Otay Ranch Resort Village
Noise Impact Report

Prepared for the
County of San Diego
Draft

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San Diego, California

Noise Impact Report

Otay Ranch Resort Village

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TABLE OF CONTENTS

List of Figures

Figure **Page**

List of Tables

GLOSSARY OF TERMS AND ACRONYMS

°F	degrees Fahrenheit
ADT	average daily traffic
AMSL	above mean sea level
Caltrans	California Department of Transportation
CNEL	Community Noise Equivalent Level
County	County of San Diego
cy	cubic yard
dB	decibel
dBA	a-weighted decibel
EIR	Environmental Impact Report
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
GPA	General Plan Amendment
HVAC	heating, ventilation, and air conditioning
in/sec	inches per second
L_{eq}	equivalent noise level over a period of time
LOS	level of service
mph	miles per hour
NA	noise abatement
NSLU	noise-sensitive land use
PPV	peak particle velocity
proposed project	Otay Ranch Resort Village Specific Plan project
SEL	Sound Exposure Level
SLM	sound level meter
SR	State Route
SRP	Otay Subregional Plan
TNM	Traffic Noise Model Version 2.5
Traffic memorandum	*Otay Ranch Resort Village Construction Related Traffic Analysis Memorandum*

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EXECUTIVE SUMMARY

The Otay Ranch Resort Village (proposed project) would develop 1,881 single-family homes in five single-family neighborhoods, 57 multi-family residences in a mixed-use configuration with up to 20,000 square feet of neighborhood commercial, retail, and office uses, a 200-room resort hotel with up to 20,000 square feet of visitor-serving commercial uses offices, and conference facilities, 28.6 acres of public and private parks, 144 acres of manufactured slopes and fuel breaks, and would retain 1,089 acres of natural preserve open space. The proposed project also includes an elementary school site and a public safety site (e.g., fire station and sheriff's storefront).

The project site is currently undeveloped open space and would require extensive grading and earthmoving prior to construction. The goal of the proposed project is to develop a residential and resort community that would utilize the unique project site and maximize views while preserving open space and providing recreational activities and non-vehicular transportation opportunities (e.g., biking and walking paths) to local residents and visitors. This report analyzes the potential noise impacts resulting from both construction and operation of the proposed project.

The proposed project is subject to the County of San Diego (County) General Plan Noise Element and the County Noise Ordinance. The Noise Element sets standards associated with human activities and related noise-sensitive land uses (NSLUs). Nearby existing NSLUs include single-family residences located to the northwest and west of the project site. The County Noise Ordinance sets limits on noise levels generated from one property to another and governs noise generated by construction activities.

With respect to both construction and operation of the proposed project, this report includes an assessment of noise and groundborne vibration impacts in relation to NSLUs (considering their relative exposure) based on respective significance guidelines. Mitigation measures are specified where impacts are potentially significant, and noise abatement measures are recommended, where appropriate, to reduce and minimize noise and vibration levels.

Operation of the proposed project would generate additional on and off-site vehicle trips which could result in potentially significant impacts to NSLUs. With the implementation of the mitigation

measure identified in Section 2.2, the traffic generated by the proposed project would increase on and off--site traffic noise by a less-than-significant level.

With respect to noise levels from stationary sources associated with operation of the proposed project, noise levels from mechanical heating, ventilation, and air conditioning (HVAC) equipment; standby generators; parking lots; and loading dock and delivery activities may exceed the applicable County Noise Ordinance limits. This would be considered a potentially significant noise impact. Mitigation measures identified in Section 3.2 would reduce stationary source noise to levels that would not exceed applicable County Noise Ordinance limits. Additional design considerations and noise abatement recommendations for emergency generators are outlined to further reduce noise levels.

Construction noise levels associated with the proposed project would result primarily from the operation of construction vehicles and equipment for site grading and construction of new facilities. Construction-related traffic would also be added to the local roadway system. Construction activities would potentially be heard by local residents; however, construction of the proposed project (including off-site traffic) would not exceed the County construction-related noise thresholds, and construction noise impacts would be less than significant. In addition, noise abatement measures are identified in Section 3.3 to further reduce noise levels; and mitigation measures for impulsive construction noise impacts are in Section 3.4.

Blasting activities associated with site grading could exceed County noise and vibration thresholds and could result in a potentially significant impact. Implementation of the mitigation measure identified in Section 4.2 would be required to reduce blasting impacts to a less-than-significant level. Implementation of the additional mitigation measure in Section 4.2 would reduce vibration from construction equipment to less than significant levels due to sufficient distances from structures.

1.0 INTRODUCTION

This report analyzes noise impacts from both construction and operation of the Otay Ranch Resort Village project (proposed project). The proposed project is located in unincorporated San Diego County, east of the City of Chula Vista as shown in Figure 1. The project vicinity is shown in Figure 2. Noise is generally defined as unwanted or objectionable sound.

The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance, and, in the extreme, hearing impairment. The purpose of this analysis is to characterize the existing noise conditions, identify applicable regulations (i.e., County of [County] General Plan Noise Element and the County Noise Ordinance), assess noise impacts from construction and operation of the proposed project, and identify mitigation measures and design considerations to reduce identified impacts.

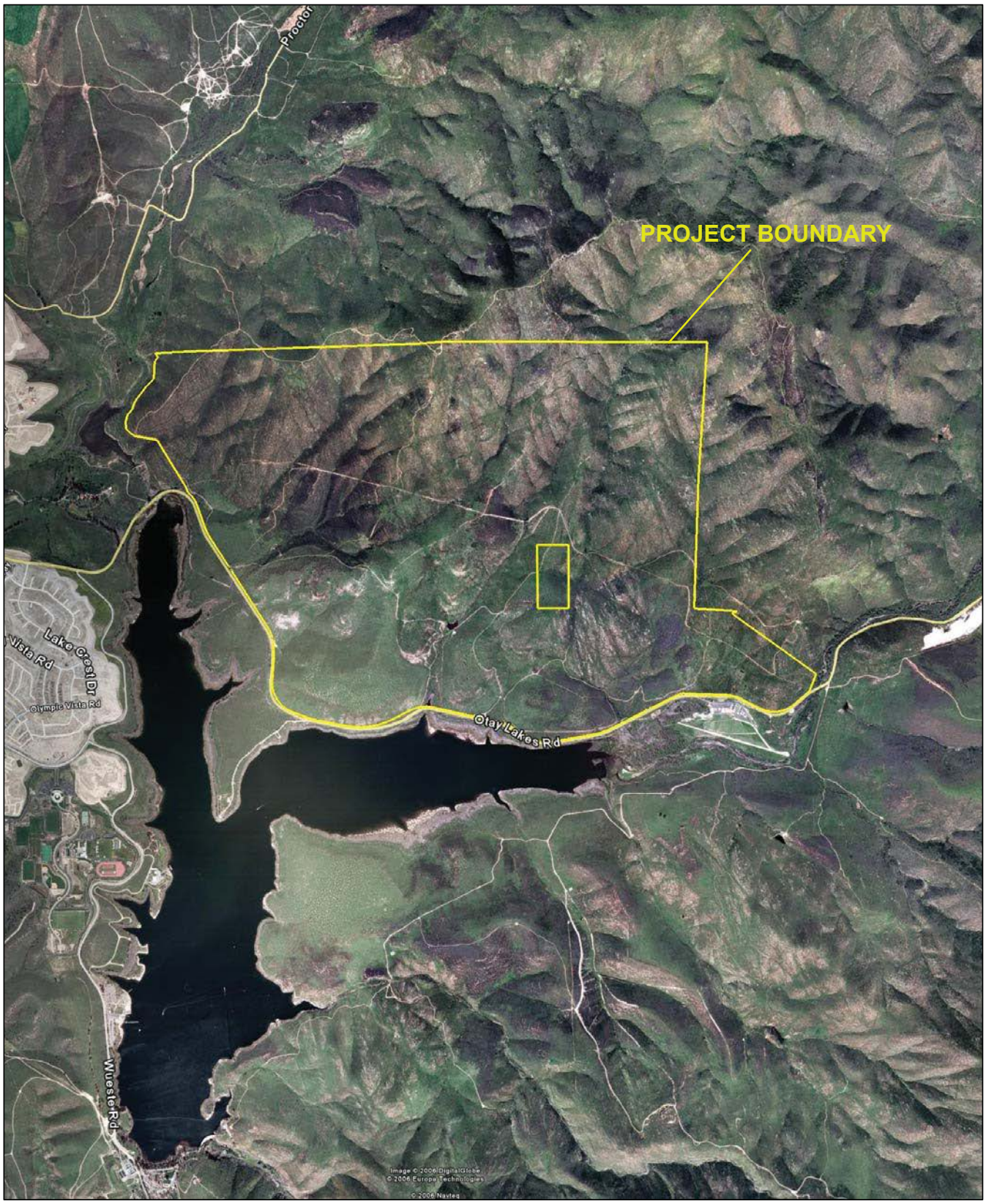
This report was prepared in accordance with the County's Guidelines for Determining Significance and Report Format and Content Requirements, Noise (County's Noise Guidelines) (County of San Diego 2009). The results of this noise report will be incorporated into an environmental impact report (EIR) prepared pursuant to the California Environmental Quality Act.

1.1 PROJECT DESCRIPTION

1.1.1 Proposed Land Uses

The project site is approximately 1,869 acres. The project proposes to develop 1,881 single-family homes in five single-family neighborhoods, and 57 multi-family residences with up to 20,000 square feet of commercial/retail uses in a mixed-use configuration on 14.1 acres; a resort hotel with up to 200 rooms and 20,000 square feet of visitor-serving commercial uses on 17.4 acres; and 28.6 acres of public and private parks, and manufactured open space (see Appendix E). The proposed project includes an elementary school site and public safety site (e.g., fire station and sheriff's storefront); however, these uses would be developed by the agencies that operate them (e.g., school district, fire department/sheriff's department).

Figure 1
Regional Location Map



SOURCE: Google Earth 2006

0 .25 .5 1 Mile

Figure 2
Project Vicinity Map

The project site is currently undeveloped open space and would require extensive grading and earthmoving prior to construction. A majority (58 percent) of the project site would be dedicated to habitat preserve land. The goal of the proposed project is to develop a residential and resort community, which would utilize the unique project site and maximize views while preserving open space and providing recreational activities and non-vehicular transportation opportunities (e.g., biking and walking paths) to local residents and visitors.

On October 28, 1993, the County Board of Supervisors and the Chula Vista City Council jointly certified the Otay Subregional Plan, Volume II ("Otay SRP"), which is included in the County General Plan (i.e., Part XXIII). This report and the subsequent EIR will evaluate the proposed project within the context of the County General Plan and conformance with the Otay SRP.

The approved Otay SRP includes the project site as "Village 13/Resort Village." In accordance with the Otay SRP, the planned uses within Village 13 (i.e., the project site) include hotel uses with up to 800 rooms, shops, restaurants, and conference facilities. Permitted residential uses include a maximum of 1,938 homes (i.e., 530 single-family and 1,408 multi-family residences). Other planned land uses include two neighborhood parks and commercial areas and a golf course. Adoption of the proposed project would help further refine the land use plans, development regulations, goals, objectives, and policies in the County's General Plan and Otay SRP.

1.1.2 Construction

Construction of the proposed project is anticipated to occur over an approximate 11-year period, with potential on-site occupation beginning at the end of year 2. Construction of the proposed project development would be non-sequential to adjust to market changes, economic conditions, and regulatory constraints. Site grading and earthmoving would be extensive due to the topography of the project site. It is anticipated the development would involve phased grading on-site, which may overlap road grading activities associated with the widening and realignment of Otay Lakes Road. The nearest NSLU property line (2691 Otay Lakes Road) to the project site is approximately 1,250 feet west of the nearest point of construction for the proposed development. Proposed phased construction grading is detailed in Section 3.3-1.

Project construction would result in a total of 160 average daily traffic (ADT) volumes generated from 160 employee trips distributed across the area roadway network. During the AM peak hour,

construction trips would be approximately 80 worker trips. The maximum daily construction activity that would occur during development of the proposed project has been assessed to evaluate associated impacts of the proposed project.

Blasting Operations

Blasting operations would be required on the project site prior to grading and development. It is anticipated that all blasting operations would occur independently from all other construction activities; all other construction activities (e.g., grading, building construction, asphalt paving) would cease during a blasting event.

Site Grading and Earthmoving Phases

Grading of the project site is planned to occur in phases over 11 years, as detailed in Section 3.3-1, based on non-sequential development. The proposed project would require grading and earthmoving of approximately 14.2 million cubic yards (cy).

Road Construction and Circulation

The primary access road to the project site is Otay Lakes Road. Otay Lakes Road is classified as a 4-lane Major Road with Intermittent Turn Lanes from the City/County boundary to the second project entry (i.e., Strada Piazza) in the County General Plan. Otay Lakes Road is classified as a 6-lane Prime Arterial in the Otay SRP. The project proposes an Otay SRP Amendment to reclassify Otay Lakes Road as 4-lane Boulevard with Raised Median from the City/County boundary to the second project entry.

Internal roadway circulation would be developed as part of each construction phase and is anticipated to comprise approximately 39 acres of the total project site.

1.2 ENVIRONMENTAL SETTING AND EXISTING CONDITIONS

The project site comprises a broad mesa sloping to the south, broken by several steep canyons draining from north to south. Portions of the relatively flat mesa extend north into the Jamul Mountains, becoming part of steeper slopes. Developed site elevations are proposed to range from

approximately 500 feet above mean sea level (AMSL) at the southern end of the project site to approximately 900 feet AMSL in the northern portions.

1.2.1 Adjacent Land Uses

The project site is located along the existing Otay Lakes Road, which traverses the southern portion of the project site and provides access to the property. To the west, within the City of Chula Vista, are the Eastlake Vistas residential community, the Eastlake Woods residential community, and the U.S. Olympic Training Center. Lower Otay Lake, a reservoir and water supply owned by the City of San Diego, is located to the south. Upper Otay Lake and the Birch Family Estate are located to the northwest. The John Nichols Field Airfield, a restricted, private-use airfield is located at the eastern end of Lower Otay Lake on City of San Diego property, to the south across Otay Lakes Road (see Figure 3).

Four schools are in proximity of the project site: Eastlake Middle School (0.9 mile [4,700 feet] to the west), Salt Creek Elementary School (1.2 miles [6,600 feet] to the west), Arroyo Vista Elementary School (1.6 miles [8,200 feet] to the west), and Olympic View Elementary School (2.2 miles [11,800 feet] to the west). The nearest single-family residence is located approximately 0.3 mile (1,700 feet) to the west of the northwest edge of the project site.

1.2.2 Existing Noise Conditions

The primary existing noise source on the project site and within the project vicinity is vehicle traffic on Otay Lakes Road. Within the vicinity of the project site, Otay Lakes Road is currently a 2-lane roadway with a posted speed limit of 50 miles per hour (mph) (SANDAG 2006). Within the City of Chula Vista, between Telegraph Canyon Road and Lake Crest Drive, Otay Lakes Road is a 6-lane roadway with a raised median with a posted speed limit of 50 mph. East of Lake Crest Drive, Otay Lakes Road becomes a 2-lane undivided road east of Lake Crest Drive.

Source: Digital Globe 2008; Otay Ranch 2009.

2,000 1,000 0 2,000 Feet

Scale: 1:24,000; 1 inch = 2,000 feet

Figure 3
Existing Project Site

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The secondary existing noise source at the project site and vicinity is aircraft activity, including commercial, private, and military aircraft flyovers (high and low altitude) and weekday daytime jump plane aircraft activity from adjacent John Nichols Field Airfield; particularly jump plane takeoffs from the adjacent west end of the airfield runway, over Otay Lakes Road and along the adjacent project site boundary.

Otay Lakes Road

The County General Plan Circulation Element designates Otay Lakes Road as a 4-lane Major Road from the City/County boundary to the second proposed project entrance, although as references above the proposed project includes a General Plan Amendment to reclassify this portion of Otay Lakes Road to a Boulevard with Raised Median. The City of Chula Vista classifies Otay Lakes Road as a 6-lane prime, with the exception of the segment between Interstate 805 and Eastlake Parkway, which is classified as a 7-lane expressway. Existing ADT volume data on Otay Lakes Road are presented in Table 1.

Table 1
Existing Average Daily Traffic Volumes

Roadway Segment (Otay Lakes Road)	Total	Level of Service (LOS)
County of San Diego		
Wueste Road to Campo Road (SR-94)	2,927	B
City of Chula Vista		
East H Street to Telegraph Canyon Road/Otay Lakes Road	28,912	C
La Media Road to Rutgers Avenue	42,142	B
Rutgers Avenue to SR-125 SB Ramps	41,931	B
SR-125 SB Ramps to SR-125 NB Ramps	46,406	C
SR-125 NB Ramps to Eastlake Parkway	40,291	A
Eastlake Parkway to Lane Avenue	26,054	A
Lane Avenue to Fenton Street	18,832	A
Fenton Street to Hunte Parkway	18,627	A
Hunte Parkway to Woods Drive	9,672	A
Woods Drive to Lake Crest Drive	7,546	A
Lake Crest Drive to Wueste Road	2,654	A

Source: Chen Ryan 2015

Existing ADT volumes on Otay Lakes Road within San Diego County (shown in Table 1) represent a current roadway level of service (LOS) B (e.g., free flow for traffic) in the vicinity of the proposed project. The current ADT volumes on Otay Lakes Road in the City of Chula Vista represent LOS A, with the exception of the segments between La Media Road to the State Route (SR) 125 ramps (i.e., currently operating at LOS B), the segment containing the SR-125 ramps (i.e., currently operating at LOS C), and the segment between East H Street and Telegraph Canyon/Otay Lakes Road (i.e., currently operating at LOS C) (Chen Ryan 2015).

John Nichols Airfield

The John Nichols Airfield is a restricted, private-use, single runway airfield, located on land owned by the City of San Diego and leased to the airfield operator, Skydive San Diego, a commercial skydiving/parachute training company. Skydive San Diego utilizes the airfield as a training facility for contract Navy Seal parachute training, commercial public skydiving, and as a base and storage for ultra-light/light sport aircraft activity. As a restricted-use facility, the airfield is generally closed to transient and non-based aircraft, which must obtain permission from the airfield operator to land (e.g., emergencies). All aircraft currently based at the airfield are associated with skydiving or ultra-light activity. Specifically, there are currently two Cessna Grand Caravan jump planes (single-engine Blackhawk-conversion turboprops with capacity of up to 21 people each), three Twin Otter jump planes (twin engine turboprops with capacity of up to 23 people each), and approximately 20 ultra-light/light aircraft (Mead & Hunt 2013).

Jump plane activity at the airfield occurs only during daylight hours, and varies significantly depending upon weather/wind, the day of the week, commercial skydiving patrons, and primarily when the Navy Seal training missions are being conducted. Annual jump plane activity is estimated by the airfield operator at 7,500 departures (15,000 total operations). According the airfield operator, on a busy day, there can be between 30 -50 jump plane departures (Mead & Hunt 2013). This activity level as stated by the operator is substantially higher than what was observed during a noise monitoring site visit, as discussed in Section 1.3.2. Ultra-light aircraft activity was estimated by the study at approximately 3,000 annual departures (6,000 total annual operations), usually operated in the vicinity of the airfield, only during low wind conditions during daylight hours (i.e., mornings and late afternoons) (Mead & Hunt 2013).

The airfield has one runway, oriented roughly east/west, which are not lighted and with no instrument procedures (i.e., all aircraft activity is daylight hours only). The runway, Runway 9-27, is paved and approximately 1,800 feet in length, and is used primarily by the jump planes for takeoffs and landings. Due to predominant winds at the airfield being from the west, aircraft takeoffs and landings are made from the east to the west. Therefore, all departing aircraft takeoff from the west end of Runway 9-27, turning left upon lift off to climb-up and over Otay Lakes Road, and Lower Otay Lake, and then turn 180 degrees left with altitude to release the jumpers over the drop zone near the center of the airfield. After a rapid rate-of-decent, the jump planes return to the east end of the Runway 9-27, landing east to west (Mead & Hunt 2013).

1.2.3 Near-term and Future Noise Conditions without Project

Near-term (2025) and future (2030) traffic volumes without the proposed project are presented in Table 2. Under 2025 conditions, Otay Lakes Road would continue to be a 2-lane light collector in the project vicinity. The future volumes shown indicate that Otay Lakes Road within San Diego County would operate at LOS C or better without the proposed project, except at SR-125 SB Ramps to SR-124 NB Ramps, which would operate at LOS D.

Within the City of Chula Vista, without the proposed project, Otay Lakes Road would generally operate at LOS C or better, with the exception of the segment between SR-125 SB ramps to the SR-125 NB ramps; which would operate at LOS D in future (2030).

