2.7 Noise

This section summarizes the potential noise impacts resulting from implementation of the proposed Project. The noise analysis of the proposed Project includes a description of existing conditions, an evaluation of potential noise impacts associated with Project construction and operations, identification of feasible mitigation measures, and discussion of the potential noise-related cumulative impacts of the proposed Project. The noise measurement terms used in this section are decibel (dB), which represents the loudness of a noise; A-weighted decibel (dBA), a noise measurement that approximates the range of human hearing; L_{eq}, the average noise level over a measured period of time, typically a 1-hour or 24-hour measurement; and the Community Noise Equivalent Level (CNEL), which assigns a 5-dB "penalty" to noise measurements taken between 7:00 p.m. and 10:00 p.m.

The analysis presented in this section is based on the Otay Ranch Resort Village Noise Impact Report (Noise Study) (AECOM 2015), provided as **Appendix C-11** to this EIR.

In 1993, the Otay Ranch PEIR, was certified and provided a program-level analysis of the existing conditions and potential impacts related to noise for the entire Otay Ranch area, including the Project site. The PEIR concluded that implementation of the Otay Ranch Project would result in significant noise impacts associated with the exposure of noise-sensitive receptors to noise levels in excess of the 60 dBA CNEL standard[1], and indirect roadway and construction noise impacts on least Bell's vireo habitat in other portions of the Otay Ranch community (not the proposed Project site). The Otay Ranch PEIR is incorporated into this EIR by reference and is available for public inspection and review at the County of San Diego, PDS, 5510 Overland Avenue, San Diego, California.

The noise analysis in this 2015 EIR is different from the 1993 PEIR, as it specifically considers the proposed Project site. This noise section references and uses information provided in the PEIR; however, the analysis and conclusions are based specifically on the proposed Project's impacts and consistency with existing plans and policies. Potential noise impacts to noise sensitive birds and habitat are discussed under Section 2.3 Biological Resources, which identified no least Bell's vireo habitat within the proposed Project site. Short-term indirect impacts to noise sensitive species, particularly nesting bird species, include potential construction noise impacts, particularly at the edge of proposed development adjacent to natural habitat areas. To mitigate those impacts and avoid indirect noise impacts to sensitive wildlife species, MM BIO-15 imposes the following requirements on the Project applicant:

- No clearing, grading, or grubbing activities may occur within occupied gnatcatcher habitat during the breeding season for coastal California gnatcatcher (February 15 to August 15, annually). If construction occurs during the breeding season, a nesting survey for California gnatcatcher shall be conducted prior to the onset of construction and

[1] The County of San Diego typically describes community noise levels in terms of CNEL. CNEL is the average A-weighted sound level during a 24-hour day. It is obtained after adding 5 dB to sound levels in the evening hours (7:00 p.m. to 10:00 p.m.) and adding 10 dB to the sound levels at night (10:00 p.m. to 7:00 a.m.). The 5-dB and 10-dB penalties are applied to account for increased noise sensitivity during the evening and nighttime hours.

construction may occur if active nests can be avoided and provided an adequate buffer or noise levels are documented to be below 60 dBA Leq at the nest site.

- When clearing, grading, or grubbing activities occur during the breeding season for raptors (January 15 to July 31, annually), nesting bird surveys shall be conducted by a qualified biologist for the San Diego County Department of Planning and Development Services to identify active nest locations. Construction activities shall be restricted or modified such that noise levels related to those activities are below 60 dBA Leq, or other Wildlife Agency approved restrictions, in the vicinity of any active nest sites.
- Uses in or adjacent to the preserve shall be designed to minimize noise impacts. Berms or walls shall be constructed adjacent to commercial areas and any other use that may introduce noises that could impact or interfere with wildlife utilization of the preserve. Excessively noisy uses or activities adjacent to breeding areas must incorporate noise-reduction measures or be curtailed during the breeding season of sensitive bird species.

2.7.1 Existing Conditions

2.7.1.1 *Existing Land Uses and Noise*

Otay Lakes Road forms the southern boundary of the Project site and provides the primary ingress and egress to the Project site. A private restricted-use airfield, the John Nichols Field Airfield, is located at the southeastern end of the Project site across from Otay Lakes Road. The proposed Project is not immediately adjacent to any existing developed property.

The primary existing noise source on the project site and within the project vicinity is vehicle traffic on Otay Lakes Road. Existing average daily traffic (ADT) volumes on Otay Lakes Road in the vicinity of the proposed project are approximately 2,927 with a roadway level of service (LOS) B (e.g., free flow for traffic) (Chen Ryan 2015). The secondary existing noise source at the project site and vicinity is aircraft high altitude flyovers from commercial, private, and military aircraft, and low altitude flyovers from daytime only skydiving jump plane takeoffs from the adjacent west end of the airfield runway, over Otay Lakes Road and the adjacent project site boundary. Annual jump plane activity is estimated at 7,500 departures, which varies daily (up to 30 -50 jump plane departures on a busy day) depending upon weather/wind, and scheduled commercial and Navy skydiving jumps being conducted (Mead & Hunt 2013).

Ambient noise measurements, primarily for vehicle traffic noise on Otay Lakes Road, were conducted at the Project site and in the developed community west of the Project site in the City of Chula Vista to determine existing noise conditions. Refer to the Noise Study, **Appendix C-11** for the equipment used and equipment specifications. Noise measurements were taken at seven locations as shown in **Figure 2.7-1** and **Figure 2.7-2**. Locations 1, 2, 3, and 7 are located in the developed community west of the Project site, along Otay Lakes Road, Clubhouse Drive, and Greensview Drive, to measure conditions in the immediate Project vicinity. Locations 4, 5, and 6 are located on Otay Lakes Road adjacent to the Project site to measure existing on-site conditions. The ambient noise level ranges are based on L_{90} measurements for each location. L_{90} measurements represent the noise level value that is exceeded at least 90 percent of the time during the course of measurement. A summary of the noise measurements taken at the seven

locations is provided in **Table 2.7-1**. As shown in **Table 2.7-1**, on-site background noise levels were measured between 35 dBA L_{90} and 43 dBA L_{90}, with higher background noise levels nearest Otay Lakes Road at the eastern end of the Project site, which is likely due to the influence of John Nichols Field. Off-site background noise levels in the Project vicinity were measured between 44 dBA L_{90} and 57 dBA L_{90}, with background noise levels of 50 dBA L_{90} or greater near Otay Lakes Road.

Noise measurements, primarily from jump plane takeoffs and flyovers, were also conducted at the project site boundary, nearest the west end of the John Nichols Airfield runway along Otay Lakes Road. During a one-hour measurement, the noise levels of two jump takeoffs and their low altitude flyovers and landings were recorded. A summary of the measurement is presented in **Table 2.7-2**. As shown in **Table 2.7-2**, jump plane flyovers from runway takeoffs (lasting approximately 20 seconds each) recorded maximum noise levels of 86 and 96 dBA L_{max}, for several seconds when the planes were approximately 100 feet overhead at the property line adjacent to Otay Lakes Road. However, the measurements also included passing traffic on Otay Lakes Road. With no vehicle or aircraft activity, ambient noise levels were observed as low as 32 dBA L_{min}. The one-hour average noise level at this location for this period was approximately 63 dBA L_{eq}.

2.7.1.2 *Regulatory Setting*

California Code of Regulations

Title 24 of the California Code of Regulations requires that residential structures, except detached single-family dwellings, be designed to prevent the intrusion of exterior noise so that the interior CNEL with windows closed, attributable to exterior sources, shall not exceed 45 dBA in any habitable room.

San Diego County General Plan

The following Goal and Policies of the County General Plan Noise Element is relevant to the Project:

GOAL N-2

Protection of Noise Sensitive Uses. A noise environment that minimizes exposure of noise sensitive land uses to excessive, unsafe, or otherwise disruptive noise levels.

Policies

N-2.1 Development Impacts to Noise Sensitive Land Uses. Require an acoustical study to identify inappropriate noise level where development may directly result in any existing or future noise sensitive land uses being subject to noise levels equal to or greater than 60 dBA CNEL and require mitigation for sensitive uses in compliance with the noise standards listed in Table N-2.

N-2.2 Balconies and Patios. Assure that in developments where the exterior noise level on patios or balconies for multi-family residences or mixed-use developments exceed 65 dBA CNEL, a solid noise barrier is incorporated into the building design of the balconies and patios while still maintaining the openness of the patio or balcony.

For all projects except single-family detached dwellings, exterior noise is defined as "noise measured at all exterior areas that are provided for group or private usable open space purposes." For single-family projects, exterior noise is defined as "noise measured at an outdoor living area that adjoins and is on the same lot as the dwelling, and which contains at least the following minimum area:

- Net lot area up to 4,000 square feet: 400 square feet
- Net lot area 4,000 square feet to 10 acres: 10 percent of net lot area
- Net lot area more than 10 acres: 1 acre

County of San Diego Noise Ordinance

The County Noise Ordinance, Section 36.404, sets limits on the noise levels generated from one property to another, such as from mechanical equipment. Section 36.410 of the Noise Ordinance also regulates noise generated by construction activities.

Section 36.404. Sound Level Limits

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 set forth in Section 36.404 and shown herein as **Table 2.7-3**. The noise level limits vary with the zoning of the properties concerned. The proposed Project site is currently zoned Specific Plan (S88) and Open Space (S80). Adjacent properties are zoned S80, Agriculture (A72), and Limited Control (S87).

Section 36.408. Hours of Operation of Construction Equipment

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

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

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

Section 36.409. Sound Level Limitations on Construction Equipment

Except for emergency work, it shall be unlawful for any person to operate construction equipment or cause construction equipment to be operated, that exceeds an average sound level

of 75 decibels for an eight-hour period, between 7 a.m. and 7 p.m., when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is being received.

Section 36.410. Sound Level Limitations on Impulsive Noise

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

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

City of Chula Vista General Plan

The Environmental Element of the City's General Plan contains applicable noise/land use compatibility guidelines, which are shown in **Table 2.7-4**. Policies from the City's General Plan relevant to this noise analysis include:

EE 21.1 Apply the exterior land use-noise compatibility guidelines (contained in **Table 2.7-4)** to new development where applicable and in light of project-specific considerations.

EE 21.3 Promote the use of available technologies in building construction to improve noise attenuation capacities.

