensitive receptor locations are in the range of 45-50 dB DNL on Montebello Road and 52-56 dB DNL/CNEL in the neighborhoods from Los Altos to Cupertino, including Cristo Rey, which is typical for suburban neighborhoods. Homes directly adjacent to the major roadways in the area will have higher noise levels.

The ambient noise study revealed that noise from the quarry is generally inaudible at residences in the vicinity with the exception of a low "hum" sound from the kilns that is slightly noticeable at night when the ambient sound levels drop. The sound from the kilns is only audible at residences that are not near any major roadways, such as Foothill Boulevard, Stevens Creek Boulevard, Highway 85 and Interstate 280.

As the existing noise exposures are primarily in the 52-56 dB DNL/CNEL range, the Santa Clara County Noise Element limit of 55 dB DNL and the City of Cupertino Noise Element limit of 60 dB CNEL for the RPA operations are adequate noise standards. In addition, compliance with the 55 dB DNL standard of the Noise Element will result in increases in the noise environments by no more than 3-5 dB. At the home along Montebello Road, a project-generated noise exposure of 53 dB DNL would be limit for compliance with CEQA policy.



FIGURE 2

This satellite image provides a view of the quarry outlined in red with the nearest residential locations outlined in blue. The yellow stick pins indicate the locations of the ambient noise measurements made in 2009. As shown, measurement Location 3 was at the north end of the EMSA. The caretaker's home is indicated by the blue circle just below the north end of the EMSA. Cristo Rey is to the north (right) of the EMSA and has a partial view into the project area. The blue circles to the west of Cristo Rey are in the City of Los Altos and are substantially below the north ridgeline of the quarry along the WMSA, North Quarry and EMSA.

The blue circles to the east of the quarry are in the DeAnza Oaks development (along Stevens Creek Boulevard), at the end of Voss Avenue and in the Balboa Road area. These homes are also substantially below the ridgelines to the east of the quarry and do not have a view to the quarry, with the exception of a small portion of the WMSA at the very highest point at the westerly end.

The blue circle at the top of the image represents the home on Montebello Road that is closest to the WMSA. Although this home is somewhat higher in elevation, a portion of a ridge interrupts most of the lines of sight into the quarry.

VII. Project-Generated Noise Impacts

The project-generated noise impacts to the residential areas were divided into three segments, corresponding to the main phases of the RPA. The reclamation of the EMSA (Phase 1) will affect only those residences to the north/northeast of the site where there is a line of sight to the work area. The caretaker's home is the closest residence and the Cristo Rey development is the next closest.

Figure 3 depicts the view from the north end of the EMSA toward the Gates of Heaven Cemetery (foreground) and the Cristo Rey residential area in the far background. The caretaker's home is just off of the picture to the right.



FIGURE 3

The reclamation of the WMSA and backfilling of the North Quarry (Phase 2) could affect only the residences along Montebello Road, with the residence at the end of the publicly accessed portion of the road the closest to the work area. The photograph below (Figure 4) depicts the view from the front gate of the home toward the quarry. Visible is part of the North Quarry and Crusher/Support area. The home is on the nose of a hill off to the left that has a greater view into the WMSA than what is shown in the photo.

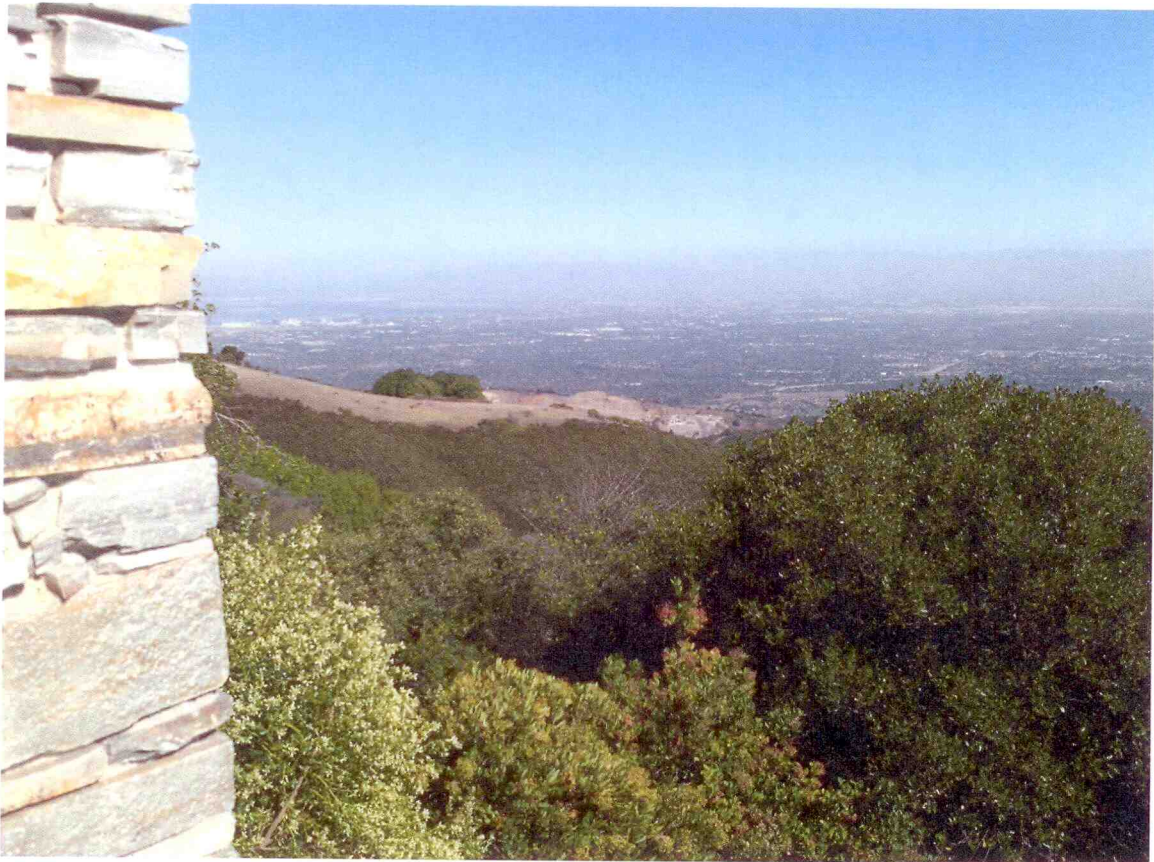


FIGURE 4

The demolition and removal of the surge pile/conveyor system and rock plant is in the vicinity of residences to the southeast of the quarry. The nearest home is at the terminus of Balboa Road approximately 1,000 ft. to the east of the ambient measurement Location 2. The view in the photograph below (Figure 5) was from approximately 2,700 ft. west of the Balboa Road home and approximately 4,500 ft. from the surge pile. The rock plant is not visible. Only the upper portion of the WMSA at its highest point is visible from the Balboa Road home (approx. 3 miles).



