FOCUSED CONSTRUCTION NOISE ANALYSIS

Green Canyon Tentative Map 5553 RPL2
San Diego County Case Number: PDS2008-3100-555

Lead Agency:

County of San Diego
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Cedaredge, Colorado 81413
Phone: 310-779-7409

Job #B30307N1

April 10, 2013

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EXECUTIVE SUMMARY

The proposed project, the Green Canyon Subdivision (Tentative Map 5553), consists of the division of a parcel into 22 single-family residential private lots. The project site is located at the intersection of Winterhaven Road and Sunnycrest Lane in the unincorporated community of Fallbrook, County of San Diego, California.

According to the County of San Diego, traffic and aircraft noise is not expected to be an issue at proposed residences in the current or future noise environments as all proposed noise sensitive land use and buildable area on site fall outside of the 60 CNEL traffic and aircraft noise contours. For this reason, traffic and aircraft noise have not been addressed within this noise report.

Temporary construction noise was calculated to determine the impact this activity will have on surrounding residential properties. Section 36.409 of the County of San Diego Noise Ordinance states it is unlawful to operate construction equipment that exceeds an average sound level of 75 dB for an eight-hour period between 7 a.m. and 7 p.m. when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is being received. Section 36.410 of the Noise Ordinance provides noise level limits for impulsive noise, such as blasting or the use of equipment such as a rock crusher, pile driver, hoe ram, or drill rig. As no blasting or other impulsive construction activity will take place on site, the noise level limits within this section do not apply.

Current proposed construction activities are expected to meet County of San Diego noise regulations for temporary construction noise during all phases of construction, and therefore, no mitigation is deemed necessary. General good practice measures should be followed, including reasonable maintenance of equipment, conservative planning of simultaneous equipment operation, and using equipment with effective mufflers. Equipment operation must also be limited to the allowable hours of operation set by the County of San Diego. With these recommendations, it is expected that construction equipment noise levels will be at or below an average eight-hour equivalent noise level of 75 dBA, in compliance with County of San Diego regulations.

1.0 INTRODUCTION

This acoustical analysis report is submitted to satisfy the acoustical requirements of the County of San Diego for Tentative Map (TM 5553) approval. Its purpose is to assess noise impacts from construction activities to identify project features or requirements necessary to remain in compliance with County of San Diego noise regulations for temporary construction noise.

All noise level or sound level values presented herein are expressed in terms of decibels, with A-weighting to approximate the hearing sensitivity of humans. Time-averaged noise levels are expressed by the symbol L_{EQ}, for a specified duration. The Community Noise Equivalent Level (CNEL) is a calculated 24-hour weighted average, where sound levels during evening hours of 7 p.m. to 10 p.m. have an added 5 dB weighting, and sound levels during nighttime hours of 10 p.m. to 7 a.m. have an added 10 dB weighting. This is similar to the Day-Night sound level, L_{DN}, which is a 24-hour average with an added 10 dB weighting on the same nighttime hours but no added weighting on the evening hours. Sound levels expressed in CNEL are always based on A-weighted decibels. These metrics are used to express noise levels for both measurement and municipal regulations, for land use guidelines, and for enforcement of noise ordinances. Further explanation can be provided upon request.

1.1 Project Description

The proposed project consists of the division of a parcel into 22 single-family residential private lots. The gross lot areas range from approximately 1.01 acres to 2.76 acres.

1.2 Environmental Settings and Existing Conditions

1.2.1 Project Location

The project site is located at the northwest corner of the intersection of Winterhaven Road and Sunnycrest Lane in the community of Fallbrook, County of San Diego, California. The Assessor's Parcel Number (APN) for the property is 106-300-41. The project location is shown on the Vicinity Map, Figure 1, following this report. An Assessor's Parcel Map, Satellite Aerial Photograph, and Topographic Map are also provided as Figures 2 through 4, respectively.

1.2.2 Existing Noise Conditions

Traffic noise is not considered to be significant at the project site, and therefore, traffic noise levels are not expected to exceed the 60 CNEL threshold of the County of San Diego. Additionally, although the project is within two miles of the Fallbrook Airport, the project site is not located within the 60 CNEL contour of the airport. For these reasons, no further analysis of traffic or aircraft noise is required at this time. Temporary construction noise is the focus of this analysis.

1.3 Methodology

Modeling of the outdoor noise environment for temporary construction noise is accomplished using Cadna Version 3.7, which is a model-based computer program developed by DataKustik for predicting noise impacts in a wide variety of conditions. Cadna (Computer Aided Noise Abatement) assists in the calculation, presentation, assessment, and mitigation of noise exposure. It allows for the input of project-specific information such as noise source data, barriers, structures, and topography to create a detailed model and uses the most up-to-date calculation standards to predict outdoor noise impacts.

Existing topographical contours present on the preliminary grading plan of the project site were included in the Cadna noise prediction model. Contours from approximately 590 feet to 680 feet, by increments of 5 to 10 feet, were included. These are considered to be the only on-site permanent features that will affect the noise propagation of the existing and proposed noise sources to the adjacent property lines.

In order to validate the results of the Cadna noise prediction model, the noise impacts from the construction equipment were manually calculated as simple attenuation by distance considering equipment duty cycle. This was performed for one of the receiver locations at each noise-sensitive property line. These values were compared to those predicted by Cadna. The Cadna model includes additional attenuation due to intervening structures, topography, and ground absorption, to which the differences in modeled and calculated noise levels are attributed. This data is summarized in Table 1.

Table 1. Calculated Noise Levels for Model Comparison							
Noise Source	**Receiver**	**Lots**	**Receiver Location**	**Distance from Source (ft)**	**Calculated Noise Level[2] (dBA)**	**Cadna Model Noise Level[3] (dBA)**	**Difference (dB)**
2 D9 Dozers, 2 950 Loaders, 633 Scraper[1]	R1	1 & 2	South PL[5]	230	73.5	71.0	2.5[4]
	R2	1 & 2	West PL[6]	190	75.2	74.7	0.5[4]
	R5	10, 11, 13, 14, 15	North PL	282	71.8	71.3	0.5[4]

[1]40% duty cycle assumed for all equipment per FHWA document.
[2]Calculated as attenuation by distance only, $L_2 = L_1 - 20\log(d_2 / d_1)$
[3]As predicted by Cadna model
[4]Differences between calculated and Cadna noise levels can be attributed to site topography and ground absorption.
[5]Nearest property line to the south across Winterhaven Road
[6]Nearest property line to the west across Sunnycrest Lane

2.0 PROJECT-GENERATED AIRBORNE NOISE

2.1 Guidelines for the Determination of Significance

Section 36.409 of the County of San Diego Noise Ordinance states it is unlawful to operate construction equipment that exceeds an average sound level of 75 dBA for an eight-hour period, between 7 a.m. and 7 p.m. when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is being received. In addition, according to Section 36.408 of the ordinance, construction activities must be limited to the hours of 7 a.m. to 7 p.m., Monday through Saturday (except legal holidays). No construction activity is permitted on Sunday. Section 36.410 provides noise limits for impulsive noise, which is defined as a high peak noise level of short duration (one second or less). Impulsive activity includes blasting and the use of equipment such as a rock crusher, hoe ram, pile driver, or drill rig.

Please refer to Appendix B: Pertinent Sections of the County of San Diego Noise Ordinance.

2.2 Potential General Construction Noise Impacts

2.2.1 Potential Temporary Construction Noise Impacts without Mitigation

According to the County of San Diego Noise Ordinance, temporary construction noise must be adequately controlled at occupied properties. The occupied properties surrounding the site include receivers to the south (across Winterhaven Road), west (across Sunnycrest Lane), and north. Noise-sensitive receivers to the east are located at a greater distance from potential noise sources and therefore, will be exposed to less noise due to distance attenuation and shielding provided by intervening structures or topography. The property located to the southeast of the site is an unoccupied church facility.

Construction scheduling information was obtained from Annie Aguilar, project engineer. Grading will be the first phase of construction, and will be accomplished using two Caterpillar D9 dozers, two

Caterpillar 950 loaders, and a 633 scraper. All of this equipment may be in use simultaneously. According to Ms. Aguilar, there will be no import or export, and thus no dump trucks will be present. Site grading will take approximately five weeks. No blasting or other impulsive construction activity is anticipated, and therefore, the noise limits set within Section 36.410 do not apply for this project. The next phase of construction consists of site improvements, including road, sewer, water, and joint trench. The pieces of equipment expected to operate on site at this time are a 633 scraper, 950 loader, and G14 blade during road grading, a 330 excavator and 933 loader during sewer and water, and a small backhoe (typical model assumed) and a 933 loader for joint trench digging. All improvements are expected to be completed within eight weeks. House construction will take place next in three phases of seven to eight homes each. Each phase is expected to take 120 days, for a total of 360 days. No houses will be constructed simultaneously. No information was provided for equipment during house construction, but it is assumed that a compressor and a forklift will be located on site.

Please refer to Table 2 for typical noise levels of construction equipment planned to be used on site, as described above.

Table 2. Typical Construction Equipment Noise Levels[1]

Noise Source	Duty Cycle (%)	Measured Noise Level (L_{MAX}) at 50 feet (dBA)
Caterpillar D9 Dozer	40	85
Caterpillar 950 Loader	40	75
Caterpillar 633 Scraper	40	87
G14 Blade	40	85
330 Excavator	40	85
933 Loader	40	80
Backhoe	40	80
Compressor	40	80
Forklift	40	80[2]

[1]Source: Federal Highway Administration (FHWA) Construction Noise Levels and Ranges, unless otherwise noted.
[2]Source: Wieland Associates, 1999.

Receiver to the south, west, and north were calculated for each phase of construction. During the grading phase, it was assumed that all five pieces of equipment would be operating simultaneously (considering duty cycle), spread out among various portions of the site (each piece of equipment was assumed to be about 100 feet apart). This method should account for the varying distance from source to receiver as equipment moves around the site. Three representative areas were chosen to account for worst-case noise exposure during grading at sensitive receivers. For site improvements such as road grading, water, sewer, and joint trench, it was assumed that all noise sources would be located around the location of the on-site roadways. Two representative locations at the project roadways were chosen for calculation of noise from this phase that assumed all pieces of equipment operating simultaneously (considering duty cycle) in these locations. Finally, during the house construction phase, three representative calculations were performed assuming no houses will be constructed at the same time, per Ms. Aguilar's description, and assuming that during house construction, a compressor and forklift will be operating simultaneously (considering duty cycle) around the pad of the house.

Noise levels for each phase of construction are shown in Table 3, with the worst-case noise level shown for each receiver. Detailed calculations can be found in Appendix C: Construction Equipment Noise Calculations. Graphical representations of source and receiver locations and noise contours are shown in Figures 5 through 12 for each calculated scenario described above.

Table 3. Temporary Construction Noise Levels at Neighboring Properties

Phase	Equipment Used	Receiver Location	8-Hour Average Noise Level (dBA)
PHASE 1: GRADING	2 D9 Dozers, 2 950 Loaders, 633 Scraper	South (R-1)	71.0
		West 1 (R-2)	74.7
		West 2 (R-3)	70.0
		North 1 (R-4)	72.3
		North 2 (R-5)	71.3
PHASE 2: IMPROVEMENTS	633 Scraper, 950 Loader, G14 Blade, 330 Excavator, 2 933 Loaders, Backhoe	South (R-1)	72.9
		West 1 (R-2)	69.1
		West 2 (R-3)	68.9
		North 1 (R-4)	71.4
		North 2 (R-5)	N/A[1]
PHASE 3: HOUSE CONSTRUCTION	Compressor, Forklift	South (R-1)	70.9
		West 1 (R-2)	61.3
		West 2 (R-3)	67.9
		North 1 (R-4)	64.4
		North 2 (R-5)	74.3

[1]Equipment distance to R-5 is expected to be approximately equivalent to equipment distance to R-4 during this phase of construction. A separate calculation was not performed for this receiver.