EE 22.5 Where necessary, require appropriate mitigation measures in order to attenuate existing and projected traffic noise levels in accordance with applicable standards, including the exterior land use-noise compatibility guidelines (contained in **Table 2.7-4).**

According to **Table 2.7-4**, 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).

City of Chula Vista Noise Ordinance

Chapter 19.68 of the City's Zoning Code, the Noise Control Ordinance, requires that "no person shall operate or cause to be operated, any source of sound … or allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person, which causes the

noise level to exceed … the applicable limits given in Table III." Construction noise and the noise from motor vehicles operating on public ROW are exempt from these standards. **Table 2.7-5** includes the applicable portion of Table III of the noise ordinance. The ordinance states that if the measured ambient level exceeds that permissible as shown in **Table 2.7-5**, the allowed noise exposure shall be the ambient noise level, measured from the noise source.

Section 17.24.0040B of the City's Municipal Code restricts the hours of construction activity, as follows: "The use of any tools, power machinery or equipment or the conduct of construction and building work in residential zones so as to cause noises disturbing to the comfort and repose of any person residing or working in the vicinity, between the hours of 10:00 p.m. and 7:00 a.m., Monday through Friday, and between the hours of 10:00 p.m. and 8:00 a.m., Saturday and Sunday, except when the same is necessary for emergency repairs required for the health and safety of any member of the community." Any construction activities that occur within the City would need to occur during these times.

2.7.2 Analysis of Project Effects and Determination as to Significance

2.7.2.1 *Noise Sensitive Land Uses Affected by Airborne Noise*

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.

<u>County Guidelines for the Determination of Significance</u>

The following significance guidelines are based on the Guidelines for Determining Significance and Report and Content Requirements for Noise approved by DPLU on January 27, 2009. A significant noise impact would occur if the Project:

- Results in the exposure of any on- or off-site, existing or reasonably foreseeable, future noise-sensitive land use to exterior or interior noise (including noise generated from the Project, together with noise from roads, railroads, airports, heliports, or 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 pre-existing noise.

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

     1) Net lot area up to 4,000 square feet: 400 square feet

2) Net lot area greater than 4,000 square feet and up to 10 acres: 10 percent of net lot area

3) Net lot area over 10 acres; 1 acre

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

B. Interior Locations:

i. 45 dB (CNEL) except for the following cases:

1) Rooms that 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); and

2) Corridors, hallways, stairwells, closets, bathrooms, or any room with a volume less than 880 cubic feet.

- Generates airborne noise (from all noise sources) that would exceed the following standards listed in the San Diego County Code of Regulatory Ordinances, Section 36.404, Sound Level Limits, at or beyond the property line:
  - 7 a.m. to 10 p.m. 50 dB
  - 10 p.m. to 7 a.m. 45 dB
- Generates an average sound level greater than 75 dB for an 8-hour period between 7 a.m. and 7 p.m., when measured at the property line of the property where the noise source is located or on any occupied property where the noise is being received.
- Produces an impulsive noise that exceeds the maximum sound level of 82 decibels measured at the property line of occupied property of a residential, village zoning, or civic use; or 85 decibels at occupied property of an agricultural, commercial, or industrial use. For a public road project, the maximum sound level is 85 decibels measured at the property line of occupied property of a residential, village zoning, or civic use; or 90 decibels at occupied property of an agricultural, commercial, or industrial use.
- Produces an impulsive noise that exceeds Caltrans recommended vibration thresholds of 0.2 peak particle velocity (PPV) (Caltrans 2002).

Rationale for Selection of Guideline

The establishment of exterior and interior sound level limits is in accordance with Policy N-2.1 of the Noise Element of the County General Plan.

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, as shown in **Table 2.7-4**, 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, as shown in Table 2.7-5, exterior noise levels are not 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.

Rationale for Selection of Guideline

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).

Analysis

VEHICLE TRAFFIC NOISE

County of San Diego

Permanent increases in ambient noise levels are most often associated with noise from vehicular sources. Otay Lakes Road would be the primary source of on- and off-site traffic noise associated with Project operation. A secondary source of on-site traffic noise would be Strada Piazza, which functions as a collector road for access between residential areas and Otay Lakes Road and to the school site, parks, and the mixed-use center. According to the Project traffic study (Chen Ryan 2015), approximately 86 percent of Project traffic would travel on Otay Lakes Road west of the Project's west entrance and 14 percent would travel to the east toward Highway 94. Approximately 17 percent of Project traffic would use Wueste Road and 16 percent would use Hunte Parkway for travel between destinations to the west and south. Only 5 percent or less

would travel north from Otay Lakes Road. **Table 2.7-6** shows existing traffic volumes without and with the Project and the resulting change in dBA at locations where the increase from traffic noise would be 1.0 dBA or greater.

As shown in **Table 2.7-6**, the County segments that would have noise levels that noticeably increase would be Otay Lakes Road between Wueste Road and Driveway #2 (Strada Piazza) of 9 CNEL increase, and between Driveway #2 and #3 of 4 CNEL increase.

Currently, along Otay Lakes Road between Driveway #1 and Driveway #2, there are no noise-sensitive receptors. One NSLU is located between Lake Crest Drive and Wueste Road, north of Otay Lakes Road, 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 2.7-6**, existing plus project noise levels from Otay Lakes Road would attenuate to approximately 58 CNEL or less at this distance. Thus, the 9 dBA increase over existing noise levels would be **less than significant** as noise levels at this County receiver 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 noise-sensitive land uses along this location would be the Thousand Trail Recreational Vehicle (RV) Park 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 2.7-6**, 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 2.7-6** would be less than 65 CNEL. Therefore, land uses along Otay Lakes Road would be compatible with existing and future noise levels, and no direct noise impacts would occur along County roadways.

In addition, future 2030 PM peak-hour traffic volumes along the Project frontage of Otay Lakes Road would range from 950 trips east of Driveway #3 (Strada Ravenna) to 2,520 trips west of Driveway #1. The predicted 2030 peak-hour traffic volumes along on-site segments of Otay Lakes Road could expose sensitive receptors to noise levels in excess of applicable standards.

To evaluate the noise levels that sensitive receptors would be exposed to as a result of the proposed Project, the future exterior CNEL was calculated for proposed residential lot locations (i.e., receptors) within the Project boundaries at 5 feet above grade elevation and 15 feet back from the property line at the rear of the properties fronting Otay Lakes Road. All posted speed limits were assumed to be actual traffic speeds for purposes of noise modeling. The traffic mix used for Otay Lakes Road assumes a mix of 95 percent automobile, 2.6 percent medium trucks, and 2.4 percent heavy trucks. All receptors were modeled using a drop-off rate of 3 dBA per doubling of distance.

As shown in **Table 2.7-7** and **Figures 2.7-3, 2.7-4,** and **2.7-5**, operation of the proposed Project could expose 20 residential receptor sites to exterior noise levels greater than 60 dBA CNEL that

would affect patios and other outdoor living areas and *a **potentially significant** noise impact would occur* (**Impact N-1**). **Figures 2.7-3, 2.7-4,** and **2.7-5** 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 dBA CNEL or less, and thereby reduce the impact to ***less than significant***.

County of San Diego standards require an interior noise assessment for residential areas exposed to noise levels greater than 60 dBA CNEL. At receptor locations 2, 8, 10, 12, 17, 21, 28, 32, 37, 56, 57, 58, 60, 117, 124, 135, 138, 155, 159, and 162 exterior noise levels could exceed 60 dBA CNEL. Therefore, interior *noise impacts to residential lots at these locations are considered **potentially significant*** (**Impact N-1**).

City of Chula Vista

As shown in **Table 2.7-6**, the City segments with a noticeable increase would be Otay Lakes Road between Hunte Parkway and Woods Drive of a 4 CNEL increase, Woods Drive and Lake Crest Drive of a 5 CNEL increase, and Lake Crest Drive and Wueste Road with an 8 CNEL increase. 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 at least 100 feet from the centerline of Otay Lakes Road. 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 2.7-6**, 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 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.

AIRCRAFT NOISE

The centerline of the single runway at John Nichols Airfield is located approximately 850 feet south of the Project site across from Otay Lakes Road. The nearest proposed houses would be located approximately 1,025 feet north of the centerline of the main runway. No noise contours have been developed for this private, restricted-use (daytime commercial skydiving) airfield.

Two site visits have been conducted. On one day, minimal to no flight operations were observed, and on another day with maximum flight operations of 3 fights per hour were observed. During the noise monitoring specifically for vehicle traffic on Otay Lakes Road (**Table 2.7-1**), one small, single-engine propeller airplane landed during measurement 6 (see Figure 2.7-2)

generating a short-term noise level of 64 dBA (**Table 2.7-1**) for approximately 2 seconds as it passed overhead.

Noise measurements, primarily from jump plane takeoffs and flyovers, were also conducted at the project site boundary nearest the west end of the John Nichols Airfield runway along Otay Lakes Road. During a one-hour measurement, the noise levels of two jump takeoffs and their direct low altitude flyovers and landings were recorded. A summary of the measurement is presented in **Table 2.7-2**, which also shows the sound exposure levels (SEL) for the takeoff, flyover, and landing events.

As shown in **Table 2.7-2**, the direct jump plane flyovers from the two runway takeoffs (lasting approximately 20 seconds each) recorded maximum noise levels of 86 and 96 dBA L_{max}, respectively, for several seconds when the planes were approximately 100 feet directly overhead at the property line adjacent to Otay Lakes Road. However, the measurements also included passing traffic on Otay Lakes Road, typically 65 – 69 dBA Lmax at this location, including passing emergency vehicles at 96 dBA L_{max}. With no vehicle or aircraft activity, ambient noise levels were observed as low as 32 dBA L_{min}. The one-hour average noise level at this location for this period was approximately 63 dBA L_{eq}.

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 2.7-2,** 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 dBA CNEL at the measurement location. As discussed in Section 2.7.1.1, the measurements were taken at the project site boundary nearest the west end of the airfield's Runway 27, in the overhead path of jump plane takeoffs from the runway over Otay Lakes Road.

Impacts from aircraft noise would be **less than significant** because no NSLUs would be exposed to noise levels greater than 60 dBA CNEL from maximum daily aircraft operations at John Nichols Airfield. Additionally, since the proposed Project would not feature land uses that involve the generation of aircraft noise, there would be ***no significant*** *impacts* associated with this activity.