FIGURE 5

Table IV, below, provides the noise exposures and noise levels generated by the EMSA reclamation operations at each of the residential areas that could be effected mostly by the RPA work. The noise excesses are shown in Bold. Note that there will be no noise excesses during daytime hours. All noise excesses would occur during or because of nighttime operations. The typical operational scenario represents operations over most of the EMSA area where most of the work is shielded by topography.

TABLE IV							
EMSA Reclamation Plan Amendment Project-Generated Noise Levels							
	Lmax	L2	L8	L25	L50	Leq	DNL/CNEL
Daytime Limit	80/65	75	70	65	60	--	55
Nighttime Limit	70/55	65	60	55	50	--	
Receptor (Typical Operations)							
Caretaker	65	57	56	55	53	54	53
Cristo Rey	60	54	53	52	50	51	50/51
Voss Ave.	37	28	27	26	24	25	25/26
Receptor (Unshielded Operations)							
Caretaker	72	64	63	62	60	61	61
Cristo Rey	65	58	57	56	54	55	55/56
Voss Ave.	46	37	36	35	33	34	34/35

The area of work in the EMSA that will result in noise level excesses is shown in the yellow area on the satellite image (Figure 6) on the following page. This area is approximately 11.5 acres of the EMSA 74 acre site. Noise excesses will occur only during nighttime hours and/or because of operations at elevations higher than 615 ft. where topographic shielding is minimized. The caretaker's home is outlined in purple in the image.

The unshielded noise analysis assumes that all of the listed heavy equipment would operate simultaneously during nighttime hours and/or operate at elevations above 560 ft. for the caretaker's home location and 615 ft. for the Cristo Rey locations. These assumptions may not be realistic. However, precise operational information is not available regarding how much equipment will be operating at any given location at any given time.



FIGURE 6

Table V, provides the WMSA/North Quarry backfill operational noise levels and noise exposures at the most impacted home along Montebello Road.

TABLE V							
WMSA/North Quarry Backfill Reclamation Plan Amendment Project-Generated Noise Levels							
	Lmax	L2	L8	L25	L50	Leq	DNL
Daytime Limits	80	75	70	65	60	--	55
Nighttime Limits	70	65	60	55	50	--	
Receptor (Typical Operations)							
Montebello Road	44	44	43	42	40	41	40
Receptor (Unshielded Operations)							
Montebello Road	54	54	53	52	50	51	50

As shown above, RPA operations in the WMSA/North Quarry will be in compliance with the standards of the Santa Clara County Noise Element and Noise Ordinance. The increase in the existing ambient noise environment is predicted to be no more than 3 decibels. No other residences along Montebello Road have a line of sight to the quarry that could result in significant noise increases.

Table VI, below, provides the RPA operational noise levels from the demolition and removal of the surge pile, overland conveyor system and rock plant at the nearest and most impacted residence closest to the Phase 3 area. This residence is at the terminus of Balboa Road. Ambient sound measurement Location 2 from the ambient noise level study in 2009 was approximately 1,500 ft. to the west of this home. Note that there will be no unshielded operations associated with Phase 3 at the residences to the east of the quarry.

TABLE VI							
Rock Plant/Conveyor Demolition Project-Generated Noise Levels							
	Lmax	L2	L8	L25	L50	Leq	DNL
Daytime Limits	80	75	70	65	60	--	55
Nighttime Limits	70	65	60	55	50	--	
Receptor							
Balboa Road	41	39	38	37	35	36	32

The Phase 3 RPA operational noise will not be significant at the residences to the east of the quarry and will not add to the existing noise environment in the area.

The Permanente Creek Reclamation Area work will be fully shielded from view at the most impacted Montebello Road residence with the exception of a portion of Sub-Area 2 where this is a line-of-sight from the home between topographic elements. Table VII provides the noise levels generated by work in the PCRA.

TABLE VII							
Permanente Creek Reclamation Area Project-Generated Noise Levels							
	Lmax	L2	L8	L25	L50	Leq	DNL
Daytime Limits	80	75	70	65	60	--	55
Nighttime Limits	70	65	60	55	50	--	
Receptor (Typical Operations)							
Montebello Road	21	21	20	19	17	18	17
Receptor (Unshielded Operations)							
Montebello Road	35	35	34	33	31	32	31

Work in the PCRA will be within the limits of the Santa Clara County Noise Element and Noise Ordinance standards and will not add to the existing noise environment at the Montebello Road residence.

CEQA Analysis

Table VIII provides a comparison of the project-generated noise exposures to the existing ambient noise exposures at the receptor locations in the vicinity of the RPA operational areas, including the PCRA. Shown in the table are the ambient noise exposures, the project-generated noise exposures under average topographically shielded conditions and unshielded topographic conditions, the total combined noise exposures and the change in the noise environment for each receptor location.

The increase in noise exposure at the caretaker’s residence and at the Cristo Rey development will result in a significant noise impact when all of the equipment associated with the Phase 1 process operated above 560 ft in elevation and within 1,600 ft. of the residences and operates at night.

