

**NOISE LETTER FOR PROPOSED
ROSEMARY'S MOUNTAIN QUARRY EXPANSION**

PDS2013-MUP-87-021W2, PDS2013-RC-87-001W2

Log No: 87-2-13

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GLOSSARY OF TERMS AND ACRONYMS

CNEL	community noise equivalent level
dB	decibels
dBA	A-weighted sound level
DPLU	Department of Planning and Land Use
I-15	Interstate 15
L _{eq}	equivalent sound level
MUP	Major Use Permit
NSA	noise-sensitive area
NSLU	noise-sensitive land use
Project	Rosemary's Mountain Quarry Expansion
SLM	sound level meter
SR-76	State Route 76

1.0 EXECUTIVE SUMMARY

This Noise Letter summarizes the results of a focused noise analysis conducted for the Rosemary's Mountain Quarry Expansion Project (project). The project is an amendment to a Major Use Permit (MUP) and Reclamation Plan (RP) for an existing construction aggregate quarry and materials processing site. The amendment is to increase the MUP boundary by 10.21 acres and the RP boundary by 10.35 acres in order to reconfigure the process area. This will ease congestion on the project, increase site efficiency, and improve overall safety at the site. Reconfiguration of the process plant area will include extending the haul road northward and expansion of the upper elevation pad to accommodate stockpiles and load out facilities. A crushing / screening plant will be eliminated from the mid-level pad and that pad utilized for product stockpiles. Revision, or deletion, of conditions associated with enclosures around the crushing/screening equipment is also requested. As shown in Figures 1 and 2, the quarry is located at 5606 Pala Road/State Route 76 (SR-76) in Fallbrook, California, approximately 1.25 miles east of the intersection of Interstate 15 and Pala Road/SR-76.

The noise analysis was conducted in response to a request from San Diego County Department of Planning and Land Use (DPLU) specialist comments (Project Issue Checklist, 2/7/2013). The noise analysis was conducted by an approved County noise consultant and focused on determining compliance with the County Noise Ordinance at the property boundary. In addition, any new locations for staging, materials processing, and/or new equipment and the proposed changes in the use of sound-absorbing materials were analyzed. The analysis utilized information provided by previous and newly conducted noise measurements, topographical and aerial maps to evaluate the worst-case 8-hour and 1-hour noise generating activities associated with both the current site development (i.e., construction) phase, and operational phases of the project.

Based upon the noise analysis conducted, the proposed operations/activities (expansion of the MUP boundary, relocation of the crushing/screening equipment, and revision or deletion of conditions associated with sound absorbing materials around the crushing / screening equipment) will comply with the applicable San Diego County noise standards.

1.1 COUNTY NOISE STANDARDS

The project is located in the County of San Diego. The San Diego County Code of Regulatory Ordinances (Title 3, Division 6, Chapter 4, Section 36.404, General Sound Level Limits) has established maximum noise levels at the boundary of various land uses for noise sources within its purview, such as stationary and other non-transportation-related noise sources (Table 1). Hourly sound levels in rural residential and agricultural zones are not to exceed 50 dBA between 7 a.m. and 10 p.m. or 45 dBA between 10 p.m. and 7 a.m.

Table 1. Sound Level Limits in Decibels (dBA)

Zone	Time	1-Hour Average Sound Level Limits (dBA)
1 RS, RD, RR, RMH, A70, A72, S80, S81, S87, S90, S92, and RV and RU with a density of less than 11 dwelling units per acre.	7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	50 45
2 RRO, RC, RM, S86, V5, and RV and RU with a density of 11 or more dwelling units per acre.	7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	55 50
3 S94, V4, and all commercial zones.	7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	60 55
4 V1, V2 V1, V2 V1 V2 V3	7 a.m. to 7 p.m. 7 p.m. to 10 p.m. 10 p.m. to 7 a.m. 10 p.m. to 7 a.m. 7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	60 55 55 50 70 65
5 M50, M52, and M54	Anytime	70
6 S82, M56, and M58.	Anytime	75
7 S88 (see subsection (c) below)		

Section 36.404, Sound Level Limits, states in part:

(a) Except as provided in section 36.409 of this chapter, it shall be unlawful for any person to cause or allow the creation of any noise, which exceeds the one-hour average sound level limits in Table 36.404, when the one-hour average sound level is measured at the property line of the property on which the noise is produced or at any location on a property that is receiving the noise.