AIRCRAFT NOISE PLUS TRAFFIC NOISE

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, a traffic CNEL is calculated from a theoretical maximum traffic volume on a roadway and an aircraft CNEL is based on a theoretical average 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 2.7-5 shows the proximity of the 60 dBA 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 2.7-5**, the 60 dBA 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 **Appendix C-11,** Table 7 Traffic Noise Model Results identifies 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 dBA CNEL. With the addition of aircraft noise at these locations, combined noise levels would range from 57 to 60 dBA CNEL. Additionally, due to the relatively lower aircraft noise levels, aircraft noise would not affect the vehicle traffic contour lines shown in **Figure 2.7-5** Thus, even considering the combination of aircraft and vehicle traffic, future noise levels would not exceed 60 dBA CNEL and no additional mitigation would be required. Therefore, aircraft operations at John Nichols Airfield would result in ***less than significant*** noise impacts.

2.7.2.2 *Project-Generated Airborne Noise*

Guidelines for the Determination of Significance

A significant noise impact would occur if the Project:

- Generates airborne noise (from all noise sources) that would exceed the following standards listed in the San Diego County Code of Regulatory Ordinances, Section 36.404, Sound Level Limits, at or beyond the property line:
    - 7 a.m. to 10 p.m. 50 dB
    - 10 p.m. to 7 a.m. 45 dB

Rationale for Selection of Guideline

The operational noise objective is based on the potential for noise generated by on-site uses from stationary sources to impact nearby NSLUs. These uses would include commercial and industrial uses, mechanical equipment used for heating and air conditioning, and activities such as large delivery trucks idling while unloading, and pump stations for wastewater conveyance.

Analysis

Potential NSLUs that may be affected by noise generated on-site during Project operation would include on-site residential, recreational, day care, and school land uses developed by the proposed Project, and surrounding residential land uses. The primary on-site noise source would be mechanical equipment used for heating and air conditioning. In addition, the commercial and resort land uses would generate noise from delivery activities. The following analysis is based on typical equipment installation practices and does not take into consideration voluntary measures that could be taken to achieve an increased level of noise abatement, such as locating all emergency generators within enclosures, behind barriers, or oriented within the site design to eliminate the line of site between sensitive receptors and generators.

HVAC Equipment

HVAC equipment could be a primary noise source associated with commercial or public facility 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 (U.S. Environmental Protection Agency [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 stated above 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, noise from HVAC equipment under the proposed Project would be a ***potentially significant*** *impact* (**Impact N-2).**

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 up-grade under pressure. The Project proposes three on-site pump stations that would be required at the locations identified in Figure 1.0-6, as well as on **Figures 2.7-3, 2.7-4**, and **2.7-5**.

The proposed pump stations would be constructed as both below- and above-grade facilities and each include three 30-horsepower (hp) pumps (**Figure 2.7-6**). The 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 proposed pump station 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 for land 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 noise level limits at surrounding residential property, if the pump station access door is located at least 15 feet from an adjacent residential property line. The

proposed pump stations, as shown on **Figures 1.0-6, 2.7-3, 2.7-4**, and **2.7-5**, are located greater than 15 feet, from their nearest respective residential property line. Therefore, the operational noise levels of the pump stations would attenuate with these distances to below the most stringent County noise level limit of 45 dBA L_{eq} during nighttime hours at a residential property line. Therefore, *this impact is considered **less than significant***.

Emergency Generators

Emergency gas-powered generators may be used during power outages as backup supply of necessary power requirements to vital systems within the proposed facilities constructed on the school, resort, public safety, and mixed-use land uses. Emergency generators are typically operated during loss of main electrical supply or preventive maintenance/testing. The operation of emergency generators with rated power outputs of 1,500 kilowatts (kW) can generate noise levels of approximately 95 dBA at 7 meters (23 feet) (Cummins Power Generation 2 009), which would attenuate to the County noise limits for stationary sources at approximately 3,500 feet (daytime) and 6,000 feet (nighttime).

Each of the three proposed pump stations associated with the wastewater collection and conveyance systems of the residential developments, would include an 80 kilowatt emergency back-up gas-powered generator, which, during a system power failure, would be activated and operational to provide temporary electrical power. In addition, these generators would be temporarily activated for regular maintenance and testing during the County's Noise Ordinance allowable hours during the daytime. The pump stations would be enclosed in the above-grade portion of the pump station. Operational noise level of the enclosed 80 kW generator is rated at 68 dBA at 23 feet. Therefore, the generator noise would attenuate to below the County nighttime limit of 45 dBA at approximately 400 feet from the pump station, assuming a drop-off rate of 6 dBA per doubling of distance. However, the proposed pump stations, as shown on Figures **1.0-6, 2.7-3, 2.7-4,** and **2.7-5**, are located less than 400 feet from their nearest respective residential property line. Therefore, the emergency generator associated with each pump stations could generate noise levels exceeding County standards. This impact would be ***potentially significant*** **(Impact N-2).**

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, considered a ***less-than-significant*** *impact*.

Parking Lot Activities

Parking lots are expected to be included in the community commercial, school, 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. Based on the Project land use plan it is likely that residential land uses would be within 350 feet of commercial areas. Therefore, the impact of noise generated from parking lot activities is considered a ***potentially significant*** *impact* (**Impact N-3**).

Loading Dock and Delivery Activity

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 EDAW 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 (EDAW 2006). Based on these previously measured noise levels, the County's daytime stationary noise criterion would be exceeded approximately 300 feet from the acoustic center of the loading dock and the nighttime stationary noise criterion would be exceeded approximately 170 feet from the acoustic center of the loading dock.

Based on the land use plan of the Project and four alternatives, it is likely that residential land uses would be within 170 feet of commercial areas. Therefore, noise generated from loading dock and delivery activities is considered a ***potentially significant*** *impact* (**Impact N-3**).

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.***

Other Stationary Noise Sources

No large stationary noise sources, such as a power plant or an industrial operation, are planned as part of the Project. However, at this stage of Project design and planning, information necessary for the assessment of noise impacts, such as equipment manufacturers and models or loading dock locations, is unavailable. Noise generated by on-site land use activities associated with the proposed Project could, therefore, result in a substantial permanent increase in ambient noise levels in the Project vicinity and exceed the sound level limits of Section 36.404 of the County Noise Ordinance. Therefore, noise generated on-site during operation of the proposed Project is considered a ***potentially significant*** *impact* (**Impact N-3**).

2.7.2.3 *Construction Noise*

Guidelines for the Determination of Significance

A significant construction noise impact would occur if the Project:

- Generates an average sound level greater than 75 dB for an 8-hour period between 7 a.m. and 7 p.m., when measured at the property line of the property where the noise source is located or on any occupied property where the noise is being received.

Rationale for Selection of Guideline

Construction causes the exposure of on- or off-site areas to noise associated with Project-related activities, including site grading, truck/construction movement, engine noise, rock excavation, and rock crushing. Noise from rock blasting associated with the Project is addressed below in Section 2.7.2.4.

Analysis

Construction of the proposed Project is anticipated to occur over a period of 10 years. It is anticipated that all development areas would involve phased grading, with adjacent roads and utilities constructed in each phase.

Noise impacts associated with construction activities are a function of (a) noise generated by the construction equipment, (b) the location and sensitivity of nearby land uses, and (c) the timing and duration of noise-generating activities. Noise levels within and adjacent to the sites on which Project construction occurs would increase.

Construction activities would be carried out in distinct phases, with each phase exhibiting unique noise characteristics based on the mix of construction equipment in use. The maximum noise level ranges for various pieces of construction equipment at a distance of 50 feet are shown in **Table 2.7-8,** which presents maximum values, not the average sound level generally used in this assessment. The average sound level at construction sites is typically less than the maximum noise level because the equipment operates in alternating cycles of full and low power. Also, the equipment rotates in various directions (i.e., noisiest side of the equipment to quieter sides of the equipment) and moves around the construction site, especially during clearing and grading activities. Thus, the average noise levels produced are less than the maximum level.

Grading

Grading activities generally require the largest, heaviest equipment, typically generating the greatest 1-hour average noise levels. The noise levels at construction sites typically range from 65 to 88 dB L_{eq} at 50 feet from the center of the activity. Construction noise in a well-defined area typically attenuates at approximately 6 dB per doubling of distance. It is anticipated that the development would involve phased grading on-site, which may overlap road grading activities associated with the off-site widening of Otay Lakes Road west of the Project site. 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 1.0-10** 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.

Rock Drilling, Blasting, and Crushing

Due to the Project site's underlying geologic setting which includes much rock, site preparation would include some rock drilling for rock blasting, and subsequent on-site rock crushing for aggregate.

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 drilling through the rock. No more than one to two blasts would occur in any one area per day due to the time required to drill the holes as well as to insert and connect the blasting materials.

The exact extent and location of these activities on-site is unknown at this time. Thus, it has been assumed that rock drilling and blasting could potentially occur at any location on-site, as needed. Assuming drilling and blasting activities are conducted in proximity to residences, the loudest drill, operating worst-case (continuously for 8 hours for two blasts to be conducted), would potentially generate a maximum 8-hour average noise level of approximately 98 dB at 50 feet, which would attenuate with distance of approximately 800 feet or greater to below the County's noise ordinance criteria of 75 dBA averaged over an 8-hour period, depending upon the local site surface and whether any intervening topography or structures exist, and without noise mitigation.

The primary noise source of drill-blast operations is the drilling, not the blasting, due to the short duration of the subsurface-contained blast compared to the continuous hours of drilling activity exposed at the surface. 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, some blast energy does escape into the atmosphere as a sequence of airborne sound waves (a phenomenon known as "air blast over-pressure"), which are very low frequency, below the human audible range. 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 at this time.

Residences in proximity to drill-blast areas could be subject to intermittent drilling and blasting activities over several months, depending upon the type and amount of rock encountered. After each blast, several days to a couple of weeks are required to remove blasted material before the next drilling and blasting sequence.