Within San Diego County, under 2030 conditions without the proposed project, Otay Lakes Road would be improved as a 4-lane collector to the approximate location of the proposed project's main entrance (Strada Piazza), but would continue as a 2-lane light collector from that point to Campo Road/SR-94. Under 2030 conditions without the proposed project, the initial section of Otay Lakes Road from Wueste Drive to the proposed Corso Orvieto Road would operate at LOS A, while the 2-lane portion from Corso Orvieto Road to Campo Road would operate at LOS C.

For the purpose of this noise analysis, the noisiest condition is represented as LOS C, which is a free-flow state with the maximum number of vehicles using the roadway. LOS A and B categories allow full travel speed but do not have as many vehicles generating noise. LOS D, E, and F indicate a greater number of vehicles, but these are typically moving slower, generating less noise.

Table 2
Near-term and Future Average Daily Traffic Volumes Without Project

Roadway Segment (Otay Lakes Road)	Near-term (2025)	Future (2030)	
County of San Diego	**ADT**	**ADT**	**LOS**
Wueste Road to Driveway #2	6,000	6,400	A
Driveway #2 to Campo Road (SR-94)	6,000	6,400	C
City of Chula Vista	**ADT**	**ADT**	**LOS**
East H Street to Telegraph Canyon Road/Otay Lakes Road	32,100	42,800	B
La Media Road to Rutgers Avenue	43,200	46,700	C
Rutgers Avenue to SR-125 SB Ramps	43,600	42,600	B
SR-125 SB Ramps to SR-125 NB Ramps	47,700	50,800	D
SR-125 NB Ramps to Eastlake Parkway	47,500	48,900	A
Eastlake Parkway to Lane Avenue	28,500	30,400	A
Lane Avenue to Fenton Street	20,800	17,700	A
Fenton Street to Hunte Parkway	19,800	16,800	A
Hunte Parkway to Woods Drive	14,300	13,200	A
Woods Drive to Lake Crest Drive	16,700	13,000	A
Lake Crest Drive to Wueste Road	5,350	6,400	A

Source: Chen Ryan 2015

1.3 METHODOLOGY AND EQUIPMENT

1.3.1 Noise Measuring Methodology and Procedures

The unit of measurement used to describe a noise level is the decibel (dB). Decibels are measured on a logarithmic scale that quantifies sound intensity in a manner similar to the Richter scale used for earthquake magnitudes. A 10 dB increase represents a 10-fold increase in sound intensity, a 20 dB change is a 100-fold difference, 30 dB is a 1,000-fold increase, etc. Thus, a doubling of the energy of a noise source, such as doubling of traffic volume, would increase the noise level by 3 dB; a halving of the energy would result in a 3 dB decrease.

The human ear is not equally sensitive to all frequencies within the sound spectrum. Therefore, a method called "A-weighting" is used to filter noise frequencies that are not audible to the human

ear. A- weighting approximates the frequency response of the average young ear when listening to most ordinary everyday sounds. When people make relative judgments of the loudness or annoyance of a sound, their judgments correlate well with the "A-weighted" levels of those sounds. Therefore, the A-weighted noise scale is used for measurements and standards involving the human perception of noise. In this report, all noise levels are A-weighted and "dBA" is understood to identify the A-weighted decibel.

In addition to noise levels, the duration or exceedance of noise over time is also important for the assessment of potential noise disturbance. Average noise levels over a period of minutes or hours are usually expressed as dBA L_{eq}, or the equivalent noise level for that period. The period of time averaged may be specified; $L_{eq(3)}$ would be a 3-hour average. When no period is specified, a 1-hour average is assumed.

The timing of noise is also an important factor to consider in assessing potential noise impacts as noise levels that may be acceptable during the day may create disturbance during evening or nighttime hours. Community Noise Equivalent Level (CNEL) is the energy average of the A-weighted sound levels occurring during a 24-hour period, with a 5 dBA penalty added to the sound levels occurring between 7:00 p.m. and 10:00 p.m. and 10 dBA added to the sound levels occurring between 10:00 p.m. and 7:00 a.m.

Sound Exposure Level (SEL) is the most common measure of noise exposure for a single aircraft flyover. SEL is a summation of the A-weighted sound energy at a particular location over the true duration of a noise event normalized to a fictional duration of one second. SEL is similar to Leq but instead of averaging it over the entire measurement period, SEL uses a reference duration of 1 second, which eliminates the influence of the measurement duration.

Human perception of noise has no simple correlation with acoustical energy. The perception of noise is not linear in terms of dBA or in terms of acoustical energy. Two equivalent noise sources do not sound twice as loud as one source. It is widely accepted that the average healthy ear can barely perceive changes of 3 dBA, increase or decrease; that a change of 5 dBA is readily perceptible; and that an increase (decrease) of 10 dBA sounds twice (half) as loud (Caltrans 2009). Table 3 provides examples of common activities and the sound levels associated with those activities.

Table 3
Typical Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110	Rock Band
Jet Fly-over at 300 m (1,000 ft)	100	
Gas Lawn Mower at 1 m (3 ft)	90	
Diesel Truck at 15 m (50 ft), at 80 km/hr (50 mph)	80	Food Blender at 1 m (3 ft) Garbage Disposal at 1 m (3 ft)
Noisy Urban Area, Daytime Gas Lawn Mower, 30 m (100 ft)	70	Vacuum Cleaner at 3 m (10 ft)
Commercial Area Heavy Traffic at 90 m (300 ft)	60	Normal Speech at 1 m (3 ft)
Quiet Urban Daytime	50	Large Business Office Dishwasher in Next Room
Quiet Urban Nighttime	40	Theater, Large Conference Room (Background)
Quiet Suburban Nighttime	30	Library
Quiet Rural Nighttime	20	Bedroom at Night, Concert Hall (Background)
	10	Broadcast/Recording Studio
	0	Lowest Threshold of Human Hearing

Source: Caltrans 2009

From the source to the receiver, noise changes both in level and frequency spectrum. The most obvious change is the decrease in noise as the distance from the source increases. The manner in which noise reduces with distance depends on the following important factors: ground absorption, atmospheric effects and refraction, shielding by natural and man-made features, noise barriers, diffraction, and reflection. For a point or stationary noise source, such as construction equipment, the attenuation or drop-off in noise level would be at least -6 dBA for each doubling of unobstructed distance between source and the receiver and could increase to -7.5 dBA depending on the acoustic characteristics of the intervening ground. For a linear noise source, such as vehicles traveling on a roadway, the attenuation or drop-off in noise level would be approximately -3 dBA for each doubling of unobstructed distance between source and the receiver and could increase to -4.5 dBA depending on the acoustic characteristics of the intervening ground.

A large object in the path between a noise source and a receiver can significantly attenuate noise levels at that receiver. The amount of attenuation provided by this "shielding" depends on the size of the object and the frequencies of the noise levels. Natural terrain features, such as hills and dense woods, as well as man-made features, such as buildings and walls, can significantly alter noise levels. Walls or berms are often specifically used to reduce or attenuate noise.

Noise-sensitive receptors are generally considered humans engaged in activities, or occupying land uses, that may be subject to the stress of significant interference from noise. Human activities usually associated with sensitive receptors include, but are not limited to, talking, reading, and sleeping. Land uses associated with noise-sensitive human receptors include residential dwellings including mobile homes, hotels/motels, hospitals, nursing homes, educational facilities, and libraries. In addition to human receptors, protected animal species and their habitats may be considered sensitive noise receptors, especially during their breeding season.

1.3.2 Noise Measurements and Observations

Ambient noise levels were measured within the proposed project site and in the surrounding area with a Larson-Davis (LD) Model 824 SLM; and aircraft takeoffs with a LD model 820 SLM. All measurements were taken at a height of five feet above existing grade. SLM calibrations were checked before and after use. The following parameters were used for the noise measurements:

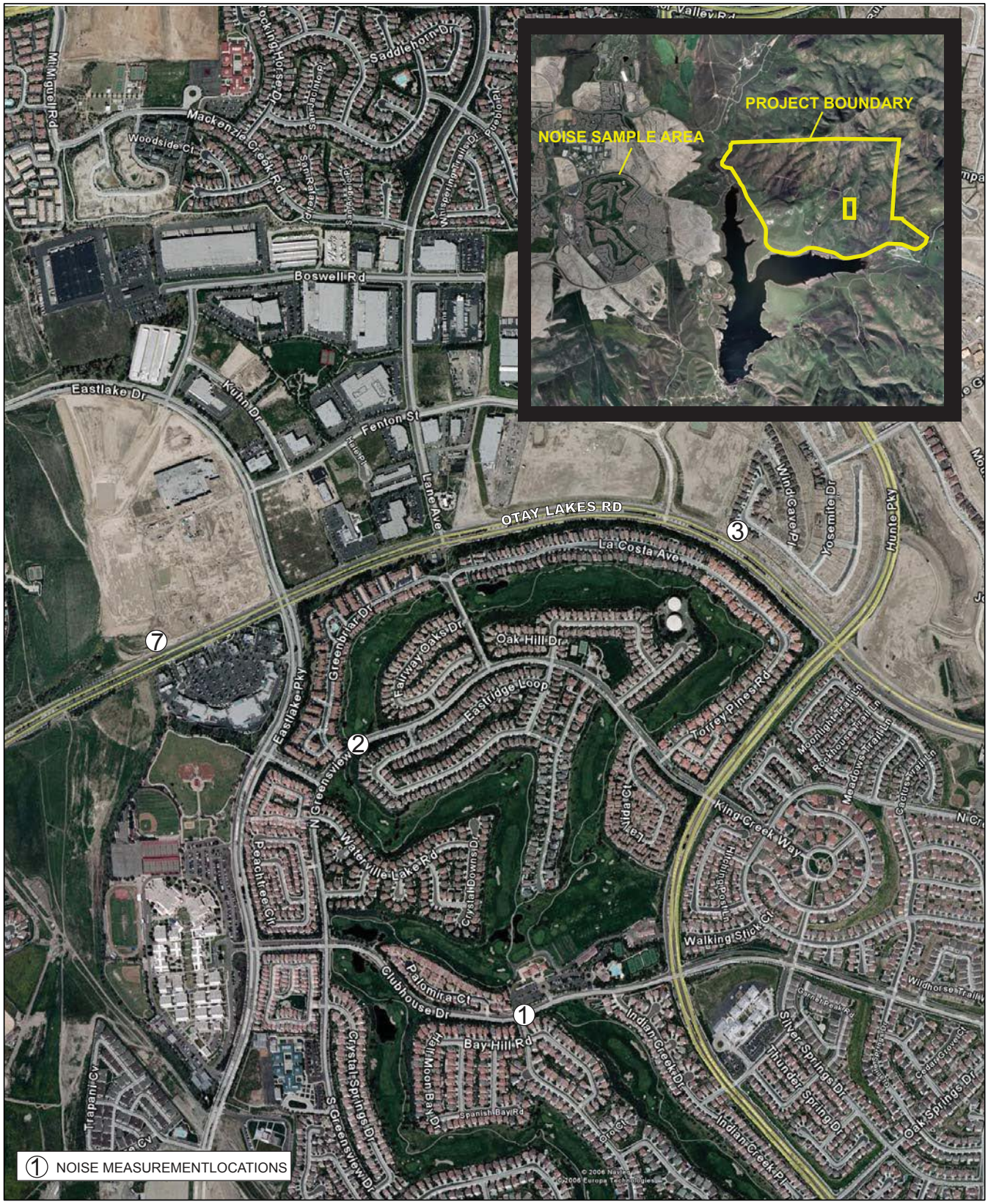
Filter:	A-weighted
Response:	Slow
Interval Period:	1 Minute
Time History Period:	1 Second

On December 5, 2006, seven short-term daytime noise measurements were taken by a noise specialist (EDAW, Inc.) within the project site boundaries and in the developed community located to the west of the project site, within the City of Chula Vista. Measurements were taken between 10:30 a.m. and 4:00 p.m. The weather was dry and slightly breezy (>3.5 mph), with temperatures ranging between 72 degrees Fahrenheit (°F) and 76°F. The locations of the noise measurements are shown in Figures 4 and 5. A summary of the measurements is presented in Table 4a.

The first three and the final noise measurement locations were located within the City of Chula Vista along Otay Lakes Road, Clubhouse Drive, and Greensview Drive (see Figure 4). Measurement site 1 was 53 feet north of Clubhouse Drive in a parking lot to the east of the intersection with Silverado Drive. This location was chosen to represent future on-site project roadways serving the proposed resort land use. Measurement site 2 was located 63 feet north of Greensview Drive. The single-family and multi-family residences around Clubhouse Drive and Greensview Drive are located 30 to 50 feet from local roadways and are typical of the development style that would be constructed as part of the proposed project. Measurement site 3 is situated 77 feet north of Otay Lakes Road, between 2564 and 2556 Table Rock Avenue on a concrete pathway between Table Rock Avenue and Otay Lakes Road. Measurement site 7 was located at the north side of Otay Lakes Road, approximately 65 feet west of Eastlake Parkway and 67 feet from Otay Lakes Road. Measurement site 7 represents existing noise levels along Otay Lakes Road where there is greater medium and heavy truck traffic due to the commercial and industrial land uses at Lane Avenue.

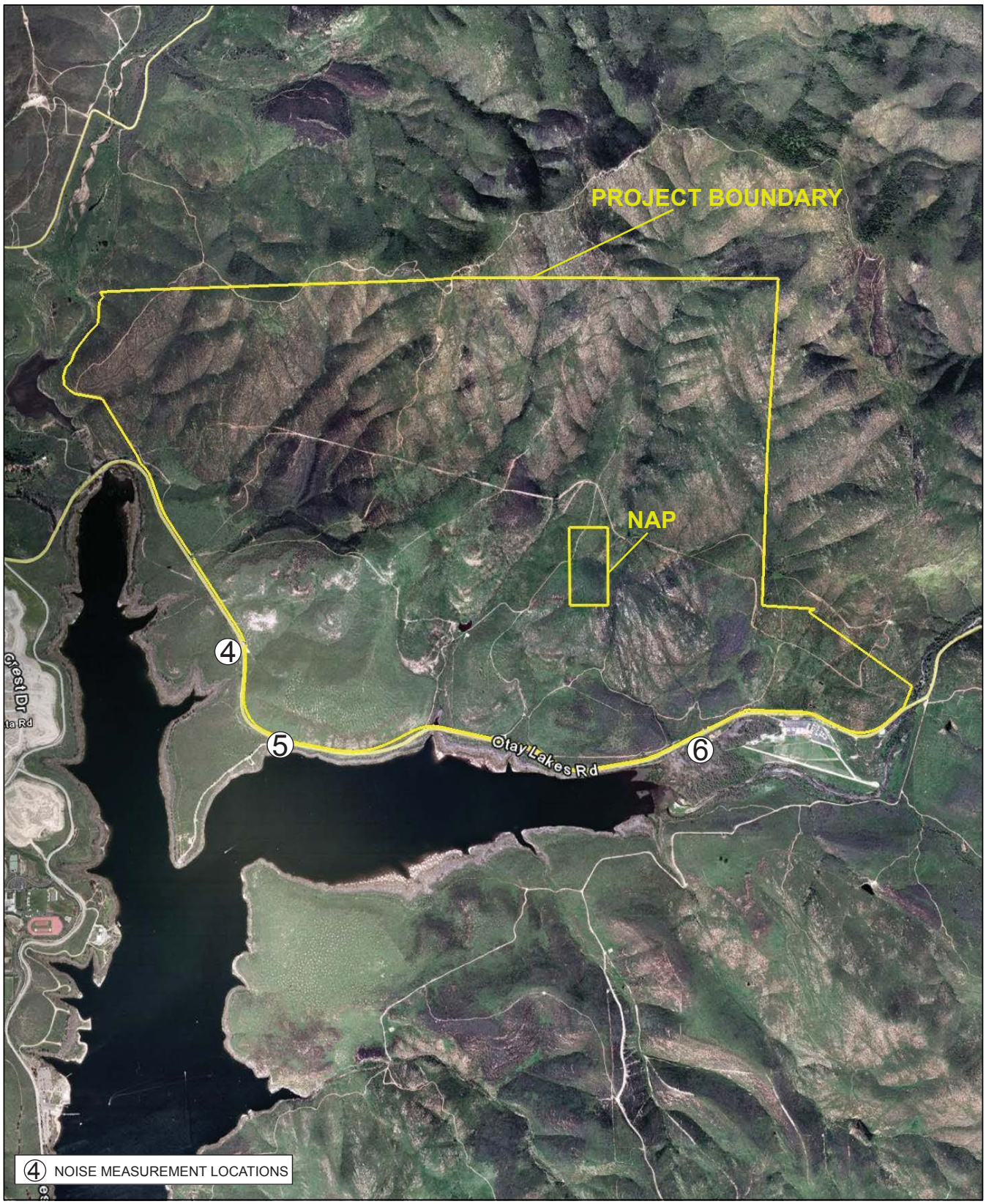
Measurements 1, 2, 3, and 7, west of the project site, along Otay Lakes Road, Clubhouse Drive, and Greensview Drive, were taken not to represent existing conditions on the project site, but to represent future operational conditions anticipated on the project site and in the surrounding area. These locations were chosen due to the similarity of development style, similarity of roadway widths and capacities, and based on existing traffic volumes on these roads and future predicted volumes on project roadways.

Measurement sites 4, 5, and 6 represent existing noise levels along Otay Lakes Road, where the proposed project would be situated (see Figure 5). Currently, no residences exist along this segment of Otay Lakes Road. Measurement site 4 was situated approximately 3,500 feet south from the northern apex of Otay Lake along Otay Lakes Road. This measurement site was stationed on the western side of Otay Lakes Road approximately 56 feet from the roadway. The topography for measurement site 4 was 3 to 7 feet above the roadway. Measurement site 5 was located south and east of measurement site 4; the sound level meter (SLM) was situated to the height of Otay Lakes Road. Measurement site 5 was situated 55 feet southwest of Otay Lakes Road,



SOURCE: Google Earth 2006

Figure 4
Noise Measurement Locations - City of Chula Vista



SOURCE: Google Earth 2006

Figure 5
Noise Measurement Locations - Project Site

Table 4a
Noise Measurement Data - Vehicle Traffic

Site ID*	Location	Start Time	dBA				Noise Sources
			L_{eq}	L_{max}	L_{min}	L_{90}	
1	Northeast corner of Clubhouse Drive and Silverado Drive	12/05/06 10:51 p.m.	57	73	41	46	Traffic on Clubhouse Drive and Silverado Drive was the dominant noise source. Traffic within golf course parking lot was secondary source. Peak noise level was caused by a lawn mower on Clubhouse Drive.
2	Greensview Drive, east of 2300-A Greenbrier Drive	12/05/06 11:28 p.m.	53	65	40	44	Traffic on Greensview Drive was the dominant noise source. Peak noise level was caused by a heavy truck passing on Greensview Drive.
3	Otay Lakes Road, between 2564 and 2556 Table Rock Avenue	12/05/06 12:08 p.m.	63	73	41	50	Traffic on Otay Lakes Road was the dominant noise source. Peak noise level was caused by a heavy truck passing on Otay Lakes Road.
4	Otay Lakes Road, approximately 3,500 feet south from the northern apex of Otay Lake	12/05/06 2:04 p.m.	53	71	34	36	Traffic on Otay Lakes Road was the dominant noise source. Secondary sources included airplane passing overhead. Peak noise level was caused by a heavy truck passing on Otay Lakes Road.
5	Otay Lakes Road, approximately 2,500 feet from site 4	12/05/06 2:30 p.m.	64	90	34	35	Traffic on Otay Lakes Road was the dominant noise source. Secondary sources included a helicopter. Peak noise level was caused by a motorcycle passing on Otay Lakes Road.
6	Otay Lakes Road, situated 8,800 feet east from measurement site 5	12/05/06 2:59 p.m.	60	76	37	43	Traffic on Otay Lakes Road was the dominant noise source. Secondary sources included an airplane landing. Peak noise level was caused by a motorcycle passing on driveway to airfield.
7	Otay Lakes Road, approximately 65 feet west of Eastlake Parkway	12/05/06 2:40 p.m.	62	74	54	57	Traffic on Otay Lakes Road was the dominant noise source. Peak noise level was caused by a heavy truck passing on Otay Lakes Road.

* The Site ID corresponds to locations shown in Figures 5 and 6.
L_{eq} – Average noise level for the measurement period; L_{max} – Maximum noise level for the measurement period; L_{min} – Minimum noise level for the measurement period; L_{90} – Noise level exceeded 90 percent of the time during the measurement period.
Source: EDAW 2006

approximately 0.50 mile (2,500 feet) from site 4. Measurement site 6 was located at the south side of Otay Lakes Road at the John Nichols Airfield driveway. Site 6 was situated 1.6 miles (8,800 feet) east of measurement site 5 and 61 feet south of Otay Lakes Road.