TABLE VIII						
CEQA Analysis – Noise Exposures, dB DNL						
Phase 1		Project-generated Noise		Total Noise Exposure		
Receptor	Ambient	Avg. Shield	Unshielded	Avg. Shield	Unshielded	ΔdB
Caretaker’s Home	55	53	61	57	62	+2/+7
Cristo Rey	50	50	55	53	56	+3/+6
Voss Ave.	50	25	34	50	50	0
Phase 2						
Montebello Rd.	47	40	50	48	52	+2/+5
Phase 3						
Balboa Rd.	52	32	N/A	52	N/A	0

VIII. Mitigation Measures

To reduce noise excesses for compliance with the Santa Clara County Noise Element and Noise Ordinance standards and the City of Cupertino Noise Ordinance standards and to reduce noise impacts to a less than significant level for compliance with CEQA, the following noise control measures are recommended:

- Prohibit heavy equipment operations in the northerly portion of the EMSA identified in yellow on Figure 6 during nighttime hours (10:00 p.m. to 7:00 a.m.).
- Limit all operations in the EMSA within 1,600 ft. of the caretaker’s home, identified in yellow on Figure 6, to one 8-hour shift per day.

Table IX, below, provides the resultant noise exposures for average and unshielded conditions, and change in the noise exposures with the implementation of the mitigation measures recommended herein.

TABLE IX						
CEQA Analysis – Mitigated Noise Exposures, dB DNL						
Phase 1		Project-generated Noise		Total Noise Exposure		
Receptor	Ambient	Avg. Shield	Unshielded	Avg. Shield	Unshielded	ΔdB
Caretaker’s Home	55	49	56	56	58	+1/+3
Cristo Rey	50	46	51	51	53	+1/+3
Voss Ave.	50	19	19	50	50	+0/+0
Phase 2						
Montebello Rd.	47	40	50	48	52	+1/+5
Phase 3						
Balboa Rd.	52	32	N/A	52	N/A	0

The increases in the noise environments at receptor locations at which the ambient noise exposures are near or at the respective General Plan limits will be no more than 3 decibels. This increase is considered a less-than-significant impact. At the receptor locations where the existing ambient is well below the General Plan limit, the increase in the noise environment will be no more than 5 decibels, which is also considered a less-than-significant impact. With the incorporation of the above recommended measures, the project will result in less-than-significant impacts to the surrounding communities and will comply with CEQA policy.

IX. Description of the Analytical Methodologies

The Reclamation Plan Amendment area consists primarily of three major locations within the greater Lehigh Quarry. The main reclamation area under Phase 1, which includes the reclamation of the Eastern Materials Storage Area (EMSA), is located at the northeast corner of the quarry, just north of the main concrete batching plant and entrance to the quarry.

The main reclamation area under Phase 2, which includes moving excess materials from the Western Materials Storage Area (WMSA) to backfill the North Quarry, re-grade the existing slopes and re-vegetate the area, is the largest of the three phase areas and is located from the approximate physical center of the quarry to the westerly end.

Phase 3 of the RPA includes the demolition/removal of the surge pile, the overland conveyor system and the rock plant that are located toward the southerly tip of the quarry.

To determine the levels of noise generated by each of the three phases for an evaluation against the standards of the Santa Clara County Noise Ordinance, and ultimately, the noise exposures for evaluations against the standards of the Santa Clara County Noise Element and CEQA, 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 Phase 1 and Phase 2 were provided in the Air Quality Technical Analysis. The list of equipment planned for Phase 3 was provided in the 2011 Permanente Quarry Financial Assurance Estimate, Ref. (j). The daily durations of use of the equipment for Phase 3 were not included in the Financial Assurance Estimate. Therefore, we are assuming, for the purposes of this study, that Phase 3 operations utilizing heavy equipment will occur for 8 hours per day during the day shift.

Because the County noise standards are in terms of short-term noise levels (1 second, 5 minutes, 15 minutes, 24 hours, etc.), a hypothetical operational scenario was produced as it is unknown exactly where and when any particular item of equipment will be operating under these short time frames. For instance, Phase 1 will have three Cat D10 bulldozers in operation. The assumed scenario yields one D10 operating closest to the receptor location while the second D10 operates at the farthest area from the receptor location and the third D10 operates somewhere in between those two. Likewise for the haul trucks and other equipment where there is more than one. The scenario assumed places multiple items of equipment spread out fairly evenly over the reclamation or work area on any given day.

For the daily amount of use and the times of day that equipment will be used, equipment that is scheduled for longer than one shift was divided between the day shift and the swing shift with at least one hour of nighttime operation. Note that both shifts have one nighttime hour within the work period.

The analyses for Phases 1, 2 and 3 included the extrapolation of the equipment noise levels from a reference distance to the source-to-receptor distances, the average noise shielding provided by topography, the maximum operating sound level at the receptor location, an adjustment to convert the maximum sound level to the hourly average sound level (L_{eq}), the L_{eq} at the receptor location and the Day-Night Level at the receptor location. Also included in the analyses are the Day-Night Levels if all of the equipment operates at elevations where no topographic shielding occurs.

The analyses contained in this study do not include the re-vegetation/re-seeding of the reclamation areas as these operations are relatively benign acoustically. The analyses represent the noise environments created during the operations that include the heavy equipment from commencement through final grading of the respective area.

The project-generated “L” exceedance values (L_2 , L_8 , L_{25} and L_{50}) used in the Santa Clara County Noise Ordinance cannot be calculated precisely as these values are dependent upon the noise levels generated by all of the equipment operating in any Phase, the duration of operation at any given location and the time of day of the operations. Thus, reference was made to the long-term annual noise monitoring studies performed at the Granite Construction Felton Quarry in Santa Cruz County, Ref.’s (j-m).

During continuous quarrying/earth moving operations associated with rock quarries, there is a simple, quantifiable relationship between the hourly average noise level (L_{eq}) and the “L” exceedance values. Over several years of data acquisition, typical heavy equipment operations in a mountainous quarry generate “L” exceedance values in relation to the L_{eq} as follows:

$$L_2 = L_{eq} + 3$$

$$L_8 = L_{eq} + 2$$

$$L_{25} = L_{eq} + 1$$

$$L_{50} = L_{eq} - 1$$

To determine the project-generated noise exposures for an evaluation against the standards of the Santa Clara County Noise Element and CEQA, the DNL’s were calculated as a decibel average of the L_{eq} ’s as they apply to the daytime and nighttime periods of the DNL index. The DNL formula used to calculate the DNL is provided in Appendix B.