2.2.2 Design Considerations and Temporary Mitigation Measures

As shown above, noise levels from temporary construction are expected to be in compliance with the County of San Diego eight-hour average equivalent noise limit of 75 dBA. For this reason, no mitigation is deemed necessary.

For any project in which construction activity will take place near occupied residential property, the following “good practice” recommendations should be adhered to whenever possible:

1. Turn off equipment when not in use.
2. Equipment used in construction should be maintained in proper operating condition, and all loads should be properly secured, to prevent rattling and banging.
3. Use equipment with effective mufflers.
4. Minimize the use of backup alarms.
5. Equipment staging areas should be placed at locations away from noise-sensitive receivers.

These general recommendations, in addition to limiting construction equipment operation to the allowable hours detailed in the County of San Diego Noise Ordinance, will assist in maintaining the comfort of neighboring sensitive receivers during the construction of this site.

3.0 CONCLUSION

As shown above, it is determined that temporary construction activities are expected to meet the County of San Diego noise limit of 75 dBA at all adjacent occupied properties, in compliance with Section 36.409. In addition, as no blasting or other impulsive construction equipment will be used on site, the noise level limits in Section 36.410 for this type of activity do not apply. No mitigation is deemed necessary for controlling temporary construction noise. General good practice measures should be followed, including reasonable maintenance of equipment, conservative planning of simultaneous equipment operation, and using equipment with effective mufflers. Equipment operation must also be limited to the allowable hours of operation set by the County of San Diego. With these recommendations, it is expected that construction equipment noise levels will be at or below an average eight-hour equivalent noise level of 75 dBA, in compliance with County of San Diego regulations.

4.0 CERTIFICATION

The findings and recommendations of this acoustical analysis report are based on the information available and are a true and factual analysis of the potential acoustical issues associated with the Green Canyon Subdivision project in the unincorporated community of Fallbrook, County of San Diego, California. This report was prepared by Amy Lynn Hool and Douglas K. Eilar.

Douglas K. Eilar
Principal/Senior Acoustical Consultant

Amy Lynn Hool, Senior Acoustical Consultant

5.0 REFERENCES

1. County of San Diego Noise Element to the General Plan.

2. County of San Diego Noise Ordinance.

3. Harris, Cyril M., Handbook of Acoustical Measurements and Noise Control, 3rd Edition, Acoustical Society of America, 1998.

4. Heeden, Robert A., Compendium of Materials for Noise Control, U.S. Department of Health, Education and Welfare, National Institute for Occupational Safety and Health, November 1978.

5. Irvine, Leland K., Richards, Roy L., Acoustics and Noise Control Handbook for Architects and Builders, Kreiger Publishing Company, 1998.

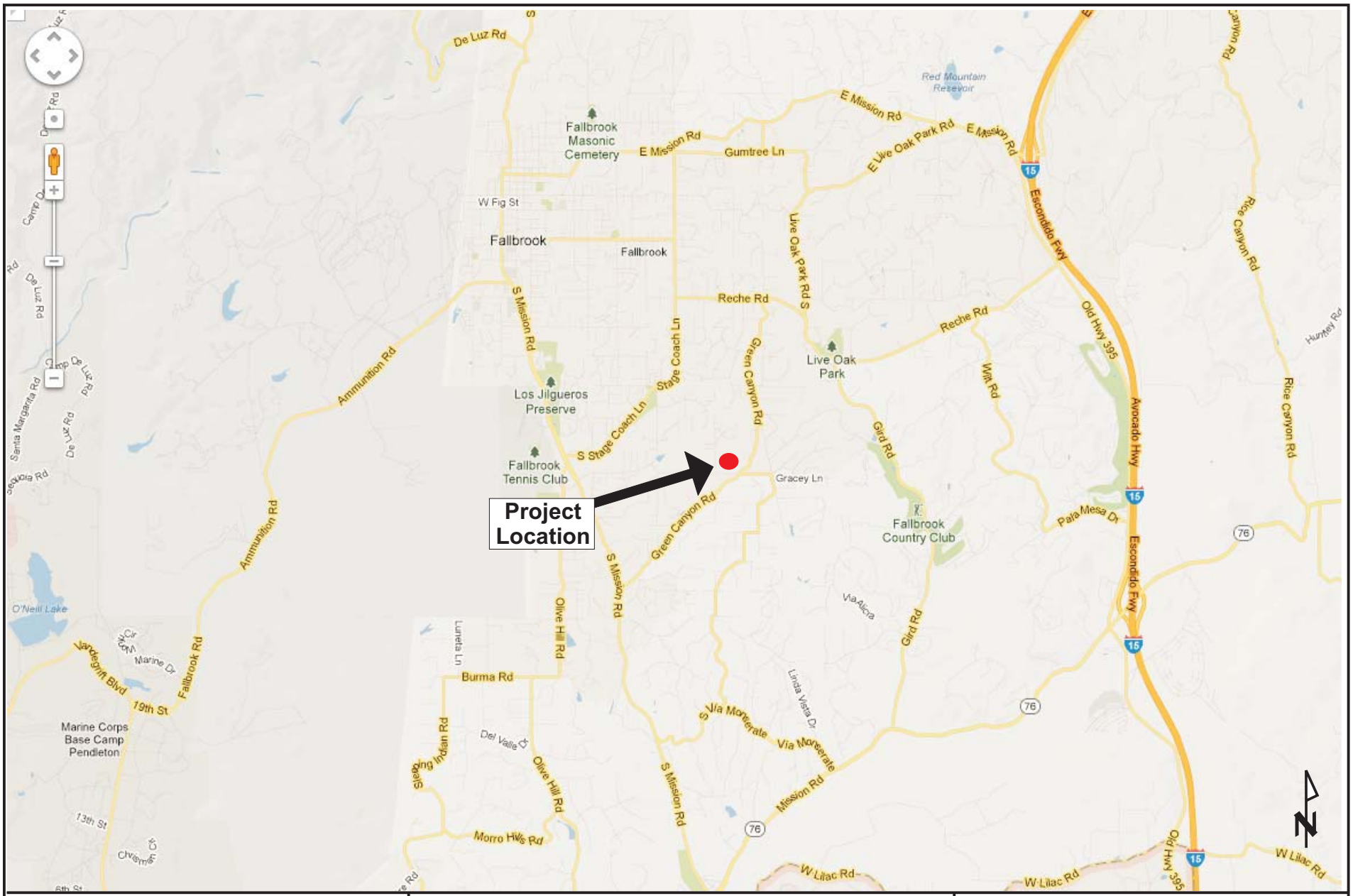
6. NBS Building Sciences Series 77, Acoustical and Thermal Performance on Exterior Residential Walls, U.S. Department of Commerce/National Bureau of Standards, November 1976.

7. Western Electro-Acoustic Laboratory, Inc., 1711 Sixteenth Street, Santa Monica, California 90404, 213-80-9268, Sound Transmission Loss Vs. Glazing Type, Window Size and Air Filtration, January 1985. The research described in this report was prepared for the California Association of Window Manufacturers, 823 North Harbor Boulevard, Suite E, Fullerton, California 92632, 714-525-7088.

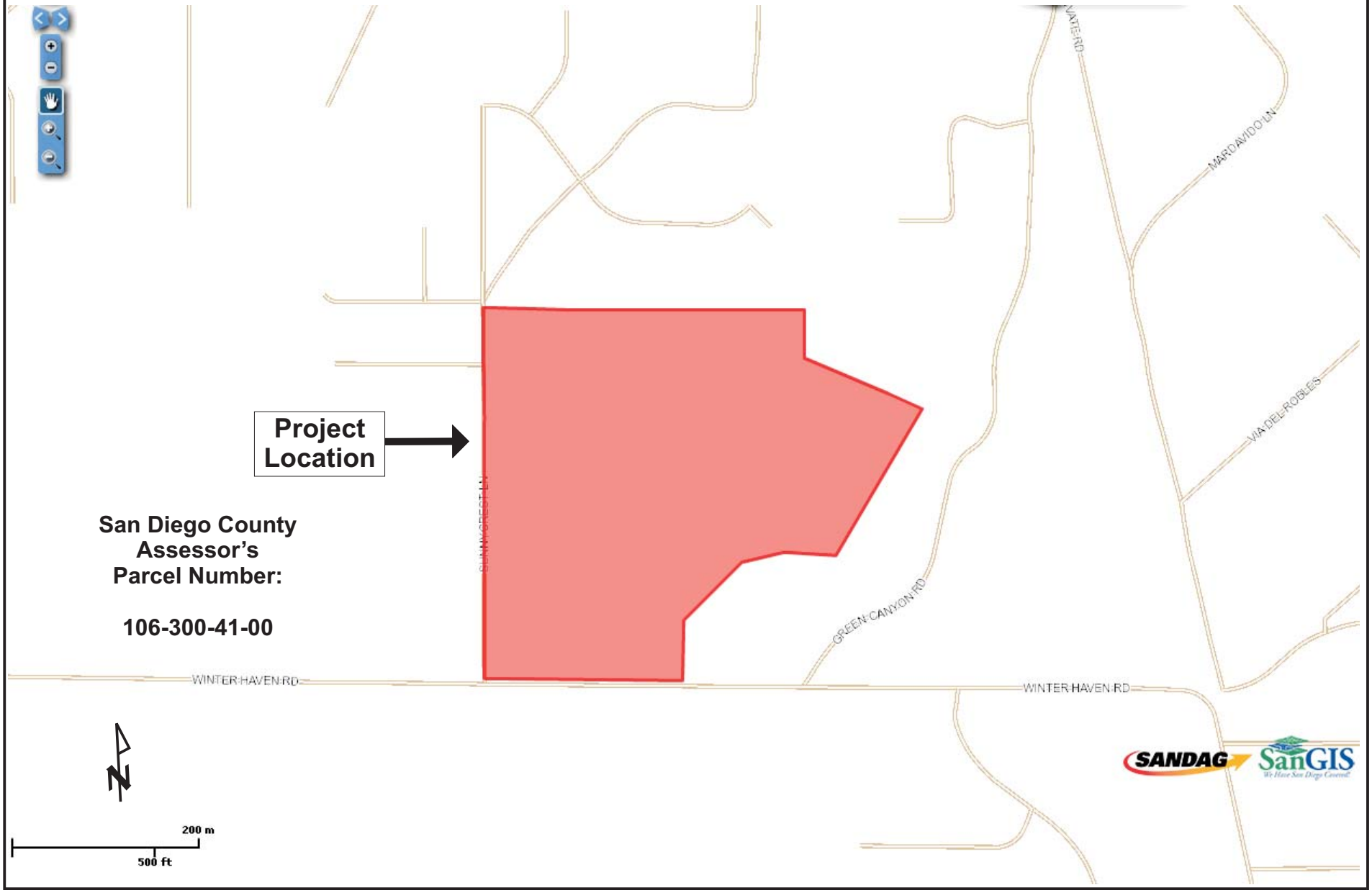
8. United States Department of Transportation Federal Highway Administration, Highway Construction Noise Handbook, Section 9.0 “Construction Equipment Noise Levels and Ranges,” August 2006.