Crushing of the blasted rock may also occur on-site to transport and/or reuse the material for aggregate. 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. Rock crushers are stationary with material stockpiles in proximity, and are therefore, located away from noise sensitive receptors. Rock crushing typically includes a dozer and a loader for loading the rock crusher. The combined noise level from all these pieces of equipment would be maximum of approximately 95 dBA L_{max} at 50 feet with an hourly average of approximately 92 dBA L_{eq} at 50 feet. Based on a conservative attenuation rate of 6 dBA per doubling of distance, noise levels from rock crushing activities would attenuate with distance to 75 dBA L_{eq} at approximately 350 feet, which would comply with the County's noise level limit for construction noise of 75 dBA averaged over an 8-hour period. However, if rock crushing occurs over longer periods, the County could impose stricter limits, such as 60 dBA CNEL, which would require a separation of approximately 2,000 feet between the rock crushing activities and the nearest property line. As no locations for rock crushing have been identified, mitigation measures have 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. Rock crushing operations would be established at appropriate locations on-site to minimize the line of sight to noise-sensitive receptors and, therefore, would reduce the impact of noise to sensitive receptors to the maximum extent practicable.

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 close 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 Lmax at 50 feet. No potential rock crushing locations have been identified as the location would typically be chosen based on distance to material and accessibility by haul trucks. 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, at this distance would comply with the County's noise level limit for construction noise of 75 dBA averaged over an 8-hour period.

On-site Construction Noise Impacts

On-site noise-sensitive receptors would be residents of homes completed during earlier phases of construction and inhabited during times that later phases of Project construction are taking place. Based on the Project phasing plan, it has been assumed that future development construction sites would be as near as 50 feet from these occupied residences. At 50 feet, the hourly average construction noise levels, primarily due to site grading (not associated with rock drilling, blasting, or crushing), would be at or below 75 dBA L_{eq} at 50 feet from the activity, with maximum noise levels of 88 dBA L_{max} during peak construction activity. Such noise levels could create temporary annoyance; however, peak noise levels would occur only sporadically, since not all equipment would be operating at all times and most construction activity would actually take place at longer distances from the receivers. Therefore, since the average noise level at 50 feet would be at or below 75 dBA L_{eq}, and no construction work would be performed during hours prohibited by the County Noise Ordinance, this impact would be ***less than significant***.

For potential rock drilling/blasting activities on-site, the exact location and extent is unknown at this time; however, these activities could potentially occur at any location on-site where rock is encountered. Assuming drilling and blasting activities are conducted in proximity to residences, the loudest drill, operating worst-case (continuously for 8 hours for two blasts to be conducted), would potentially generate a maximum 8-hour average noise level of approximately 98 dBA L_{eq} at 50 feet, which would attenuate with distance of approximately 800 feet or greater to below the County's noise ordinance criteria of 75 dBA L_{eq} averaged over an 8-hour period, depending upon the local site surface and whether any intervening topography or structures exist, and without noise mitigation.

Crushing of the blasted rock for aggregate may also occur on-site. Rock crushers are stationary with material stockpiles in proximity, and are therefore, located away from noise sensitive receptors. Rock crushing would generate approximately 95 dBA L_{max} at 50 feet with an hourly average of approximately 92 dBA L_{eq} at 50 feet, which would attenuate with distance to 75 dBA L_{eq} at approximately 350 feet, which would comply with the County's noise level limit for construction noise of 75 dBA L_{eq} averaged over an 8-hour daytime period.

Therefore, since it is feasible that construction noise impacts from rock drilling, blasting, and crushing may occur, this impact is ***potentially significant*** (**Impact N-4**) and a noise analysis assessing the proposed blasting and materials handling associated with the proposed Project would be required prior to County approval of the Final Map, Grading or Improvement Plan, or prior to Site Plan approval of residential development that may be impacted by rock drilling, blasting, and crushing.

Potential impulsive noise impacts associated with rock drilling and crushing are also analyzed below in Section 2.7.2.4, Impulsive Noise.

Off-site Noise Impacts from On-Site Construction

The nearest existing residential property is located approximately 850 feet north of the nearest roadway construction point on Otay Lakes Road and approximately 70 feet above the roadway atop a hill. The nearest residence to the Project's on-site construction is approximately 1,700 feet northwest of the nearest point of the proposed development. At 850 feet, the 1-hour average noise level would be approximately 54 dBA L_{eq}, although short-term noise levels may reach as high as 64 dBA for short periods typically less than 1 minute when several pieces of equipment are in proximity and the engines are under full load. Thus, the proposed Project would not violate the County Noise Ordinance threshold of an average sound level greater than 75 dBA L_{eq} and the impact on off-site sensitive receptors would be ***less than significant***.

Off-site Sewer Line Construction Noise Impacts

The Project proposes an off-site sewer line to the Salt Creek Interceptor, located approximately 2 miles west of the Project site. Construction noise impacts from construction of this line would be within existing public roads (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 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 No sensitive land uses are within 50 feet of the proposed sewer expansion line along Otay Lakes Road. Therefore, noise from off-site sewer line construction would be in compliance with Section 36.410 of the County Noise Ordinance and the construction noise impact would be ***less than significant***.

Off-site Construction Traffic Noise Impacts

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, (Fehr and Peers 2011a). 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 dBA 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** of the Noise Impact Report). Therefore, construction traffic would not result in a 3 dBA increase in the daily or peak hour traffic noise levels and the additional construction-related traffic would have a ***less than significant*** *temporary increase in overall traffic noise levels*.

2.7.2.4 *Impulsive Noise*

Guidelines for the Determination of Significance

A significant impulsive noise impact would occur if the Project:

- Produces an impulsive noise that exceeds the maximum sound level of 82 decibels measured at the property line of occupied property of a residential, village zoning, or civic use; or 85 decibels at occupied property of an agricultural, commercial, or industrial use. For a public road project, the maximum sound level is 85 decibels measured at the property line of occupied property of a residential, village zoning, or civic use; or 90 decibels at occupied property of an agricultural, commercial, or industrial use.

Rationale for Selection of Guideline

The impulsive noise sound level limit is in accordance with Section 36.410 of the County Noise Ordinance. The threshold of significance is based on exceeding the noise level limits at the property line of occupied property for 25 percent of the minutes during the measurement period. The minimum measurement period is 1 hour, and measurements are to be conducted every 1

minute from a fixed location on the occupied property. If the measurement exceeds the maximum sound level limit for any portion of each minute of the measurement period, it will be deemed that the maximum sound level was exceeded during that minute.

Analysis

Rock Drilling, Blasting, and Crushing

Impulsive noise sources associated with construction activities generated by Project implementation could include blasting to break up bedrock close to the surface on the Project site. Using explosives to break rock generates low frequency sound waves that can damage buildings. However, techniques have been developed that allow blasting to be conducted in relative proximity to buildings without causing damage (e.g. noise blankets, multi-charges, reduced blast force).

Due to the geologic character of the Project site, explosive blasting and on-site rock breaking and drilling is anticipated during site preparation activities. At the current stage of the Project design, a blasting study has not been completed and no specific blasting locations are 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, some blast energy escapes into the atmosphere as a sequence of airborne sound waves, a phenomenon known as "air blast over-pressure." These sound waves are very low frequency, below the audible range. Very high blast over-pressure levels can rattle or in some cases break windows. However, with modern blasting practices air-blast over-pressure rarely reaches levels that could cause building damage.

The nearest off-site 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 noise or materials handling would generate substantial noise impacts. However, since no blasting and materials handling plans are available, no exact blast charge weights, locations, and air blast noise levels can be determined.

The sudden and intense airborne noise potential created by a blast would create local 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.

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 to two blasts would occur in any one area per day because of the time required to drill the holes as well as to 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 8 hours for two blasts to be conducted, would generate an 8-hour average noise level of approximately 98 dB at 50 feet and would attenuate to below the County Noise Ordinance criteria of 75 dBA averaged over an 8-hour period at approximately 800 feet or greater, depending upon the local site surface and whether any intervening topography or structures exist, and without noise mitigation, such as construction of noise barriers.

The primary noise source of drill-blast operations is the drilling and not the blasting due to the 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.

As stated above, the Project would also include rock crushing. No potential rock crushing locations have been identified as the location would typically be chosen based on distance to material and accessibility of haul trucks. 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. However, if rock crushing occurs over longer periods than what is specified in the County's Guidelines for Significance regarding noise, or at the discretion of the County, the County could impose stricter limits, such as 60 dBA, which would require a separation of approximately 1,000 to 2,000 feet between the rock crushing activities and the nearest property line depending on the intervening terrain. This distance can be substantially reduced through the use of shielding. However, as no locations for rock crushing have been identified, mitigation measures have 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.

Therefore, since it is feasible that noise impacts from rock drilling, blasting, and crushing may occur, *this impact is* ***potentially significant*** (**Impact N-5**) and a noise analysis assessing the proposed blasting and materials handling associated with the proposed Project would be required prior to County approval of the Final Map or prior to Site Plan approval of residential development that may be impacted by rock drilling, blasting, and crushing.

2.7.2.5 *Groundborne Noise and Vibration*

Guidelines for the Determination of Significance

A significant vibration impact would occur if the Project:

- Produces an impulsive noise that exceeds Caltrans' recommended vibration thresholds of 0.2 peak particle velocity (PPV) (Caltrans 2002).

Rationale for Selection of Guideline

Caltrans vibration impact assessment methodology recommends the above threshold for prevention of human disturbance and structural damage from vibration sources.

Analysis

Construction Equipment and Blasting

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

As discussed above, on-site construction equipment that would cause most of the noise and vibration impacts 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 inches per second (in/sec) peak particle velocity (PPV) and 58 to 87 vibration decibels (VdB referenced to 1 microinch per second [μin/sec] and based on the root mean square [RMS] velocity amplitude) at 25 feet (FTA 2006). 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 an adjacent development phase. Therefore, vibration levels during Project construction could exceed the FTA-recommended standard of 0.0040 in/sec PPV.

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 is reduced 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.

Due to the geologic character of the Project site, explosive blasting and/or onsite 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.

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 vibration impacts. However, as blasting plans and materials handling plans are not currently available, the amount of vibration cannot be predicted and the possibility that blasting would occur after Project homes have been occupied does exist.

Therefore, the potential exists for ***potentially significant*** *vibration impacts* to occur (**Impact N-6**) and a vibration analysis assessing the proposed blasting and materials handling associated with the proposed Project would be required prior to issuance of County grading permits for any phase of Project grading.

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.

2.7.3 Cumulative Impact Analysis

Cumulative noise impacts would be those associated with Project traffic volumes; traffic volumes generated by other past, present, and reasonably foreseeable development projects; and/or a summary of development projections contained in an adopted planning document. According to the County Guidelines, a cumulatively considerable impact occurs when a project contributes a noise level increase of greater than 1 dBA 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.