The work at the project site is currently being carried out under the existing permit conditions (MUP 3301-87-021-03, August 17, 2013). The applicable noise control standards for this Project are as follows:

Site development (i.e., current, construction) phase: San Diego County Code Noise Ordinance for Extractive Industries (75 dBA L_{eq} 1-hour) at project boundaries and 75 dBA L_{eq} 8-hour at noise-sensitive land use (NSLU).

The project is currently in the site development phase; thus, the applicable noise control standard at this time is the 8-hour standard. After site development, the operational phase noise standard will be applicable, as follows:

Operational (future) phase: San Diego County Code Noise Ordinance for

Extractive Industries (75 dBA L_{eq} 1-hour) at project boundaries and San Diego DPLU General Plan Noise Element Standard (60 dBA CNEL) at NSLU.

2.0 NOISE ANALYSIS METHODOLOGY

The following describes the methods used to assess noise levels from the project.

2.1 Noise Measurements

Short-term attended sound level measurements were conducted with a Rion NL-32 Sound Level Meter (SLM). This instrument is categorized as a Type 1 (Precision Grade) device. Noise was measured at five locations in and around the project area (as shown in Figure 4). Noise measurements were taken at the western project limit boundary (N3), the western property boundary (N4), the northwestern property boundary (N5), the northern property boundary (location N6), and near the current northeastern corner property boundary (location NE). This most recent noise measurement data was also compared to prior noise measurements conducted on site since site development started in 2008, and found to be generally consistent.

The sound-measuring instruments used for the surveys were set to the “slow” time response and the A-weighted decibel (dBA) scale for all of the noise measurements with the exception of the blast noise measurements. Noise measurements were 30 minutes in duration, and the primary noise metric used for the study is the L_{eq} , i.e., the energy-averaged noise level during the time period measured.

To ensure accuracy, the laboratory calibration of the instruments was field checked before and after each measurement period. The accuracy of the acoustical calibrator is maintained through a program established through the manufacturer and traceable to the National Institute of Standards and Technology. The sound measurement instruments meet the requirements of the American National Standard S 1.4-1983 and the International Electrotechnical Commission Publications 804 and 651. In all cases, the microphone height was 5 feet above the ground, and the microphone was equipped with a windscreen.

MUP Boundary Expansion

The primary revision to the MUP as it pertains to noise would be the proposed expansion of the project boundary. Reconfiguration of the process plant area will include extending the haul road northward and expansion of the upper elevation pad to accommodate stockpiles and load out facilities. A crushing / screening plant will be eliminated from the mid-level pad and that pad utilized for product stockpiles. The crushing / screening plant (plant) will be relocated to a new pad located near the northeast corner of the site. The new pad will be partially on property within the existing MUP boundary and partially on property to the north of the existing MUP boundary, resulting in an expansion of the MUP area of approximately 10.21 acres. However, the plant itself would be located within the existing MUP area, and would be well below both the existing grade and surrounding boundaries and NSLU. The expansion area will be used for stockpiles (see Figure 3).

In order to determine if this change would result in an exceedance of the applicable noise standards, the crushing / screening plant was relocated to the northernmost existing pad (also known as the 570 pad, because it is graded to an elevation of approximately 570 feet above mean sea level). The 570 pad is the northernmost portion of the active project site, and thus is the closest location within the MUP relative to the nearest NSLU (location N6). The 570 pad is the worst-case location for the crushing / screening plant because it is the nearest possible location to N6, and also because at this location there is no topographical shielding (i.e., no intervening terrain between the screening plant and location N6). The plant at the 570 pad is within the line-of-sight of location N6. At its previous location (the 370 pad), the plant was shielded from direct view of location N6 by substantial amounts of rock and soil, and thus the noise from these activities was generally inaudible or only faintly audible. Similarly, the proposed future location of the screening plant (near the northeast corner of the project boundary at the 490 pad) would also be shielded from direct view at location N6.