9. Wyle Laboratories, Development of Ground Transportation Systems Noise Contours for the San Diego Region, December, 1973

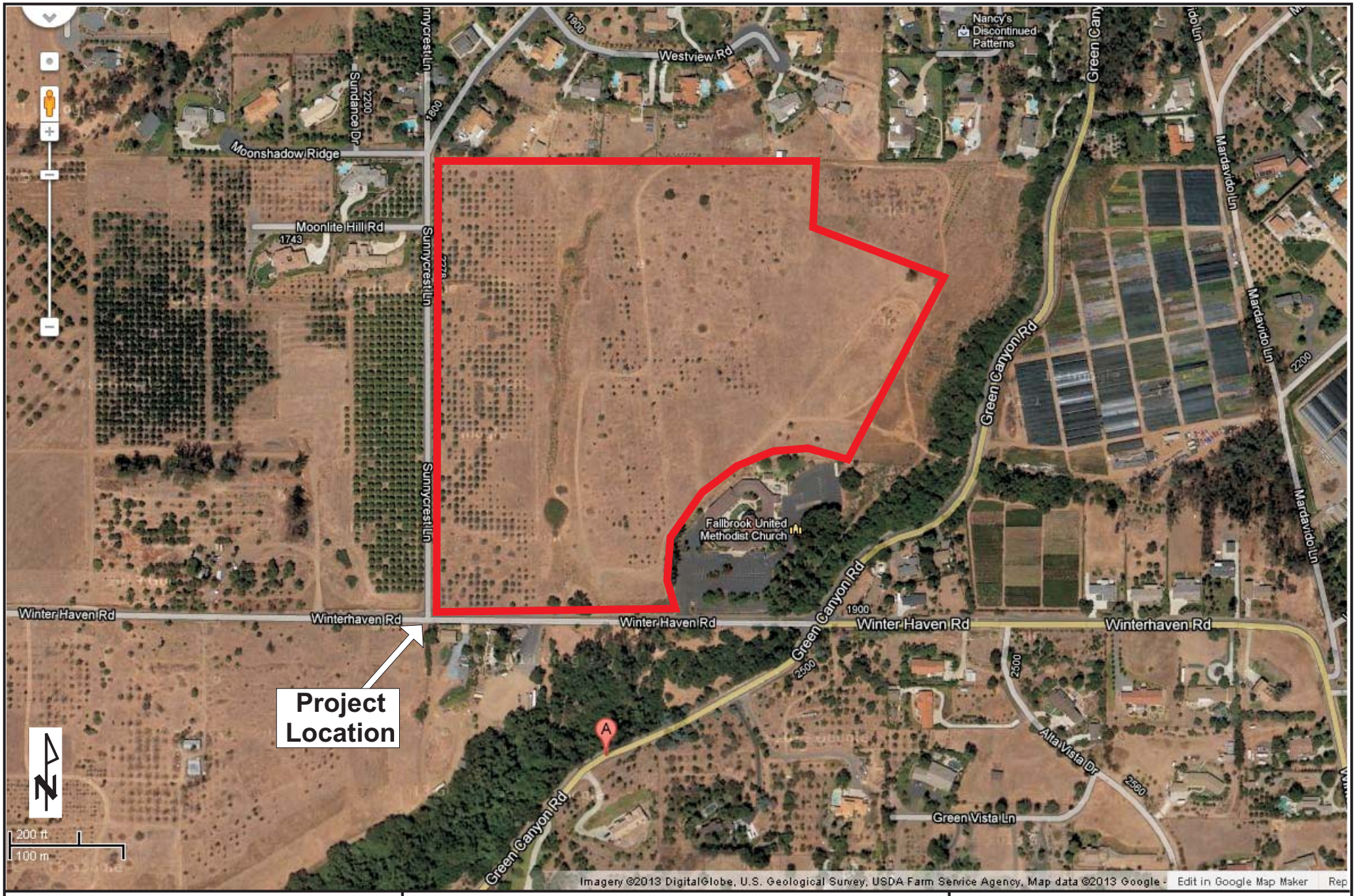
FIGURES



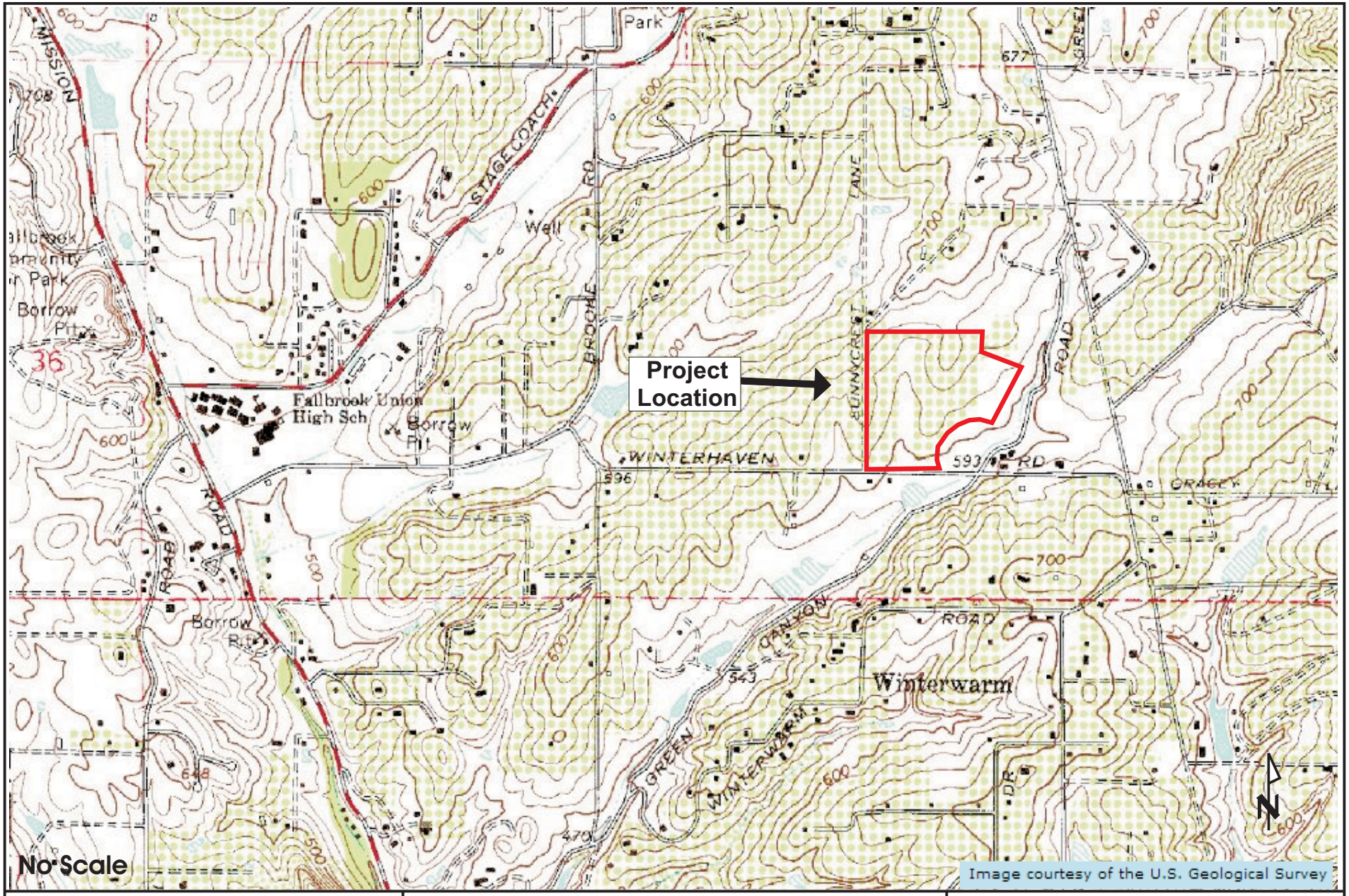
Eilar Associates, Inc. **321 Willowspring Drive North** **Encinitas, California 92024** **760-738-5570**	**Vicinity Map** **Job #B30307N1**	**Figure 1**



Eilar Associates, Inc. 321 Willowspring Drive North Encinitas, California 92024 760-738-5570	Assessor's Parcel Map Job # B30307N1	Figure 2

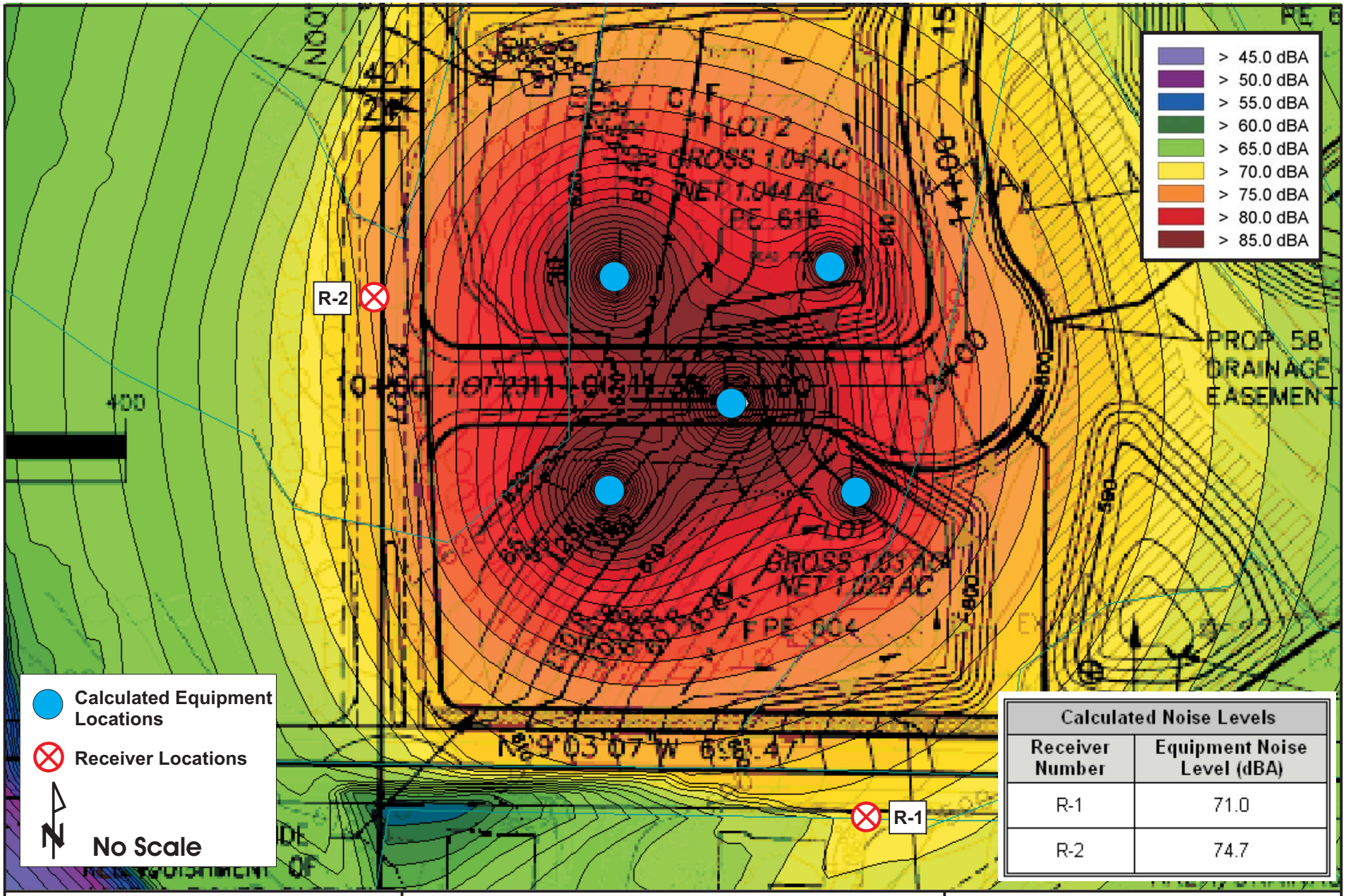


Eilar Associates, Inc. **321 Willowspring Drive North** **Encinitas, California 92024** **760-738-5570**	**Satellite Aerial Photograph** **Job # B30307N1**	**Figure 3**