Phase 1 – EMSA Reclamation

Table X on page 30 provides the list of heavy equipment for the Phase 1 operations. Included in the Table are the maximum operating sound levels normalized to a distance of 100 ft. from the equipment. The equipment noise levels were acquired from several sources, Ref.'s (o-r). The raw noise data for the various items of equipment were acquired at various distances. The normalization of the noise data was performed using a standard noise attenuation rate of:

$$20\log_{10}(r_1/r_2).$$

Table XI on page 31 provides the analysis for the caretaker's home. As shown, the maximum noise levels will be within the limits of the Santa Clara County Noise Ordinance during daytime operations. However, the nighttime maximum noise limit will likely be exceeded if EMSA reclamation operations take place between 10:00 p.m. and 7:00 a.m.

Although the L_{eq} is not limited, it is the basis for the determination of the "L" exceedance values of the Noise Ordinance and the DNL values used in the Noise Elements. The "L" exceedance values for the noisiest hour were calculated using the method described above and reported in Table IV of this report. If operations take place during nighttime hours, the L_{50} limit of 50 dBA will be exceeded. If operations take place during nighttime hours and the operations occur at elevations higher than 560 ft., the L_8 , L_{25} and L_{50} values will be exceeded. In addition, the Santa Clara County Day-Night Level limit of 55 dB will also be exceeded.

For the CEQA evaluation, the project-generated noise exposures were added to the existing ambient noise exposure at the residence and the difference was calculated. An increase of 5 dB or less in the noise environment is considered a less than significant impact. Nighttime operations at elevations greater than 560 ft. and in the noise impact area identified in Figure 5 as the yellow area will result in increases in the noise exposures at the caretaker's residence greater than 3 decibels. This will result in a significant noise impact. Mitigation measures will be required and are described in Section VIII of this report.

**TABLE X
EMSA RECLAMATION - PHASE 1**

Equipment						
Make	Model	Type	Daily Use - hrs	Lmax Sound Level	dist, ft.	
Cat	D10	Track Bulldozer	11	83	100	
Cat	D10	Track Bulldozer	11	83	100	
Cat	D10	Track Bulldozer	11	83	100	
Cat	345	Excavator	8	74	100	
Cat	16	Motor Grader	6.5	79	100	
Cat	16	Motor Grader	6.5	79	100	
Cat	785	Mining Truck	12	82	100	
Cat	777	Off Road Haul	14	80	100	
Cat	777	Off Road Haul	14	80	100	
Cat	777	Off Road Haul	14	80	100	
Cat	777	Off Road Haul	14	80	100	
Cat	777	Off Road Haul	14	80	100	
Cat	777	Off Road Haul	14	80	100	
Cat	777	Off Road Haul	14	80	100	
Cat	740	Articulated Truck	6	76	100	
Cat	740	Articulated Truck	6	76	100	
Cat	740	Articulated Truck	6	76	100	
Cat	824	Dozer	4	76	100	
Cat	992	Front End Loader	9	80	100	
Cat	992	Front End Loader	9	80	100	
Cat	992	Front End Loader	9	80	100	
Cat	988	Front End Loader	4	78	100	
Cat	773	Water Truck	8	78	100	
Cat	773	Water Truck	8	78	100	
Holland Dozer Trap		Bin Fill/Conveyor	16	76	100	

**TABLE XI
CARETAKER HOME**

Equip. Model	Dist. ft.	Sound Level	Avg. Shielding	Lmax at Receptor	Lmax to Leg adj	Sound Level @ Receptor		Unshielded DNL
						Leq	DNL	
D10	1100	62	-7	55	-8	47	44	51
D10	2400	55	-7	48	-8	40	37	44
D10	3700	52	-7	45	-8	37	34	41
345	2600	46	-7	39	-8	31	30	37
16	1100	58	-7	51	-8	43	41	48
16	3700	48	-7	41	-8	33	31	38
785	1200	60	-7	53	-8	45	45	52
777	1100	59	-7	52	-8	44	46	53
777	1600	56	-7	49	-8	41	43	50
777	2700	51	-7	44	-8	36	38	45
777	3700	49	-7	42	-8	34	36	43
777	1100	59	-7	52	-8	44	46	53
777	1600	56	-7	49	-8	41	43	50
777	2700	51	-7	44	-8	36	38	45
777	3700	49	-7	42	-8	34	36	43
740	1100	55	-7	48	-8	40	37	44
740	2400	48	-7	41	-8	33	30	37
740	3700	45	-7	38	-8	30	27	34
824	1400	53	-7	46	-8	38	30	37
992	2800	51	-7	44	-8	36	32	39
992	3200	50	-7	43	-8	35	31	38
992	3700	49	-7	42	-8	34	30	37
988	4000	46	-7	39	-8	31	28	35
773	1100	57	-7	50	-8	42	37	44
773	3500	47	-7	40	-8	32	27	34
Bin Fill/Conveyor	4000	44	-7	37	-8	29	32	39
						TOTAL	54	61
						Fully Shielded=	47	46

Table XII on page 33 provides the analysis for the homes in the Cristo Rey development. The maximum noise levels will be within the limits of the Santa Clara County Noise Ordinance for both daytime and nighttime operations. The City of Cupertino Noise Ordinance limits will be exceeded during nighttime operations that are within 2400 ft. of the Cristo Rey development south property line. If operations take place during nighttime hours and the operations occur at elevations higher than 615 ft., the L_{25} and L_{50} values will be exceeded. The project-generated noise exposures will be within the 55 dB DNL limit of the Santa Clara County Noise Element. The 60 dB CNEL limit of the City of Cupertino Noise Element will not be exceeded.

In terms of the CEQA evaluation, the noise exposure increase will be greater than 5 decibels if operations occur during nighttime hours and at elevations greater than 615 ft. The increase in noise could result in a significant noise impact. Mitigation measures will be required and are described in Section VIII of this report.