The most recent noise measurements for this MUP modification were conducted on April 11, 2012, with the crushing / screening plant in the worst-case location (570 pad). As the measurement data shows (Table 2), the noise level with the screening plant and associated activities in full operation did not exceed applicable San Diego County noise standards. Because the future proposed location will be further from the nearest NSLU and will also be screened from direct line-of-sight by intervening terrain, the proposed MUP expansion will not exceed applicable noise standards. Analytical modeling conducted for this project also confirms this conclusion (please see Section 2.4, below).

Table 2. Noise Measurement Results (dBA)

Site ID	Measurement Results (dBA)					
	Measurement Location	Date/ Start Time	Noise Sources	L _{eq}	Applicable Noise Threshold ² (L _{eq})	Noise Threshold exceeded? (Yes/No)
N3-A	Western <u>project</u> boundary	4/11/13 1:05 p.m.	Distant non-project-related traffic (I-15), distant aircraft, birds; no project-related noise ¹	45.8	75	No
N3-B	Western <u>project</u> boundary	4/11/13 1:35 p.m.	Distant non-project-related traffic (I-15), distant aircraft, birds; no project-related noise ¹	47.2	75	No
N4-A	Western property boundary, adjacent to existing residence	4/11/13 2:30 p.m.	Non-project-related distant traffic (SR-76); distant non-project-related roadway construction; birds; no project-related noise ¹	48.5	75	No
N4-B	Western property boundary, adjacent to existing residence	4/11/13 3:00 p.m.	Non-project-related distant traffic (SR-76); distant non-project related roadway construction; birds; no project-related noise ¹	46.5	75	No
N5-A	Northwestern property boundary	4/11/13 11:30 a.m.	Distant non-project-related traffic (I-15), rustling leaves, birds; distant aircraft; no project-related noise ¹	46.5	75	No
N5-B	Northwestern property boundary	4/11/13 12:00 p.m.	Distant non-project-related traffic (I-15), rustling leaves, birds; distant aircraft; no project-related noise ¹	45.5	75	No
N6-A	Northern property boundary (Pankey House)	4/11/13 10:20 a.m.	Project-related crushing / screening noise; barking dogs, birds	59.8	75	No
N6-B	Northern property boundary (Pankey House)	4/11/13 10:50 a.m.	Project-related crushing / screening noise; barking dogs, birds	60.8	75	No
NE-A	Near northeast <u>project</u> boundary	4/11/13 1:05 p.m.	Crushing / screening and loading (large backhoe and bulldozer, heavy trucks) noise, max from loader drive-by; distant aircraft	62.6	81	No
NE-B	Near northeast <u>project</u> boundary	4/11/13 1:35 p.m.	Crushing / screening and loading (large backhoe and bulldozer, heavy trucks) noise, max from loader drive-by; distant aircraft	63.3	81	No

¹ The continuing site development activities (in this case, limited to crusher and loader activities) while the measurement was being conducted was verified visually by the field noise specialist.

² Noise thresholds for the current phase of the project (site preparation) derived from Section 36.409 Construction Equipment and Section 36.410 Impulsive Noise.

Revision or Deletion of Conditions Associated with Enclosures

Condition C.14 requires the installation of sound absorbing materials on the inside of the crushing / screening enclosures. The measurements conducted on April 11, 2013 (as well as those conducted previously), are representative of the noise levels without sound-absorbing materials¹. As shown in Table 2, the worst-case noise levels as measured at the 570 pad would not exceed applicable noise standards. Analytical modeling conducted for this project also confirms this conclusion (see Section 2.4). However, sound-absorbing materials are available for use in the proposed type of structure and will be installed if sounds levels were to exceed county limits.

As specified Section 3.e. of the current permit (MUP 3301-87-021-03, August 17, 2013), "If the design noise levels are not met, the quarry operator would have 60 days to correct the problem. If after 60 days the problem has not been corrected, the quarry operator would only be allowed to operate equipment which will meet the design noise levels pursuant to the County Noise Ordinance and County Noise Element." Thus, although as demonstrated by the noise measurements and the analytical noise modeling, no exceedance of applicable noise standards is anticipated, there is a clear process for resolution in the unlikely event of an exceedance.