Eilar Associates, Inc. **321 Willowspring Drive North** **Encinitas, California 92024** **760-738-5570**	**Topographic Map** **Job # B30307N1**	**Figure 4**

SOUTH



Calculated Noise Levels	
Receiver Number	Equipment Noise Level (dBA)
R-1	71.0
R-2	74.7

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321 Willowspring Drive North
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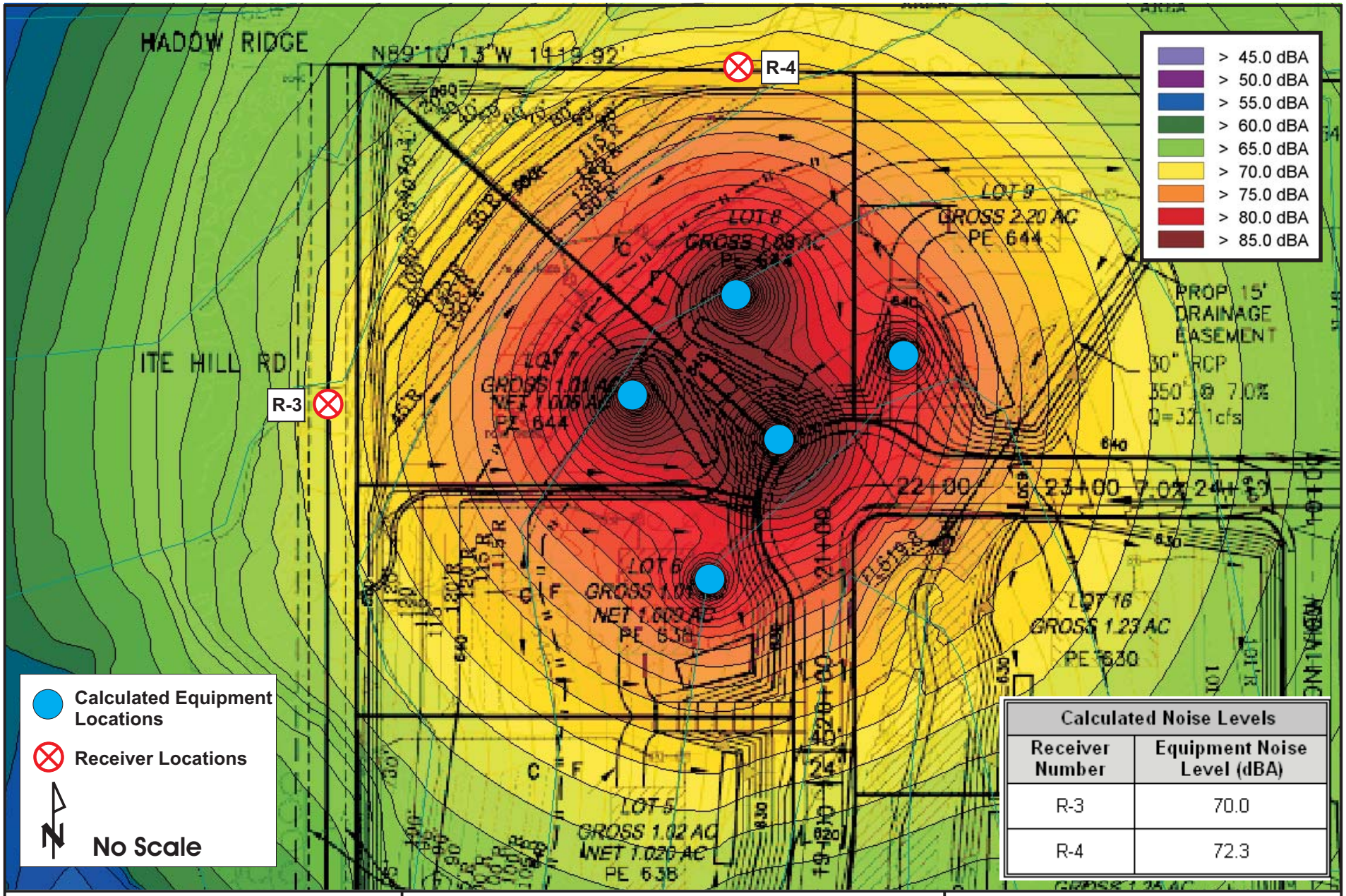
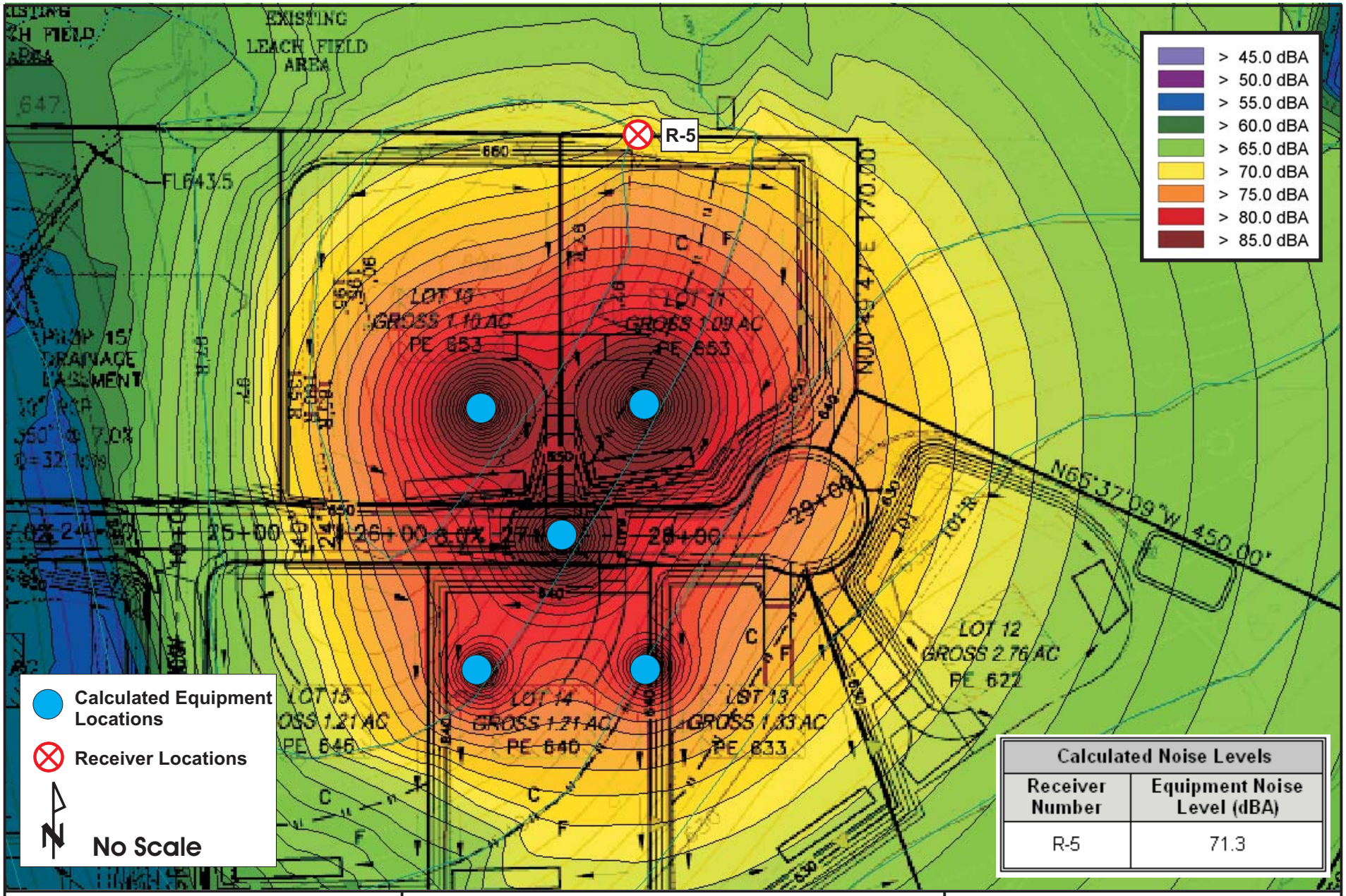
Site Plan Showing Temporary Construction Noise Impacts, Grading Phase - South
Job # B30307N1

Figure 5

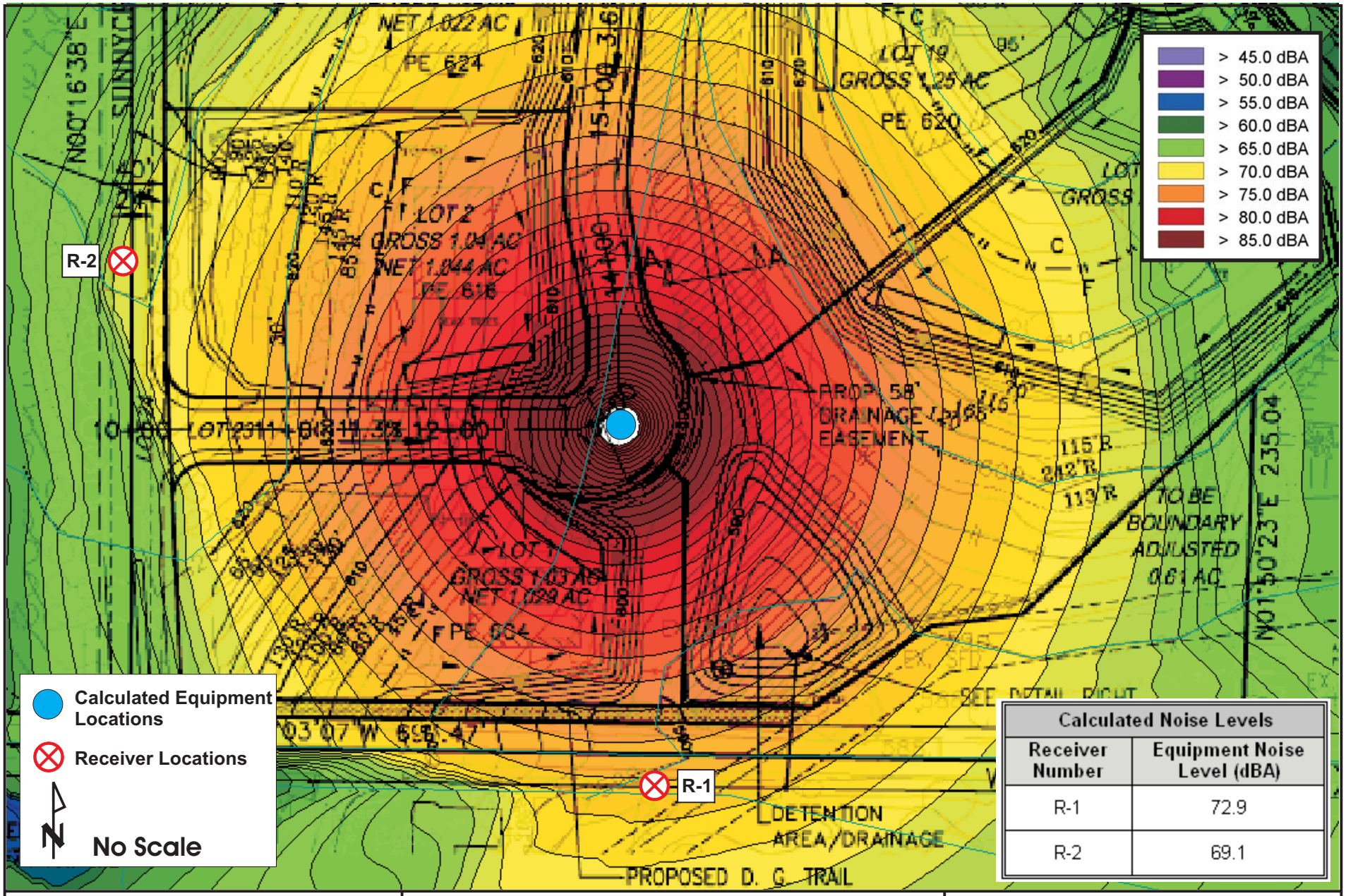


Calculated Noise Levels	
Receiver Number	Equipment Noise Level (dBA)
R-3	70.0
R-4	72.3