Table XIII on page 34 provides the analysis for the nearest residence to the east of the quarry at the end of Voss Avenue. The total L_{eq} was calculated to be 25 dBA, which is lower than the typical ambient sound levels. An L_{eq} of 25 dBA is a level typical of a suburban home interior in the middle of the night with the windows closed. The noise exposure was also calculated to be 25 dB. Because of the large separation distance and the topographic shielding provided by the interposed ridgeline, the maximum noise levels, the "L" exceedance values and the DNL's/CNEL's will be within the limits of the County and City standards under both daytime and nighttime operational scenarios.

As the project-generated noise exposures will be more than 10 decibels lower than the existing ambient noise exposure, the project noise will not add to the ambient. Project-generated noise will be insignificant.

TABLE XII
CRISTO REY

Equip. Model	Dist., ft.	Sound Level	Avg. Shielding	Lmax at Receptor	Lmax to Leq adj	Sound Level @ Receptor		Unshielded DNL/CNEL
						Leq	DNL/CNEL	
D10	2400	55	-5	50	-8	42	39	44
D10	3700	52	-5	47	-8	39	36	41
D10	5000	49	-5	44	-8	36	33	38
345	3900	42	-5	37	-8	29	28	33
16	2400	51	-5	46	-8	38	36	41
16	5000	45	-5	40	-8	32	30	35
785	2500	54	-5	49	-8	41	41	46
777	2400	52	-5	47	-8	39	41	46
777	2900	51	-5	46	-8	38	40	45
777	4000	48	-5	43	-8	35	37	42
777	5000	46	-5	41	-8	33	35	40
777	2400	52	-5	47	-8	39	41	46
777	2900	51	-5	46	-8	38	40	45
777	4000	48	-5	43	-8	35	37	42
777	5000	46	-5	41	-8	33	35	40
740	2400	48	-5	43	-8	35	32	37
740	3700	45	-5	40	-8	32	29	34
740	5000	42	-5	37	-8	29	26	31
824	2700	47	-5	42	-8	34	26	31
992	4100	48	-5	43	-8	35	31	36
992	4500	47	-5	42	-8	34	30	35
992	5000	46	-5	41	-8	33	29	34
988	5300	44	-5	39	-8	31	28	33
773	2400	50	-5	45	-8	37	32	37
773	4800	44	-5	39	-8	31	26	31
Bin Fill/Conveyor	5300	42	-5	37	-8	29	32	37
TOTAL						51	50	55
fully shielded =						46	45	

**TABLE XIII
VOSS AVE**

Equip. Model	Dist. ft.	Sound Level	Avg. Shielding	Leq @ Receptor	Lmax to Leq adj	Sound Level @ Receptor		Unshielded DNL/CNEL
						Leq	DNL/CNEL	
D10	2000	36	-9	27	-8	19	16	25
D10	3000	26	-9	17	-8	9	6	15
D10	4000	20	-9	11	-8	3	0	9
345	3500	15	-9	6	-8	-2	-3	6
16	2000	32	-9	23	-8	15	13	22
16	4000	16	-9	7	-8	-1	-3	6
785	2100	34	-9	25	-8	17	17	26
777	2000	33	-9	24	-8	16	18	27
777	2500	28	-9	19	-8	11	13	22
777	3300	21	-9	12	-8	4	6	15
777	4000	17	-9	8	-8	0	2	11
777	2000	33	-9	24	-8	16	18	27
777	2500	28	-9	19	-8	11	13	22
777	3000	22	-9	13	-8	5	7	16
777	4000	17	-9	8	-8	0	2	11
740	2000	29	-9	20	-8	12	9	18
740	3300	18	-9	9	-8	1	-2	7
740	4000	13	-9	4	-8	-4	-7	2
900								
824	2300	26	-9	17	-8	9	1	10
900								
992	3100	21	-9	12	-8	4	0	9
992	4100	18	-9	9	-8	1	-3	6
992	4000	17	-9	8	-8	0	-4	5
900								
988	4300	13	-9	4	-8	-4	-7	2
900								
773	2000	31	-9	22	-8	14	9	18
773	3800	16	-9	7	-8	-1	-6	3
Bin Fill/Conveyor	4300	11	-9	2	-8	-6	-3	6
					TOTAL	25	25	34
					Fully Shielded =	20	20	

Phase 2 – WMSA Reclamation and North Quarry Backfill

Table XIV on page 36 provides the list of heavy equipment for the Phase 2 operations. As in Table X, included are the maximum operating sound levels normalized to a distance of 100 ft. from the equipment. The calculation methodologies used for the Phase 2 analysis were the same as those used for Phase 1.

Table XV on page 37 provides the analysis for the residence at the end of Montebello Road. The maximum noise levels will be within the limits of the Santa Clara County Noise Ordinance during daytime and nighttime operations. The “L” exceedance values will be within the respective limits of the Santa Clara County Noise Ordinance under daytime and nighttime operations. The project-generated noise exposures will be within the 55 dB DNL limit of the Santa Clara County Noise Element standards.

Because the ambient noise environment at the Montebello Road residence is lower than in the Cupertino and Los Altos neighborhoods (due to the far distance to major roadways), the operational activities could increase the ambient noise environment by up to 5 decibels if the Phase 2 equipment operates above 800 ft. in elevation and operates at night. A 5 decibel increase, although noticeable, is considered a less than significant impact. Mitigation measures will not be required.

TABLE XIV

PHASE 2

WMSA/North Quarry Backfill	Equipment Make	Model	Type	Daily Use - hrs	Sound Level	dist, ft.
	Cat	D11	Tractor	14	84	100
	Cat	D11	Tractor	14	84	100
	Cat	D11	Tractor	14	84	100
	Cat	D8T	Tractor	8	74	100
	Cat	345	Excavator	8	76	100
	Cat	16	Grader	4	79	100
	Cat	16	Grader	4	79	100
	Cat	777	Haul Truck	6	80	100
	Cat	777	Haul Truck	6	80	100
	Cat	777	Haul Truck	6	80	100
	Cat	777	Haul Truck	6	80	100
	Cat	777	Haul Truck	6	80	100
	Cat	777	Haul Truck	6	80	100
	Cat	777	Haul Truck	6	80	100
	Cat	777	Haul Truck	6	80	100
	Cat	777	Haul Truck	6	80	100
	Cat	777	Haul Truck	6	80	100
	Cat	740	Haul Truck	8	76	100
	Cat	740	Haul Truck	8	76	100
	Cat	740	Haul Truck	8	76	100
	Cat	824	Dozer	7	76	100
	Cat	992	Loader	6	80	100
	Cat	992	Loader	6	80	100
	Cat	992	Loader	6	80	100
	Cat	988	Loader	8	78	100
	Cat	773	Water Truck	5	78	100
	Cat	773	Water Truck	5	78	100
	Holland Dozer Trap		BIN FILL/CONVEYOR	16	76	100
	Holland Dozer Trap		BIN FILL/CONVEYOR	16	76	100
	Holland Dozer Trap		BIN FILL/CONVEYOR	16	76	100
	Holland Dozer Trap		BIN FILL/CONVEYOR	16	76	100
PCRA	CAT	345	Excavator	16	76	100