As shown in Table 4a, the dominant noise source at the project site is traffic noise from Otay Lakes Road. Ranges in background noise levels can be determined based on the L_{90} measurements (which represent the noise level exceeded 90 percent of the time during the measurement) for each location. Background noise levels in the community west of the project site were measured between 44 and 57 dBA L_{90} with background noise levels of 50 dBA L_{90} or greater near Otay Lakes Road. Background noise levels at the project site were measured between 35 and 43 dBA L_{90} with higher background noise levels nearest Otay Lakes Road at the eastern end, which is likely due to the influence of the John Nichols Airfield (see Appendix C for monitoring data). One small, single-engine propeller airplane landed during measurement 6. The airplane landing generated a short-term noise level of approximately 64 dBA at measurement 6 for approximately 2 seconds as it passed overhead.

While the noise measurements are from 2006, a 2014 update to the project Traffic Impact Analysis, which included new traffic counts along Otay Lakes Road, documented that the number of trips near the 2006 noise measurements have not significantly changed (Chen Ryan 2015). Table 4b compares the prior traffic volumes and LOS to the updated traffic volumes and LOS.

Table 4b
Comparison of Traffic Volumes on Otay Lakes Road

Roadway Segment (Otay Lakes Road)	Total		LOS	
	2006	2014	2006	2014
Eastlake Parkway to Lane Avenue	22,900	26,054	A	A
Lane Avenue to Fenton Street	22,900	18,832	A	A
Fenton Street to Hunte Parkway	18,200	18,627	A	A
Hunte Parkway to Woods Drive	9,600	9,672	A	A
Woods Drive to Lake Crest Drive	8,000	7,546	A	A
Lake Crest Drive to Wueste Road	2,500	2,654	A	A
Wueste Road to SR-94	2,900	2,927	A	A

Source: Chen Ryan 2015

Ambient Noise Measurements – Aircraft Activity

In the April 2013 Mead & Hunt report, the airfield operator identified "30 - 50 jump plane departures to occur on a busy day". In response, an AECOM noise specialist returned to the airfield in June 2013 to observe aircraft activity, and measure aircraft noise levels from jump plane takeoffs and flyovers at the nearest project site boundary. An AECOM noise specialist visited the airfield on Sunday June 23, 2013 at 4 p.m.; however, no jump plane activity was observed, only one ultra-light flight. On the following day, Monday June 24, 2013, AECOM contacted the airfield to confirm that a normal day of jump plane skydiving was occurring.

During a 90-minute site visit by AECOM (from 2:45 – 4:15 p.m.), four jump plane events (i.e., takeoff, skydiving, and landing) were observed by the same jump plane. A one-hour continuous noise measurement was taken from 3:00 – 4:00 p.m. on Monday, June 24, 2013 at the project site boundary nearest the west end of the airfield's Runway 27, in the path of jump plane takeoffs from the runway over Otay Lakes Road and the monitoring location (see Figure 5 – approximately 1,000 feet west of the previous Measurement Site 6). The weather was clear, dry and breezy (>5 mph), and the temperature was 79°F. During this one-hour measurement, the noise levels of two jump takeoffs, direct flyovers, and landings were recorded. A summary of the measurement is presented in Table 4c. Table 4c also shows the sound exposure levels (SEL) for the takeoff, flyover, and landing events.

As shown in Table 4c, the jump plane flyovers resulted in maximum noise levels of 86 and 96 dBA Lmax, respectively, for several seconds when the planes were approximately 100 feet overhead; with takeoff to flyover lasting approximately 20 seconds. During the second observed takeoff and flyover, there were also several emergency vehicles passing on Otay Lakes Road, which recorded noise levels greater than the aircraft takeoff flyovers (e.g., 96 dBA Lmax for passing fire trucks). The recorded 96 dBA L_{max} was due to the emergency vehicles and not the jump plane. Measurements of a jump plane landing were also recorded at a maximum noise level of 70 dBA L_{max}. Additional passing traffic on Otay Lakes Road was observed and recorded at 65 – 69 dBA Lmax at this location. With no vehicle or aircraft activity, ambient noise levels were observed as low as 32 dBA, representative of the remote rural undeveloped location. The one-hour average noise level at this location for this period was approximately 63 dBA L_{eq}.

Table 4c
Noise Measurement Data – Aircraft Takeoffs and Landings

Time	dBA				Noise Sources
	L_{eq}	L_{max}	L_{min}	SEL	
3:10 p.m.	-	86	34	91	Jump plane takeoff & flyover
3:30 p.m.	-	96	49	101	Emergency vehicles, jump plane takeoff & flyover
3:45 p.m.	-	70	50	82	Jump plane landing
3:00 – 4:00 pm	63	96	30	-	Traffic on Otay Lakes Road was the dominant noise source. Peak noise level from takeoffs and heavy truck passing on Otay Lakes Road.

L_{eq} – Average noise level for the measurement period;
L_{max} – Maximum noise level for the measurement period;
L_{min} – Minimum noise level for the measurement period;
SEL – Sound Exposure Level
Source: AECOM 2013

1.3.3 Noise Modeling

The Federal Highway Administration's (FHWA) Traffic Noise Model version 2.5 (TNM) was used to predict existing and future traffic noise levels at specific receiver locations. Inputs to TNM include the three-dimensional coordinates of the following:

- roadways, noise receivers, and topographic or planned barriers that would affect noise propagation;
- vehicle volumes and speeds, by type of vehicle;
- absorption (drop-off) factors; and
- adjustment factors.

The model outputs are noise levels at the selected receiver points. Receivers at exterior locations and ground-floor windows are modeled 5 feet above the ground elevation.

1.3.4 Noise Calculations

1.3.4.1 Construction Noise

Noise impacts from construction are a function of the noise generated by equipment, the distance to and sensitivity of nearby land uses, and the timing and duration of the noise-generating activities. Noise levels from construction activities are typically considered as point sources and would drop off at a rate of -6 dBA per doubling of distance over hard site surfaces, such as streets and parking lots. The drop-off rate would be approximately -7.5 dBA per doubling of distance for soft site surfaces, such as grass fields and open terrain with vegetation (FTA 2006).

The magnitude of construction noise impacts depends on the type of construction activity, the noise level generated by various pieces of construction equipment, the duration of the activity, and the distance between the activity and noise-sensitive receivers. As shown in Table 5, maximum noise levels from construction equipment range from approximately 70 dBA to 90 dBA at 50 feet from the source (FTA 2006). The noise levels vary for each type of equipment, as equipment may come in different sizes and with different engines. Construction equipment noise levels also vary as a function of the activity level or duty cycle. In a typical construction project, the loudest short-term noise levels are those of earth-moving equipment under full load, which are on the order of 85 to 90 dBA at a distance of 50 feet from the source.

Typical construction projects, with equipment moving from one point to another, work breaks, and idle time, have long-term noise averages that are lower than louder short-term noise events. Additionally, due to the dynamic nature of a construction site, noise levels are calculated from the center of the activity. For the purpose of this analysis, a maximum 1-hour average noise level of 75 dBA L_{eq} at a distance of 50 feet from the center of typical construction activity is assumed to occur. Noise levels of other activities, such as framing or paving, would be less.

To assess off-site construction-related traffic impacts, daily construction trips were compared to 2015 ADT and peak volumes and LOS levels. Construction traffic-related impacts would occur if the project would result in a 3 dBA increase from either peak hour or daily operations, or reduce service levels to below LOS C.

Table 5
Construction Equipment Noise Emission Levels

Equipment	Noise Level at 50 ft	Typical Duty Cycle
Auger Drill Rig	85	20%
Backhoe	80	40%
Blasting	94	1%
Chain Saw	85	20%
Clam Shovel	93	20%
Compactor (ground)	80	20%
Compressor (air)	80	40%
Concrete Mixer Truck	85	40%
Concrete Pump	82	20%
Concrete Saw	90	20%
Crane (mobile or stationary)	85	20%
Dozer	85	40%
Dump Truck	84	40%
Excavator	85	40%
Front End Loader	80	40%
Generator (25 KVA or less)	70	50%
Generator (more than 25 KVA)	82	50%
Grader	85	40%
Hydra Break Ram	90	10%
Impact Pile Driver (diesel or drop)	95	20%
Insitu Soil Sampling Rig	84	20%
Jackhammer	85	20%
Mounted Impact Hammer (hoe ram)	90	20%
Paver	85	50%
Pneumatic Tools	85	50%
Pumps	77	50%
Rock Drill	85	20%
Rock Crusher	95	50%
Scraper	85	40%
Tractor	84	40%
Vacuum Excavator (vac-truck)	85	40%
Vibratory Concrete Mixer	80	20%
Vibratory Pile Driver	95	20%

KVA = kilovolt amps
Source: FHWA 2008; Daly-Standlee 2009

Due to the underlying geologic setting of rock on the project site, site preparation would include some rock drilling for rock blasting, and subsequent rock crushing for aggregate on-site. The exact extent and location of these activities on-site is generally in the more northern and eastern portions of the project site consistent with the location of hard meta-volcanic rock identified by the project geotechnical reports; however, because the precise location of where these activities will take place is not yet known, this report conservatively assumes that they could potentially occur at any location on the Project Site. Rock crushing operations would be established at an appropriate location on-site to minimize the line of sight and, thereby, the impact of noise to sensitive receptors to the maximum extent practicable.

1.3.4.2 Operational Noise

Traffic noise impacts were evaluated by review of data in the project traffic report, *Traffic Impact Analysis – Otay Ranch Resort Village Project* (Chen Ryan 2015). Off-site traffic noise level increases were calculated using accepted mathematical correlations between traffic volume changes and noise levels. Stationary source noise levels were calculated and attenuated based on equipment reference levels and monitored data.

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2.0 NOISE-SENSITIVE LAND USES AFFECTED BY AIRBORNE NOISE

2.1 GUIDELINES FOR THE DETERMINATION OF SIGNIFICANCE

Noise generated as a result of the proposed Project would affect noise sensitive land uses located both within the County of San Diego and the City of Chula Vista. Accordingly, in assessing Project impacts, the analysis applies the significance criteria specific to each respective jurisdiction. That is, for impacts within the County, the County criteria are applied, and for impacts within the City, the City's criteria are applied. The relevant criteria for each jurisdiction are presented below.

County Guidelines for the Determination of Significance

Guidelines for the determination of significance of environmental noise impacts for this and other impact sections were promulgated by the County in January 2009 in the County's Noise Guidelines (County of San Diego 2009).

According to the County's Noise Guidelines, a project would result in a significant impact if the implementation would result in the exposure of any on-site or off-site existing or reasonably foreseeable future noise-sensitive land uses (NSLUs) to exterior or interior noise (including noise generated from the project, together with noise from roads, railroads, airports, heliports, and all other noise sources) in excess of any of the following:

A. Exterior Locations:

   i. 60 dB (CNEL); or
   ii. An increase of 10 dB CNEL over preexisting noise.

   In the case of single-family residential detached NSLUs, exterior noise shall be measured at an outdoor living area that adjoins and is on the same lot as the dwelling, and that contains at least the following minimum area:

(1)	Net lot area up to 4,000 square feet:	400 square feet
(2)	Net lot area 4,000 square feet to 10 acres:	10 percent of net lot area
(3)	Net lot area over 10 acres:	1 acre

For all projects, exterior noise shall be measured at all exterior areas provided for group or private usable open space.

B. Interior Locations:

45 dB (CNEL) except for the following cases:

i. Rooms which are usually occupied only a part of the day (schools, libraries, or similar facilities), the interior 1-hour average sound level due to noise outside should not exceed 50 decibels (A).

ii. Corridors, hallways, stairwells, closets, bathrooms, or any room with a volume less than 490 cubic feet.

The County General Plan was updated and adopted by the County Board of Supervisors on August 3, 2011. However, as the County's Noise Guidelines have not been updated to reflect the new General Plan, and as the County has not provided additional guidance at this time, this analysis uses the County's existing Noise Guidelines for determining significance under CEQA.

City Guidelines for the Determination of Significance

The following significance criteria, adapted from Appendix G of the CEQA Guidelines (14 CCR 15000 et seq.), will determine the significance of a noise impact. Impacts to noise would be significant if the proposed project would:

- Result in the exposure of persons to or generation of noise levels in excess of standards established in the City of Chula Vista General Plan or noise ordinance, or applicable standards of other agencies:

  According to the Environmental Element of City General Plan, all land uses are considered incompatible with noise levels in excess of 75 dBA CNEL. Offices, businesses, churches,

athletic fields, and community parks are considered incompatible in excess of 70 dBA CNEL. Residences, schools, neighborhood parks, and libraries, are considered incompatible in excess of 65 dBA CNEL (City 2005).

According to the City of Chula Vista Municipal Code, Chapter 19.68.010, Performance Standards and Noise Control, Exterior Noise Standards, exterior noise levels are to exceed the following limits at the property line:

Residential (except multiple dwelling)

- 7 a.m. to 10 p.m. 55 dB L_{eq}
- 10 p.m. to 7 a.m. 45 dB L_{eq}

Multiple Dwelling Residential

- 7 a.m. to 10 p.m. 60 dB L_{eq}
- 10 p.m. to 7 a.m. 50 dB L_{eq}

- Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

  A substantial increase would be considered an increase of 10 dB (CNEL) over preexisting noise.

The establishment of exterior noise standards is in accordance with the City of Chula Vista Municipal Code, Chapter 19.68.010, Performance Standards and Noise Control, Exterior Noise Standards (City 2013).

2.2 POTENTIAL NOISE IMPACTS

2.2.1 Traffic Noise and NSLU

Traffic volumes for the onsite noise level contours and compatibility analysis were developed based on the maximum ADT volumes at LOS C, which is considered conservative as LOS A and B would have lower traffic volumes, and LOS D and F would result in slower speeds due to congestion. Thus, maximum LOS C volumes would result in the highest reasonably foreseeable noise levels. To determine the noise levels increase the peak hour is modeled and adjusted to the CNEL, which based on traffic counts would be equal. Peak hour traffic volumes were calculated as 10 percent of the maximum LOS C ADT volume. Traffic volumes used in the traffic noise

model and the 60 CNEL noise contour distances from project roadways are presented in Table 6. The 60 CNEL noise contour line is shown on the project site on Figures 6, 7, and 8.

Table 6
2030 Plus Project Traffic Volumes and 60 CNEL Contour Distance

Roadway Segment	Max LOS C ADT	Peak Hour 10%	Auto	Med-Truck	Hvy-Truck	Speed (mph)	60 CNEL Contour (feet)
Otay Lakes Rd – San Diego County							
Wueste Road and Driveway #1	25,200	2,520	2,394	66	60	45	1,735
Driveway #1 to Driveway #2	23,400	2,340	2,223	61	56	45	1,535
Driveway #2 to Driveway #3	10,500	1,050	998	27	25	45	723
Driveway #3 to SR-94	9,500	950	903	25	23	45	654
Internal Roadways – San Diego County							
A	13,500	1,350	1,283	35	32	30	438
B	11,800	1,180	1,121	31	28	30	383
C	9,600	960	912	25	23	30	311
D	5,900	590	561	15	14	30	191
E	5,400	540	513	14	13	30	175
F	2,700	270	257	7	6	30	88
G	3,100	310	295	8	7	30	101
H	2,800	280	266	7	7	30	91
I	2,300	230	219	6	6	30	75
J	1,100	110	105	3	3	30	36
K	4,600	460	437	12	11	30	149
L	6,200	620	589	16	15	30	201

Source: Chen Ryan 2015

The traffic mix used in the modeling for Otay Lakes Road was developed from traffic counts taken at measurement site 3, which indicated a mix of 95 percent automobile, 2.6 percent medium trucks, and 2.4 percent heavy trucks. The traffic count at this location was used for vehicle classification at the project site for future traffic conditions as the project site is anticipated to be developed in a similar pattern as the development west of Wueste Road.

Traffic speeds were taken from observations and the San Diego Association of Governments Transportation Forecast Information Center website. All posted speed limits were assumed to be actual traffic speeds for purposes of noise modeling. All receptors were modeled using a drop-off rate of 3 dBA per doubling of distance. The model outputs are noise levels at the selected receptor points. Receptors were modeled at proposed residential lot locations within the property boundary, 5 feet above proposed grade elevation. Receptor points were set 15 feet back from the rear property lines of the first row of properties along Otay Lakes Road and other modeled internal roadways.

The predicted future exterior peak hour noise levels are presented in Table 7. Traffic data sheets are provided in Appendix B, and noise model output and input data sheets are provided in Appendix C.

Table 7
Traffic Noise Model Results

Receptor ID[1]	Lot #[2]	Peak Hour dBA L_{eq}	Exterior CNEL	Is the Exterior Land Use Compatible?	Noise Easement Required	Required Barrier Height (feet) [3]
1	MU/1	60	61	Yes	No	-
2	**R-1B/1**	**62**	**63**	**No**	**Yes**	**4**
3	R-1B/9	48	49	Yes	No	-
4	R-1B/26	58	59	Yes	No	-
5	R-1B/31	56	57	Yes	No	-
6	MU-1	51	52	Yes	No	-
7	R-1B/46	58	59	Yes	No	-
8	**R-1B/54**	**61**	**62**	**No**	**Yes**	**4**
9	R-2A/45	56	57	Yes	No	-
10	**R-2A/46**	**62**	**63**	**No**	**Yes**	**4**
11	MU/1	59	60	Yes	No	-
12	**R-2A/155**	**62**	**63**	**No**	**Yes**	**8**
13	MU/1	60	61	Yes	No	-
14	R-1D/126	57	58	Yes	No	-
15	R-1D/123	59	59	Yes	No	-
17	**R-1D/84**	**60**	**61**	**No**	**Yes**	**2**
19	R-1F/3	58	59	Yes	No	-
20	R-1F/19	56	57	Yes	No	-
21	**R-1F/11**	**61**	**62**	**No**	**Yes**	**4**

Receptor ID[1]	Lot #[2]	Peak Hour dBA L_{eq}	Exterior CNEL	Is the Exterior Land Use Compatible?	Noise Easement Required	Required Barrier Height (feet) [3]
23	R-1F/53	57	58	Yes	No	-
25	R-3A/54	55	55	Yes	No	-
26	R-3A/46	55	56	Yes	No	-
28	**R-4A/3**	**60**	**61**	**No**	**Yes**	**6**
30	R-4A/62	51	52	Yes	No	-
31	R-4A/2	58	59	Yes	No	-
32	**R-4A/49**	**60**	**61**	**No**	**Yes**	**6**
33	R-4A/31	47	48	Yes	No	-
34	R-4A/93	56	57	Yes	No	-
35	R-4C/76	58	59	Yes	No	-
36	R-4C/1	55	56	Yes	No	-
37	**R-5A/75**	**60**	**61**	**No**	**Yes**	**2**
39	R-5A/4	52	53	Yes	No	-
41	R-5A/61	53	54	Yes	No	-
43	R-5B/59	43	44	Yes	No	-
45	R-4C/4	53	54	Yes	No	-
46	R-4C/55	53	53	Yes	No	-
47	R-4B/67	57	58	Yes	No	-
48	R-4B/56	55	56	Yes	No	-
49	R-3D/10	48	49	Yes	No	-
50	R-3D/29	48	49	Yes	No	-
51	R-3D/55	58	59	Yes	No	-
52	R-3D/59	55	56	Yes	No	-
53	R-3B/29	56	57	Yes	No	-
54	R-3B/27	51	52	Yes	No	-
55	R-2A/61	46	47	Yes	No	-
56	**R-2A/13**	**62**	**63**	**No**	**Yes**	**4**
57	**R-2A/9**	**66**	**67**	**No**	**Yes**	**6**
58	**R-2A/1**	**60**	**61**	**No**	**Yes**	**4**
60	**R-1A/69**	**64**	**65**	**No**	**Yes**	**6**
61	R-1A/57	54	55	Yes	No	-
63	R-1A/70	56	57	Yes	No	-
67	R-1B/109	53	54	Yes	No	-
68	R-1D/113	53	54	Yes	No	-
69	R-1D/2	48	49	Yes	No	-
71	R-1D/83	56	57	Yes	No	-
72	R-1E/33	54	55	Yes	No	-