2.2 Noise Calculations

Utilizing the information provided above, a spreadsheet model (Microsoft Excel-based) was created, in which the major activity/noise-generating activities (relocated crushing / screening plant and previously approved on-site plant activities) were grouped accordingly.

The spreadsheet data and resultant calculated noise levels are shown in Attachment A. The reference noise levels corresponding to the noise-generating equipment was obtained from the most recent noise measurement data, and corroborated with prior measurement data of the relevant equipment. The source reference levels are shown in the Attachment A spreadsheets.

The noise levels at the critical locations of interest (N6, the nearest residence, and the nearest shared property line) were calculated using standard propagation rates for "point sources" (i.e., 6 decibels per doubling

¹ Please note, this does not reflect a change to the condition of the crushing / screening plant (beyond the relocation to the 570 pad). Sound-absorptive materials have either been added or removed from the plant. The plant as it exists at this time would be unaltered as pertains to the source noise under the proposed MUP revision, but it would be relocated to the 490 pad, which would be further away from the nearest NSLU, and would be acoustically shielded by the intervening terrain.

of distance) (Harris 1991), as follows:

$$L_A = L_{Aref} - 20 * \text{Log}(r/r_{ref})$$

In which L_A is the noise level at the location of interest, L_{Aref} is the reference emission level, r is the distance from the source to the location of interest, and r_{ref} is the reference distance.

The effects of molecular air absorption and anomalous excess attenuation would reduce the noise level from the noise sources at the rates of 0.7 dBA and 1.0 dBA per 1,000 feet, respectively.

Attenuation (insertion loss) from topographical shielding provided by the intervening local terrain was accounted for using the Fresnel Equation (Beranek 1971). The equation used and the input and output data are shown in Attachment B. The distances and elevations used for these calculations were derived from aerial images, site plans, and topographical contours of the project site and vicinity.

The maximum estimated duration and maximum number of occurrences of the individual noise sources during the worst-case hour was used to convert the (steady-state) noise level to an energy-averaged, 1-hour L_{eq} (equivalent sound level), which is the same noise metric used in the County noise ordinance. The 1-hour L_{eq} for the individual noise sources was then summed in the energy domain (logarithmically), to obtain the total 1-hour L_{eq} for each activity type (crushing/screening activities, asphalt plant, etc.).

The combined noise levels of activity type occurring concurrently (i.e., crushing/screening, asphalt plant) were also summed logarithmically.

2.3 Noise Analysis Locations

The noise spreadsheet calculations as described above were performed for two cases, at two receiver locations: the nearest NSLU (the Pankey Residence (N6)); and for the shared residential property line:

Case 1: Site development (i.e., construction phase) stage, with crushing / screening plant locate at current worst-case location (570 pad).

Case 2: Operations stage, with crushing / screening plant relocated to proposed location (490 pad).

2.4 Potential Noise Impacts

The project could result in the exposure of existing or future NSLUs to increased noise levels from project operations. Adherence to the County's noise ordinance standards will ensure that noise impacts do not occur during site development.

No new NSLUs are known or anticipated in the project vicinity.

Tables 3, 4 and 5 summarize the noise analysis results, and compare them to the relevant noise standard. As shown in Table 3, the noise levels would not exceed the applicable noise standards for the site development phase. With the crushing / screening plant located at the existing, worst-case location, the combined daytime noise level at the shared property line from the crushing / screening plant and other on-site activities was predicted to be 63 dBA L_{eq} .

As shown in Tables 4 and 5, the noise levels with the crushing / screening plant relocated to the proposed location would likewise not exceed the County's noise standards. The daytime noise level at the shared property line (as presented in Table 4) is predicted to be 54 dBA L_{eq} , and the 24-hour weighted average noise level at the nearest NSLU (as presented in Table 5) is predicted to be 49 dBA CNEL.