Eilar Associates, Inc. 321 Willowspring Drive North Encinitas, California 92024 760-738-5570	Site Plan Showing Temporary Construction Noise Impacts, Grading Phase - Northwest Job # B30307N1	Figure 6



Eilar Associates, Inc. 321 Willowspring Drive North Encinitas, California 92024 760-738-5570	Site Plan Showing Temporary Construction Noise Impacts, Grading Phase - North Job # B30307N1	Figure 7



Calculated Noise Levels	
Receiver Number	Equipment Noise Level (dBA)
R-1	72.9
R-2	69.1

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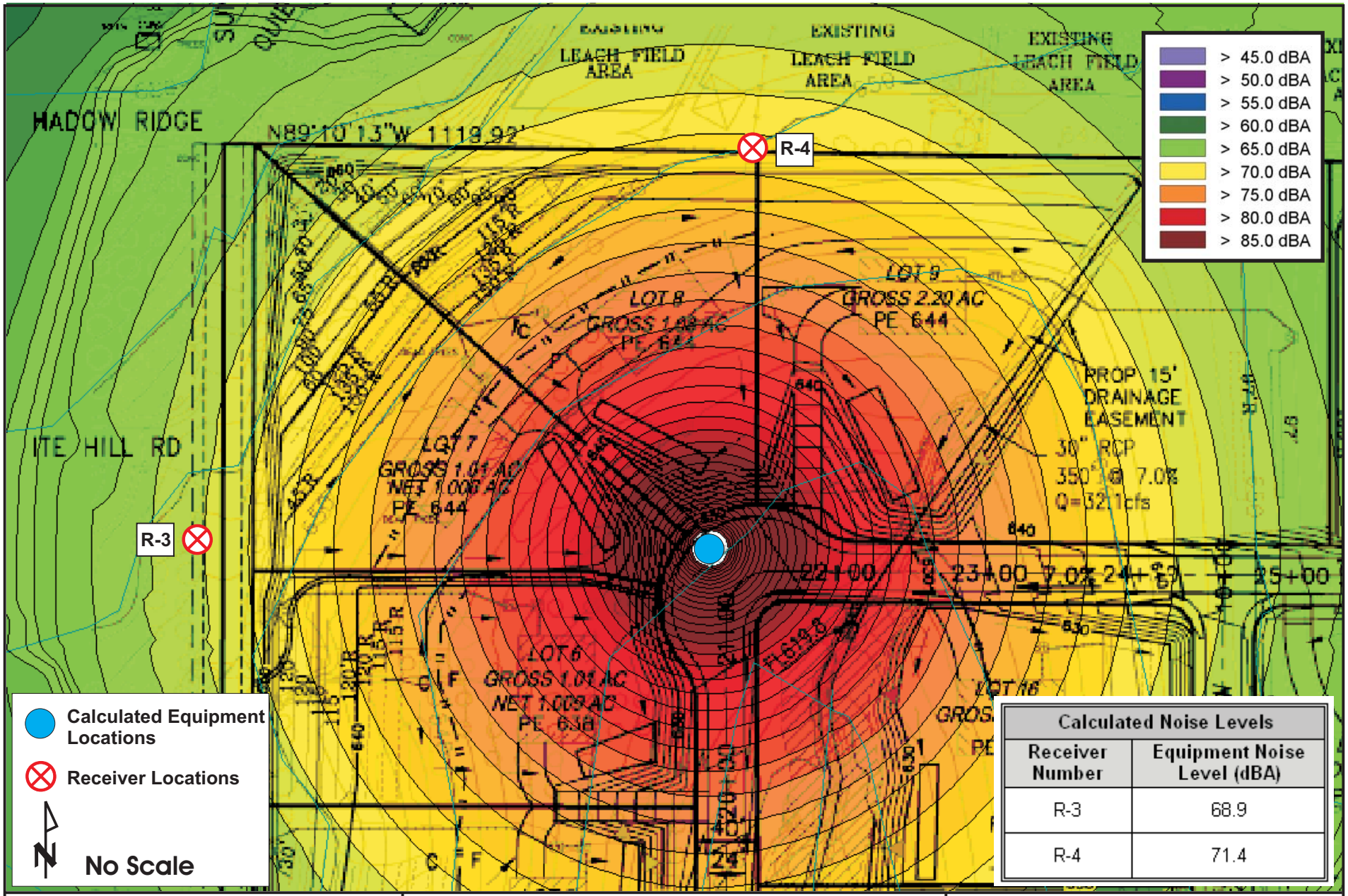
Site Plan Showing Temporary Construction Noise Impacts, Improvements Phase - South
Job # B30307N1

Figure 8



Calculated Noise Levels	
Receiver Number	Equipment Noise Level (dBA)
R-3	68.9
R-4	71.4

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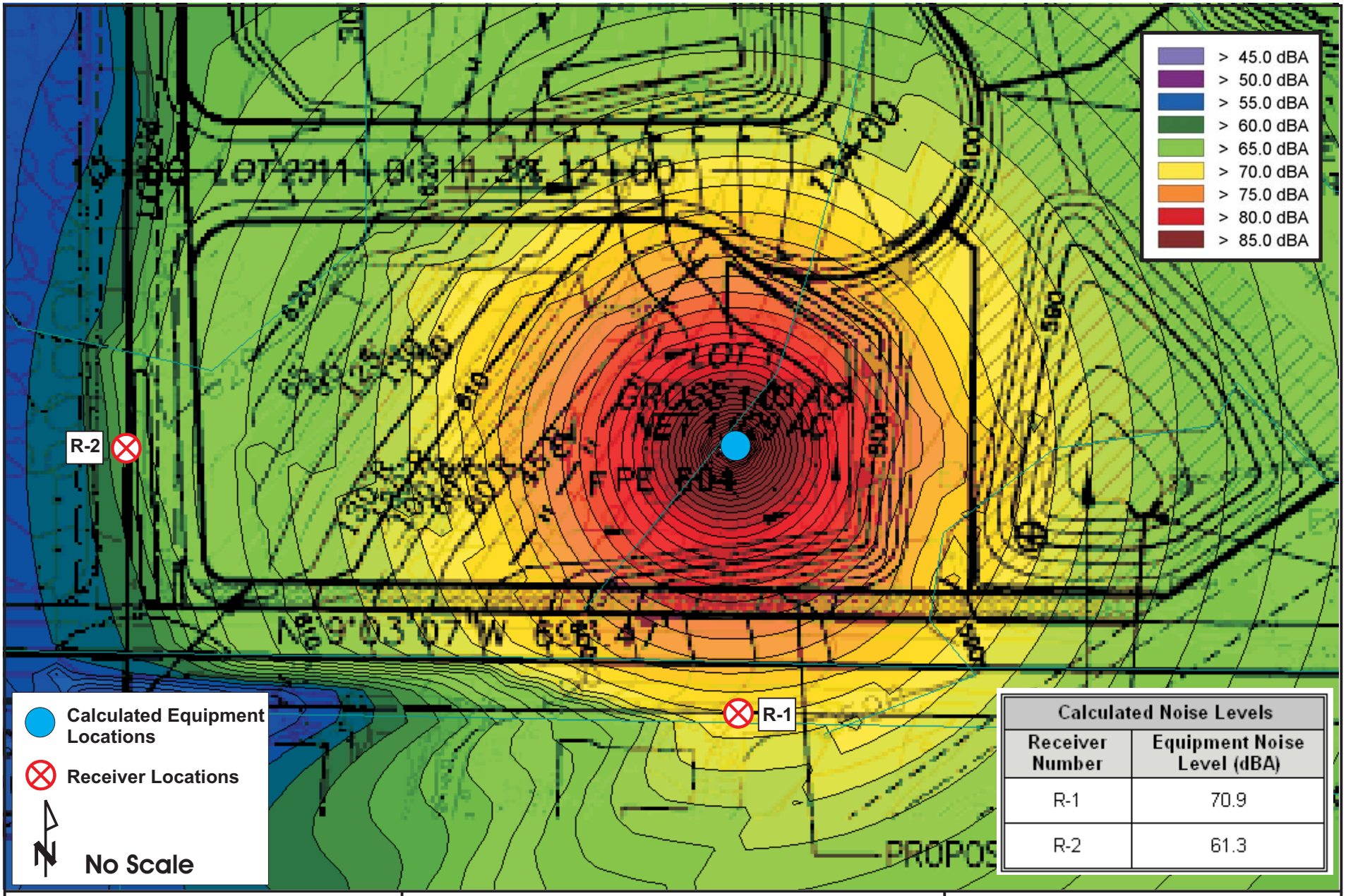
Site Plan Showing Temporary Construction Noise Impacts, Improvements Phase - Northwest
Job # B30307N1

Figure 9



Calculated Noise Levels	
Receiver Number	Equipment Noise Level (dBA)
R-1	70.9
R-2	61.3