TABLE XV

MONTEBELLO RD											
Equipment											
Make	Model	Dist. ft.	Sound Level	Shielding	Lmax at Receptor	Lmax to Leg adj	Leq at Receptor	DNL	Unshielded DNL		
Cat	D11	5000	50	-10	40	-8	32	32	42		
Cat	D11	6000	48	-10	38	-8	30	30	40		
Cat	D11	7000	47	-10	37	-8	29	29	39		
Cat	D8T	6000	38	-10	28	-8	20	19	29		
Cat	345	6000	40	-10	30	-8	22	21	31		
Cat	16	5000	45	-10	35	-8	27	25	35		
Cat	16	7000	42	-10	32	-8	24	23	33		
Cat	777	5250	46	-10	36	-8	28	26	36		
Cat	777	5500	45	-10	35	-8	27	25	35		
Cat	777	5750	45	-10	35	-8	27	25	35		
Cat	777	6000	44	-10	34	-8	26	24	34		
Cat	777	6250	44	-10	34	-8	26	24	34		
Cat	777	6500	44	-10	34	-8	26	24	34		
Cat	777	6750	43	-10	33	-8	25	23	33		
Cat	777	7000	43	-10	33	-8	25	23	33		
Cat	740	5000	42	-10	32	-8	24	23	33		
Cat	740	6000	40	-10	30	-8	22	21	31		
Cat	740	7000	39	-10	29	-8	21	20	30		
Cat	824	6000	40	-10	30	-8	22	28	38		
Cat	992	5000	46	-10	36	-8	28	26	36		
Cat	992	5000	46	-10	36	-8	28	26	36		
Cat	992	6000	44	-10	34	-8	26	24	34		
Cat	988	7000	41	-10	31	-8	23	22	32		
Cat	773	7000	41	-10	31	-8	23	21	31		
Cat	773	5000	44	-10	34	-8	26	24	34		
Holland Dozer Trap		5500	41	-10	31	-8	23	23	33		
Holland Dozer Trap		5500	41	-10	31	-8	23	23	33		
Holland Dozer Trap		6000	40	-10	30	-8	22	22	32		
Holland Dozer Trap		6000	40	-10	30	-8	22	22	32		
Cat	345	4250	43	-14	29	-8	21	17	31		
							TOTAL	41	40	50	

Phase 3 – Demolition/Removal of Surge Pile, Conveyor and Rock Plant

Table XVI on page 39 provides the list of heavy equipment for the Phase 3 operations. The equipment list for the Phase 3 operations was provided in the Financial Assurances Estimate. Thus, the hours of operation for each item were not provided. We assumed that the equipment would operate during the daytime shift only.

The equipment sound levels were normalized to a distance of 100 ft. from the equipment. The calculation methodologies used for the Phase 3 analysis were the same as those used for Phases 1 and 2.

The Table also provides the analysis for the residence at the end of Balboa Road to the southeast of the quarry closest to the Rock Plant. This home is approximately 4,000 to 4,600 ft. from the Phase 3 work area. There is a high ridgeline interposed. The home does not have a view to the Phase 3 area. The maximum noise levels will range from 28 to 33 dBA and will be within the limits of the Santa Clara County Noise Ordinance during daytime and nighttime operations. The “L” exceedance values will be within the respective limits of the Santa Clara County Noise Ordinance under daytime and nighttime operations. The noise levels will be within the limits of the City of Cupertino Noise Ordinance.

The project-generated noise exposures will be within the 55 dB DNL limit of the Santa Clara County Noise Element standards and within the 60 dB CNEL limit of the City of Cupertino Noise Element standards.

The ambient noise exposure at the Balboa Road residence, is 52 dB DNL, as determined from the ambient noise study performed in 2009. The project-generated noise exposure was calculated to be 32 dB DNL. The project will not add to the existing noise environment at the residence and the impact will be insignificant. Mitigation measures will not be required.

TABLE XVI

PHASE 3											
Make	Model	Type	Sound Level	Dist.	Balboa Rd Residence			Lmax to Leg adj	Sound Level @ Receptor		
					Sound Level	Dist	Shielding		SL @ Rec.	Leg	DNL
Overland Conveyor Demo											
Cat	330	Excavator steel shear	76	100	43	4600	-15	28	-8	20	16
Cat	330	Excavator grapple	76	100	43	4600	-15	28	-8	20	16
Cat	966	Utility Loader	78	100	45	4600	-15	30	-8	22	18
Cat	330	Excavator Breaker	76	100	43	4600	-15	28	-8	20	16
Grove	RT-635	Crane	77	100	44	4600	-15	29	-8	21	17
		Truck	80	100	47	4600	-15	32	-8	24	20
Grove	RT-635	Dump Truck	80	100	47	4600	-15	32	-8	24	20
Rock Plant Removal											
Equipment											
Make	Model	Type	Sound Level	Dist.	Sound Level	Dist	Shielding <td>SL @ Rec.</td> <td>Lmax to Leg adj</td> <td>Sound Level @ Receptor</td>	SL @ Rec.	Lmax to Leg adj	Sound Level @ Receptor	
Cat	330	Excavator steel shear	76	100	44	4000	-15	29	-8	21	17
Cat	330	Excavator grapple	76	100	44	4000	-15	29	-8	21	17
Cat	966	Utility Loader	79	100	47	4000	-15	32	-8	24	20
Cat	330	Excavator Breaker	76	100	44	4000	-15	29	-8	21	17
Cat	320	w/Bucket	76	100	44	4000	-15	29	-8	21	17
Grove	RT-635	Crane	77	100	45	4000	-15	30	-8	22	18
		Truck	80	100	48	4000	-15	33	-8	25	21
Grove	RT-635	Dump Truck	80	100	48	4000	-15	33	-8	25	21
Rough Grading											
Equipment											
Make	Model	Type	Sound Level	Dist.	Sound Level	Dist	Shielding <td>SL @ Rec.</td> <td>Lmax to Leg adj</td> <td>Sound Level @ Receptor</td>	SL @ Rec.	Lmax to Leg adj	Sound Level @ Receptor	
Cat	330	Excavator steel shear	76	100	44	4000	-15	29	-8	21	17
Cat	330	Excavator grapple	76	100	44	4000	-15	29	-8	21	17
Cat	966	Utility Loader	79	100	47	4000	-15	32	-8	24	20
Cat	330	Excavator Breaker	76	100	44	4000	-15	29	-8	21	17
Cat	320	w/Bucket	76	100	44	4000	-15	29	-8	21	17
Grove	RT-635	Crane	77	100	45	4000	-15	30	-8	22	18
		Truck	80	100	48	4000	-15	33	-8	25	21
Grove	RT-635	Dump Truck	80	100	48	4000	-15	33	-8	25	21
									TOTAL =	36	32