Project-generated traffic would contribute to cumulative increases in traffic noise levels. Noise level increases would be greatest nearest the Project site, which would have 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.

Similar to direct traffic noise impacts, a cumulative traffic noise impact occurs when the noise level would exceed the applicable standard and result in a substantial noise level increase. The Project's contribution to the future noise level is determined by comparing future noise conditions without and with the proposed Project.

According to the proposed Project's traffic study (Chen Ryan 2015), the cumulative traffic generation analysis in the Project vicinity is based on ADT volumes from SANDAG's Year 2030 Transportation Model, and the ADT volumes associated with the operation of the Jamul Casino and the construction of the La Media Bridge between southern Chula Vista and the Community of Otay Mesa.

Tables 2.7-9 and **2.7-10** present the ADT volumes for the existing, cumulative without project condition, and the cumulative with proposed project conditions for County and Chula Vista

roadways, respectively. Off-site traffic noise impacts have been evaluated based on the calculated change in noise levels due to the increase in traffic volumes. As shown in **Tables 2.7-9** and **2.7-10**, 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 at 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 and Lake Crest Drive (City);
- Lake Crest Drive and 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.

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 2.7-9**, future noise levels from Otay Lakes Road would attenuate to approximately 55 dBA 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 dBA 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 **Table 2.7-9**, traffic noise levels beyond 100 feet attenuate to less than 64 dBA CNEL and at 160 feet traffic noise levels would attenuate to less than 62 dBA 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 2.7-9,** 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. Therefore, cumulative noise impacts along Otay Lakes Road within the County would be **less than significant.**

City of Chula Vista

Traffic noise levels along several roadways within Chula Vista would similarly experience a potentially substantial increase in noise levels. Specifically, 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 dBA 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 dBA CNEL. This falls below the City's threshold and would be considered **less than significant**.

Based on observations, the NSLUs along all the affected Chula Vista 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).

Based on the noise levels presented in **Table 2.7-10**, a 5 dBA reduction in these noise levels would result in noise levels ranging from 59 to 64 dBA CNEL and project-related traffic would add more than a 1 dBA CNEL increase to cumulative noise level increase. These noise levels would comply with the City of Chula Vista's 65 dBA CNEL noise compatibility guidelines at the affected NSLUs; therefore, cumulative noise impacts within the City of Chula Vista would be **less than significant**

2.7.4 Significance of Impacts Prior to Mitigation

The following significant impacts were identified in the Project's noise analysis:

Impact Number	Description of Project's Effect	Significance of Impact
N-1	Traffic noise resulting in exposure of sensitive receptors within the Project site to exterior noise levels in excess of 60 dBA CNEL, and interior noise levels in excess of 45 dBA CNEL.	Potentially significant direct impact
N-2	Noise generated by on-site HVAC and emergency generators	Potentially significant direct impact
N-3	Noise generated by other on-site land use activities (e.g., other stationary sources) associated with the proposed Project could exceed the Sound Level Limits of Section 36.404 of the County Noise Ordinance.	Potentially significant direct impact

Impact Number	Description of Project's Effect	Significance of Impact
N-4	Noise generated by construction activities associated with the proposed Project, including rock crushing and drilling could exceed the construction hours of Section 36.408 and the construction Sound Level Limits of Section 36.409 of the County Noise Ordinance.	Potentially significant direct impact
N-5	Impulsive noise from explosives blasting or on-site rock-crushing and drilling activities resulting in exposure of a noise-sensitive land use to noise impacts in excess of County standards.	Potentially significant direct impact
N-6	Groundborne vibration on-site from construction equipment activities (site grading and truck transport), rock blasting, or rock-breaking activities could resulting in exposure of noise-sensitive land uses to significant vibrations or groundborne noise impacts in excess of the County guidelines.	Potentially significant direct impact

2.7.5 Mitigation

The following mitigation measures would be incorporated into implementation of the proposed Project to reduce noise impacts.

2.7.5.1 *Impacts Related to the Exposure of Noise-Sensitive Land Uses to Substantial Exterior/Interior Noise Levels*

To reduce excessive traffic noise levels, individual lots identified in **Table 2.7-7** are required to be designed using individual barriers located within each lot to shield a yard 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 2.7-7**. These calculations and additional noise attenuation requirements are outlined in the measures below.

M-N-1a The Project proponent shall prepare a noise protection easement for those lots identified in **Table 2.7-7** of the Project EIR. 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 residence's 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 in height.

M-N-1b Concurrent with approval of the Final Map, the Project proponents shall dedicate to the County a noise protection easement on each of the lots identified in **Table 2.7-6** for the receptor locations shown in **Figures 2.7-3, 2.7-4,** and **2.7-5** of the

Project EIR. 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(s).

M-N-1c For any lot shown to be exposed to noise levels exceeding 60 dBA CNEL, the noise protection easement shall require that, prior to approval of the building permit or other development approval, an acoustical study be prepared based on proposed noise barrier placement and housing construction to demonstrate and ensure that interior noise levels are below 45 dBA CNEL.

M-N-1d The Project proponent shall construct a noise barrier at the top of slope and at the back of yards for any Noise Sensitive Land Use that would be exposed to a CNEL greater than 60 dBA, as shown in **Figures 2.7-3, 2.7-4,** and **2.7-5** of the Project EIR. The barrier shall be at the height specified in **Table 2.7-7**. Barriers may be constructed of masonry, wood, and transparent materials, such as glass or Lucite. Earthen berms or a combination of berms and walls could also be used to provide noise attenuation.

M-N-1e Noise barriers, as described in M-N-1d, would not reduce noise levels to second-story elevations due to their lesser barrier heights relative to two-story structures. Where two-story homes are to be located where traffic noise levels would meet or exceed 60 dBA CNEL without abatement (see **Table 2.7-6** of the Project EIR), the noise protection easement required by mitigation measure M-N-1 shall specify that the applicant for a building permit or other development approval must have to demonstrate that interior noise levels due to exterior noise sources would not exceed 45 dBA CNEL prior to approval of the building permit or other development approval. 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.

2.7.5.2 *Project-Generated Airborne Noise (Stationary Activities)*

M-N-2 Prior to Site Plan approval of proposed land uses within the mixed-use, resort, public safety, or single family residential sites, the applicant or designee(s) shall prepare acoustical studies of proposed mechanical equipment, which shall identify all noise-generating equipment (including emergency generators and generators associated with the proposed sewer pump stations), predict property line noise levels 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.

M-N-3: Prior to the issuance of a building permit for commercial land uses containing loading docks, delivery areas, and parking lots, 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.

2.7.5.3 Construction Noise

M-N-4 To reduce construction noise impacts associated with rock drilling and crushing noise generated by Project-related blasting activities, Project applicant(s) of all phases of Project development shall conform to the following requirements, which shall be prominently noted on grading plans:

- 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.
- 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.
    - All rock drilling activities shall be located a minimum distance of 800 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 36.404. The 800-foot setback distance may be reduced if a noise study is conducted for rock processing activities and noise levels of such activities would be within acceptable County limits at the reduced distances as determined by the noise study.
    - 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 36.404. The 350-foot setback distance may be reduced if a noise study is conducted for rock processing activities and noise levels of such activities would be within acceptable County limits at the reduced distances as determined by the noise study.

2.7.5.4 *Impulsive Noise*

M-N-5 To reduce impulse noise impacts associated with air blast over-pressure and rock drilling and crushing noise generated by Project-related grading activities, Project applicant(s) of all phases of Project development shall conform to the following requirements, which shall be prominently noted on grading plans:

- 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.
- 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.
    - All rock drilling activities shall be located a minimum distance of 800 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 36.404. The 800-foot setback distance may be reduced if a noise study is conducted for rock processing activities and noise levels of such activities would be within acceptable County limits at the reduced distances as determined by the noise study.
    - All rock crushing activities shall be located a minimum distance of 800 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 36.404. The 800-foot setback distance may be reduced if a noise study is conducted for rock processing activities and noise levels of such activities would be within acceptable County limits at the reduced distances as determined by the noise study.

2.7.5.5 *Groundborne Vibration*

M-N-6 To reduce impacts associated with groundborne vibration generated by Project-related construction activities, the applicant(s) of all Project phases shall conform to the following requirements, which shall be prominently noted on grading plans:

- Heavy construction equipment shall not be operated within 200 feet of any residential structure.

- 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.

2.7.6 Conclusion

2.7.6.1 *Traffic Noise*

Increased traffic volumes on on-site segments of Otay Lakes Road and interior Project roads would result in potentially significant direct and cumulative impacts associated with the exposure of on-site noise-sensitive land uses to exterior and interior noise levels in excess of applicable standards. However, the direct and cumulative impacts would be reduced to less-than-significant levels through implementation of mitigation measure M-N-1. Increased traffic volumes on off-site segments of Otay Lakes Road would result in **less-than-significant** impacts to ambient noise levels and no mitigation is required.

2.7.6.2 *Aircraft Noise*

During operation of the proposed Project, impacts associated with the exposure of Project-related noise-sensitive land uses to noise levels from aircraft operations at John Nichols Field would be less than significant and no mitigation is required. The proposed Project would not feature land uses that generate aircraft noise; **no impacts** associated with this issue would occur.

2.7.6.3 *Stationary Activities*

Operation of the proposed Project could result in potentially significant noise impacts associated with on-site mechanical equipment used in residential and commercial developments and delivery activities associated with the Project's commercial land uses. However, implementation of mitigation measures M-N-2 and M-N-3 would reduce potential impacts from mechanical equipment and delivery activities associated with the commercial and resort land uses to a **less than significant** level.

2.7.6.4 *Construction Activities*

During construction activities, implementation of the proposed Project would be required to comply with Section 36.408 and 36.409 of the County Noise Ordinance, which restricts exposure at the property lines of on-site or nearby sensitive receptors to an eight hour average sound level greater than 75 dBA L_{eq} between the hours of 7 a.m. and 7 p.m. Therefore, the impact of construction noise from normal grading and construction activities would be less than significant. Rock drilling, blasting, and crushing noise would be required to adhere to mitigation measure M-N-3, which requires setback distances from occupied property lines of 800 feet for rock drilling and 350 feet for rock crushing, and 1,000 feet from occupied structures for rock blasting to reduce these impacts to a less than significant level. Impulsive noise associated with

Project blasting, drilling, and crushing would be required to adhere to mitigation measure M-N-5, with the same setbacks as M-N-4, which would reduce the impacts from impulsive noise to a **less than significant** level.