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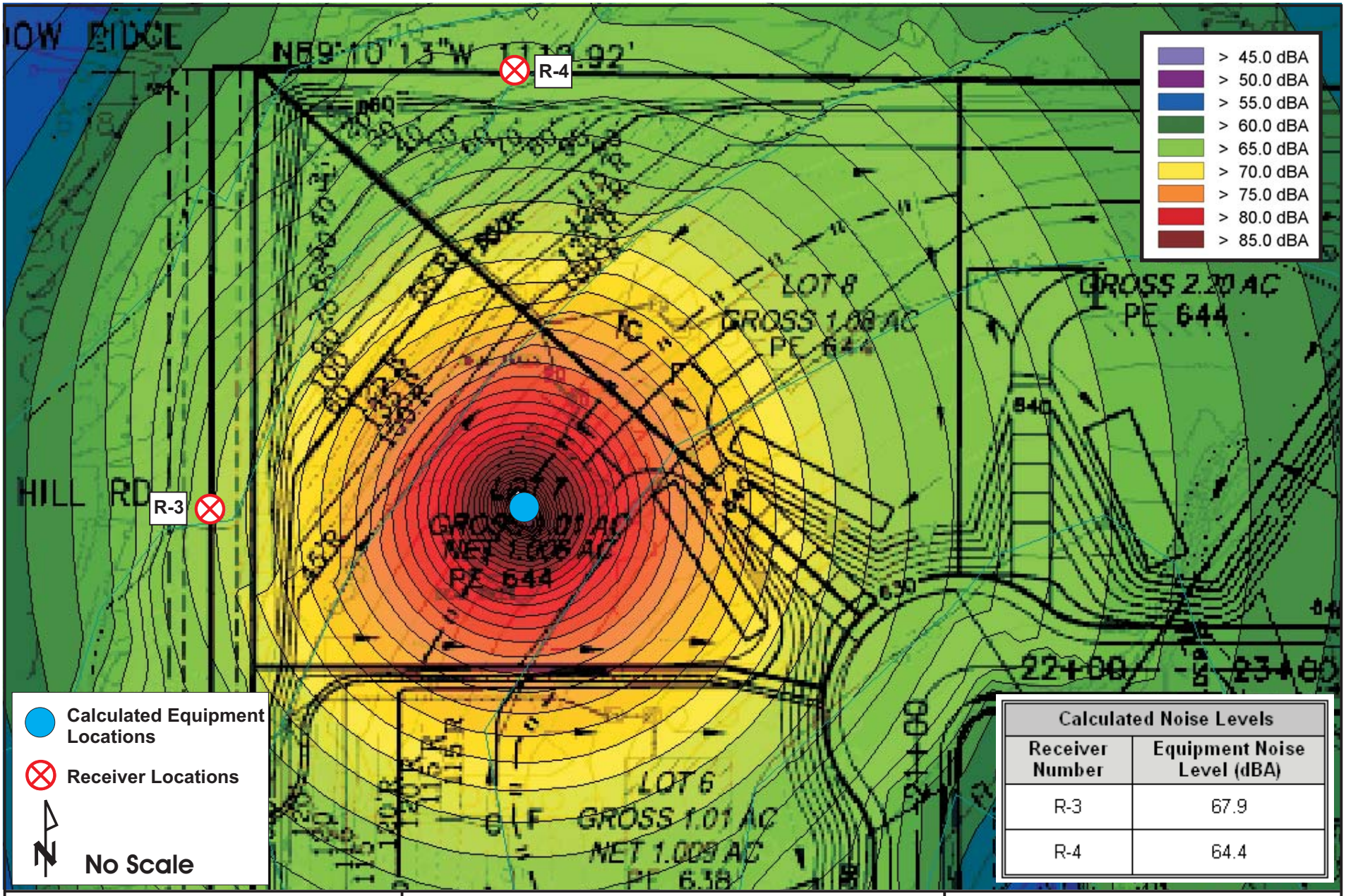
Site Plan Showing Temporary Construction Noise Impacts, House Construction - South
Job # B30307N1

Figure 10



Calculated Noise Levels	
Receiver Number	Equipment Noise Level (dBA)
R-3	67.9
R-4	64.4

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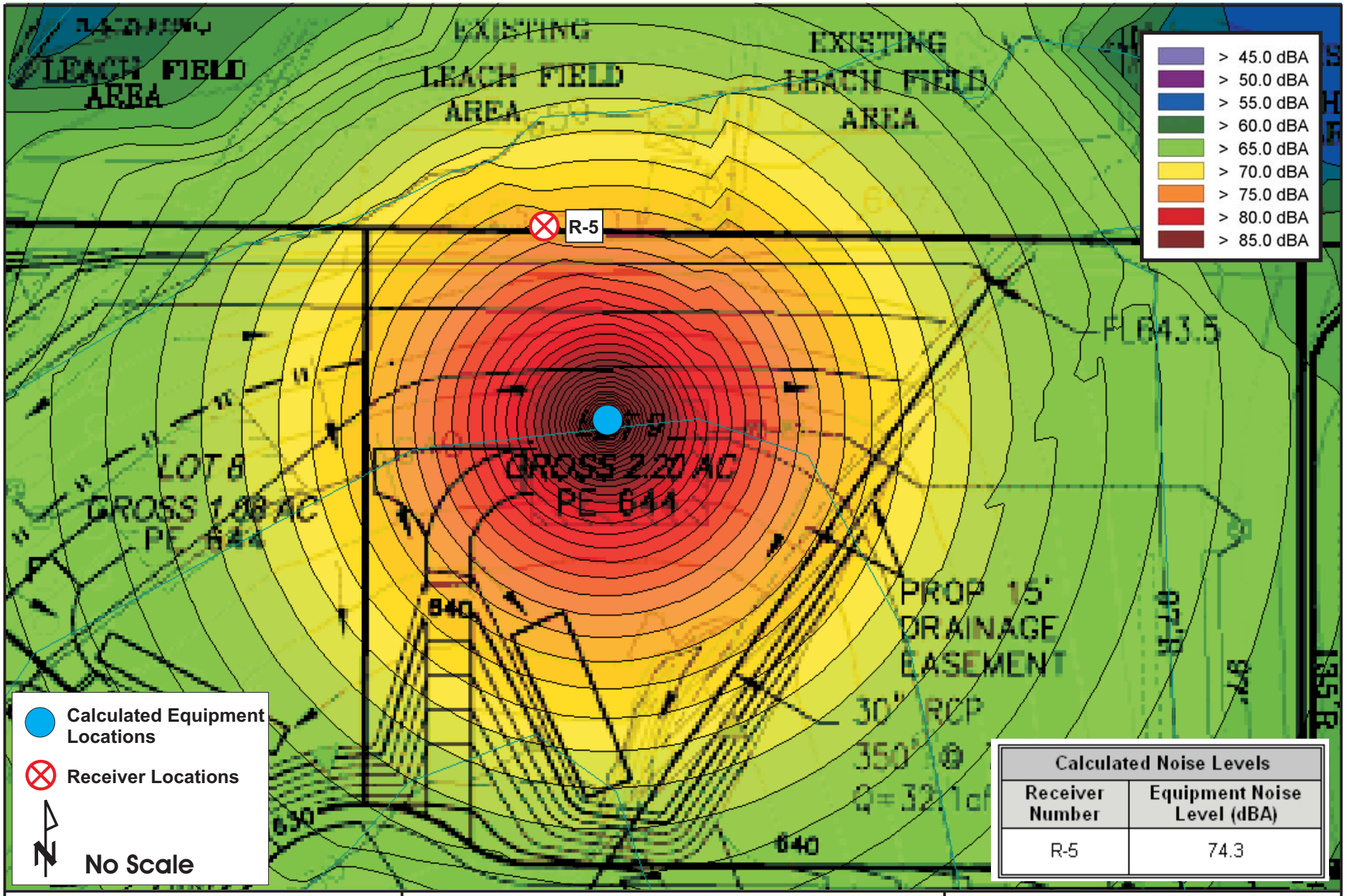
Site Plan Showing Temporary Construction Noise Impacts, House Construction - Northwest
Job # B30307N1

Figure 11



Calculated Noise Levels	
Receiver Number	Equipment Noise Level (dBA)
R-5	74.3

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Site Plan Showing Temporary Construction Noise Impacts, House Construction - North
Job # B30307N1

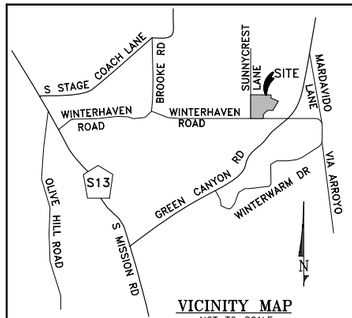
Figure 12

APPENDIX A

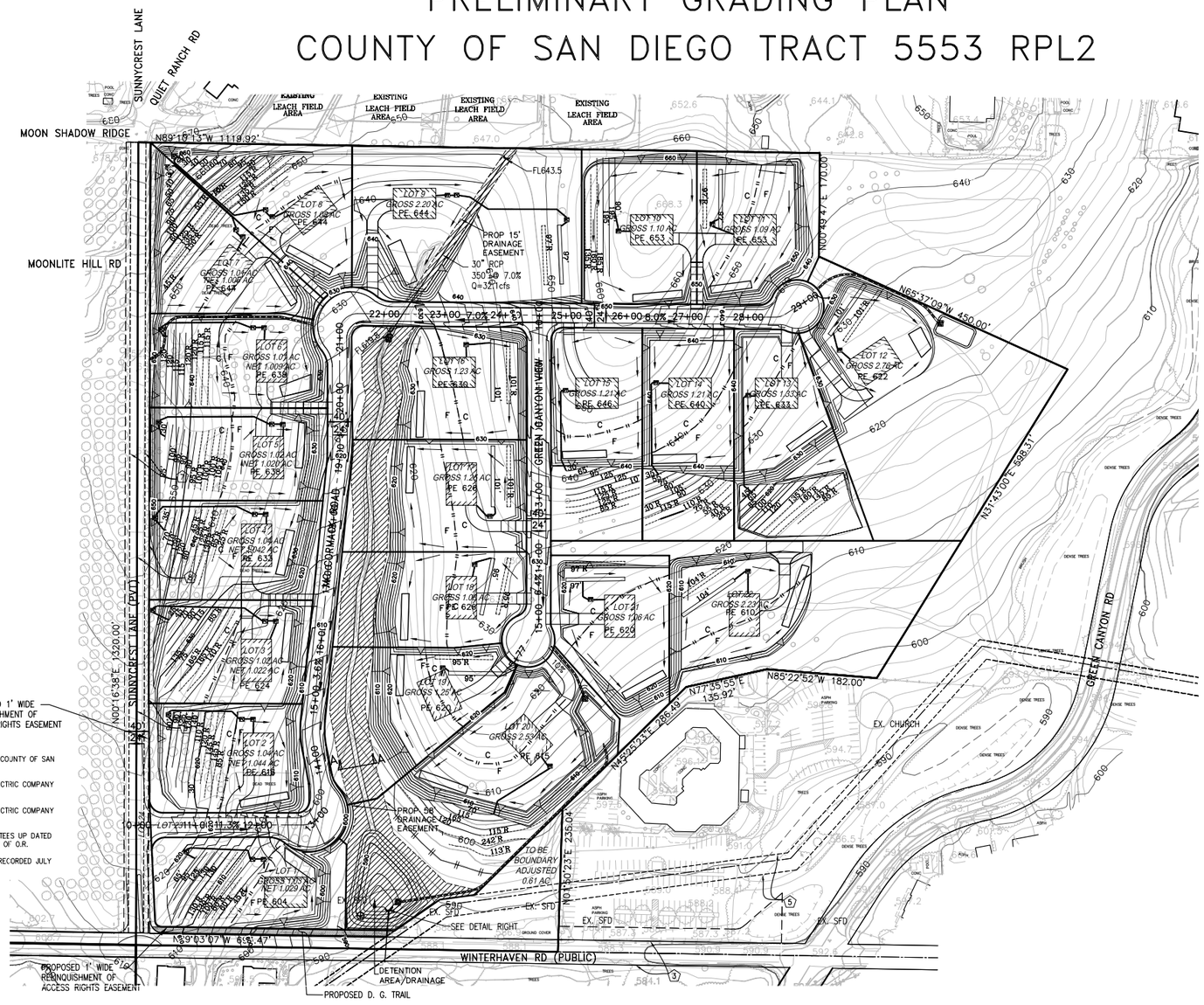
Project Plans

HEALTH DEPT. NO.: _____

PRELIMINARY GRADING PLAN
COUNTY OF SAN DIEGO TRACT 5553 RPL2



VICINITY MAP
NOT-TO-SCALE
THOMAS BROTHERS GUIDE PAGE: 1028, A-7



LEGEND

- PROJECT BOUNDARY
- PROPOSED LOT LINE
- PROPOSED DRAINAGE EASEMENT
- CUT/FILL LINE (C / F)
- PAD ELEVATION — PE 650
- CUT SLOPE – 1:5 MAX — 1:5
- FILL SLOPE – 2:1 — 2:1
- PROPOSED HORIZONTAL PIT
- RESERVE HORIZONTAL PIT
- LEACH FIELD — 40'
- EXISTING WELL *
- HAMMER HEAD
- IMP
- BROW DITCH

NOTE: *
EXISTING WELL TO BE PLUGGED/CAPPED AND ABANDONED IN PLACE.