Table 3. Predicted Noise Levels at the Shared Property Line of Nearest NSLU during Construction (Site Development) Phase

Receiver Location	Source Location	Distance (Source to Receiver), Feet	Daytime L_{eq} (dBA)	Nighttime L_{eq} (dBA)	San Diego DPLU Construction Noise Ordinance Standard (75 dBA L_{eq8-hr}) Exceeded ?
Shared Property Line	Crusher/loader/screening plant operations at existing (worst-case) location (570 pad)	525	63	40	No

Table 4. Predicted Noise Levels at the Shared Property Line of Nearest NSLU during Operational Phase

Receiver Location	Source Location	Distance (Source to Receiver), Feet	Daytime L_{eq} (dBA)	Nighttime L_{eq} (dBA)	San Diego DPLU Construction Noise Ordinance Standard (75 dBA L_{eq8-hr}) Exceeded ?
Shared Property Line	Crusher/loader /screening plant operations at proposed future location (490 pad)	890	54	40	No

Table 5. Predicted Noise Levels at N6 (Nearest NSLU) during Operational Phase

Receiver Location	Source Location	Distance (Source to Receiver), Feet	Predicted Exterior Noise Level (dBA CNEL)	San Diego DPLU General Plan Noise Element Standard (60 dBA CNEL) Exceeded?
N6 (Nearest NSLU)	Crusher/loader /screening plant operations at proposed future location (490 pad)	1100	49	No

2.5 Mitigated Noise Impacts

No exceedances of the applicable noise limits are predicted based upon the noise modeling. Thus, no mitigation measures are required or proposed.

2.6 Conclusions

No significant noise impacts, either directly project-related or cumulative, are anticipated as a result of the proposed project. With implementation of the proposed MUP modifications, Project-related noise levels are anticipated to be lower than under existing conditions based upon the analysis herein.

3.0 CERTIFICATION

I certify that I have conducted/supervised the calculations for this report. I concur with its methodologies, modeling results, conclusions, and recommendations.

A handwritten signature in blue ink, appearing to read "Mike Greene".

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4.0 REFERENCES

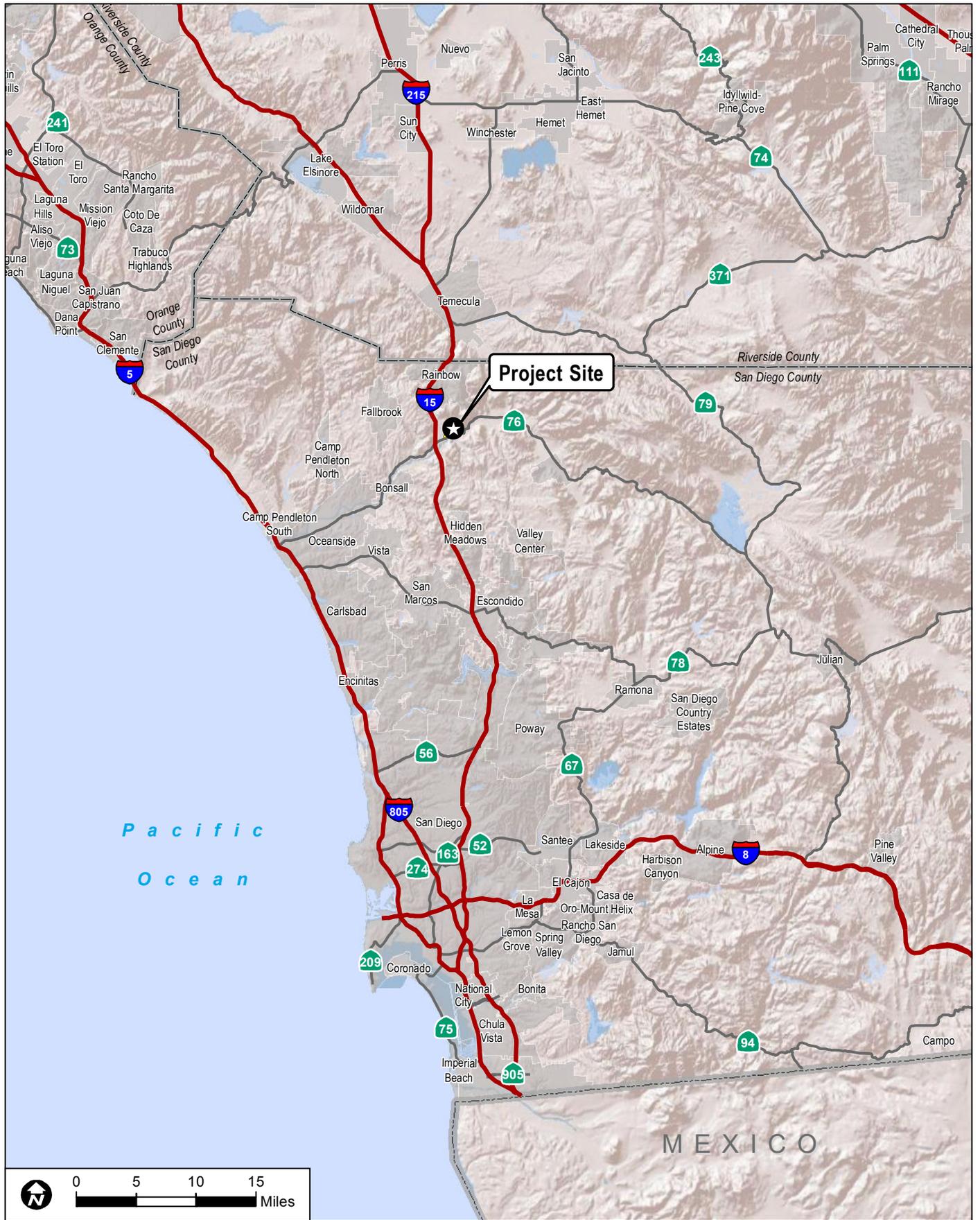
Beranek, Leo L., ed. 1971. *Noise and Vibration Control*. New York, New York: McGraw-Hill Inc.