2.7.6.5 *Groundborne Vibration*

During Project grading and blasting operations, potential impacts associated with the exposure of a noise-sensitive land use to groundborne vibration levels would be reduced to a level less than significant by mitigation measure M-N-5, which requires Project blasting operations to be planned, conducted, and monitored to reduce the impact of groundborne vibration on noise-sensitive land uses (rock blasting shall not be performed within 1,000 feet of a residential structure); and by mitigation measure M-N-6, which requires that heavy equipment not be operated within 200 feet of an inhabited residence.

Table 2.7-1
Noise Measurements – Vehicle Traffic

Site ID*	Location	Date Time	L_{eq} (dBA)	L_{max} (dBA)	L_{min} (dBA)	L_{90} (dBA)	Noise Sources
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 by 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 by on Otay Lakes Road.
4	Okay Lakes Road, approximately 3,500 feet south from the northern end of Lower 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 south of 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 helicopter. Peak noise level was caused by a motorcycle passing on Otay Lakes Road.
6	Otay Lakes Road, situated 8,800 feet east of 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 airplane landing (64 dBA). Peak noise level was caused by a motorcycle passing on driveway to airfield.
7	Otay Lakes Road, approximately 1,020 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 2.7-1 and 2.7-2.
Source: EDAW 2006

Table 2.7-2
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

Table 2.7-3
County of San Diego Noise Ordinance Sound Level Limits

Zone	Applicable Hours	Sound Level Limit dB $L_{eq\ (1\ hour)}$
RS, RD, RR, RMH, A70, A72, S80, S81, S87, S90, S92, RV, and RU. Use Regulations 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
RRO, RC, RM, C30, S86, RV, RU and V5. Use Regulations 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
S94, V4, and all other commercial zones.	7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	60 55
V1, V2 V1 V2	7 a.m. to 7 p.m. 7 p.m. to 10 p.m. 10 p.m. to 7 a.m. 10 p.m. to 7 a.m.	60 55 55 50
V3	7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	70 65
M50, M52, M54	Anytime	70
S82, M56, and M58	Anytime	75
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 8 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) Fixed-location public utility distribution or transmission facilities located on or adjacent to a property line are subject to the noise level limits in this table, as measured at or beyond 6 feet from the boundary of the easement upon which the equipment is located.

Table 2.7-4: City of Chula Vista Exterior Land Use-Noise Compatibility Guidelines

Land Use	Annual CNEL in Decibels					
	50	55	60	65	70	75
Residential						
Schools, Libraries, Daycare Facilities, Convalescent Homes, Outdoor Use Areas, and Other Similar Uses Considered Noise Sensitive						
Neighborhood Parks, Playgrounds						
Community Parks, Athletic Fields						
Offices and Professional						
Places of Worship (excluding outdoor use areas)						
Golf Courses						
Retail and Wholesale Commercial, Restaurants, Movie Theaters						
Industrial, Manufacturing						

Source: City 2005.

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Table 2.7-5: City of Chula Vista Exterior Noise Standards

Environmental Noise – L_{eq} in any hour[1]		
Receiving Land Use Category	**Noise Level (dBA)**	
	10 p.m. to 7 a.m. (Weekdays) 10 p.m. to 8 a.m. (Weekends)	**7 a.m. to 10 p.m. (Weekdays) 8 a.m. to 10 p.m. (Weekends)**
All residential, except multiple dwelling	45	55
Multiple dwelling residential	50	60
Commercial	60	65

Source: City 2013

[1] Environmental noise is the L_{eq} in any hour. The limits also apply to a category of noise defined as nuisance noise, and the limits are not to be exceeded at any time.

Table 2.7-6
Traffic Volumes and Noise Levels – Existing and Existing Plus Project Conditions

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 (County)	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	7,099	63	4
	Driveway #3 and SR-94	2,927	59	5,347	62	3
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**

Table 2.7-6
Traffic Volumes and Noise Levels – Existing and Existing Plus Project Conditions

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
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

Table 2.7-7
Traffic Noise Model Results

Receptor ID[1]	Lot #[2]	Peak Hour dBA L_{eq}	Exterior CNEL	Barrier Height (ft)	Mitigated CNEL
2	R-1B-1	62	63	4	58
8	R-1B-54	61	62	4	59
10	R-2A-46	62	63	4	59
12	R-2A-155	62	63	8	59
17	R-1D-84	60	61	2	60
21	R-1F-11	61	62	4	58
28	R-4A-3	60	61	6	57
32	R-4A-49	60	61	6	59
37	R-5A-75	60	61	2	59
56	R-2A-13	62	63	4	59
57	R-2A-9	66	67	6	60
58	R-2A-1	60	61	4	60
60	R-1A-69	64	65	6	54
117	R-1F-7	60	61	2	59
124	R-2A-162	60	61	2	60
135	R-1A-64	62	63	10	58
138	R-2A-5	62	63	6	57
155	R-4B-61	60	61	6	58
159	R-4A-56	60	61	2	60
162	R-4C-75	60	61	6	60

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.

[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. See Figures 2.7-3, 2.7-4, and 2.7-5 for receiver locations, Project lot numbers, and barrier locations.

Source: AECOM 2012

Table 2.7-8
Typical Noise Level Ranges at Domestic Housing Construction Sites

Construction Phase	Maximum Noise Level at 50 feet - dBA	
	Minimum Required Equipment On-Site	All Pertinent Equipment On-Site
Clearing	83	83
Excavation	75	88
Foundation/Conditioning	81	81
Paving	65	81
Finishing and Cleanup	72	87

Source: Bolt, Beranek and Newman, "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances," prepared for the U.S. Environmental Protection Agency, 1971.

Table 2.7-9
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)
		Traffic Volumes (ADT)	Traffic Noise Level at 100 feet (CNEL)	Traffic Volumes (ADT)	Traffic Noise Level at 100 feet (CNEL)		Traffic Volumes (ADT)	Traffic Noise Level at 100 feet (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

Table 2.7-10
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 Volumes (ADT)	Traffic Noise Level at 100 feet (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

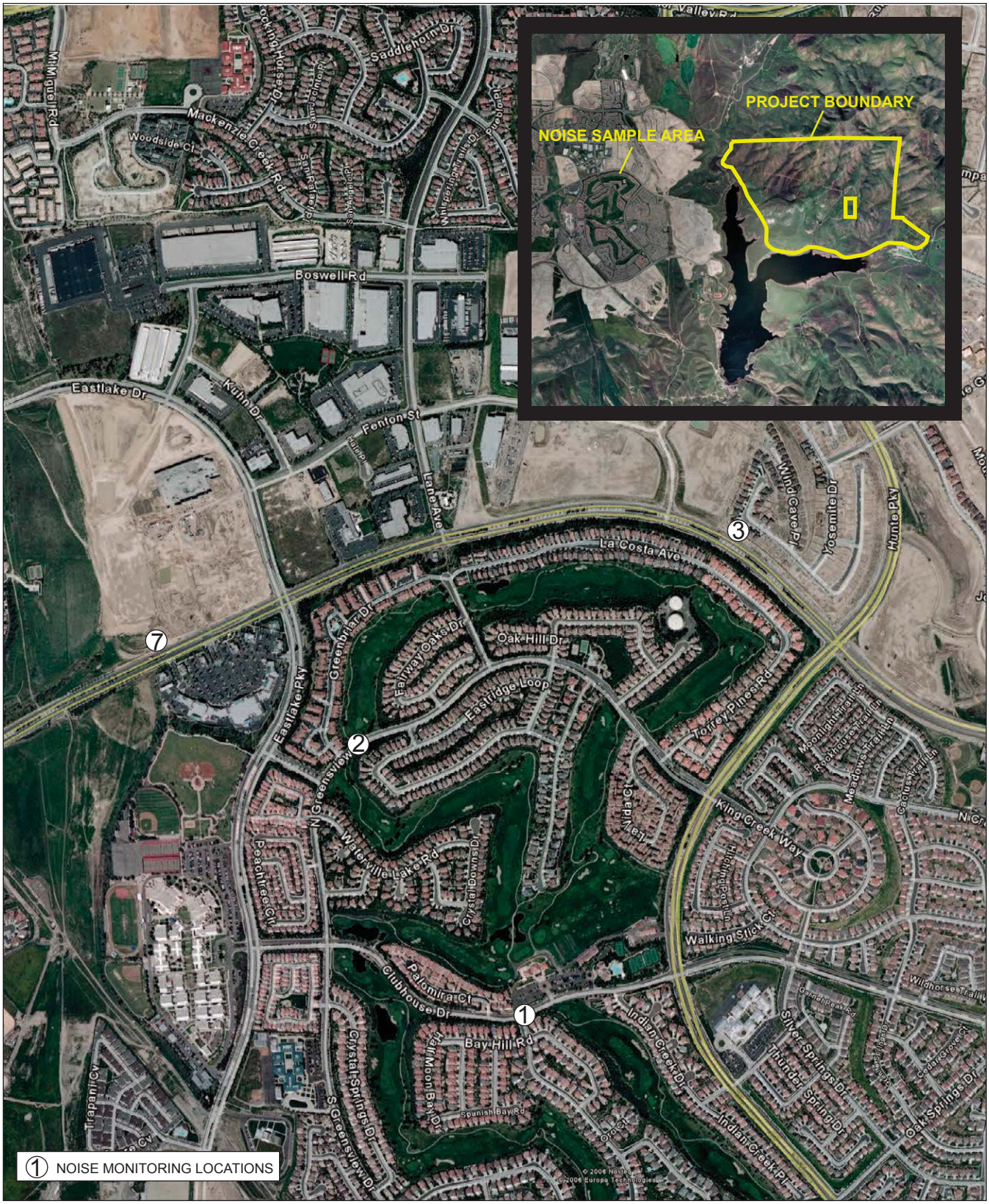
City Roadways	Segment	Existing		Cumulative		Change vs. Existing (CNEL)	Cumulative + Project		Change vs. Existing (CNEL)	Project Contribution (CNEL)
		Traffic Volumes (ADT)	Traffic Noise Level at 100 feet (CNEL)	Traffic Volumes (ADT)	Traffic Noise Level at 100 feet (CNEL)		Traffic Volumes(ADT)	Traffic Noise Level at 100 feet (CNEL)		
	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**
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

City Roadways	Segment	Existing		Cumulative		Change vs. Existing (CNEL)	Cumulative + Project		Change vs. Existing (CNEL)	Project Contribution (CNEL)
		Traffic Volumes (ADT)	Traffic Noise Level at 100 feet (CNEL)	Traffic Volumes (ADT)	Traffic Noise Level at 100 feet (CNEL)		Traffic Volumes(ADT)	Traffic Noise Level at 100 feet (CNEL)		
	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.