Receptor ID[1]	Lot #[2]	Peak Hour dBA L_{eq}	Exterior CNEL	Is the Exterior Land Use Compatible?	Noise Easement Required	Required Barrier Height (feet) [3]
74	R-2A/84	43	44	Yes	No	-
75	R-3A/68	52	53	Yes	No	-
77	R-5A/11	46	47	Yes	No	-
78	R-5A/14	48	49	Yes	No	-
79	R-5B/132	59	60	Yes	No	-
80	Resort	45	46	Yes	No	-
82	R-2A/44	46	47	Yes	No	-
83	R-2A/10	56	57	Yes	No	-
84	R-2A/14	55	56	Yes	No	-
85	R-3B/23	49	50	Yes	No	-
86	R-3B/19	47	48	Yes	No	-
87	R-2A/66	46	47	Yes	No	-
88	R-2A/60	48	49	Yes	No	-
89	R-2A/35	50	51	Yes	No	-
90	R-2A/20	47	48	Yes	No	-
91	R-2A/21	51	52	Yes	No	-
92	R-2A/34	48	49	Yes	No	-
93	R-3D/66	54	55	Yes	No	-
94	R-3D/64	53	54	Yes	No	-
95	R-3D/51	59	60	Yes	No	-
96	R-3D/46	49	50	Yes	No	-
97	R-3D/42	42	43	Yes	No	-
98	R-3D/38	51	52	Yes	No	-
99	R-3D/33	48	49	Yes	No	-
100	R-3D/25	47	48	Yes	No	-
101	R-3D/21	48	49	Yes	No	-
102	R-3D/16	49	50	Yes	No	-
103	R-3D/12	52	53	Yes	No	-
104	R-3D/6	44	45	Yes	No	-
105	R-3D/3	46	47	Yes	No	-
106	R-3A/43	50	51	Yes	No	-
107	R-3A/57	56	57	Yes	No	-
108	R-3A/15	54	55	Yes	No	-
109	R-3A/12	54	55	Yes	No	-
110	R-2A/88	54	55	Yes	No	-
111	R-1F/54	55	56	Yes	No	-
112	R-1F/51	54	55	Yes	No	-

Receptor ID[1]	Lot #[2]	Peak Hour dBA L_{eq}	Exterior CNEL	Is the Exterior Land Use Compatible?	Noise Easement Required	Required Barrier Height (feet) [3]
113	R-1F/49	53	54	Yes	No	-
114	R-1F/48	52	53	Yes	No	-
115	R-1F/21	48	49	Yes	No	-
116	R-1F/15	59	60	Yes	No	-
117	**R-1F/7**	**60**	**61**	**No**	**Yes**	**2**
118	R-1F/2	54	55	Yes	No	-
119	R-1F/78	56	57	Yes	No	-
120	R-2A/156	57	58	Yes	No	-
121	R-2A/163	44	45	Yes	No	-
122	R-2A/170	56	57	Yes	No	-
123	R-2A/169	54	55	Yes	No	-
124	**R-2A/162**	**60**	**61**	**No**	**Yes**	**2**
125	R-1B/50	52	53	Yes	No	-
126	R-1B/106	56	57	Yes	No	-
127	R-1D/133	56	57	Yes	No	-
128	R-1B/94	53	54	Yes	No	-
129	R-1B/111	36	37	Yes	No	-
130	R-1B/113	37	38	Yes	No	-
131	R-1B/89	56	57	Yes	No	-
132	R-1B/84	59	60	Yes	No	-
133	R-1B/119	34	35	Yes	No	-
134	R-1B/5	51	52	Yes	No	-
135	**R-1A/64**	**62**	**63**	**No**	**Yes**	**10**
136	R-1A/60	54	55	Yes	No	-
138	**R-2A/5**	**62**	**63**	**No**	**Yes**	**6**
140	R-1D/93	52	53	Yes	No	-
141	R-1D/88	56	57	Yes	No	-
143	R-3A/20	50	51	Yes	No	-
144	R-5A/1	57	58	Yes	No	-
145	R-5A/77	55	56	Yes	No	-
146	R-5A/60	52	53	Yes	No	-
147	R-5B/70	53	54	Yes	No	-
148	R-5B/22	36	37	Yes	No	-
149	R-5A/8	40	41	Yes	No	-
150	R-5B/130	55	56	Yes	No	-
151	R-5B/1	50	51	Yes	No	-
152	R-4C/9	49	50	Yes	No	-

Receptor ID[1]	Lot #[2]	Peak Hour dBA L_{eq}	Exterior CNEL	Is the Exterior Land Use Compatible?	Noise Easement Required	Required Barrier Height (feet) [3]
153	R-4C/3	55	56	Yes	No	-
154	R-4C/36	57	58	Yes	No	-
155	**R-4B/61**	**60**	**61**	**No**	**Yes**	**6**
156	R-4B/43	56	57	Yes	No	-
157	R-4B/41	54	55	Yes	No	-
158	R-4B/30	51	52	Yes	No	-
159	**R-4A/56**	**60**	**61**	**No**	**Yes**	
160	R-4A/94	53	53	Yes	No	-
161	R-4A/84	53	54	Yes	No	-
162	**R-4C/75**	**60**	**61**	**No**	**Yes**	**6**
163	R-4A/29	41	42	Yes	No	-
164	R-4A/40	52	53	Yes	No	-
165	R-4A/1	57	58	Yes	No	-
166	R-4C/56	47	48	Yes	No	-
167	R-4C/33	53	54	Yes	No	-
168	R-5A/68	49	51	Yes	No	-
169	R-5B/64	41	42	Yes	No	-
170	Resort	52	54	Yes	No	-

Note: Based on 24-hour traffic volume data for local roadway west of the project site. CNEL values for roadway affected by the proposed project are calculated to be 1 dBA higher than the predicted peak hour noise level. Lots that would be exposed to CNEL levels exceeding 60 dBA CNEL are indicated in **bold**.

1 Receiver Identification Numbers may not be sequential

2 Lot numbers were not assigned at the time of the modeling. Locations of receivers were placed within lot lines on the existing site plan in the TNM model.

3 Minimum height required for a noise barrier, which can be in the form of a berm, a wall, or, if necessary a berm/wall combination (when the barrier height would exceed 6 feet).

Source: Data compiled by AECOM 2009

As indicated in **bold** in Table 7, potential locations of NSLUs would be exposed to noise levels in excess of 60 dBA per the County's Noise Guidelines. This would result in a **potentially significant** impact to future NSLUs. To mitigate this potential impact, noise barriers were modeled along the back yards of residential lots nearest Otay Lakes Road and other proposed roadways that exceeded 60 CNEL within residential lots. Figures 6, 7, and 8 show potential locations of noise-impacted lots on the project site and the height of noise barriers that would be required to reduce exterior noise levels at these locations to 60 CNEL or less, and thereby reduce the impact to less than significant.

Typical modern residential construction would provide attenuation of 20 dBA from exterior to interior locations (Egan 1988). Thus, an exterior noise level of 65 CNEL at the building façade would be attenuated to 45 CNEL at interior locations. Based on the noise levels presented in Table 7, interior noise levels at all locations, except at and near receptors 57 and 60, would not exceed 45 CNEL.

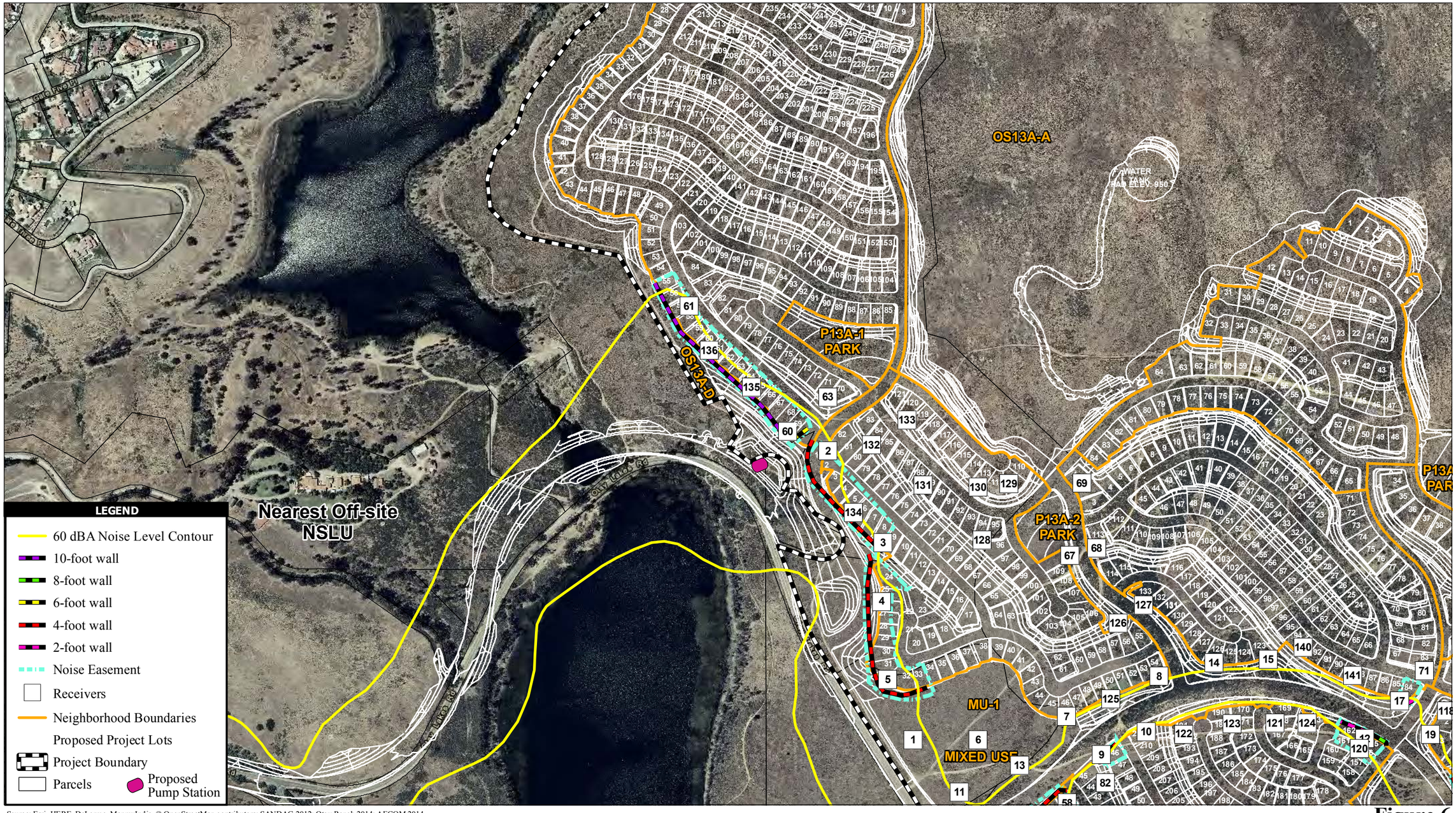
County of San Diego standards require an interior noise assessment for residential areas exposed to noise levels greater than 60 CNEL. At receptor locations 2, 8, 10, 12, 21, 28, 32, 37, 56, 57, 58, 60, 117, 124, 135, 138,155, and 162 exterior noise levels could exceed 60 CNEL. Thus, if two-story residences are constructed in these locations, noise-sensitive second-floor locations may require additional attenuation measures, such as acoustically rated windows and doors, structure setbacks, or limiting openings on walls facing Otay Lakes Road. These measures are common for new developments in the San Diego region. A mitigation measure (MM N-1) has been identified that requires the project to provide air conditioning or equivalent forced air circulation for all first-row residential properties with building walls facing Otay Lakes Road. For typical residential construction, closed windows would provide sufficient exterior-to-interior noise reduction to reduce exterior noise levels to comply with County interior noise standards.

2.2.1.1 Mitigation Measures and Noise Abatement Measures

Mitigation Measures

Due to the potential conflicts with the proposed land uses and predicted future noise levels along Otay Lakes Road and other internal roads within the project site, the following measures would be required to reduce potential traffic noise impacts to a less-than-significant level and ensure the proposed project complies with the County's noise standards:

MM N-1: Individual lots identified in **bold** in Table 7 are required to be designed using individual barriers located within each lot to shield an exterior area of sufficient size in the proper location. Quantifying the area per lot that would require protection shall occur as part of the Site Plan review for the individual lots identified in Table 7 and shown in Figures 6, 7, and 8. These calculations and additional noise attenuation requirements are outlined in the measures below.



Source: Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors; SANDAG 2012; Otay Ranch 2014; AECOM 2014

Figure 6
Noise Model Receiver and Barrier Locations
Western Project Area

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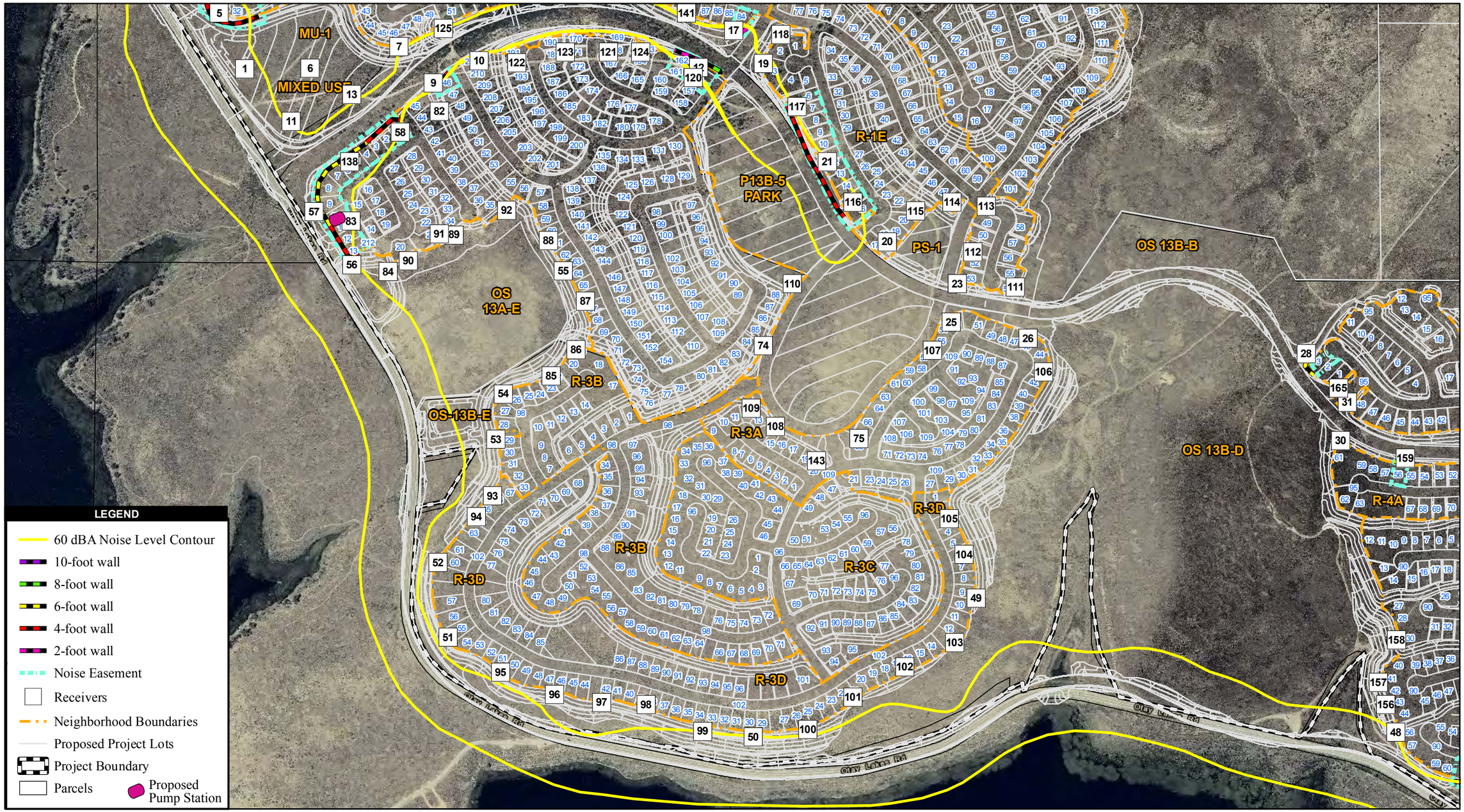

Source: Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors; SANDAG 2012; Otay Ranch 2014; AECOM 2014

Figure 7
Noise Model Receiver and Barrier Locations
Central Project Area

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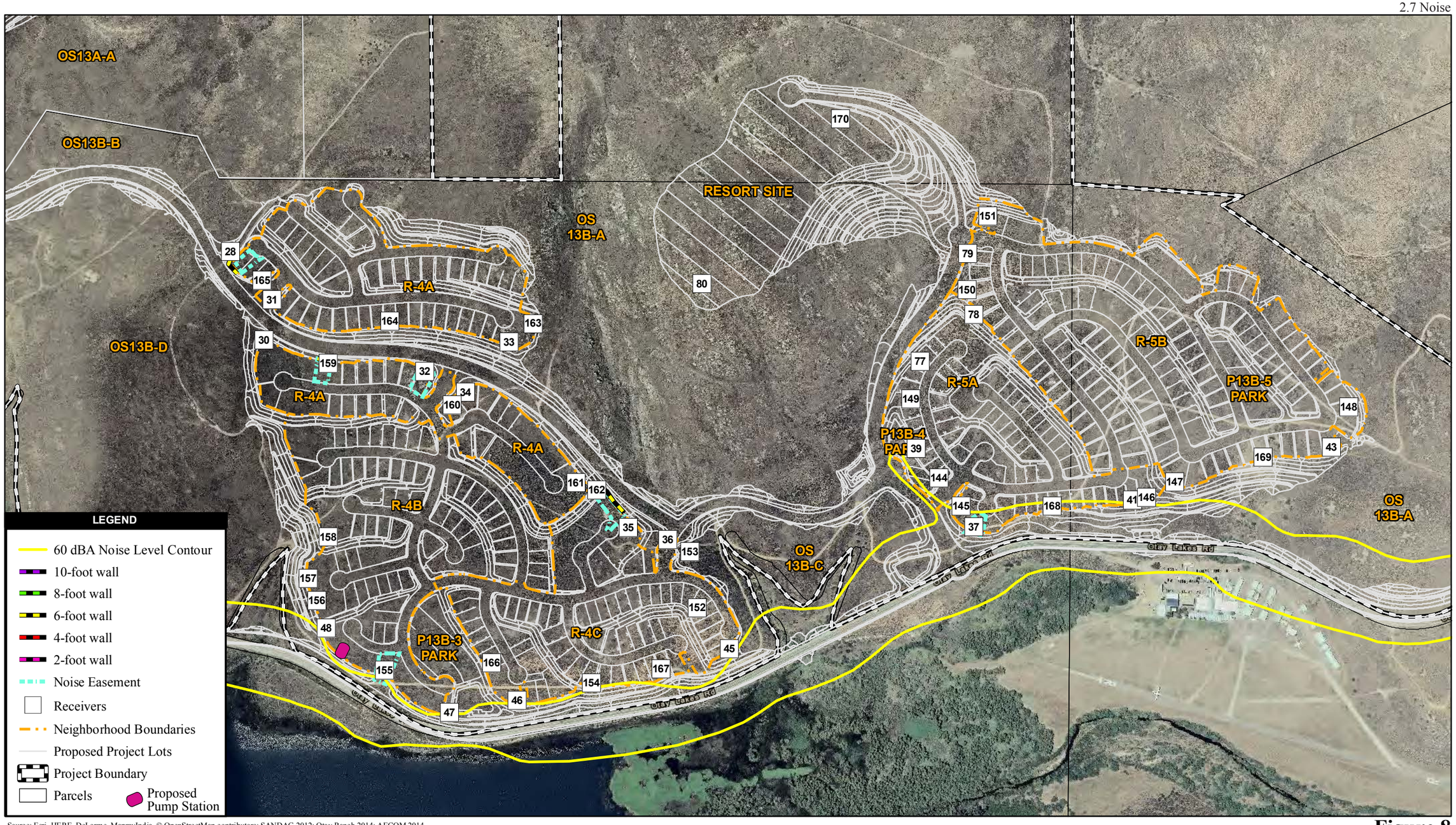

Source: Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors; SANDAG 2012; Otay Ranch 2014; AECOM 2014

Figure 8
Noise Model Receiver and Barrier Locations
Eastern Project Area

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- The project proponent shall prepare a noise protection easement for those lots identified in **bold** in Table 7. The noise protection easement language shall contain a restriction stating that the structure and the outdoor activity area will be placed such that a noise barrier will complement the architecture and reduce noise levels at outdoor activity areas to within acceptable standards, and will not incorporate a solid (opaque) wall in excess of 10 feet.

- Prior to approval of each Final Map, the applicant shall dedicate to the County "noise protection easements" on each of the lots identified in **bold** in Table 7 and shown in Figures 6, 7, and 8. These easements are for the protection of noise-sensitive locations from excessive traffic noise. The noise protection easements shall be shown on each Final Map.

- For any lot shown to be exposed to noise levels exceeding 60 CNEL, the noise protection easement shall require that, prior to approval of the building permit or other development approval, an acoustical study shall be prepared based on noise barrier placement and housing construction to demonstrate and ensure that interior noise levels are below 45 CNEL.