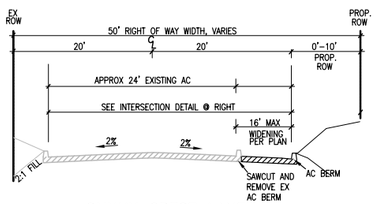
PLOTTABLE EASEMENTS:

PTR #307420924

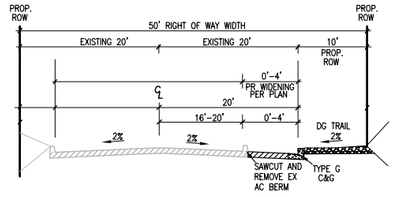
3. AN EASEMENT FOR RIGHT OF WAY FOR PUBLIC ROAD AND INCIDENTAL PURPOSES TO THE COUNTY OF SAN DIEGO RECORDED APRIL 8, 1941 IN BOOK 1156 PAGE 259 OF O.R.
5. AN EASEMENT FOR PIPELINE AND INCIDENTAL PURPOSES TO THE SAN DIEGO GAS AND ELECTRIC COMPANY PER DEED RECORDED JUNE 6, 1960 AS FILE/PAGE NO. 115415 OF O.R.
7. AN EASEMENT FOR PIPELINE AND INCIDENTAL PURPOSES TO THE SAN DIEGO GAS AND ELECTRIC COMPANY PER DEED RECORDED FEBRUARY 25, 1991 AS DOCUMENT NO. 1991-0080842 OF O.R.
8. AN EASEMENT FOR ROAD AND INCIDENTAL PURPOSES TO F.W. ROOD AND I.P. ROOD, TRUSTEES UP DATED FEBRUARY 2, 1990 PER DEED RECORDED JULY 6, 1992 AS DOCUMENT NO. 1992-0420095 OF O.R.
9. AN EASEMENT FOR ROAD AND INCIDENTAL PURPOSES TO SID AND JEAN BERK PER DEED RECORDED JULY 6, 1992 AS DOCUMENT NO. 2001-0771250 OF O.R.

GRAPHIC SCALE
0 50 100 200 400
(IN FEET)
1 inch = 100 ft.

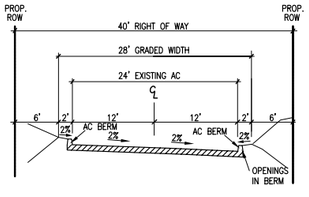
SAN DIEGUITO ENGINEERING, INC
4407 MANCHESTER, SUITE 105
ENCINITAS, CA 92024
PHONE: (760) 753-5525
CIVIL ENGINEERING • PLANNING
LAND SURVEYING



SUNNY CREST LANE
EXISTING PRIVATE ROAD



WINTERHAVEN ROAD
NOT-TO-SCALE



PROPOSED PRIVATE RD. SECTION
MC CORMAC ROAD & GREEN CANYON VIEW
NOT-TO-SCALE

NOTE: ACCESS ROAD DESIGN MEETS COUNTY OF SAN DIEGO PRIVATE ROAD DESIGN STANDARD 3.1(c) for AD 100-750.

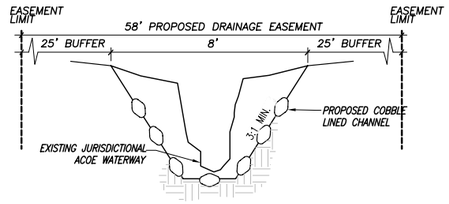
NOTES:

1. TAX ASSESSOR'S PARCEL NO.: 106-300-41
2. TOPOGRAPHY SOURCE: MORENO AERIAL, DATED: 11-29-07
3. PRELIMINARY EARTHWORK QUANTITES:
   LOTS 1 THRU 22
   CUT = 79,683 CU YD
   FILL = 77,052 CU YD
   EXPORT = 2,631 CU YD

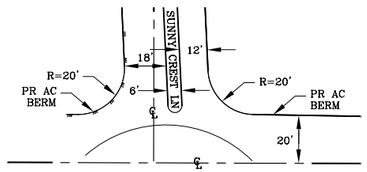
PRELIMINARY GRADING PLAN NOTE:

THIS PLAN IS PROVIDED TO ALLOW FOR FULL AND ADEQUATE DISCRETIONARY REVIEW OF A PROPOSED DEVELOPMENT PROJECT. THE PROPERTY OWNER ACKNOWLEDGES THAT ACCEPTANCE OR APPROVAL OF THIS PLAN DOES NOT CONSTITUTE AN APPROVAL TO PERFORM ANY GRADING SHOWN HEREON, AND AGREES TO OBTAIN VALID GRADING PERMISSIONS BEFORE COMMENCING SUCH ACTIVITY.

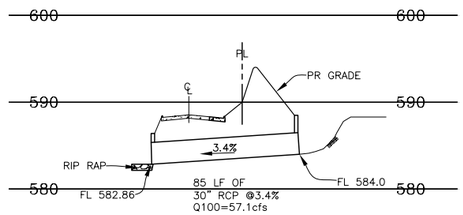
ALL GRADING DETAILS WILL BE IN ACCORDANCE WITH SAN DIEGO REGIONAL STANDARD DRAWING D-2, D-35B,AND D-40



SECTION A-A
CHANNEL SECTION
NOT-TO-SCALE



INTERSECTION OF SUNNYCREST LN & WINTERHAVEN RD
NOT-TO-SCALE



30" RCP CULVERT PROFILE
NOT-TO-SCALE

PROPERTY OWNER / SUBDIVIDER

HALSTEAD B. MCCORMAC TRUST
DOUGLAS E. MCCORMAC TRUSTEE
16533 2500 ROAD, CEDAREDGE, CO 81413
(970)856-4121

BY: _____ DATE

PREPARED BY:

IVAN R. FOX RCE# 38114
SAN DIEGUITO ENGINEERING, INC. 4407 MANCHESTER AVE. SUITE 105 ENCINITAS, CA 92024

BY: _____ DATE

REGISTERED PROFESSIONAL ENGINEER IVAN R. FOX NO. 38144 EXP. 3-31-13 CIVIL STATE OF CALIFORNIA

ENGINEER'S NAME: SAN DIEGUITO ENGINEERING
PHONE NO. (760) 753-5525

SHEET 1 OF 1
FILE NO. 5278

U:\1data\Civil 3D\5278 McCormac\Green Canyon North\TM & GP & FUEL\5278 TM GP North.dwg, 1/28/2013 8:40:24 PM, Mantoniadis

APPENDIX B

Pertinent Sections of the County of San Diego Noise Ordinance

(Amended by Ord. No. 7428 (N.S.), effective 2-4-88; amended by Ord. No. 9962 (N.S.), effective 1-9-09)

SEC. 36.408. HOURS OF OPERATION OF CONSTRUCTION EQUIPMENT.

Except for emergency work, it shall be unlawful for any person to operate or cause to be operated, construction equipment:

(a) Between 7 p.m. and 7 a.m.

(b) On a Sunday or a holiday. For purposes of this section, a holiday means January 1st, the last Monday in May, July 4th, the first Monday in September, December 25th and any day appointed by the President as a special national holiday or the Governor of the State as a special State holiday. A person may, however, operate construction equipment on a Sunday or holiday between the hours of 10 a.m. and 5 p.m. at the person's residence or for the purpose of constructing a residence for himself or herself, provided that the operation of construction equipment is not carried out for financial consideration or other consideration of any kind and does not violate the limitations in sections 36.409 and 36.410.

(Amended by Ord. No. 9962 (N.S.), effective 1-9-09)

SEC. 36.409. SOUND LEVEL LIMITATIONS ON CONSTRUCTION EQUIPMENT.

Except for emergency work, it shall be unlawful for any person to operate construction equipment or cause construction equipment to be operated, that exceeds an average sound level of 75 decibels for an eight-hour period, between 7 a.m. and 7 p.m., when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is being received.

(Amended by Ord. No. 9700 (N.S.), effective 2-4-05; amended by Ord. No. 9962 (N.S.), effective 1-9-09)

SEC. 36.410. SOUND LEVEL LIMITATIONS ON IMPULSIVE NOISE.

In addition to the general limitations on sound levels in section 36.404 and the limitations on construction equipment in section 36.409, the following additional sound level limitations shall apply:

(a) Except for emergency work or work on a public road project, no person shall produce or cause to be produced an impulsive noise that exceeds the maximum sound level shown in Table 36.410A, when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is received, for 25 percent of the minutes in the measurement period, as described in subsection (c) below. The maximum sound level depends on the use being made of the occupied property. The uses in Table 36.410A are as described in the County Zoning Ordinance.

TABLE 36.410A.
MAXIMUM SOUND LEVEL (IMPULSIVE) MEASURED AT OCCUPIED PROPERTY IN DECIBELS (dBA)

OCCUPIED PROPERTY USE	DECIBELS (dBA)
Residential, village zoning or civic use	82
Agricultural, commercial or industrial use	85

(b) Except for emergency work, no person working on a public road project shall produce or cause to be produced an impulsive noise that exceeds the maximum sound level shown in Table 36.410B, when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is received, for 25 percent of the minutes in the measurement period, as described in subsection (c) below. The maximum sound level depends on the use being made of the occupied property. The uses in Table 36.410B are as described in the County Zoning Ordinance.

TABLE 36.410B.
MAXIMUM SOUND LEVEL (IMPULSIVE) MEASURED AT OCCUPIED PROPERTY IN DECIBELS (dBA) FOR PUBLIC ROAD PROJECTS

OCCUPIED PROPERTY USE	dB(A)
Residential, village zoning or civic use	85
Agricultural, commercial or industrial use	90

(c) The minimum measurement period for any measurements conducted under this section shall be one hour. During the measurement period a measurement shall be conducted every minute from a fixed location on an occupied property. The measurements shall measure the maximum sound level during each minute of the measurement period. If the sound level caused by construction equipment or the producer of the impulsive noise exceeds the maximum sound level for any portion of any minute, it will be deemed that the maximum sound level was exceeded during that minute.

(Added by Ord. No. 9962 (N.S.), effective 1-9-09)

SEC. 36.411. CONTAINERS AND CONSTRUCTION MATERIAL.

It shall be unlawful for any person to handle, transport, or cause to be handled or transported in any public place, any container or any construction material in such a way as to create a disturbing, excessive, or offensive noise as defined in section 36.402 of this chapter.

(Amended by Ord. No. 9962 (N.S.), effective 1-9-09)

SEC. 36.412. SIGNAL DEVICE FOR FOOD TRUCKS.