X. Conclusions

In conclusion, the sound levels generated by the Lehigh Quarry Reclamation operations are likely to exceed the limits of the County of Santa Clara Noise Element and Noise Ordinance standards at the caretaker's home and possibly at the homes of the Cristo Rey development to the northeast and north of the EMSA, respectively, depending on precise operational conditions. Reclamation of the WMSA and backfilling of the North Quarry will not generate significant levels of noise at the residence surrounding the quarry. Demolition and removal of the surge pile, overland conveyors and rock plant also will not generate excessive noise levels at the residences surrounding the quarry. Noise from reclamation of the Permanente Creek area will not generate significant levels of noise.

The above report presents the results of a noise assessment study for the Lehigh Quarry Reclamation Plan Amendment Environmental Impact Report in Santa Clara County. If you have any questions or would like an elaboration on this report, please call me.

Prepared By:

EDWARD L. PACK ASSOC., INC.



Jeffrey K. Pack
President

APPENDIX A

References

- (a) Santa Clara County General Plan, Health and Safety Element, Section I, 1995
- (b) Noise Ordinance of the County of Santa Clara, Chapter VII, Section B11-192, 1981
- (c) City of Cupertino General Plan 2000-2020, Public Health and Safety Element, “Noise Pollution”, Section 6, November 15, 2005
- (d) City of Cupertino Municipal Code, Title 20, Section 10.48 “Community Noise Limits”, 10.48.040 “Daytime and Nighttime Maximum Noise Levels”, 2001
- (e) The California Environmental Quality Act Statute and Guidelines, California Code of Regulations, Title 14, Division 6, Chapter 3, Appendix G, XII – Noise, 2011
- (f) “Reclamation Plan Amendment for Permanente Quarry”, by EnviroMine, Inc., December 2011
- (g) “Air Quality Technical Analysis, Revised Reclamation Plan Amendment, Permanente Quarry, Santa Clara County, California”, by Ashworth Leininger Group, November 30, 2011
- (h) “Noise Monitoring, Lehigh Quarry, Santa Clara County”, by Edward L. Pack Associates, Inc., Project No. 41-020, March 19, 2010
- (i) “Kaiser Permanente Cement Plant Noise Assessment Study For the Planned ‘Cristo Rey’ Single-Family Residential Development, Cupertino”, by Edward L. Pack Associates, Inc., Project No. 27-034, April 28, 1995
- (j) “Financial Assurance Estimate for Permanente Quarry”, by EnviroMine, Inc., April 2011
- (k) “Noise Assessment Study for the Felton Quarry, San Lorenzo Avenue, Santa Cruz County”, by Edward L. Pack Associates, Inc., Project No. 33-085, September 26, 2001
- (l) “Noise Monitoring of Quarry Operations, Granite Construction Company Felton Quarry, San Lorenzo Avenue, Santa Cruz County Felton”, by Edward L. Pack Associates, Inc., Project No. 36-013-2, September 23, 2004
- (m) “Annual Noise Monitoring, Granite Construction Company Felton Quarry, San Lorenzo Avenue, Santa Cruz County Felton”, by Edward L. Pack Associates, Inc., Project No. 38-045, July 18, 2006

References (cont'd)

- (n) "Reclamation Grading Monitoring, Hanson Aggregates Felton Quarry, Santa Cruz County", by Edward L. Pack Associates, Inc., Project No. 39-063, November 1, 2007
- (o) "Noise Assessment Study for the Star Concrete Recycling Facility, 1404 South Seventh Street, San Jose", by Edward L. Pack Associates, Inc., Project No. 39-035, June 27, 2007
- (p) "Heavy Equipment Noise Levels", 19th International Congress on Acoustics, Madrid, Spain, September 2-7, 2007
- (q) "Noise Assessment Study for the Graniterock Batch Plant, California Avenue, Sand City", by Edward L. Pack Associates, Inc., Project No. 34-038, May 22, 2002
- (r) "Environmental Noise Assessment for the Mission Valley Rock Company Quarry Expansion EIR, Paloma Road, Alameda County", by Edward L. Pack Associates, Inc., Project No. 26-026, April 14, 1994