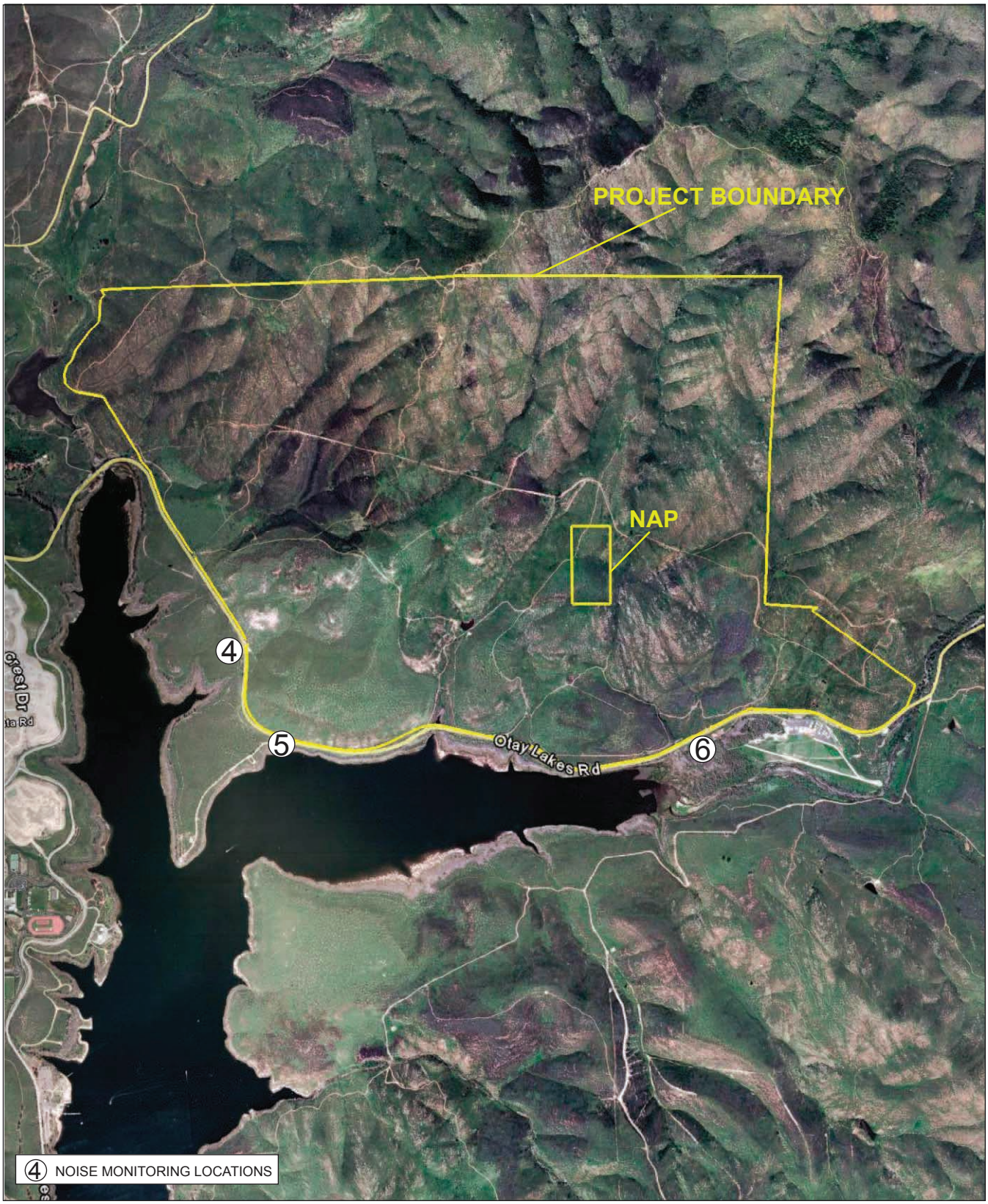
Source: Chen Ryan 2015



SOURCE: Google Earth 2006

No Scale

Figure 2.7-1
Noise Monitoring Locations - City of Chula Vista



SOURCE: Google Earth 2006

No Scale

Figure 2.7-2
Noise Monitoring Locations - Project Site

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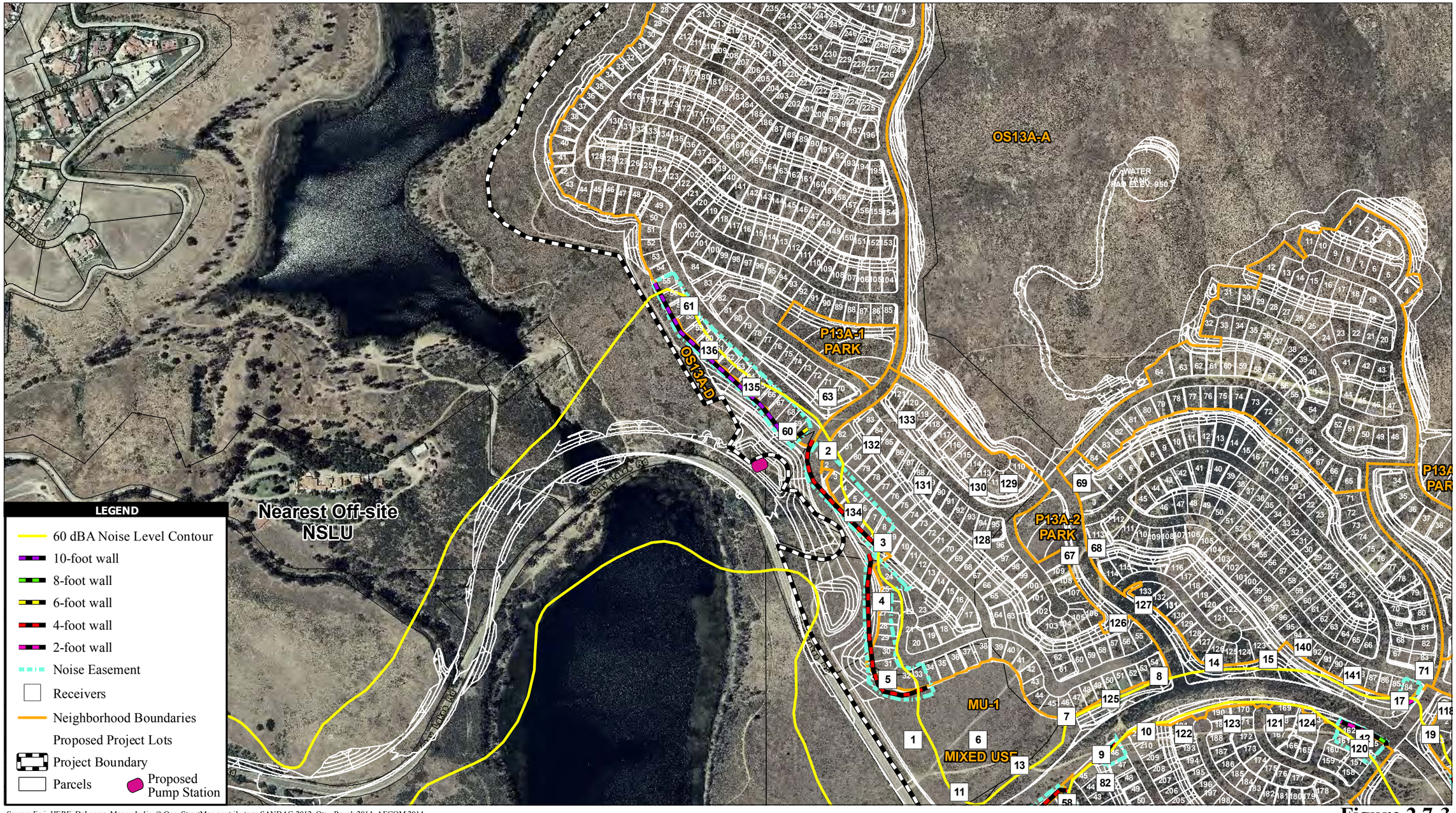

Source: Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors; SANDAG 2012; Otay Ranch 2014; AECOM 2014