- The project proponent shall construct a noise barrier at the top of slope and at the back of yards for any NSLU that is exposed to a 60 CNEL or greater, as shown in Figures 6, 7, and 8. The barrier shall be at the height specified in Table 7. Barriers may be constructed of masonry, wood, and transparent materials, such as glass or Lucite. Earthen berms or a combination of berms and walls would also provide noise attenuation.

- Noise barriers, as described above, would not reduce noise levels to second-story elevations due to their lesser barrier height relative to two-story structures. Where two-story homes are forecast to exceed 60 CNEL without abatement (see Table 7), the Building Permit applicant must have to demonstrate that interior noise levels due to exterior noise sources would not exceed 45 CNEL. In these cases, it is anticipated that the typical method of compliance would be to provide the homes with air conditioning or equivalent forced air circulation to allow occupancy with closed windows, which, for most residential construction, would provide sufficient exterior-to-interior noise reduction.

Implementation: Project applicant(s) and primary contractor(s) of all project phases.

Timing: Prior to design and implementation of development of on-site residential areas.

Enforcement: County

Summary

Implementation of MM N-1 would ensure that traffic noise sources associated with area traffic would be reduced to a **less-than-significant level** at affected NSLUs.

2.2.2 Aircraft Noise and NSLU

The centerline of the single runway at the John Nichols Airfield is located approximately 850 feet south of the project site across Otay Lakes Road. The nearest proposed residences would be located approximately 1,025 feet north of the centerline of the main runway. As this is a privately operated airfield, no aircraft noise contours have been developed for this airfield.

The 2013 Mead & Hunt study stated that annual jump plane activity is estimated by the airfield operator at 7,500 departures (15,000 total operations). This average annual operation was used to calculate the CNEL due to jump plane activity. As shown in Table 4c, the maximum noise level for a jump plane takeoff and flyover (not affected by emergency vehicle noise) is 86 dBA L_{max} and the maximum noise level for a jump plane landing is 70 dBA L_{max}. The measured SEL for a jump plane takeoff and flyover is 91 dBA and the measured SEL for a jump plane landing is 82 dBA. The noise levels for takeoffs, flyovers, and landings were calculated from the measured SELs using the following equation:

$$CNEL = SEL + 10*\log (N) - 49.4$$

Where, N is equal to the number of events during the daytime hours. As noted above, jump planes only operate during the daytime.

Using this equation, it was calculated that jump plane takeoffs and flyovers generate a CNEL of 54.8 dBA and landings generate a CNEL of 45.8 dBA. This results in a combined noise level of 55 CNEL at the measurement location. As discussed in Section 1.3.2, the measurements were taken at the project site boundary nearest the west end of the airfield's Runway 27, in the path of jump plane takeoffs from the runway over Otay Lakes Road.

Therefore, noise levels from aircraft operation at the John Nichols Airfield alone would not exceed 60 CNEL within the project; thus, the impact of airfield operations at the John Nichols Airfield on the project site would be **less than significant**.

2.2.3 Aircraft and Traffic Noise and NSLU

The following assessment presents a combined assessment of traffic and aircraft noise. This assessment should be considered a worst case scenario, as the actual averaging periods of the two sources are not equal. While the CNEL is typically used to determine compatibility of land uses with vehicular traffic and aircraft noise, traffic CNEL is calculated based on a theoretical maximum traffic volume on a roadway and an aircraft CNEL is based on a theoretical average of annual operations. However, for purposes of this noise assessment, the CNEL values used in the traffic and aircraft analyses are considered to be equivalent.

Figure 8 shows the proximity of the 60 CNEL contour from vehicle traffic noise on Otay Lakes Road to potential locations of noise-impacted lots on the project site. As shown on Figure 8, the 60 CNEL contour is adjacent to, but does not cross over, the residential lots along Otay Lakes Roads near the west end of the airfield runway; therefore, none of these residences have proposed noise barriers for traffic noise alone. As shown in Table 7, exterior noise levels at the NSLU located in the vicinity of the flight path adjacent to Otay Lakes Road (Receivers 45, 46, 47, 154, and 167) range from 53 to 58 CNEL. With the addition of aircraft noise at these locations, combined noise levels would range from 57 to 60 CNEL. Additionally, due to the relatively lower aircraft noise levels, aircraft noise would not affect the vehicle traffic contour lines shown in Figure 8. Thus, even with the combination of aircraft and vehicle traffic, future noise levels would not exceed 60 CNEL and no additional mitigation would be required. Therefore, aircraft operations at John Nichols Airfield would result in **less than significant** noise impacts.

2.3 OFF-SITE DIRECT AND CUMULATIVE NOISE IMPACTS

2.3.1 Off-site Impacts to NSLUs

Traffic volumes for the offsite noise impacts analysis were developed based on the ADT volumes from the traffic report (Chen Ryan 2015). Peak hour traffic volumes were calculated as

10 percent of the maximum LOS C ADT and used to calculate the CNEL (County 2009). The traffic speeds and vehicle mix used in the modeling of offsite noise levels were the same as for onsite traffic noise modeling.

While the proposed project would increase traffic volumes on several local roadways, noise level increases would be greatest nearest the project site, as this would represent the location of the greatest concentration of project-related traffic. Traffic noise is primarily a function of volume, vehicle mix, speed, and proximity. For purposes of this evaluation, the vehicle mix, speed, and proximity of offsite receivers are assumed to remain constant between the existing and future conditions. Thus, the primary factor affecting noise levels would be increased traffic volumes. Tables 8 and 9 present the existing ADT volumes for the existing condition without project, and for the existing condition with the proposed project on County of San Diego roadways and City of Chula Vista roadways, respectively. Off-site traffic noise impacts have been evaluated based on the calculated change in noise levels due to the increase or decrease in traffic volumes.

A substantial noise increase is defined as an increase of 10 dBA above existing conditions as stated in the County's Noise Report Guidelines Section 4.1-A (ii). However, the guidelines, as part of the Report Format and Content Requirements, include a statement that a "doubling of sound energy" is considered a significant impact at a "documented noisy site." A doubling of sound energy is equivalent to a 3 dBA increase. A documented noisy site is assumed to be a location with NSLUs that currently exceeds 60 CNEL. Thus, a substantial increase is defined as a 10 dBA increase, or greater, over existing noise levels when existing and future noise levels are below the County's land use compatibility standards, or a 3 dBA increase when existing or future noise levels equal or exceed the County's land use compatibility standards, or the applicable standards of an adjacent jurisdiction, i.e., 65 CNEL within Chula Vista.

2.3.1.1 County of San Diego

As shown in Table 8, within the County, the proposed project traffic would increase noise levels by 3 CNEL or more along all four segments of Otay Lakes Road between Wueste Road and SR-94 over existing conditions. There are no existing NSLUs between project Driveway #1 and Driveway #2; thus, no impact occurs along this portion of Otay Lakes Road. One NSLU is located between Lake Crest Drive and Wueste Road, north of Otay Lakes

Table 8
County Roadways – Existing and Existing Plus Project Conditions

County Roadways	Segment	Existing Traffic Volumes (ADT)	Existing Traffic Noise Level at 100 feet (CNEL)	Existing + Project Traffic Volumes (ADT)	Existing + Project Traffic Noise Level at 100 feet (CNEL)	CNEL Increase
Otay Lakes Rd	Wueste Rd and Driveway #1	2,927	59	22,467	68	9
	Driveway #1 and Driveway #2	2,927	59	20,717	68	9
	Driveway #2 and Driveway #3	2,927	59	7,009	63	4
	Driveway #3 and SR-94	2,927	59	5,347	62	3

Source: Chen Ryan 2015

Road; the NSLU is located approximately 870 feet from the centerline of Otay Lakes Road and approximately 90 feet above the existing roadway grade. Based on the noise levels presented in Table 8, existing plus project noise levels from Otay Lakes Road would attenuate to approximately 58 CNEL or less at this distance (870 feet), assuming acoustically hard site conditions. Thus, the 9 dBA increase over existing noise levels would be **less than significant,** as noise level of 58 CNEL at this NSLU would be below the County's noise and land uses compatibility level of 60 CNEL.

Along Otay Lakes Road between Driveway #3 and SR-94, the only potentially NSLUs along this location would be the Thousand Trail Recreational Vehicle (RV) Park. The RV park contains RV spaces as well as a common area with a swimming pool and small playground approximately 130 feet south of Otay Lakes Road. Based on the 2011 General Plan Noise Element, noise levels below 70 CNEL are acceptable for active use parks and 65 CNEL is acceptable for passive parks. Based on the noise levels presented in Table 8, increases of approximately 3 CNEL would occur east of driveway #3, and noise levels at 100 feet from the center of the roadway would reach 62 CNEL. The nearest RV space used for camping is located 240 feet from the centerline of Otay Lakes Road and the swimming pool/playground area is approximately 130 feet from the centerline of Otay Lakes Road. At these distances, the noise levels presented in Table 8 would be

less than 65 CNEL, the acceptable County noise level for passive parks. Therefore, NSLUs along Otay Lakes Road would be compatible with existing and future noise levels, and no direct noise impacts would occur along County roadways.

2.3.1.2 City of Chula Vista

Traffic noise levels along several roadways within Chula Vista would similarly experience a potentially substantial increase in noise levels. The City considers 65 CNEL to be acceptable for residential uses. Based on observations, the NSLUs along all the affected roadways are located at distances of 100 feet or greater and are all shielded from local roadways by solid masonry walls and solid combination barriers, such as masonry atop earthen berms and masonry with glass/acrylic glass. These wall/berm combinations would block the line of sight between the source and receiver and provide a minimum 5 dBA reduction in noise levels (FHWA 2011).

As shown in Table 9, direct impacts within Chula Vista would be limited to Otay Lakes Road between Hunte Parkway and Wueste Road, where noise levels would increase by 4 to 8 dBA over existing conditions. Residential, institutional, and recreational NSLUs are located north and south of the Otay Lakes Road between Hunte Parkway and Wueste Road.

Between Hunte Parkway and Woods Drive residential and recreational park uses are located immediately south of Otay Lakes Road. A church is located at the northeast corner of Otay Lake Road and Hunte Parkway and a fire station located at the northwest corner of Otay Lakes Road and Woods Drive. All land uses along this segment are located at least 100 feet from the centerline of Otay Lakes Road. Similarly, between Woods Drive and Lake Crest Drive, residential and recreational land uses are located at least 100 feet south of Otay Lakes Road. No NSLUs are located north of Otay Lakes between Woods Drive and Wueste Road. The NSLUs between Lake Crest Drive and Wueste Road and south of Otay Lakes Road are generally located at distances greater than 150 feet from the centerline of Otay Lakes Road.

The church, fire station, and recreational land uses are generally level with Otay Lakes Road. The residential land uses vary in elevation relative to Otay Lakes Road. Near the intersection of Otay Lakes Road and Hunte Parkway, the residential uses are approximately 20 feet below the grade of Otay Lakes Road and transitions 20 feet above grade near the intersection with Woods

Table 9
Chula Vista Roadways - Existing and Existing Plus Project Conditions

City Roadways	Segment	Existing Traffic Volumes (ADT)	Existing Traffic Noise Level at 100 feet (CNEL)	Existing + Project Traffic Volumes (ADT)	Existing + Project Traffic Noise Level at 100 feet (CNEL)	CNEL increase
Proctor Valley Road	Lane Avenue and Hunte Parkway	14,155	65	15,033	66	1
Telegraph Canyon Road	I-805 SB Ramps and I-805 NB Ramps	55,247	71	56,125	71	0
	I-805 NB Ramps and Oleander Avenue	59,615	72	61,811	72	0
	Oleander Avenue and Medical Center Drive	55,776	71	57,972	72	1
	Medical Center Drive and Paseo Ladera	47,486	71	49,901	71	0
	Paseo Ladera and Paseo Ranchero/Heritage Road	44,404	70	47,039	71	1
	Paseo Ranchero/Heritage Road and La Media Road	35,495	69	38,569	70	1
Otay Lakes Road	East H Street and Telegraph Canyon Road/Otay Lakes Road	28,912	69	30,010	69	0
	La Media Road and Rutgers Avenue	42,142	70	46,973	71	1
	Rutgers Avenue and SR-125 SB Ramps	41,931	70	46,762	71	1
	SR-125 SB Ramps and SR-125 NB Ramps	46,406	71	51,676	71	0
	SR-125 NB Ramps and Eastlake Parkway	40,291	70	47,318	71	1
	Eastlake Parkway and Lane Avenue	26,054	68	33,959	69	1
	Lane Avenue and Fenton Street	18,832	67	27,615	68	1
	Fenton Street and Hunte Parkway	18,627	67	27,627	68	1
	Hunte Parkway and Woods Drive	**9,672**	**64**	**23,282**	**68**	**4**
	Woods Drive and Lake Crest Drive	**7,546**	**63**	**22,256**	**68**	**5**
	Lake Crest Drive and Wueste Road	**2,654**	**58**	**18,464**	**66**	**8**

City Roadways	Segment	Existing Traffic Volumes (ADT)	Existing Traffic Noise Level at 100 feet (CNEL)	Existing + Project Traffic Volumes (ADT)	Existing + Project Traffic Noise Level at 100 feet (CNEL)	CNEL increase
Olympic Parkway	La Media Road and E Palomar Street	33,412	69	33,632	69	0
	E Palomar Street and SR-125 SB Ramps	35,139	69	35,798	69	0
	SR-125 SB Ramps and SR-125 NB Ramps	38,154	70	39,691	70	0
	SR-125 NB Ramps and Eastlake Parkway	43,506	70	46,800	71	1
	Eastlake Parkway and Hunte Parkway	16,289	66	21,339	67	1
	Hunte Parkway and Olympic Vista Road	9,936	64	13,449	65	1
	East of Olympic Vista Road	4,075	60	7,588	63	3
Rock Mountain Road	SR-125 NB Ramps and Eastlake Parkway/Otay Valley Road	10,804	64	11,682	65	1
Lane Avenue	Proctor Valley Road and Otay Lakes Road	6,269	62	7,367	63	1
Hunte Parkway	Proctor Valley Road and Otay Lakes Road	10,897	64	14,410	66	2
	Otay Lakes Road and Clubhouse Road	8,154	63	11,009	64	1
	Clubhouse Road and Olympic Parkway	2,015	57	2,893	59	2
	Olympic Parkway and Eastlake Parkway	14,155	65	15,033	66	1

Bolded rows indicate a potential noise impact.
Source: Chen Ryan 2015

Drive and up to approximately 30 feet above the roadway grade at Wueste Road and beyond. In addition, these NSLUs are shielded from Otay Lakes Road by a 6-foot-high solid wall. This type of wall typically provides the minimum noise level reduction for breaking the line of sight, i.e., 5 dBA.

Based on the noise levels presented in Table 9, unshielded noise levels would be as high as 68 CNEL at the rear yards of these residences, however, with the existing walls and topography, noise levels inside the rear yards would be at least 5 dBA below these reported levels. Thus, existing plus project noise levels with existing walls and topography at these NSLUs are

anticipated to be 63 CNEL or less, and therefore, compatible with the City's 65 CNEL as acceptable for residential uses. Thus, the 4 to 8 CNEL increase over existing noise levels would be less than significant along these roadway segments. Therefore, the proposed project would result in a **less than significant** direct off-site impact due to project-related traffic noise.

In summary, the analysis of future off-site traffic noise levels in the County and the City has shown that project-related traffic by itself would not result in a direct noise-related significant impact. Traffic generated by the project would increase noise levels along affected roadways by less than 10 dBA at NSLU locations. where noise levels will comply with compatibility standards in the future or would result in a less than 3 dBA increase in areas that currently, or in the future, exceed the compatibility standard.

2.3.2 Cumulative Impacts to NSLUs

Project-generated road traffic could create cumulative increases in traffic noise levels at noise-sensitive receptors. According to the County Guidelines, a cumulatively considerable impact occurs when a project contributes a noise level increase of greater than 1 CNEL to a cumulative impact. Similar to direct noise impacts, a cumulative noise impact occurs when the noise level exceeds the applicable standard or a substantial noise level increase over existing noise occurs. The project's contribution to the future noise level is determined by comparing the cumulative condition with project and without project conditions.

Noise level increases would be greatest nearest the project site, which would represent the greatest concentration of project-related traffic. Traffic noise is primarily a function of volume, vehicle mix, speed, and proximity. For purposes of this evaluation, the vehicle mix, speed, and proximity are assumed to remain constant in the future as the existing condition. Thus, the primary factor affecting noise levels would be increased traffic volumes.

Tables 10 and 11 present the ADT volumes for the existing, cumulative without project, and the cumulative with proposed project conditions for County of San Diego and City of Chula Vista roadways, respectively. Off-site noise impacts have been evaluated based on the calculated change in noise levels due to the increase or decrease in traffic volumes. As shown in Tables 10 and 11, at most locations, the proposed project would not significantly contribute to the

cumulative noise level increase, i.e., the Project's contribution would not be more than 1 dBA. Exceptions to this occur the following roadway segments:

- Otay Lakes Road
    - Lane Avenue to Fenton Street (City)
    - Fenton Street to Hunte Parkway (City)
    - Hunte Parkway to Woods Drive (City)
    - Woods Drive to Lake Crest Drive (City)
    - Lake Crest Drive to Wueste Road (City)
    - Wueste Road to SR-94 (County)
- Olympic Parkway
    - East of Olympic Vista Road (City)

Potential impacts associated with NSLUs located along each of these segments are addressed below.

2.3.2.1 County of San Diego

One NSLU is located between Lake Crest Drive and Wueste Road; north of Otay Lakes Road, the NSLU is located approximately 870 feet north of the centerline of Otay Lakes Road and approximately 90 feet above the existing roadway grade. Based on the noise levels presented in Table 10, future noise levels from Otay Lakes Road would attenuate to approximately 55 CNEL or less at this distance, assuming hard site conditions. Thus, the 6 dBA increase over existing noise levels would be **less than significant** as noise levels at this County receiver would be below the noise and land uses compatibility level.

There are no existing NSLUs between project Driveway #1 and Driveway #3; thus, no impact occurs along this portion of Otay Lakes Road. Along Otay Lakes Road between Driveway #3 and SR-94, increases of approximately 2 dBA would occur and noise levels at 100 feet from the center of the roadway would reach approximately 64 CNEL. However, the only potentially noise-sensitive land uses along this location would be the Thousand Trail RV Park. Based on the noise levels presented in Tables 10, traffic noise levels beyond 100 feet attenuate to less than 64 CNEL and at 160 feet traffic noise levels would attenuate to less than 62 CNEL. As previously identified, the nearest RV space used for camping is located 240 feet from the centerline of Otay Lakes Road and the swimming pool/playground area is approximately 130 feet from the

centerline of Otay Lakes Road. At these distances, the noise levels reported in Table 10 would attenuate to less than 60 dBA CNEL and 63 dBA CNEL, respectively. Therefore, future noise levels along Otay Lakes Road would be compatible with existing and future uses within San Diego County and no cumulatively considerable noise impacts would occur along County roadways.

Project-affected roadway segments within San Diego County are limited to Otay Lakes Road between Lake Crest Drive and SR-94. While the increase along Otay Lakes Road, between Lake Crest Drive and SR-94 would potentially be cumulatively significant, the future noise levels under the cumulative condition would still be considered compatible with the affected land. Therefore, cumulative noise impacts along Otay Lakes Road within the County would be **less than significant.**

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Table 10
County Roadways– Existing, Cumulative, and Cumulative Plus Project Conditions

County Roadways	Segment	Existing		Cumulative		Change vs. Existing (CNEL)	Cumulative + Project		Change vs. Existing (CNEL)	Project Contribution (CNEL)
		ADT Volumes	Traffic Noise Level at 100' (CNEL)	ADT Volumes	Traffic Noise Level at 100' (CNEL)		ADT Volumes	Traffic Noise Level at 100' (CNEL)		
Otay Lakes Rd	Wueste Rd and Driveway #1	2,927	59	6,400	**62**	**3**	25,540	**68**	**9**	**6**
	Driveway #1 and Driveway #2	2,927	59	6,400	**62**	**3**	23,790	**68**	**9**	**6**
	Driveway #2 and Driveway #3	2,927	59	6,400	**62**	**3**	10,170	**64**	**5**	**2**
	Driveway #3 and SR-94	2,927	59	6,400	**62**	**3**	8,420	**64**	**5**	**2**

Note: Bolded numbers indicate a cumulative noise impact.
Source: Chen Ryan 2015

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2.3.2.2 City of Chula Vista

Traffic noise levels along several roadways within Chula Vista would experience a potentially substantial increase in noise levels, as defined by the County's guidelines (greater than a 1 dBA increase). Based on the noise levels presented in Table 11, five segments of Otay Lakes Road, from Lane Avenue to Wueste Road, would experience increases of between 2 dBA and 6 dBA as a result of project traffic in the cumulative scenario. Additionally, Olympic Parkway, east of Olympic Vista Road would experience a 2 dBA increase.