APPENDIX B

Noise Standards and Terminology

1. Noise Standards

A. Santa Clara County Noise Element Standards

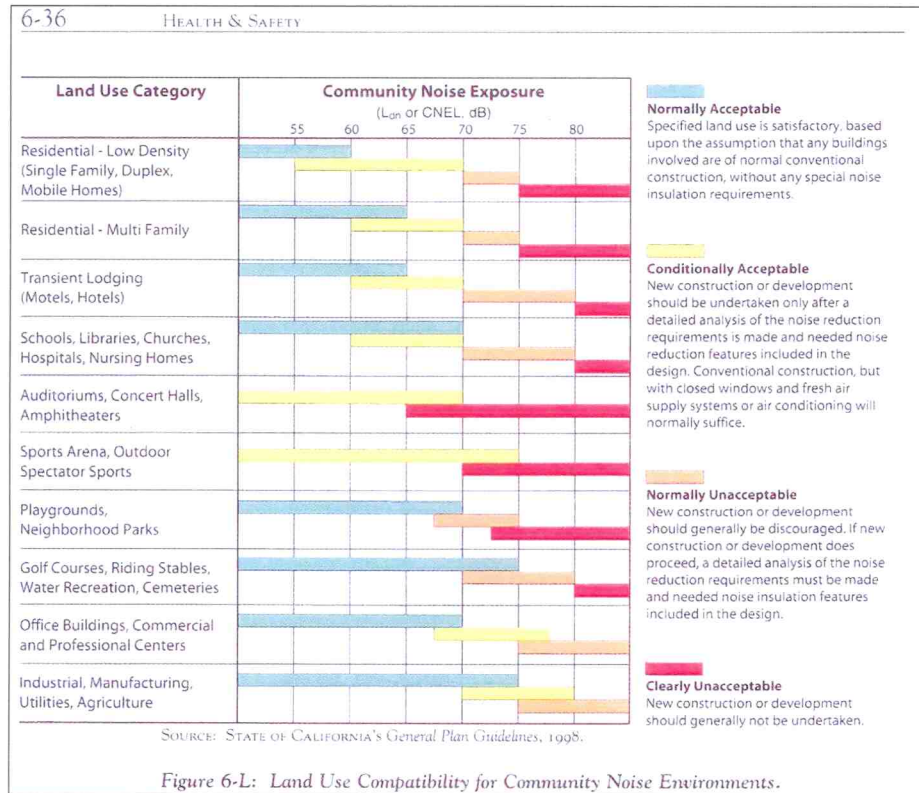
The Land Use Compatibility Standards of the Santa Clara County Noise Element, use the Day-Night Level (DNL) noise descriptor and identify an exterior noise environment of up to 55 dB DNL as satisfactory for residential uses. Where the noise level at a proposed development site is below 55 dB DNL, mitigation measures are not required. The exterior noise level range between 55 and 65 dB DNL is identified as "cautionary", and over 65 dB is "critical".

Industrial land use noise exposures are limited to 70 dB DNL.

For interior exposures in residential buildings, a compatibility level of 45 dB DNL is specified.

B. City of Cupertino “Noise Element” Standards

The City of Cupertino Health and Safety Element of the General Plan, prepared in 2001, references the Land Use Compatibility Chart published by the State of California. The Noise Element standards are shown below.



The Noise Element references the Sound Transmission Control standards of the State of California Code of Regulations, Title 24, which limits interior noise exposures in multi-family residences to 45 dB CNEL. The Noise Element suggests the application of the Title 24 standard to single-family residences as well.

2. Terminology

A. Statistical Noise Levels

Due to the fluctuating character of urban traffic noise, statistical procedures are needed to provide an adequate description of the environment. A series of statistical descriptors have been developed which represent the noise levels exceeded a given percentage of the time. These descriptors are obtained by direct readout of the sound level meters. The statistical levels used in the Santa Clara County Noise Ordinance to describe community noise violations are defined as follows:

- L_{\max} - The maximum 1 second root-mean-square of a sound's waveform
- L_2 - A noise level exceeded for 2% of the time
- L_8 - A noise level exceeded for 8% of the time, considered to be an "intrusive" level.
- L_{25} - The noise level exceeded 50% of the time.
- L_{50} - The noise level exceeded 90 % of the time, representing the "mean" noise level.

B. Day-Night Level (DNL)

Noise levels utilized in the standards are described in terms of the Day-Night Level (DNL). The DNL rating is determined by the cumulative noise exposures occurring over a 24-hour day in terms of A-Weighted sound energy. The 24-hour day is divided into two subperiods for the DNL index, i.e., the daytime period from 7:00 a.m. to 10:00 p.m., and the nighttime period from 10:00 p.m. to 7:00 a.m. A 10 dBA weighting factor is applied (added) to the noise levels occurring during the nighttime period to account for the greater sensitivity of people to noise during these hours. The DNL is calculated from the measured L_{eq} in accordance with the following mathematical formula:

$$DNL = [(L_d + 10 \log_{10} 15) \& (L_n + 10 + 10 \log_{10} 9)] - 10 \log_{10} 24$$

Where:

- L_d = L_{eq} for the daytime (7:00 a.m. to 10:00 p.m.)
- L_n = L_{eq} for the nighttime (10:00 p.m. to 7:00 a.m.)
- 24 indicates the 24-hour period
- & denotes decibel addition.

C. **Community Noise Equivalent Level (CNEL)**

The CNEL is a measure of the cumulative noise exposure over a 24 hour period. The CNEL index divides the 24 hour day into three subperiods, i.e., the daytime (7:00 am to 7:00 pm), the evening period (7:00 pm to 10:00 pm), and the nighttime period (10:00 pm to 7:00 am). Also, weighting factors of 5 and 10 dBA are applied to the evening and nighttime periods, respectively, to account for the greater sensitivity of people to noise during those periods. The CNEL values are calculated from the measured L_{eq} values in accordance with the following mathematical formula:

$$CNEL = [(L_d + 10 \log_{10} 12) \& (L_e + 5 + 10 \log_{10} 3) \& (L_n + 10 + 10 \log_{10} 9)] - 10 \log_{10} 24$$

where:

- L_d = L_{eq} for the daytime (7:00 a.m. to 7:00 p.m.)
- L_e = L_{eq} for the evening (7:00 p.m. to 10:00 p.m.)
- L_n = L_{eq} for the nighttime (10:00 p.m. to 7:00 a.m.)
- 24 indicates the 24 hour period
- & denotes decibel addition

D. **A-Weighted Sound Level**

The decibel measure of the sound level utilizing the "A" weighted network of a sound level meter is referred to as "dBA". The "A" weighting is the accepted standard weighting system used when noise is measured and recorded for the purpose of determining total noise levels and conducting statistical analyses of the environment so that the output correlates well with the response of the human ear.