No person shall operate or cause to have operated or used any sound signal device other than sound-amplification equipment attached to a motor vehicle wagon or manually propelled cart from which food or any other items are sold which emits a sound signal more frequently than once every ten minutes in any one street block and with a duration of more than ten seconds for any single emission. The sound level of this sound signal shall not exceed 90 decibels at 50 feet from the point of the noise source.

(Amended by Ord. No. 9962 (N.S.), effective 1-9-09)

SEC. 36.413. MULTIPLE FAMILY DWELLING UNITS.

Notwithstanding any other provision of this chapter it shall be unlawful for any person to create, maintain or cause to be maintained any sound within the interior of any multiple family dwelling unit which causes the noises level to exceed those limits set forth below in another dwelling unit:

TABLE 36.413
ALLOWABLE INTERIOR NOISE LEVEL

Type of Land Use	Hours		Allowable Interior Noise Level (dBA)	
		No Time	1 min in 1 hour	5 min in 1 hour
Multifamily	10 pm- 7 am	> 45	40	35
Residential	7 am-10 pm	> 55	50	35

(> greater than)

APPENDIX C

Construction Equipment Noise Calculations

Cadna Noise Model - Sound Levels														
Name	**ID**	**Type**		**Oktave Spectrum (dB)**										**Source**
			Weight	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**A**	**lin**	
D9 Dozer	L_1	Lw (c)		123.7	121.7	120.7	118.7	112.7	111.7	104.7	103.7	119.9	127.8	FHWA/Defra
950 Loader	L_2	Lw (c)		117.7	112.7	107.7	108.7	103.7	100.7	94.7	87.7	109.6	119.7	FHWA/Defra
633 Scraper	L_3	Lw (c)		123.7	122.7	118.7	114.7	119.7	113.7	109.7	100.7	122.2	128.1	FHWA/Defra
G14 Blade	L_4	Lw (c)		121.7	120.7	116.7	112.7	117.7	111.7	107.7	98.7	120.2	126.1	FHWA/Defra
330 Excavator	L_5	Lw (c)		117.7	126.7	120.7	116.7	112.7	110.7	106.7	103.7	119.6	128.6	FHWA/Defra
933 Loader	L_6	Lw (c)		122.7	117.7	112.7	113.7	108.7	105.7	99.7	92.7	114.6	124.7	FHWA/Defra
416 Backhoe	L_7	Lw (c)		120.7	112.7	110.7	110.7	109.7	106.7	105.7	96.7	114.5	122.5	FHWA/Defra
Compressor	L_8	Lw (c)		133.7	122.7	113.7	108.7	106.7	104.7	107.7	96.7	115.2	134.1	FHWA/Defra
Fork Lift	L_9	Lw (c)		100.6	108.1	108.5	109.8	110.1	108.7	104.1	97.4	114.6	116.5	Wieland/Defra

Cadna Noise Model - Point Sources - Grading										
Name	ID	Result. PWL	Lw / Li		Height	Coordinates			Operating Time	
		Day	Type	Value		X	Y	Z	Day	Night
		(dBA)			(m)	(m)	(m)	(m)	(min)	(min)
D9 Dozer 1	S_1	119.9	Lw	L_1	1.83	211.46	102.1	189.54	24	0
D9 Dozer 2	S_2	119.9	Lw	L_1	1.83	211.85	136.31	190.09	24	0
950 Loader 1	S_3	109.6	Lw	L_2	1.83	250.65	101.44	185.54	24	0
950 Loader 2	S_4	109.6	Lw	L_2	1.83	246.59	137.95	186.67	24	0
633 Scraper	S_5	122.2	Lw	L_3	1.83	230.97	116.19	188.13	24	0
D9 Dozer 1	NW_1	119.9	Lw	L_1	1.83	238.84	393.63	193.83	24	0
D9 Dozer 2	NW_2	119.9	Lw	L_1	1.83	260.31	414.58	193.83	24	0
950 Loader 1	NW_3	109.6	Lw	L_2	1.83	293.18	402.71	193.83	24	0
950 Loader 2	NW_4	109.6	Lw	L_2	1.83	253.75	356.04	193.81	24	0
633 Scraper	NW_5	122.2	Lw	L_3	1.83	267.7	385.07	193.83	24	0
D9 Dozer 1	N_1	119.9	Lw	L_1	1.83	440.47	400.32	203	24	0
D9 Dozer 2	N_2	119.9	Lw	L_1	1.83	457.11	373.33	200.41	24	0
950 Loader 1	N_3	109.6	Lw	L_2	1.83	475.25	346.88	193.83	24	0
950 Loader 2	N_4	109.6	Lw	L_2	1.83	440.34	346.02	200.18	24	0
633 Scraper	N_5	122.2	Lw	L_3	1.83	474.22	400.95	200.37	24	0

Cadna Noise Model - Noise Levels at Receivers - Grading, South						
Name	ID	Level Lr	Height	Coordinates		
		Day		X	Y	Z
		(dBA)	(m)	(m)	(m)	(m)
South	R_1	71.0	1.52	252.28	50.43	181.73
West 1	R_2	74.7	1.52	174.49	132.94	192.75
West 2	R_3	54.5	1.52	176.52	391.95	202.44
North 1	R_4	55.5	1.52	260.1	461.07	200.22
North 2	R_5	50.3	1.52	472.8	457.42	202.49

Cadna Noise Model - Noise Levels at Receivers - Grading, Northwest						
Name	ID	Level Lr	Height	Coordinates		
		Day		X	Y	Z
		(dBA)	(m)	(m)	(m)	(m)
South	R_1	52.4	1.52	248.44	50.43	181.77
West 1	R_2	54.3	1.52	174.49	118.76	191.79
West 2	R_3	70.0	1.52	176.52	391.95	202.44
North 1	R_4	72.3	1.52	260.1	461.07	200.22
North 2	R_5	56.7	1.52	472.8	457.42	202.49

Cadna Noise Model - Noise Levels at Receivers - Grading, North						
Name	ID	Level Lr	Height	Coordinates		
		Day		X	Y	Z
		(dBA)	(m)	(m)	(m)	(m)
South	R_1	50.8	1.52	248.44	50.43	181.77
West 1	R_2	51.3	1.52	174.49	118.76	191.79
West 2	R_3	55.2	1.52	175.37	422.86	204.56
North 1	R_4	56.9	1.52	227.1	462.21	202.53
North 2	R_5	71.3	1.52	472.8	457.42	202.49

Cadna Noise Model - Point Sources - Improvements										
Name	ID	Result. PWL	Lw / Li		Height	Coordinates			Operating Time	
		Day	Type	Value		X	Y	Z	Day	Night
		(dBA)			(m)	(m)	(m)	(m)	(min)	(min)
933 Loader 1	S_1	114.6	Lw	L_6	1.83	267.27	118.47	184.36	24	0
330 Excavator	S_2	119.6	Lw	L_5	1.83	267.33	119.96	184.39	24	0
G14 Blade	S_3	120.2	Lw	L_4	1.83	268.31	119.24	184.29	24	0
950 Loader	S_4	109.6	Lw	L_2	1.83	268.09	120.77	184.36	24	0
633 Scraper	S_5	122.2	Lw	L_3	1.83	269.13	120.12	184.3	24	0
933 Loader 2	S_6	114.6	Lw	L_6	1.83	267.29	118.55	184.36	24	0
Backhoe	S_7	114.5	Lw	L_7	1.83	266.72	119.6	184.43	24	0
933 Loader 1	NW_1	114.6	Lw	L_6	1.83	274.06	380.35	193.83	24	0
330 Excavator	NW_2	119.6	Lw	L_5	1.83	274.06	380.35	193.83	24	0
G14 Blade	NW_3	120.2	Lw	L_4	1.83	274.06	380.35	193.83	24	0
950 Loader	NW_4	109.6	Lw	L_2	1.83	274.06	380.35	193.83	24	0
633 Scraper	NW_5	122.2	Lw	L_3	1.83	274.06	380.35	193.83	24	0
933 Loader 2	NW_6	114.6	Lw	L_6	1.83	274.06	380.35	193.83	24	0
Backhoe	NW_7	114.5	Lw	L_7	1.83	274.06	380.35	193.83	24	0

Cadna Noise Model - Noise Levels at Receivers - Improvements, South						
Name	ID	Level Lr	Height	Coordinates		
		Day		X	Y	Z
		(dBA)	(m)	(m)	(m)	(m)
South	R_1	72.9	1.52	275.53	50.88	181.82
West 1	R_2	69.1	1.52	173.05	150.95	193.52
West 2	R_3	54.9	1.52	175.37	422.86	204.56
North 1	R_4	54.9	1.52	227.1	462.21	202.53

Cadna Noise Model - Noise Levels at Receivers - Improvements, Northwest						
Name	ID	Level Lr	Height	Coordinates		
		Day		X	Y	Z
		(dBA)	(m)	(m)	(m)	(m)
South	R_1	54.7	1.52	275.53	50.88	181.82
West 1	R_2	60.3	1.52	173.05	150.95	193.52
West 2	R_3	68.9	1.52	171.18	381.67	201.94
North 1	R_4	71.4	1.52	282.78	460.68	199.46

Cadna Noise Model - Point Sources - House Construction										
Name	**ID**	**Result. PWL**	**Lw / Li**		**Height**	**Coordinates**			**Operating Time**	
		Day	**Type**	**Value**		**X**	**Y**	**Z**	**Day**	**Night**
		(dBA)			**(m)**	**(m)**	**(m)**	**(m)**	**(min)**	**(min)**
Compressor	S_1	115.2	Lw	L_8	1.83	267.27	118.47	184.36	24	0
Fork Lift	S_2	114.6	Lw	L_9	1.83	267.33	119.96	184.39	24	0
Compressor	NW_1	115.2	Lw	L_8	1.83	268.31	119.24	184.29	24	0
Fork Lift	NW_2	114.6	Lw	L_9	1.83	268.09	120.77	184.36	24	0
Compressor	N_1	115.2	Lw	L_8	1.83	269.13	120.12	184.3	24	0
Fork Lift	N_2	114.6	Lw	L_9	1.83	267.29	118.55	184.36	24	0

Cadna Noise Model - Noise Levels at Receivers - House Construction, South						
Name	ID	Level Lr	Height	Coordinates		
		Day		X	Y	Z
		(dBA)	(m)	(m)	(m)	(m)
South	R_1	70.9	1.52	251.47	51.04	181.93
West 1	R_2	61.3	1.52	174.79	84.06	189.59
West 2	R_3	44.7	1.52	175.37	422.86	204.56
North 1	R_4	44.8	1.52	227.1	462.21	202.53

Cadna Noise Model - Noise Levels at Receivers - House Construction, Northwest						
Name	ID	Level Lr	Height	Coordinates		
		Day		X	Y	Z
		(dBA)	(m)	(m)	(m)	(m)
South	R_1	44.4	1.52	251.47	51.04	181.93
West 1	R_2	45.3	1.52	174.79	84.06	189.59
West 2	R_3	67.9	1.52	176.33	398.11	202.76
North 1	R_4	64.4	1.52	219.41	461.25	203.25

Cadna Noise Model - Noise Levels at Receivers - House Construction, North						
Name	ID	Level Lr	Height	Coordinates		
		Day		X	Y	Z
		(dBA)	(m)	(m)	(m)	(m)
South	R_1	43.3	1.52	251.47	51.04	181.93
West 1	R_2	43.6	1.52	174.79	84.06	189.59
West 2	R_3	56.8	1.52	176.33	398.11	202.76
North 1	R_4	60.4	1.52	219.41	461.25	203.25
North 2	R_5	74.3	1.52	305.33	460.06	198.03