The City considers 65 CNEL to be acceptable for residential uses. The 2 dBA increase on Olympic Parkway east of Olympic Vista Road would result in a total noise level of 64 CNEL. This falls below the City's threshold of 65 CNEL and would be considered **less than significant**.

Based on observations, the NSLUs along these affected roadway segments are located at distances of 100 feet or greater from Otay Lakes Road, and are all shielded by solid masonry walls and solid combination barriers, such as masonry atop earthen berms and masonry with glass/acrylic glass. These wall/berm combinations would block the line of sight between the source and receiver and provide a minimum 5 dBA reduction in noise levels (FHWA 2011).

Based on the noise levels presented in Table 11a, a 5 dBA reduction in noise levels would result in noise levels of 62 and 64 CNEL (see Table 11a), which falls below the City's threshold of 65 CNEL. The maximum increase that project related traffic would add is a 1 CNEL increase to cumulative noise level increase on Otay Lakes Road, between Woods Drive and Wueste Road. As the noise levels under the cumulative with project condition would comply with the City's noise compatibility guidelines at the affected NSLUs (65 CNEL), the proposed project's cumulative noise impacts would be **less than significant.**

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Table 11
Chula Vista Roadways Existing, Cumulative, and Cumulative Plus Project Conditions

City Roadways	Segment	Existing		Cumulative		Change vs. Existing (CNEL)	Cumulative + Project		Change vs. Existing (CNEL)	Project Contribution (CNEL)
		Traffic Volume (ADT)s	Traffic Noise Level at 100' (CNEL)	Traffic Volumes (ADT)	Traffic Noise Level at 100 feet (CNEL)		Traffic Volumes (ADT)	Traffic Noise Level at 100 feet (CNEL)		
Proctor Valley Road	Lane Avenue and Hunte Parkway	14,155	65	30,200	69	3	31,080	69	4	0
Telegraph Canyon Road	I-805 SB Ramps and I-805 NB Ramps	55,247	71	58,700	72	0	59,580	72	0	0
	I-805 NB Ramps and Oleander Avenue	59,615	72	61,900	72	0	64,100	72	0	0
	Oleander Avenue and Medical Center Drive	55,776	71	58,500	72	0	60,700	72	0	0
	Medical Center Drive and Paseo Ladera	47,486	71	55,700	71	1	58,120	72	1	0
	Paseo Ladera and Paseo Ranchero/Heritage Road	44,404	70	56,200	71	1	58,830	72	1	0
	Paseo Ranchero/Heritage Road and La Media Road	35,495	69	49,700	71	2	52,770	71	2	0
Otay Lakes Road	East H Street and Telegraph Canyon Road/Otay Lakes Road	28,912	69	32,100	69	1	33,200	69	1	0
	La Media Road and Rutgers Avenue	42,142	70	43,200	70	0	48,030	71	1	0
	Rutgers Avenue and SR-125 SB Ramps	41,931	70	43,600	70	0	48,430	71	1	1
	SR-125 SB Ramps and SR-125 NB Ramps	46,406	71	47,700	71	0	52,970	71	1	1
	SR-125 NB Ramps and Eastlake Parkway	40,291	70	47,500	71	1	54,530	71	1	1
	Eastlake Parkway and Lane Avenue	26,054	68	28,500	69	0	36,400	70	1	1
	Lane Avenue and Fenton Street	**18,832**	**67**	**20,800**	**67**	**0**	**29,580**	**69**	**2**	**2**
	Fenton Street and Hunte Parkway	**18,627**	**67**	**19,800**	**67**	**0**	**28,800**	**69**	**2**	**2**
	Hunte Parkway and Woods Drive	**9,672**	**64**	**14,300**	**66**	**2**	**27,910**	**68**	**5**	**3**
	Woods Drive and Lake Crest Drive	**7,546**	**63**	**16,700**	**66**	**4**	**31,410**	**69**	**6**	**3***
	Lake Crest Drive and Wueste Road	**2,654**	**58**	**5,350**	**61**	**3**	**21,160**	**67**	**9**	**6**

City Roadways	Segment	Existing		Cumulative		Change vs. Existing (CNEL)	Cumulative + Project		Change vs. Existing (CNEL)	Project Contribution (CNEL)
		Traffic Volume (ADT)s	Traffic Noise Level at 100' (CNEL)	Traffic Volumes (ADT)	Traffic Noise Level at 100 feet (CNEL)		Traffic Volumes (ADT)	Traffic Noise Level at 100 feet (CNEL)		
Olympic Parkway	La Media Road and E Palomar Street	33,412	69	35,300	69	0	35,520	69	0	0
	E Palomar Street and SR-125 SB Ramps	35,139	69	54,000	71	2	54,660	71	2	0
	SR-125 SB Ramps and SR-125 NB Ramps	38,154	70	55,000	71	2	56,540	72	2	0
	SR-125 NB Ramps and Eastlake Parkway	43,506	70	57,000	72	1	60,290	72	1	0
	Eastlake Parkway and Hunte Parkway	16,289	66	33,000	69	3	38,050	70	4	1
	Hunte Parkway and Olympic Vista Road	9,936	64	16,100	66	2	19,610	67	3	1
	East of Olympic Vista Road	**4,075**	**60**	**6,900**	**62**	**2**	**10,410**	**64**	**4**	**2**
Lane Avenue	Proctor Valley Road and Otay Lakes Road	10,804	64	18,500	67	2	19,380	67	3	0*
Hunte Parkway	Proctor Valley Road and Otay Lakes Road	6,269	62	12,700	65	3	13,800	65	3	0
	Otay Lakes Road and Clubhouse Drive	10,897	64	15,000	66	1	18,510	67	2	1
	Clubhouse Drive and Olympic Parkway	8,154	63	14,000	65	2	16,850	66	3	1
	Olympic Parkway and Eastlake Parkway	2,015	57	18,200	67	10	19,080	67	10	0

Note: **Bolded** numbers indicate a cumulative noise impact.

*Due to rounding the nearest whole number, Project Contribution (CNEL) value not the exact difference in Change vs Existing (CNEL) columns for Cumulative and Cumulative Plus Project. Values are modeled to one decimal place but rounded here to the nearest whole number for comparison against exceedance threshold which is a whole number.

Source: Chen Ryan 2015

Table 11a
Chula Vista Roadways– Existing, Cumulative, and Cumulative Plus Project Conditions - Mitigated

City Roadways	Segment	Existing		Cumulative		Change vs. Existing (CNEL)	Cumulative + Project		Change vs. Existing (CNEL)	Project Contribution (CNEL)	CNEL @ 100' w/ wall
		ADT Volume	Traffic Noise Level @ 100' (CNEL)	ADT Volumes	Traffic Noise Level @ 100' (CNEL)		ADT Volumes	Traffic Noise Level at 100' (CNEL)			
Otay Lakes Road	Woods Drive and Lake Crest Drive	7,546	63	16,700	66	4	31,410	69	6	3	64
	Lake Crest Drive and Wueste Road	2,654	58	5,350	61	3	21,160	67	9	6	62

Source: Chen Ryan 2015

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3.0 PROJECT-GENERATED AIRBORNE NOISE

3.1 GUIDELINES FOR THE DETERMINATION OF SIGNIFICANCE

The County Noise Ordinance, Section 36.404, sets limits on the noise levels generated from one property to another, such as from mechanical equipment. Unless a variance has been applied for by an applicant and granted by the County, it is unlawful for a person to cause or allow noise generated on a particular property to exceed the 1-hour average sound level, at any point on or beyond the boundaries of the property, as shown in Table 12.

Section 36.409 states:

> Except for emergency work, it shall be unlawful for any person to operate construction equipment or cause the construction equipment to be operated, exceeding an average sound level of 75 dBA for an 8-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 states:

> 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 13, 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 13 are as described in the County Zoning Ordinance.

Table 12
County of San Diego Noise Ordinance Sound Level Limits

Zone	Applicable Hours	Sound Level Limit dB L_{eq} (1 hour)
(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) S-94, V4 and all other 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 10 p.m. 7 p.m. to 10 p.m. 10 p.m. to 7 a.m. 10 p.m. to 7 a.m.	60 55 55 50
(5) M-50, M-52, M-54	Anytime	70
(6) S82, M56 and M58	Anytime	75
(7) S88 (see subsection (c) below)		

Source: County of San Diego Noise Ordinance, Section 36.404

Notes:

(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

(b) Where a noise study has been conducted and the noise mitigation measures recommended by that study have been made conditions of approval of a Major Use Permit, which authorizes the noise-generating use or activity and the decision making body approving the Major Use Permit determined that those mitigation measures reduce potential noise impacts to a level below significance, implementation and compliance with those noise mitigation measures shall constitute compliance with subsection (a) above.

(c) S88 zones are Specific Planning Areas which allow for different uses. The sound level limits in Table 12 above that apply in an S88 zone depend on the use being made of the property. The limits in Table 4, subsection (1) apply to property with a residential, agricultural or civic use. The limits in subsection (3) apply to property with a commercial use. The limits in subsection (5) apply to property with an industrial use that would only be allowed in an M50, M52 or M54 zone. The limits in subsection (6) apply to all property with an extractive use or a use that would only be allowed in an M56 or M58 zone.

(d) If the measured ambient noise level exceeds the applicable limit in Table 36.404, the allowable one-hour average sound level shall be the one-hour average ambient noise level, plus three decibels. The ambient noise level shall be measured when the alleged noise violation source is not operating.

(e) The sound level limit at a location on a boundary between two zones is the arithmetic mean of the respective limits for the two zones. The one-hour average sound level limit applicable to extractive industries, however, including but not limited to borrow pits and mines, shall be 75 decibels at the property line regardless of the zone in which the extractive industry is located.

(f) A fixed-location public utility distribution or transmission facility located on or adjacent to a property line shall be subject to the sound level limits of this section, measured at or beyond 6 feet from the boundary of the easement upon which the facility is located.

Table 13
County of San Diego Code Section 36.410, 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 14, 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 14 are as described in the County Zoning Ordinance.

(c) The minimum measurement period for any measurements conducted under this section shall be 1 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.

Table 14
County of San Diego Code Section 36.410, Maximum Sound Level (Impulsive)
Measured at Occupied Property in Decibels (dBA) for Public Road Projects

Occupied Property Use	Decibels (dBA)
Residential, village zoning or civic use	85
Agricultural, commercial or industrial use	90

Other exemptions to the noise ordinance applicable to the project are outlined in the County Noise Ordinance, Section 36.417 Exemptions, which states that the following are exempt from County noise standards under the following provisions:

- Emergency work, as defined in this chapter, provided that (A) the person performing the work notifies noise control officer in advance, or as soon as practicable after the emergency and (B) any vehicle, device, apparatus or equipment used, related to or connected with the emergency work is designed, modified or equipped to reduce noise produced to the lowest possible level consistent with effective operation of the vehicle, device, apparatus or equipment.

- Noise reasonably related to authorized school: (A) bands, (B) athletic activities and (C) entertainments events.

- The operation of an emergency generator after a power failure, by an employee or agent of a law enforcement agency, fire department, hospital or other medical or surgical facility that is providing emergency medical services.

- The reasonable testing of an emergency generator by any person provided that the testing is conducted between the hours of 7 a.m. and 7 p.m.

- Noise associated with routine property maintenance used either in part or in whole for residential purposes, provided activity takes place between 7 a.m. and 8 p.m. on any day except Sunday or between 10 a.m. and 8 p.m. on Sunday.

The project would also result in a significant impact if it would result in a substantial permanent increase in ambient noise levels in the vicinity. A substantial noise increase is defined as an increase of 10 CNEL above existing conditions as stated in the County's Noise Report Guidelines Section 4.1-A (ii) (County of San Diego 2009).

3.2 POTENTIAL OPERATIONAL NOISE IMPACTS (NONCONSTRUCTION NOISE)

Proposed project operational noise impacts were evaluated by review of the most recent project plans, proposed operations, and noise data. Traffic noise impacts were evaluated by review of data in the project traffic report, *Traffic Impact Study – Otay Ranch Resort Village Project* (Chen Ryan 2015).

3.2.1 Stationary Source Noise

Project implementation would create many instances of on-site residential land uses located adjacent to or sharing a boundary with general commercial, community commercial, and mixed-use land uses (see Appendix E, Land Use Diagram). These land uses would introduce new on-site stationary noise sources, including rooftop heating, ventilation, and air conditioning (HVAC) equipment; mechanical equipment including pump stations for wastewater conveyance; emergency electrical generators; parking lot activities; loading dock operations; and parks, schools, and recreation activities.

3.2.1.1 Mechanical Equipment

HVAC Equipment

HVAC equipment could be a primary noise source associated with commercial or industrial uses. HVAC equipment is often mounted on rooftops, located on the ground, or located within mechanical rooms. The noise sources could take the form of fans, pumps, air compressors, chillers, or cooling towers.

Noise levels from HVAC equipment vary substantially depending on unit efficiency, size, and location, but generally range from 45 to 70 dBA L_{eq} at a distance of 50 feet (EPA 1971). Accounting for typical attenuation rates of 6 dB per doubling of distance, noise levels attributed to unshielded HVAC mechanical systems could exceed the County noise limit (50 dBA L_{eq}) within 475 feet of the source. In addition, sources located within 800 feet of noise-sensitive land uses could exceed the County noise limit for nighttime stationary-source noise. As a result, the impact of noise from HVAC equipment under the proposed project would be **potentially significant.**

Wastewater Pump Stations

Pump stations (i.e., lift stations) are associated with the wastewater collection and conveyance systems of residential developments, in which changes in elevation due to varied topography, require pumps at specific locations in the wastewater pipeline system to pump the wastewater

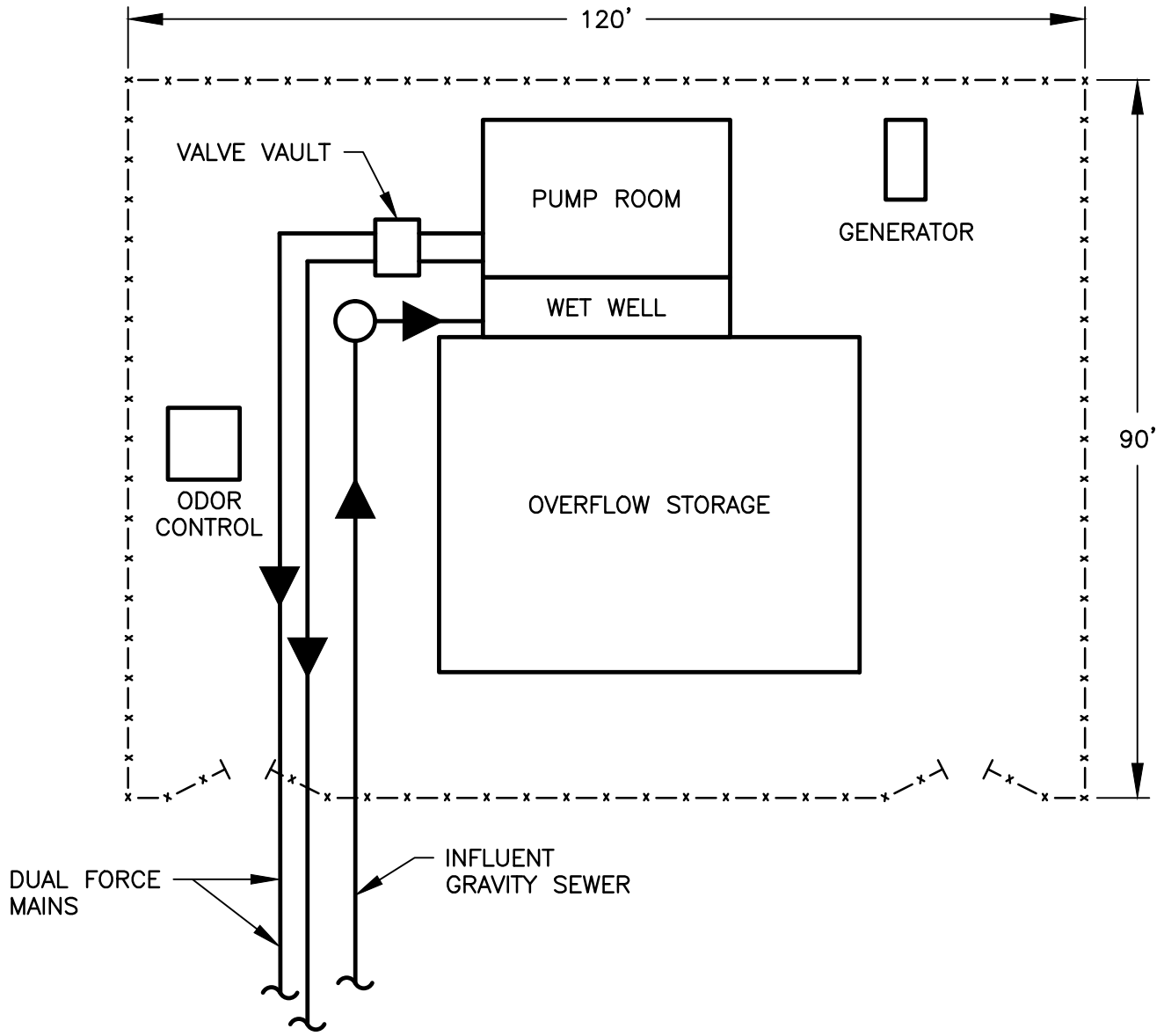
upgrade under pressure. The proposed project proposes three pump stations that would be required at the locations identified in Figures 6, 7, and 8.

The proposed pump stations would be constructed as both below- and above-grade (Figure 9). Three 30-HP pumps would be submersible below-grade in a wet well, and operate as needed based on wastewater flow demands, typically during and after peak water use in the morning and evening, and, to a lesser degree, at night. Based on similar enclosed pump stations, the pump operation would generate 45 dBA at 15 feet from the access hatch of the pump station. The County of San Diego noise ordinance sets an exterior hourly noise limit uses adjacent to residential properties of 50 dBA L_{eq} for daytime hours (7 a.m. to 10 p.m.) and 45 dBA L_{eq} during nighttime hours of (10 p.m. to 7 a.m.). Therefore, the operational pump noise would not exceed the County limit at surrounding property, if the pump station is located at least 15 feet from an adjacent property line. The pump stations access door will be located at least 15 feet from the pump station property line; therefore, this impact is considered **less than significant**.

The pump stations would also contain an emergency back-up generator, enclosed in the above-grade portion of the pump station, which, during a system power failure, would be activated and operational. To power two of the 30 HP pumps, a back-up generator of up to 80 kilowatts (kw) is needed if power is lost at the pump station. Operational noise level of the 80 kW generator is rated at 68 dBA at 23 feet. Therefore, the generator noise would attenuate to below the County limit of 45 dBA at approximately 400 feet from the pump station, assuming a drop-off rate of 6 dBA per doubling of distance. Any generator associated with the pump stations could generate noise levels exceeding applicable standards. This impact would be **potentially significant.**

3.2.1.2 Emergency Electrical Generators

Emergency generators may be used to supply necessary power requirements to vital systems within facilities constructed on the school, resort, public safety, and mixed-use land uses. Emergency generators are typically operated under two conditions: loss of main electrical supply or preventive maintenance/testing.



SOURCE:

Figure 9
Pump Station Site

Reference noise-levels of emergency generators with rated power outputs of 1,500 kilowatts are approximately 95 dBA at 7 meters (23 feet) (Cummins Power Generation 2009). Based on these reference noise levels, emergency electrical generators located within 3,500 feet of noise-sensitive land uses could exceed the County noise limit for daytime stationary-source noise. In addition, generators located within 6,000 feet of noise-sensitive land uses could exceed the County noise limit for nighttime stationary-source noise. Any generator could generate noise levels exceeding applicable standards. This impact would be **potentially significant.**

3.2.1.3 Emergency Facilities

The proposed land uses would also include emergency facilities such as fire stations that generate high noise levels from alarms and vehicle movements when station crews respond to emergency situations. The noise levels associated with the operation of emergency activities are exempt from the County Noise Ordinance and, thus, would not represent an impact.

3.2.1.4 Parking Lot Activities

Parking lots are expected be included in the commercial, school, 10.0-acre neighborhood park, and resort land uses. The details required to accurately predict noise emissions from car parking activities, location, size, and parking demand are not yet available. Therefore, the potential impact of noise generated by parking lot operations is evaluated in this analysis using a representative scenario.