County of San Diego. 2009. *Report Format and Content Guidelines: Noise*. Land Use and Environment Group, Department of Planning and Land Use. January 27, 2009.

County of San Diego. 2009. Noise Ordinance, Chapter 4, Noise Abatement and Control. Ordinance Update No. 9962. Department of Planning and Land Use. January 7, 2009.

Harris, Cyril M., ed. 1991. *Handbook of Acoustical Measurements and Noise Control*. Third Edition. New York, New York: McGraw-Hill Inc.

FIGURES



DUDEK

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FIGURE 1
Regional Location Map

Noise Letter for the Proposed Rosemary's Mountain Quarry Expansion



DUDEK

AERIAL SOURCE: BING MAPPING SERVICE

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Noise Letter for the Proposed Rosemary's Mountain Quarry Expansion

FIGURE 2
Local Vicinity Map

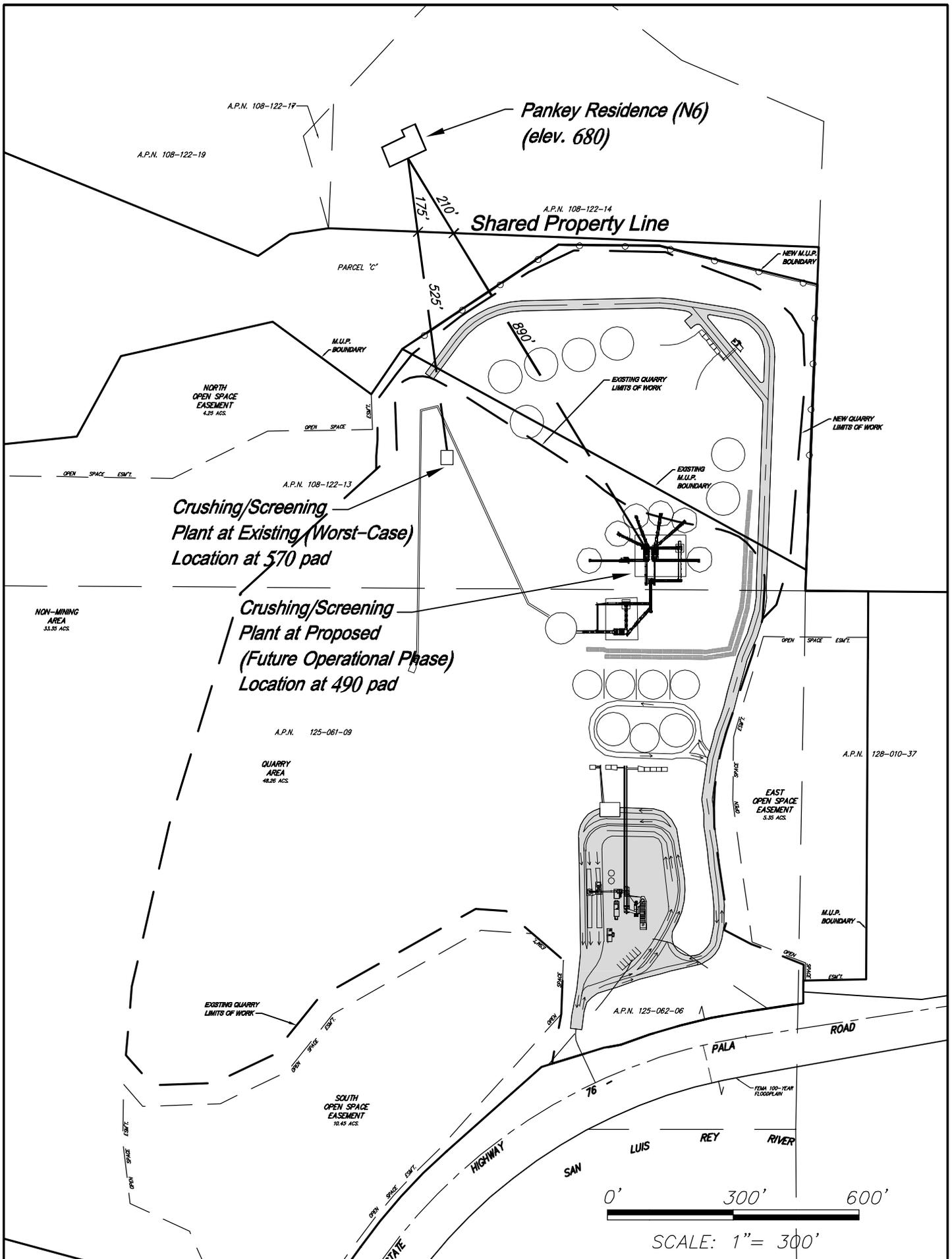
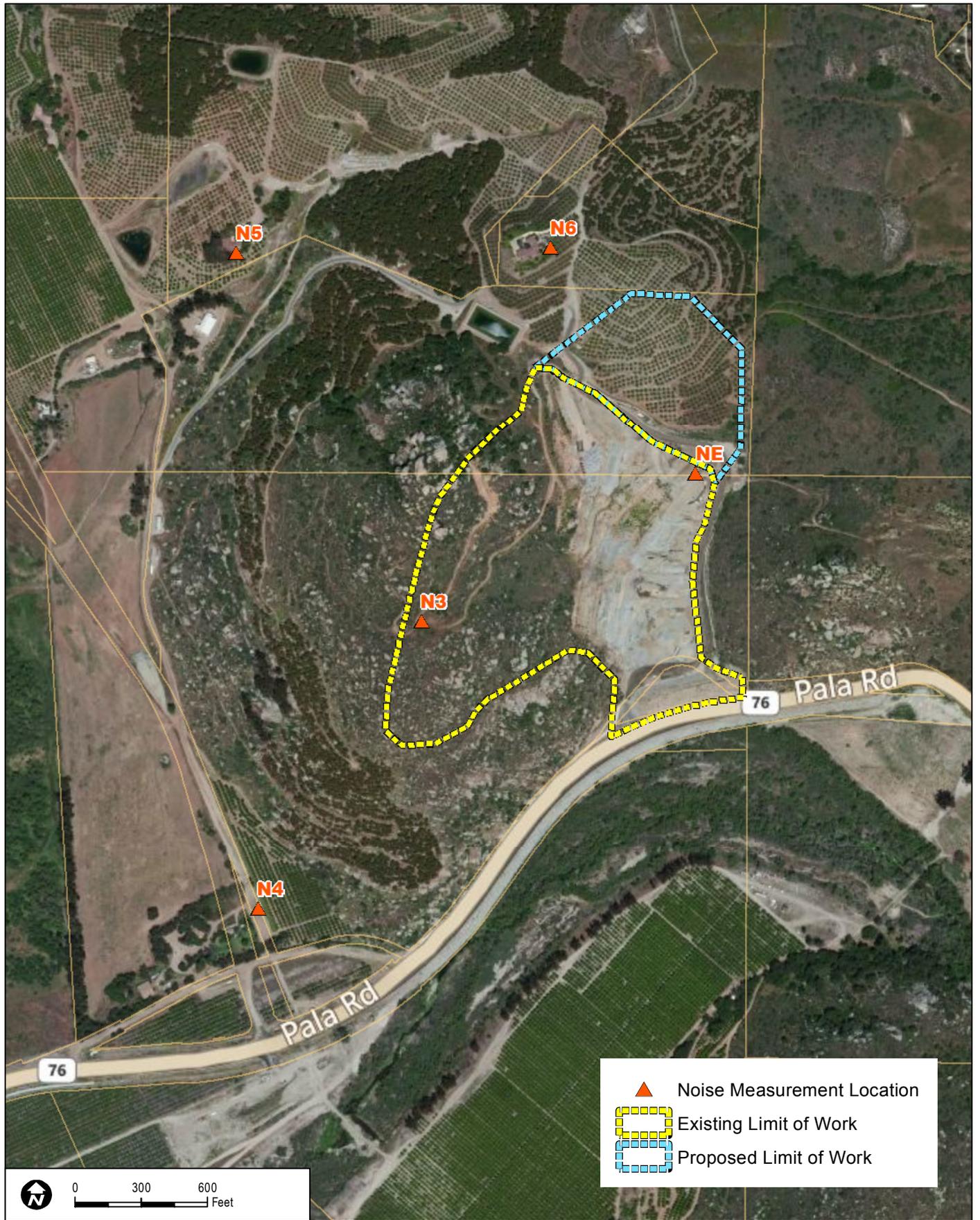