Figure 2.7-3
Noise Model Receiver and Barrier Locations
Western Project Area

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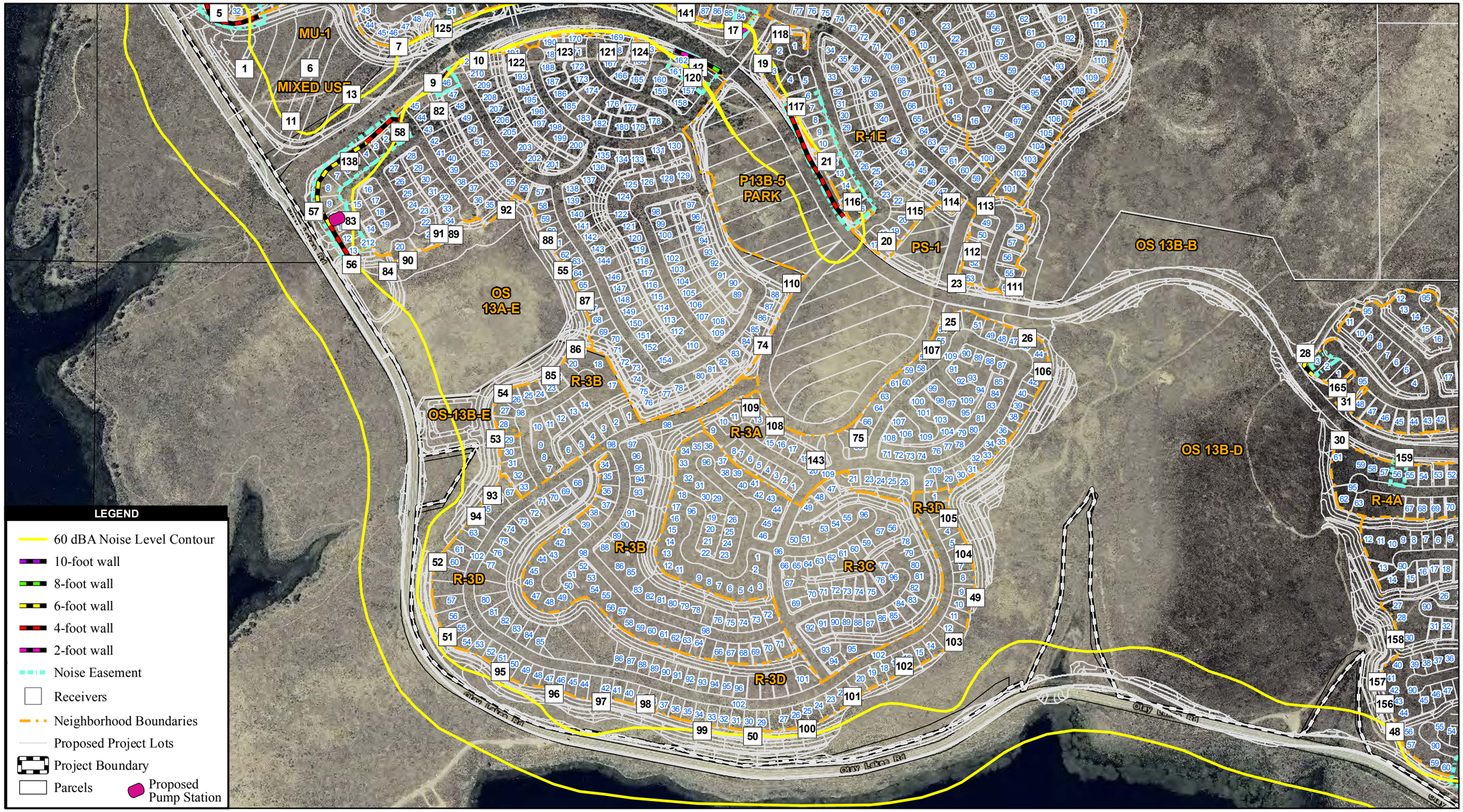

Source: Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors; SANDAG 2012; Otay Ranch 2014; AECOM 2014

Figure 2.7-4
Noise Model Receiver and Barrier Locations
Central Project Area

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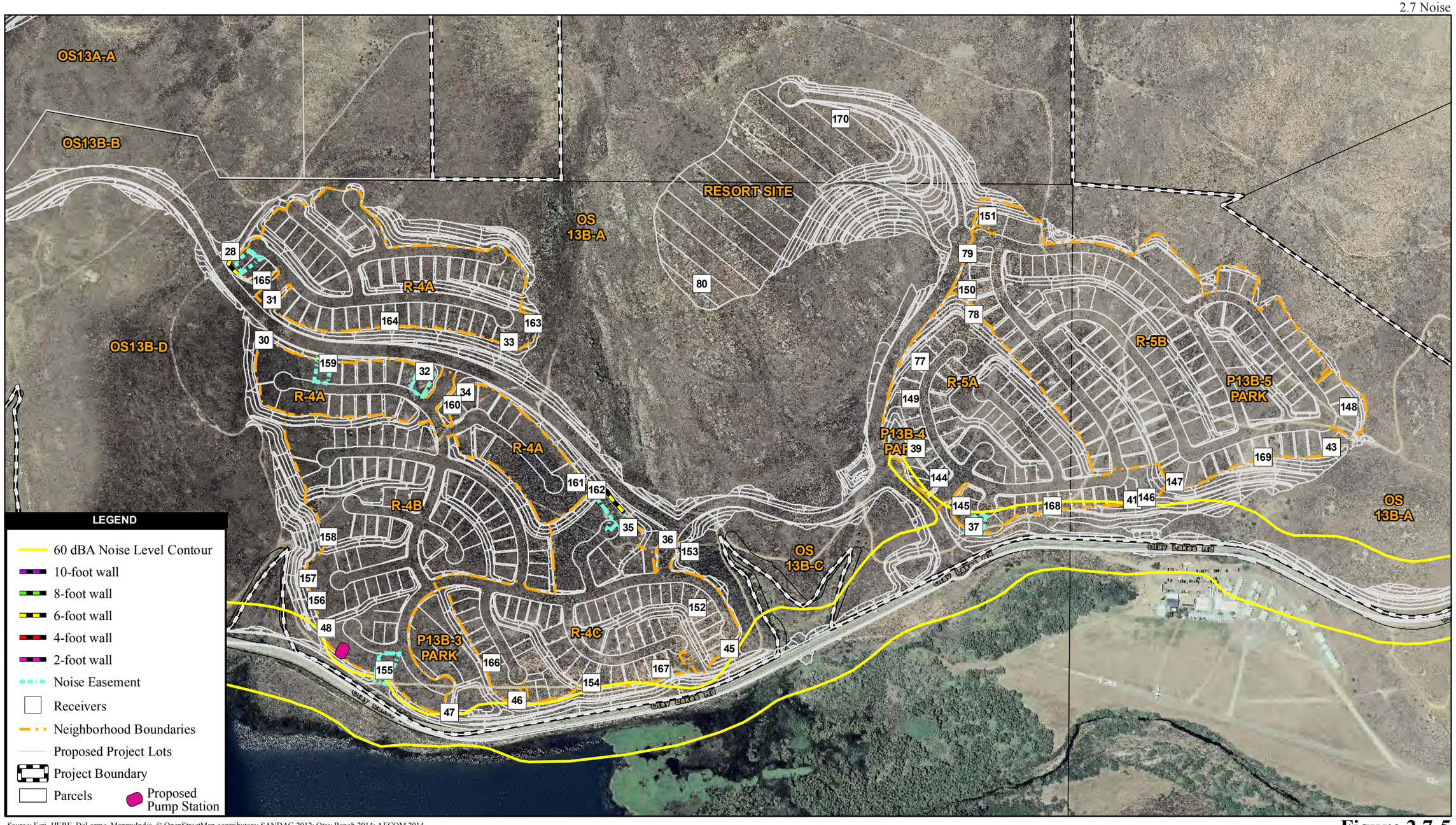

Source: Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors; SANDAG 2012; Otay Ranch 2014; AECOM 2014

0 250 500 1000 Feet

Figure 2.7-5
Noise Model Receiver and Barrier Locations
Eastern Project Area

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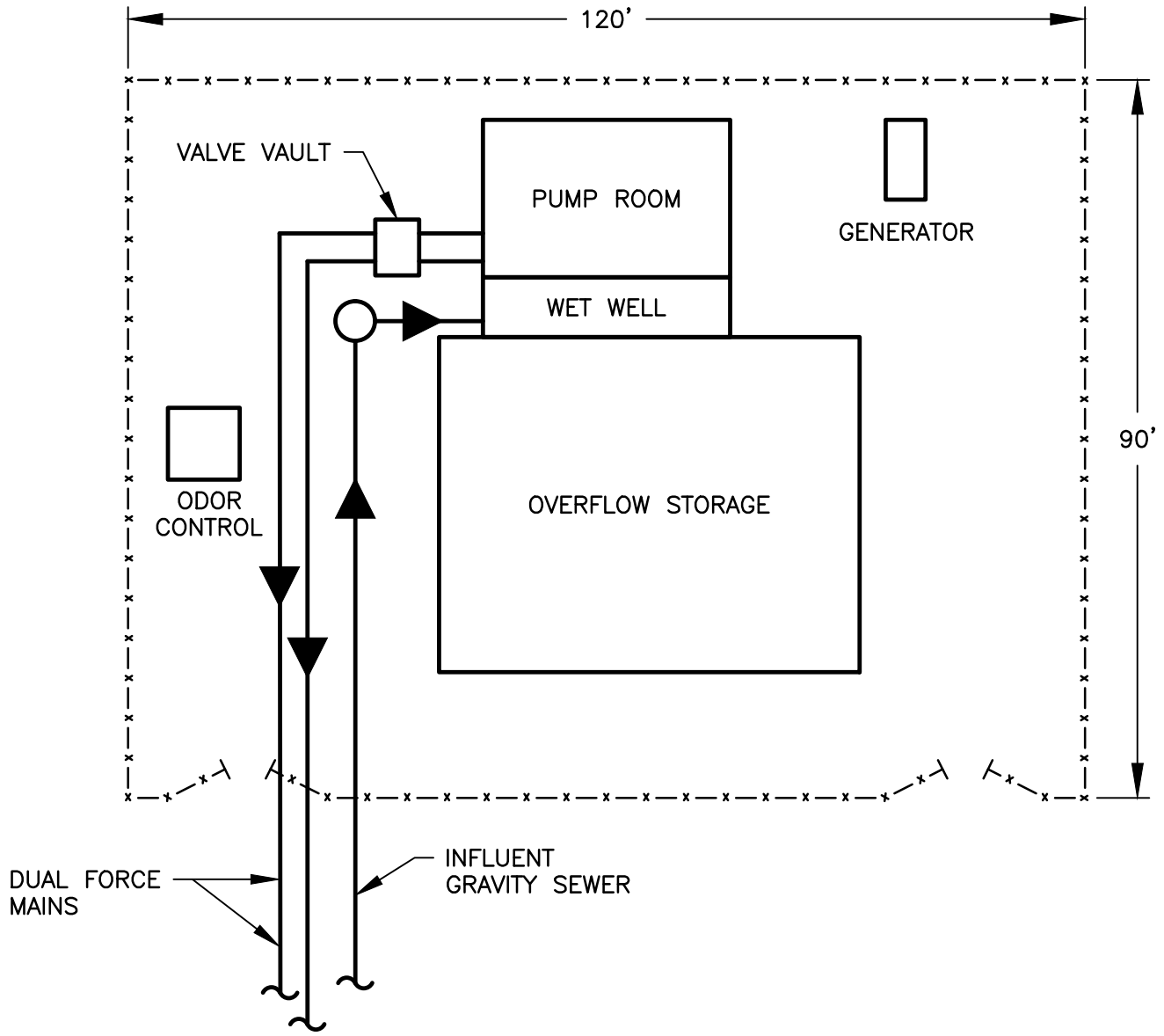

SOURCE:

Figure 2.7-6
Pump Station Site

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