Activities making up a single parking event included vehicle arrival, limited idling, occupants exiting the vehicle, door closures, conversations among passengers, occupants entering the vehicle, startup, and departure of the vehicle. A representative parking lot with 200 stalls and 400 parking events per hour would produce a noise level that exceeds the County standard for the daytime at distances up to 200 feet and exceeds the nighttime noise standard at distances up to 350 feet. It is possible that the distance between parking lots and residential land uses would be less than 350 feet because shared boundaries between commercial and school land uses exist under the proposed project. Therefore, the impact of noise generated from parking lot activities is considered a **potentially significant impact**.

3.2.1.5 Loading Dock and Delivery Activities

Loading docks and delivery activities are expected be included in the commercial and resort land uses. Noise sources associated with loading dock and delivery activities can include trucks idling, on-site truck circulation, trailer-mounted refrigeration units, pallets dropping, and the operation of forklifts. Noise monitoring at loading docks previously undertaken by AECOM indicates that typical hourly average noise levels range from 55 to 60 dBA L_{eq} and from 80 to 84 dBA L_{max} at a distance of 50 feet (AECOM 2006). Based on these previously measured noise levels, the County's daytime stationary noise criterion would be exceeded approximately 125 feet from the acoustic center of the loading dock and the nighttime stationary noise criterion would be exceeded approximately 200 feet from the acoustic center of the loading dock.

It is possible that the distance between loading docks and residential land uses could be less than 200 feet because shared boundaries between commercial and residential land uses are planned under the proposed project. Therefore, noise generated from loading dock and delivery activities is considered a **potentially significant impact**.

3.2.1.6 Recreational and Educational Activities

Activities in the proposed parks, open spaces, and schools would also be sources of noise. The County Noise Ordinance considers noise from public or private schools exempt from the Code. Noise associated with outdoor recreation areas would generally take place during daylight hours and at distances at least 50 feet from on-site residences. In addition, any activities taking place within parks considered a nuisance would be illegal under the County Noise Ordinance and would be enforced by law enforcement officers. Thus, since noise would either be exempted from standards or controlled by law enforcement, no standard violation would be expected to occur from recreational and education activities. This impact is considered **less than significant**.

3.2.2 Mitigation and Noise Abatement Measures

3.2.2.1 Mitigation Measures

Implementation of mitigation measures is required by the project in order for all noise standards to be obtained.

MM N-2: Implement best design considerations and shielding when installing stationary noise sources associated with HVAC systems and standby generators.

The following stationary source noise mitigation measure is required to minimize noise impacts to sensitive receptors:

- Prior to the issuance of a building permit, the applicant, or its designee, shall prepare an acoustical study(s) of proposed mechanical equipment including generators, which will identify all noise-generating equipment (including emergency generators and generators associated with the proposed sewer pump stations), predict noise levels at property lines from all identified equipment, and recommend mitigation to be implemented (e.g., enclosures, barriers, site orientation), as necessary, to comply with the County Noise Ordinance Section 36.404.

Implementation: Project applicant(s) and primary contractor(s) of all project phases involving blasting.

Timing: Prior to design and implementation of on-site stationary noise sources, such as HVAC systems and standby generators.

Enforcement: County

MM N-3: Implement best design considerations and shielding when developing site plans for commercial land uses containing loading docks, delivery areas, and parking lots.

The following stationary source noise mitigation measure is required to minimize noise impacts to receptors:

- Prior to the issuance of a building permit, the applicant, or its designee, will prepare an acoustical study(s) of proposed commercial land use site plans, which will identify all noise-generating areas and associated equipment, predict noise levels at property lines from all identified areas, and recommend mitigation to be implemented (e.g., enclosures, barriers, site orientation, reduction of parking stalls), as necessary, to comply with the County Noise Ordinance Section 36.404.

Implementation: Project applicant(s) and primary contractor(s) of all project phases involving blasting.

Timing: Prior to design and implementation of development of commercial areas.

Enforcement: County

Implementation of MM N-2 and MM N-3 would ensure that stationary noise sources associated with the proposed project would be reduced to a less-than-significant level at the nearest NSLUs.

Summary

MM N-2 and MM N-3 would ensure that stationary noise sources associated with the proposed project would be reduced to a less-than-significant level at the property lines pursuant to the Noise Ordinance Section 36.404 and nearest sensitive land uses.

3.3 POTENTIAL GENERAL CONSTRUCTION NOISE IMPACTS

The proposed project includes development of a variety of mixed uses (i.e., residential, commercial, schools, community parks, and open space land uses) and supporting on-site roadway and infrastructure improvements. Construction of the proposed land uses and improvements would occur throughout the specific plan area, in a sequence established by individual land owners (project applicant[s]) and influenced by market demand.

Construction noise typically occurs intermittently and varies depending upon the nature or phase of construction (e.g., demolition/land clearing, soil grading and excavation, rock drilling/blasting and breaking, building erection). Construction noise in any one particular area would be temporary and short-term and would include noise from activities such as site preparation, truck hauling of material, pouring of concrete, and use of power tools. Noise would also be generated by construction equipment, including earthmovers, material handlers, and portable generators, and could reach high levels for brief periods.

3.3.1 Grading and Site Preparation

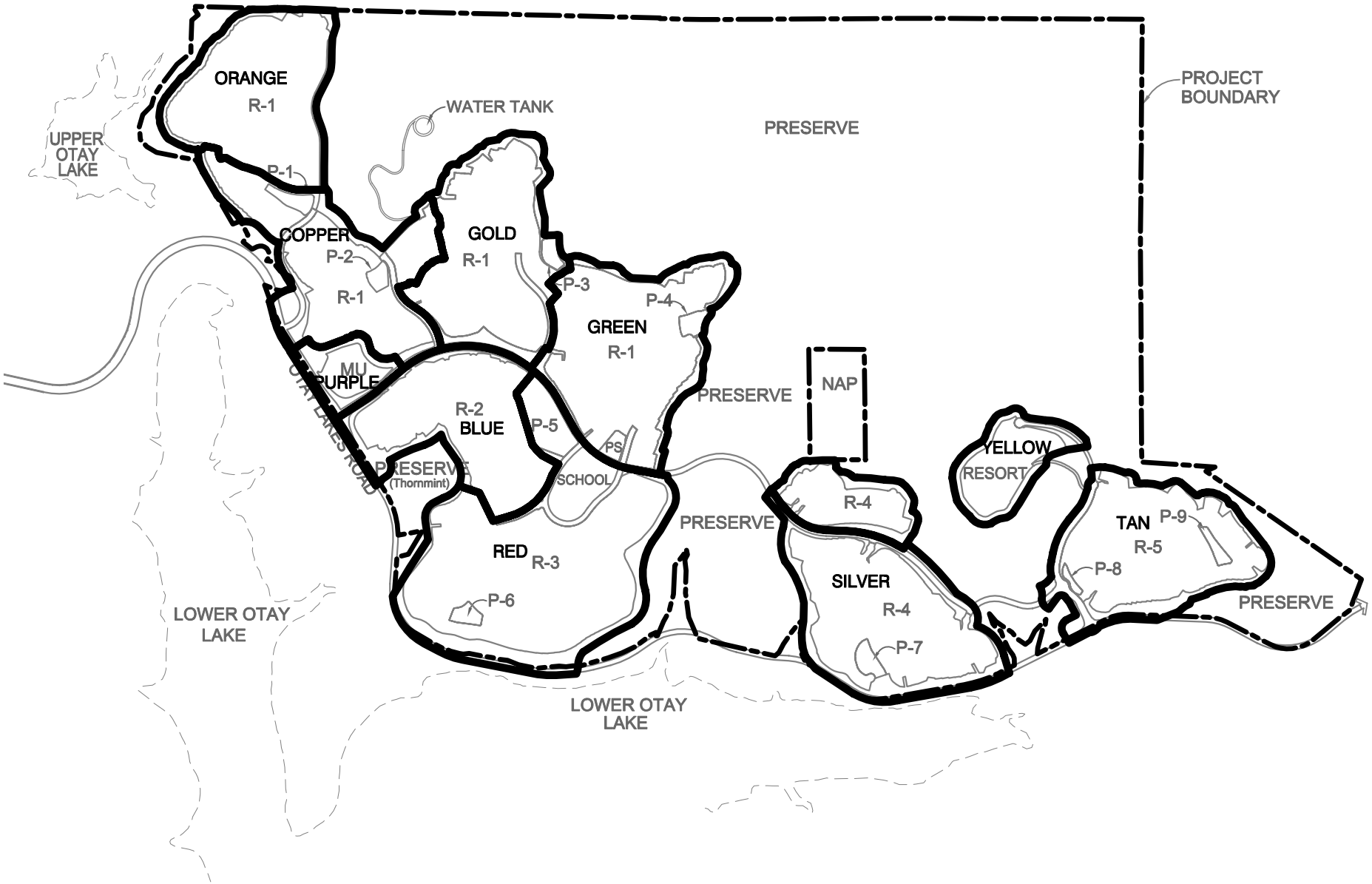
Although noise ranges are generally similar for all construction phases, the grading phase tends to involve the most equipment. The noisiest equipment types operating at construction sites typically

range from 88 dB to 91 dB L_{max} at 50 feet. Table 5 provides a list of noise generation levels for various types of construction equipment that could be used for the construction of the proposed project. Typical operating cycles may involve 2 minutes of full power, followed by 3 or 4 minutes at lower settings. Average noise levels at construction sites typically range from approximately 65 to 88 dB L_{eq} at 50 feet, depending on the activities performed.

Grading activities generate the greatest amount of noise, as this phase requires the largest and heaviest pieces of equipment. It is anticipated the development would involve phased grading on-site (Figure 10), which may overlap with the roadway grading activities associated with the widening and realignment of Otay Lakes Road. The phased grading of the site would occur non-sequentially over the 11 year development period, to allow the development to be adjusted to market changes, economic conditions, and regulatory constraints. Figure 10 provides the footprints of proposed phases labeled as colors. Phased development is anticipated to occur from west to east across the project site (e.g., sequence of blue, green, gold, copper, and orange phases), potentially with overlapping grading phases and periods of no grading activities. The nearest existing NSLU property line (2691 Otay Lakes Road) to the project site is approximately 1,250 feet west of the nearest point of construction for the proposed development.

The actual residence is located approximately 1,700 feet west of the nearest project boundary. At the property line (approximately 1,250 feet from the nearest project boundary, short-term noise levels may reach as high as 62 dBA for short periods, typically less than 30 seconds, when several pieces of equipment are in proximity and the engines are under full load. Average hourly noise levels would be substantially lower and would attenuate to 60 dBA L_{eq}; thus, the proposed project would not violate the noise ordinance and, therefore, the impact is considered **less than significant.**

Construction grading may also involve blasting to break up bedrock close to the ground surface. Use of impulsive noise equipment, e.g., jack hammers, backhoe rams, rock drills, rock crushers, etc., or explosives blasting, are further discussed below in Section 3.4. Blasting requires drilling holes in the rock to be blasted and loading the holes with explosives. The primary noise source of drill-blast operations is the drilling and not the blasting due to short duration of the blast compared to the longer drilling activity. Rock drills generate airborne noise levels of approximately 80 to 98 dB at a distance of 50 feet. Drilling holes for a blasting event can last



SOURCE:

Figure 10
Phasing Plan

from several hours to several days depending upon the rock type, area of rock to be blasted, number of holes, the depth of the holes, and the effort required to drill through the rock. Noise generated by blasting is very low in frequency, below the frequency range audible to humans. No more than one blast would occur in any one area per day because of the time required to drill the holes as well as insert and connect the blasting materials. Residences in proximity to drill-blast areas would be subject to intermittent drilling and blasting activities over several months. After each blast, several days to a couple of weeks are required to remove blasted material before the next drilling and blasting sequence.

Potential blasting locations have not been identified at this time. Assuming drilling and blasting activities are conducted in proximity to residences, the loudest drill, operating continuously for eight hours for one blast to be conducted, would generate an 8-hour average noise level of approximately 98 dB at 50 feet, which would attenuate to below the County's noise ordinance criteria of 75 dBA averaged over an 8-hour period (Section 36.409) at approximately 800 feet or greater, depending upon the local site surface and whether any intervening topography or structures exist, and without noise mitigation. Without this setback, **potentially significant impacts** could occur.

Rock crushing of the blasted materials for reuse as aggregate may also occur on-site. A rock crusher generates higher noise levels than typical construction equipment as noise is generated by the breaking of rocks as well as the diesel engine operating the crusher. However, because it does not move, and the material stockpiles can be located in proximity, the work area is easier to define for a rock crushing operation. Rock crushing would typically include the use of a dozer and a loader for loading the rock crusher. The combined noise level from all these pieces of equipment would be on the order of 92 dBA L_{eq} at 50 feet and 95 dBA L_{max} at 50 feet. As no potential location for rock crushing onsite have been identified, noise abatement has been included that would provide adequate setbacks to limit rock crushing noise levels at surrounding property lines and for on-site property lines if necessary to comply with County standards. Based on a conservative attenuation rate of 6 dBA per doubling of distance, noise levels from rock crushing activities would attenuate to 75 dBA L_{eq} at approximately 350 feet, which would comply with the County's noise level limit for construction noise. Without this setback, **potentially significant impacts** could occur.

In addition to on-site construction, off-site construction would be required for improvements along Otay Lakes Road, west of Wueste Road. Improvements to Otay Lakes Road west of the project site include grading; trenching for utilities such as sewer and water, and paving. Unlike construction associated with on-site development, roadway construction would be linear and usually extends up to 400 feet along a roadway's alignment. Thus, roadway construction noise levels are typically 72 dBA L_{eq} or lower at 50 feet from the edge of roadway construction. During maximum effort with several pieces of equipment operating at the same time in proximity or during pavement removal, maximum noise levels of 76 dBA L_{max} may be experienced at local residences; however, these would last for less than a few seconds at any specific time. Noise levels on this order would not exceed the County's construction noise levels limits and impacts would be less than significant. Noise levels on this order would not exceed the County's construction noise level limits and impacts would be **less than significant**.

Project construction would also result in a short-term increase in traffic on the local area's roadway network, but this increase would not be sufficient to increase traffic noise levels a substantial amount. It is expected that up to 160 employee commute trips would occur during the periods of maximum construction activity. Construction-related traffic would be distributed over the roadway network identified in the *Otay Ranch Resort Village Construction Related Traffic Analysis Memorandum* (Traffic Memorandum) (Fehr and Peers 2011).

Typically, traffic volumes must double to create an increase in perceptible (3 dBA) traffic noise (Caltrans 2009). The addition of construction-related trips to the roadway network would result in a maximum daily noise increase of 2 CNEL and 2 dBA L_{eq} during the AM peak hour. Construction trips would not affect the PM peak hour (see construction traffic modeling results in Appendix D). Therefore, construction traffic would not result in a 3 dBA increase in the daily or peak hour traffic noise levels. Furthermore, project construction traffic would not result in changes to LOS operations on the affected roadways (see Table 3A of the Traffic Memorandum). Therefore, the additional construction-related traffic would have a **less-than-significant** temporary increase in overall traffic noise levels.

Additional noise-sensitive receptors that could potentially be affected by construction activities are future on-site residences that would be built prior to the final development of the project site. While a complete phasing plan is not available, it has been assumed that future residential development sites would be separated by roadways and would be as near as 50 feet from active

construction. At a distance of 50 feet, noise levels could reach as high as 88 dBA L_{max} during peak construction activity at site boundaries. Such levels could create temporary annoyance; however, it should be noted that peak noise levels would occur only sporadically since not all equipment would be operating at all times. Also, most construction activity would actually take place at longer distances from the receivers. The average noise levels at 50 feet would be at or below 75 dBA L_{eq}.

Construction noise levels would be temporary in nature at any individual construction site and would not exceed County noise level standards for construction activities. No construction work would be performed during hours prohibited by the County Noise Ordinance. Therefore, this impact would be **less than significant.**

While there would be no significant construction noise impact, and no mitigation measures would be required, associated construction activities have the potential to generate sporadic short-term noise levels during peak construction activity in excess of 75 dBA L_{eq} at future residential properties. Therefore, noise abatement measures have been identified that would reduce potential annoyance associated with construction noise.

3.3.2 Mitigation and Noise Abatement Measures

3.3.2.1 Mitigation Measures

MM N-4: Implement minimum setback distances from nearest occupied property lines to comply with County noise standards when drilling and crushing rock associated with blasting activities.

The following rock drilling noise mitigation measure is required to minimize noise impacts to sensitive receptors:

- Construction equipment associated with blasting (ex. Rock drilling) shall comply with the County Noise Ordinance, Section 36.408, 36.409, and 36.410. If drilling is to occur within 800 feet of an occupied property line, noise measures such as (but not limited to) temporary noise barriers and blankets, increased setbacks, limiting construction

equipment operations, and any other methods specified within the blasting plan must be implemented to comply with County Noise Ordinance requirements.

The following rock crushing noise mitigation measure is required to minimize noise impacts to sensitive receptors:

- All rock crushing activities shall be located a minimum distance of 350 feet from the nearest property line where an occupied structure is located and shall comply with County noise standards pursuant to County Code Noise Ordinance, Section 36.409. The 350-foot setback distance may be reduced if a noise study is conducted for rock processing activities and noise levels of such activities are within acceptable County limits at modified distances determined by the noise study.

Implementation: Project applicant(s) and primary contractor(s) of all project phases involving blasting.

Timing: Prior to rock drilling and blasting activities.

Enforcement: County

Implementation of MM N-4 would ensure that rock drilling and crushing noise associated with rock blasting for the proposed project would be reduced to a less-than-significant levels at the nearest NSLUs.

3.3.2.2 Noise Abatement Measures

NA-1 All construction equipment shall be properly maintained and equipped with noise-reduction intake and exhaust mufflers and engine shrouds, in accordance with manufacturers' recommendations. Equipment engine shrouds shall be closed during equipment operation.

NA-2 Whenever feasible, electrical power shall be used to run air compressors and similar power tools.

NA-3 Equipment staging areas should be located as far as feasible from occupied residences or schools.

NA-4 For all construction activity on the project site, noise attenuation techniques should be employed as needed to ensure that noise remains below 75 dBA L_{eq} at future residences. Such techniques may include, but are not limited to, the use of sound blankets on noise-generating equipment and the construction of temporary sound barriers adjacent to construction sites, between affected uses.

Summary

Implementation of MM N-4, NA-1, NA-2, NA-3, and NA-4 would ensure that construction noise sources associated with the proposed project would be reduced to a less-than-significant level at the nearest sensitive land uses.

3.4 POTENTIAL IMPULSIVE NOISE IMPACTS

Impulsive noise sources associated with construction activities generated by project implementation could include blasting to break up bedrock close to the surface in the hills on the project site. Using explosives to break rock generates low frequency sound waves that can structurally damage buildings. However, techniques have been developed that allow blasting to be conducted in relative proximity to buildings without causing damage. The vibration and groundborne noise levels that would be produced by blasting are described in Chapter 4. No operational impulsive noise sources would be created by the proposed project.

The sudden and intense airborne noise potential created by a blast could create localized ground-borne vibrations. The character of the blast and ground vibrations would be dependent on such factors as soil and rock type, amount and type of explosive used, depth below surface, and meteorological conditions. Drilling and blasting consists of drilling a pattern of holes in the face of the rock; loading the holes with explosives; detonating the explosives; ventilating the blasting gasses; and mucking the blasted rock. The primary noise source of drill-blast operations is the drilling and not the blasting due to short duration of the blast compared to the longer drilling activity. Residences in proximity to drill-blast areas would be subject to intermittent drilling and

blasting activities over several months. After each blast, several days to a couple of weeks are required to remove blasted material before the next drilling and blasting sequence.

Drilling into the rock is necessary to create bore holes for the blasting materials. Rock drills generate airborne noise levels of approximately 80 to 98 dB at a distance of 50 feet. Drilling holes for a blasting event can last from several hours to several days depending upon the rock type, area of rock to be blasted, number of holes, the depth of the holes, and the effort required to drill through the rock. No more than one blast would occur in any one area per day because of the time required to drill the holes as well as insert and connect the blasting materials.

Potential blasting locations have not been identified at this time. Assuming drilling and blasting activities are conducted in proximity to residences, the loudest drill, operating continuously for eight hours for one blast to be conducted, would generate an 8-hour average noise level of approximately 98 dB at 50 feet, which would attenuate to below the County's noise ordinance criteria of 75 dBA averaged over an 8-hour period (Section 36.409) at approximately 800 feet or greater, depending upon the local site surface and whether any intervening topography or structures exist, and without noise mitigation. Without this setback, **potentially significant impacts** could occur.

3.4.1 Mitigation Measures

MM N-4: Implement minimum blasting setback distances from occupied property lines and comply with County noise standards, when drilling and crushing rock associated with blasting activities.

MM N-5: Prepare and implement a blast plan and monitor and record each blast near sensitive receptors.

To reduce impacts associated with air blast over-pressure generated by project-related construction activities, the project applicant(s) of all project phases shall conform to the following requirements:

- All blasting shall be performed by a blast contractor and blasting personnel licensed to operate in San Diego County.