Figure 3



▲ Noise Measurement Location
Existing Limit of Work
Proposed Limit of Work

DUDEK

AERIAL SOURCE: BING MAPPING SERVICE

FIGURE 4

Noise Measurement Locations

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Noise Letter for the Proposed Rosemary's Mountain Quarry Expansion

ATTACHMENT A: ON-SITE NOISE CALCULATIONS

ATTACHMENT B: BARRIER SHIELDING CALCULATIONS

RAY-TRACE PROGRAM (FOR A POINT-SOURCE)

Uses the Equation: $(A_{e4})_{point} = 20 \log[(2 \cdot \pi \cdot N)^{1/2} / \tanh(2 \cdot \pi \cdot N)^{1/2}] + 5 \text{dB}$
 (Ref. Pg.174, Noise and Vibration Control, L.L. Beranek Editor, 1971 Ed.)

Project: Rosemarys Mountain Quarry - Crusher Noise

Date: 4/25/2013

By: MGG

Please Enter: Using English (E) units or Metric (M) units ?

Ray Trace Number/Description	Source- Receiver Distance (ft. or m)	Source Base Elev. (ft. or m)	Source Height above Ground (ft. or m)	Receiver Base Elev. (ft. or m)	Receiver Height above Ground (ft. or m)	Horizontal Barrier Dist. (in ref. to source) (ft. or m)	Barrier Base Elev. (ft. or m)	Barrier Height (ft. or m)	Dominant Freq.(Hz)	Source- Rcvr Straight- Line Dist. (ft. or m)	Source- Top-of- Barrier Dist. (ft. or m)	Receiver- Top-of- Barrier Dist. (ft. or m)	Lambda	N _{max}	AE _(barriers) (dB)
1. Source -Top of Slope - Pankey House	1180.0	490.0	15.0	680.0	5.0	840.0	640.0	0.0	500.0	1193.6	850.8	343.0	2.3	0.1	6.4