- Each blast shall be monitored and recorded with an air blast over-pressure monitor and groundborne vibration accelerometer approved by the County that is located outside the closest residence to the blast.

- A blasting plan, including estimates of the air blast over-pressure level and groundborne vibration at the residence closest to the blast, shall be submitted to the County for review prior to the first blast. Blasting shall not commence until the County has approved the blast plan.

- Blasting shall not exceed 0.1 in/sec peak particle velocity (PPV) at the nearest occupied residence in accordance with the County's Noise Guidelines Section 4.3, Table 4, Note 6.

- Blasting shall not be conducted within 1,000 feet of on- or off-site sensitive receptors unless the blasting study concludes that a distance less than 1,000 feet is within an acceptable noise level, and a blasting plan is implemented which specifies this reduced setback.

- Construction equipment associated with blasting (ex. Rock drilling) shall comply with the County Noise Ordinance, Section 36.408, 36.409, and 36.410. If drilling is to occur within 800 feet of an occupied property line, noise measures such as (but not limited to) temporary noise barriers and blankets, increased setbacks, limiting construction equipment operations, and any other methods specified within the blasting plan must be implemented to comply with County Noise Ordinance requirements.

Implementation: Project applicant(s) and primary contractor(s) of all project phases involving blasting.

Timing: Prior to and during project-related blasting activities.

Enforcement: County

Summary

Implementation of MM N-4 and MM N-5 would ensure that impulsive noise sources associated with the proposed project would be reduced to a less-than-significant level at the nearest sensitive land uses.

3.5 CUMULATIVE OR COMBINED NOISE IMPACTS

Project implementation would result in significant noise impacts associated with construction activities; increases in traffic noise levels at existing and potential future noise-sensitive receptors in some roadway segments where the project is forecast to increase traffic volumes; and the creation of noise-sensitive land uses in areas where traffic noise levels are forecast to exceed County noise standards.

Noise is a localized occurrence and attenuates rapidly with distance. Therefore, only future development projects in the direct vicinity of the project site could add to construction or stationary source noise generated by the project and result in a cumulative noise impact.

The areas surrounding the project site are developed residential areas and thus generate a similar level of noise as the residential portion of the proposed project and a lower level of stationary source noise than the commercial portion of the proposed project. It is unlikely that project implementation would create cumulative impacts due to stationary source noise because the surrounding developments and much of the development proposed at the boundaries of the project site is residential development. Additionally, commercial development would be located at such a distance (approximately 2 miles, the Olympic Training Center) as to not contribute to cumulative impacts. In addition, MM N-2 would ensure that stationary source noise associated with the project would conform to County standards. Therefore, it is concluded that this potentially significant cumulative impact is unlikely to occur.

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4.0 VIBRATION AND NOISE IMPACTS

4.1 GUIDELINES FOR THE DETERMINATION OF SIGNIFICANCE

Project implementation could expose the uses listed in Tables 15 and 16 to groundborne vibration and noise levels equal to or in excess of the levels shown.

Table 15
Guidelines for Determining the Significance of Groundborne Vibration and Noise Impacts

Land Use Category	Groundborne Vibration Impact Levels (inches/sec rms)		Groundborne Noise Impact Levels (dB re 20 micro Pascals)	
	Frequent Events[1]	Occasional or Infrequent Events[2]	Frequent Events[1]	Occasional or Infrequent Events[2]
Category 1: Buildings where low ambient vibration is essential for interior operations (research & manufacturing facilities with special vibration constraints)[6]	0.0018[3]	0.0018[3]	Not applicable[4,5]	Not applicable[4,5]
Category 2: Residences and buildings where people normally sleep (hotels, hospitals, residences, & other sleeping facilities)[6]	0.0040	0.010	35 dBA	43 dBA
Category 3: Institutional land uses with primarily daytime use (schools, churches, libraries, other institutions, & quiet offices)[6]	0.0056	0.014	40 dBA	48 dBA

[1] "Frequent Events" is defined as more than 70 vibration events per day. Most rapid transit projects fall into this category.
[2] "Infrequent Events" is defined as fewer than 70 vibration events per day. This category includes most commuter rail systems.
[3] This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration-sensitive manufacturing or research will require detailed evaluation to define acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the HVAC systems and stiffened floors.
[4] Vibration-sensitive equipment is not sensitive to groundborne noise.
[5] There are some buildings, such as concert halls, TV and recording studios, and theaters that can be very sensitive to vibration and noise but do not fit into any of the three categories. Table 16 gives criteria for acceptable levels of groundborne vibration and noise for these various types of special uses.
[6] For Categories 2 and 3 with occupied facilities, isolated events such as blasting are significant when the peak particle velocity (PPV) exceeds 1 inch per second. Nontransportation vibration sources such as impact pile drivers or hydraulic breakers are significant when their PPV exceeds 0.1 inch per second. More specific criteria for structures and potential annoyance were developed by Caltrans (2004) and will be used to evaluate these continuous or transient sources in the County of San Diego.

Source: FTA 2006

4.2 POTENTIAL AND MITIGATED NOISE IMPACTS

Construction activities produce varying degrees of ground vibration, depending on the equipment and methods employed. While ground vibrations from typical construction activities very rarely reach levels high enough to cause damage to structures, special consideration must be made when

sensitive or historic land uses are near the construction site. The construction activities that typically generate the highest levels of vibration are blasting and impact pile driving.

Table 16
Guidelines for Determining the Significance of Groundborne Vibration and Noise Impacts for Special Buildings

Type of Building or Room	Groundborne Vibration Impact Levels (inches/sec rms)		Groundborne Noise Impact Levels (dB re 20 micro Pascals)	
	Frequent Events[1]	Occasional or Infrequent Events[2]	Frequent Events[1]	Occasional or Infrequent Events[2]
Concert Halls, TV Studios, and Recording Studios	0.0018	0.0018	25 dBA	25 dBA
Auditoriums	0.0040	0.010	30 dBA	38 dBA
Theaters	0.0040	0.010	35 dBA	43 dBA

[1] "Frequent Events" is defined as more than 70 vibration events per day. Most rapid transit projects fall into this category.
[2] "Infrequent Events" is defined as fewer than 70 vibration events per day. This category includes most commuter rail systems.
Source: FTA 2006

No operational components of the proposed project include significant groundborne noise or vibration sources and no significant vibrations sources currently exist, or are planned, in the project area. Thus, no significant groundborne noise or vibration impacts would occur with the operation of the proposed project.

4.2.1 Construction Equipment

As discussed above, on-site construction equipment that would cause the most noise and vibration would be associated with site grading. According to the Federal Transit Administration (FTA), vibration levels associated with the use of bulldozers range from approximately 0.003 to 0.089 in/sec PPV and 58 to 87 vibration decibels (VdB referenced to 1 microinch per second and based on the root mean square [RMS] velocity amplitude) at 25 feet, as shown in Table 17. Using FTA's recommended procedure for applying a propagation adjustment to these reference levels, vibration levels would exceed County-recommended thresholds (0.0040 PPV) within 200 feet of bulldozers and 180 feet of trucks. The nearest residence to these activities could be a minimum of 50 feet across an established roadway during the second development phase.

Therefore, vibration levels could exceed the FTA-recommended standard of 0.0040 in/sec PPV. This impact would be **potentially significant.**

Table 17
Typical Construction Equipment Vibration Levels

Equipment	PPV at 25 feet (in/sec)[1]	Approximate L_v at 25 feet[2]
Large Bulldozer	0.089	87
Trucks	0.076	86
Jackhammer	0.035	79
Small Bulldozer	0.003	58

[1] Where PPV is the peak particle velocity
[2] Where L_v is the velocity level in decibels (VdB) referenced to 1 microinch/second and based on the root mean square (RMS) velocity amplitude.
Source: FTA 2006

4.2.2 Construction Blasting

Due to the geologic character of the project site, explosive blasting and/or on-site rock breaking is anticipated during site preparation activities for the proposed project. Thus, significant vibrations or groundborne noise impacts may be associated with construction of the proposed project. At the current stage of the project design, a blasting study has not been completed and no specific blasting timelines, blast numbers, or locations are proposed or available.

When explosive charges detonate in rock, almost all of the available energy from the explosion is used in breaking and displacing the rock mass. However, a small portion of the energy is released in the form of vibration waves that radiate away from the charge location. The strength, or "amplitude," of the waves reduces as the distance from the charge increases. The rate of amplitude decay depends on local geological conditions but can be estimated with a reasonable degree of consistency, which allows regulatory agencies to control blasting operations by means of relationships between distance and explosive quantity. Very high blast over-pressure levels can rattle or sometimes break windows. However, air-blast over pressure rarely reaches levels that could cause building damage with modern blasting practices. Exact blast charge weights and

locations are not known at this time; thus, air blast pressures cannot be predicted. Therefore, since it is feasible that some damage may occur, this impact is **potentially significant.**

The explosive charges used in mining and mass grading are typically wholly contained in the ground. The nearest residential receptor to the blasting activities, a single-family residence northwest of the project site, is approximately 1,700 feet from the nearest potential blasting site. At this distance, it is unlikely that blasting vibration or materials handling would generate substantial groundborne vibration or noise impacts. However, as no geotechnical data or blasting and materials handling plans are available, a noise analysis assessing the proposed blasting and materials handling associated with the proposed project would be required prior to issuance of County grading permits.

4.2.3 Mitigation Measures

MM N-5: Prepare and implement a blast plan and monitor and record each blast near sensitive receptors.

MM N-6: Restrict heavy-equipment operations in areas with inhabited residential units.

To reduce impacts associated with groundborne vibration generated by project-related construction activities, the project applicant(s) of all project phases shall conform to the following requirements:

- No heavy equipment shall be operated within 200 feet of any inhabited on-site residence.
- Rock blasting shall not be performed within 1,000 feet of a residential structure.
- A vibration analysis assessing the proposed blasting and materials handling associated with proposed project shall be submitted to the County for review prior to the first blast. Blasting shall not commence until the County has approved the plan.

Implementation: Project applicant(s) and primary contractor(s) of all project phases involving blasting.

Timing: Prior to and during construction activities.

Enforcement: County

Summary

Implementation of MM N-5 and MM N-6 would ensure that groundborne vibration sources associated with blasting and equipment from the proposed project would be reduced to a less-than-significant level at the nearest sensitive land uses.

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5.0 SUMMARY OF PROJECT IMPACTS, MITIGATIONS, AND CONCLUSIONS

The preceding analysis provides an evaluation of the land use compatibility of the proposed land uses with the existing and future noise environment of the project site, potential noise and vibration impacts due to construction of the proposed project, and the direct and indirect noise generated by operation of the proposed project.

5.1 LAND USE COMPATIBILITY

The majority of the residential land uses planned for the project site would be compatible with the existing and future noise environment, with the exception of the proposed residential lots located along Otay Lakes Road and other internal roadways. In this location, buildout noise levels would exceed the 60 CNEL noise level standard. Table 7 describes lot locations and wall heights required to reduce noise levels below 60 CNEL.

None of the proposed noise-sensitive land uses would be adversely affected by aircraft operations at the John Nichols Airfield. The majority of potential noise effects are either less than significant or would be mitigated to less-than-significant levels by the measures identified in this report.

5.1.1 Mitigation Measures

The following traffic noise mitigation measures are required to minimize noise impacts to receptors:

MM N-1: The following traffic noise mitigation measures are required to minimize noise impacts to receptors:

- The project proponent shall prepare a noise protection easement for those lots identified in bold in Table 7 and shown in Figures 6, 7, and 8. The noise protection easement language shall contain a restriction stating that the structure and the outdoor activity area will be placed such that a noise barrier will complement the residences' architecture, reduce noise levels at outdoor activity areas to within acceptable standards, and will not incorporate a solid (opaque) wall in excess of 10 feet.

- Prior to approval of the Final Map, the applicant shall dedicate to the County "noise protection easements" on each of the lots identified in bold in Table 7 and shown in Figures 6, 7, and 8. These easements are for the protection of noise-sensitive locations from excessive traffic noise. The noise protection easements shall be shown on the Final Map.

- For any lot shown to be exposed to noise levels exceeding 60 CNEL, an acoustical study shall be prepared with the building permit submittal based on noise barrier placement and the design and construction of the home to demonstrate that interior noise levels would not exceed 45 CNEL.

- The project proponent shall construct a noise barrier at the top of slope and at the back of yards for any NSLU that is exposed to a CNEL exceeding 60 dBA, as described in Table 7. The barrier shall be, at a minimum, the height specified in Table 7. Barriers may be constructed of masonry, wood, and transparent materials, such as glass or Lucite. Earthen berms or a combination of berms and walls would also provide noise attenuation.

- Noise barriers, as described above, would not reduce noise levels to the second-story elevations of homes due to their height above the noise barrier. Where two-story homes are forecast to exceed 60 CNEL without abatement (see Table 7), the Building Permit applicant would have to demonstrate that interior noise levels due to exterior noise sources would not exceed 45 CNEL. In these cases, it is anticipated that the typical method of compliance would be to provide the homes with air conditioning or equivalent forced air circulation to allow occupancy with closed windows, which, for most residential construction, would provide sufficient exterior-to-interior noise attenuation.

Implementation: Project applicant(s) and primary contractor(s) of all project phases involving blasting.

Timing: Prior to design and implementation of development of on-site residential areas.

Enforcement: County

Summary

Implementation of MM N-1 would ensure that traffic noise sources associated with area traffic would be reduced to a less-than-significant level at the nearest sensitive land uses.

5.2 OPERATION

Stationary noise sources associated with the proposed project would include mechanical equipment associated with the residential and commercial developments, emergency generators and services, parking lots, delivery activities associated with the commercial land uses, and recreational and educational activities. At this stage of project development, the data necessary to evaluate non-exempt sources are unavailable; therefore, mitigation measures have been included that require the developer to prepare an acoustical study to identify potential impacts and mitigate them as necessary.

5.2.1 Mitigation Measures

The following stationary source noise mitigation measures are required to minimize noise impacts to receptors:

MM N-2: Implement best design considerations and shielding when installing stationary noise sources associated with HVAC systems and standby generators.

The following stationary source noise mitigation measure is required to minimize noise impacts to receptors:

- Prior to the issuance of a building permit, the applicant, or its designee, shall prepare an acoustical study(s) of proposed mechanical equipment, which will identify all noise-generating equipment, predict noise levels at property lines from all identified equipment, and recommend mitigation to be implemented (e.g., enclosures, barriers, site orientation), as necessary to comply with the County Noise Ordinance Section 36.404.

Implementation: Project applicant(s) and primary contractor(s) of all project phases involving blasting.

Timing: Prior to design and implementation of on-site stationary noise sources, such as HVAC systems and standby generators.

Enforcement: County

MM N-3: Implement best design considerations and shielding when developing site plans for commercial land uses containing loading docks, delivery areas, and parking lots.

The following stationary source noise mitigation measure is required to minimize noise impacts to receptors:

- Prior to the issuance of a building permit, the applicant, or its designee, shall prepare an acoustical study(s) of proposed commercial land use site plans, which shall identify all noise-generating areas and associated equipment, predict noise levels at property lines from all identified areas, and recommend mitigation to be implemented (e.g., enclosures, barriers, site orientation, reduction of parking stalls), as necessary, to comply with the County Noise Ordinance Section 36.404.

Implementation: Project applicant(s) and primary contractor(s) of all project phases involving blasting.

Timing: Prior to design and implementation of development of commercial areas.

Enforcement: County

Summary

The analysis of future off-site traffic noise levels has shown that project-related traffic itself would not result in a direct noise-related significant impact, i.e., traffic generated by the project would increase noise levels along affected roadways with off-site sensitive receptors by less than 5 dBA. MM N-2 and MM N-3 would ensure that stationary noise sources associated with the proposed project would be reduced to a less-than-significant level at the nearest sensitive land uses.

5.3 CONSTRUCTION

Construction noise levels from the proposed project would result primarily from the operation of construction vehicles and equipment for site grading and construction of new facilities. Off-site construction-related traffic increases would not result in substantial increases in noise levels. On-site construction of the proposed project could generate significant short-term noise increases to adjacent residential properties. However, based on the analysis in Chapter 3, hourly noise levels (54 dBA L_{eq}) would not exceed the limits of the County noise ordinance of 75 dBA L_{eq}, as construction activities would be restricted by the provisions outlined in the County Noise Ordinance and, therefore, construction noise impacts would be less than significant. Additionally, design considerations for construction noise abatement are outlined and recommended to further reduce construction noise levels.

Blasting activities associated with site grading could exceed County noise and vibration thresholds, thus MM N-4 and MM N-5 are required to reduce blasting impacts to a less-than-significant level.

MM N-6 would ensure that vibration from construction equipment would occur at sufficient distances from structures such that the vibration generated would not exceed the vibration guideline at the structure.

5.3.1 Mitigation Measures

The following mitigation and noise abatement measures would minimize noise impacts to sensitive noise receptors during construction:

MM N-4: Implement minimum setback distance from occupied structure and comply with County noise standards, when crushing rock associated with blasting activities.

The following rock crushing noise mitigation measure is required to minimize noise impacts to sensitive receptors:

- All rock crushing activities shall be located a minimum distance of 350 feet from the nearest property line where an occupied structure is located and shall comply with County noise standards pursuant to County Code Noise Ordinance, Section 36.409. The

350-foot setback distance may be reduced if a noise study is conducted for rock processing activities and noise levels of such activities are within acceptable County limits at modified distances determined by the noise study.

Implementation: Project applicant(s) and primary contractor(s) of all project phases involving blasting.

Timing: Prior to rock drilling and blasting activities.

Enforcement: County

Implementation of MM N-4 would ensure that rock crushing noise associated with rock blasting for the proposed project would be reduced to a less-than-significant levels at the nearest NSLUs.

MM N-5: Prepare and implement a blast plan and monitor and record each blast near sensitive receptors.

To reduce impacts associated with air blast over-pressure generated by project-related construction activities, the project applicant(s) of all project phases shall conform to the following requirements:

- All blasting shall be performed by a blast contractor and blasting personnel licensed to operate in San Diego County.

- Each blast shall be monitored and recorded with an air blast over-pressure monitor and groundborne vibration accelerometer approved by the County that is located outside the closest residence to the blast.

- A blasting plan, including estimates of the air blast over-pressure level and groundborne vibration at the residence closest to the blast, shall be submitted to the County for review prior to the first blast. Blasting shall not commence until the County has approved the blast plan.

- Blasting shall not exceed 0.1 in/sec peak particle velocity (PPV) at the nearest occupied residence in accordance with the County's Noise Guidelines Section 4.3, Table 4, Note 6.

- Blasting shall not be conducted within 1,000 feet of on- or off-site sensitive receptors unless the blasting study concludes that a distance less than 1,000 feet is within an acceptable noise level.

- Construction equipment associated with blasting (ex. drilling) shall comply with the County Noise Ordinance, Section 36.408, 36.409, and 36.410. If drilling is to occur within 800 feet of an occupied property line, noise measures such as (but not limited to) temporary noise barriers and blankets, increased setbacks, limiting construction equipment operations, and any other methods specified within the blasting plan must be implemented to comply with County Noise Ordinance requirements.

Implementation: Project applicant(s) and primary contractor(s) of all project phases involving blasting.

Timing: Prior to and during project-related blasting activities.

Enforcement: County

MM N-6: Restrict heavy-equipment operations in areas with inhabited residential units.

To reduce impacts associated with groundborne vibration generated by project-related construction activities, the project applicant(s) of all project phases shall conform to the following requirements:

- No heavy equipment shall be operated within 200 feet of any inhabited on-site residence.

Implementation: Project applicant(s) and primary contractor(s) of all project phases involving blasting.

Timing: Prior to and during construction activities.

Enforcement: County

5.3.2 Noise Abatement Measures

NA-1 All construction equipment shall be properly maintained and equipped with noise-reduction intake and exhaust mufflers and engine shrouds, in accordance with manufacturers' recommendations. Equipment engine shrouds shall be closed during equipment operation.

NA-2 Whenever feasible, electrical power shall be used to run air compressors and similar power tools.

NA-3 Equipment staging areas should be located as far as feasible from occupied residences or schools.

NA-4 For all construction activity on the project site, noise attenuation techniques should be employed as needed to ensure that noise remains below 75 dBA L_{eq} at future residences. Such techniques may include, but are not limited to, the use of sound blankets on noise-generating equipment and the construction of temporary sound barriers adjacent to construction sites, between affected uses.

Summary

Implementation of MM N-4, MM N-5, MM N-6, NA-1, NA-2, NA-3, and NA-4 would ensure that construction noise sources associated with the proposed project would be reduced to a less-than-significant level at the nearest sensitive land uses.

CERTIFICATION

The following is a list of preparers, persons, and organizations involved with the noise assessment.

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