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MELBA ROAD RESIDENTIAL SUBDIVISION ROJECT

NOISE STUDY

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MELBA ROAD RESIDENTIAL SUBDIVISION
ENCINITAS, CALIFORNIA
Noise Study

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MELBA ROAD RESIDENTIAL SUBDIVISION
ENCINITAS, CALIFORNIA
NOISE STUDY

This report is an analysis of the potential noise impacts associated with the proposed Melba Road Residential Subdivision Project (proposed project) in the City of Encinitas. This report has been prepared by Birdseye Planning Group (BPG) under contract to BRG Consultants, Inc., to support preparation of the environmental documentation pursuant to the California Environmental Quality Act (CEQA). This study analyzes the potential for permanent impacts associated with operation of the proposed project and temporary impacts associated with construction activity within proximity to the construction area.

PROJECT DESCRIPTION

The Project site is located at 1220-1240 Melba Road and 1190 Island View Lane in the Old Encinitas community on San Diego County (Assessor Parcel Numbers [APN] 259-18-003, -009, -010, -016, -102, -103, and -104. The City of Encinitas is surrounded by the cities of Carlsbad to the north and Solana Beach to the south, the unincorporated community of Olivenhain to the east, and the Pacific Ocean to the west. The property is roughly t-shaped, with its southern border along Melba Road. The 6.67-acre site is located north of Melba Road, south of Oak Crest Middle School, east of Balour Drive, and west of Crest Drive.

The Project proposes to subdivide the approximately 6.67-acre site to create thirty-one (31) new single-family lots with twenty-seven (27) market-rate units and three (3) very-low affordable dwelling units (DU). The Project proposes to utilize the California State Density Bonus law to request concessions to the development standards. The 31 units will provide a mix of two-story and one-story structures. The lots will range in size from 4,144 square feet (SF) to 34,260. Melba Road is currently a divided two-lane street that provides access to the Project area from the south. The proposed Project would construct a new 29-foot width private road from Melba Road that would extend north and end with two cul-de-sacs. Pedestrian access will be provided along the new private road.

All existing structures which comprise approximately 16,500 square feet, would be demolished and removed. Of the total 6.67-acre site, 6.271 acres would be graded/disturbed. The project would require approximately 15,000 cubic yards (CY) of cut and 10,000 CY of fill (including 5,000 CY of export) to implement the grading plans and to create the development pads and improvement areas, install all underground utilities and stormwater basins.

The proposed Project would create three separate major drainage basins. All runoff generated onsite will be conveyed to onsite biofiltration facilities, with three (3) large biofiltration basins located throughout the property. Each drainage area will be captured and conveyed to a large biofiltration basin facility located at the low end of the drainage basin, near the property boundary, by means of curb and gutter flow in the private road as well as onsite private storm

drain piping. The biofiltration basins will capture, treat, and detain storm water. Runoff will be filtered through the basin section and enter a subdrain system, which will convey treated water to an outlet structure and outfall pipe that will direct runoff offsite.

Wastewater would be conveyed off-site from new PVC sewer mains from the private road to existing sewer lines located along Melba Road to the Encina Water Pollution Control Facility (EWPCF). Two new 60" sewer manhole will be constructed along the new private roadway. The EWPCF is located at 6200 Avenida Encinas approximately 5.90 miles northwest of the site and is operated by the Cardiff Sanitation District.

The Project site is located in the City of Encinitas in the San Dieguito Water District (SDWD) service area. The Project would connect to existing SDWD distribution lines with 8" PVC sewer mains which will run under the new private road and connect to the existing 8" VCP sewer main under Melba Road. A new 8" PVC water main will also run under the new private road and connect to the exiting 6" ACP water main under Melba Road.

All construction activity would occur within the City's allowable construction hours (EMC Section 9.32.410), between 7:00 AM and 7:00 PM, Monday through Saturday. The number of construction staff working on the Project site at a given time would vary, depending on the phase of construction. Construction is anticipated to begin in mid-2022 and require approximately one year to complete. The project site is shown in Figure 1; the proposed site plan is shown in Figure 2.

SETTING

Overview of Sound Measurement

Noise level (or volume) is generally measured in decibels (dB) using the A-weighted sound pressure level (dBA). The A-weighting scale is an adjustment to the actual sound pressure levels to be consistent with that of human hearing response, which is most sensitive to frequencies around 4,000 Hertz (about the highest note on a piano) and less sensitive to low frequencies (below 100 Hertz). Sound pressure level is measured on a logarithmic scale with the 0 dB level based on the lowest detectable sound pressure level that people can perceive (an audible sound that is not zero sound pressure level). Based on the logarithmic scale, a doubling of sound energy is equivalent to an increase of 3 dBA, and a sound that is 10 dBA less than the ambient sound level has no effect on ambient noise. Because of the nature of the human ear, a sound must be about 10 dBA greater than the reference sound to be judged as twice as loud. In general, a 3 dBA change in community noise levels is noticeable, while 1-2 dB changes generally are not perceived. Quiet suburban areas typically have noise levels in the range of 40-50 dBA, while arterial streets are in the 50-60+ dBA range. Normal conversational levels are in the 60-65 dBA range, and ambient noise levels greater than 65 dBA can interrupt conversations. Noise levels typically attenuate (or drop off) at a rate of 6 dBA per doubling of distance from point sources (i.e., industrial machinery). Noise from lightly traveled roads typically attenuates at a rate of about 4.5 dBA per doubling of distance. Noise from heavily traveled roads typically

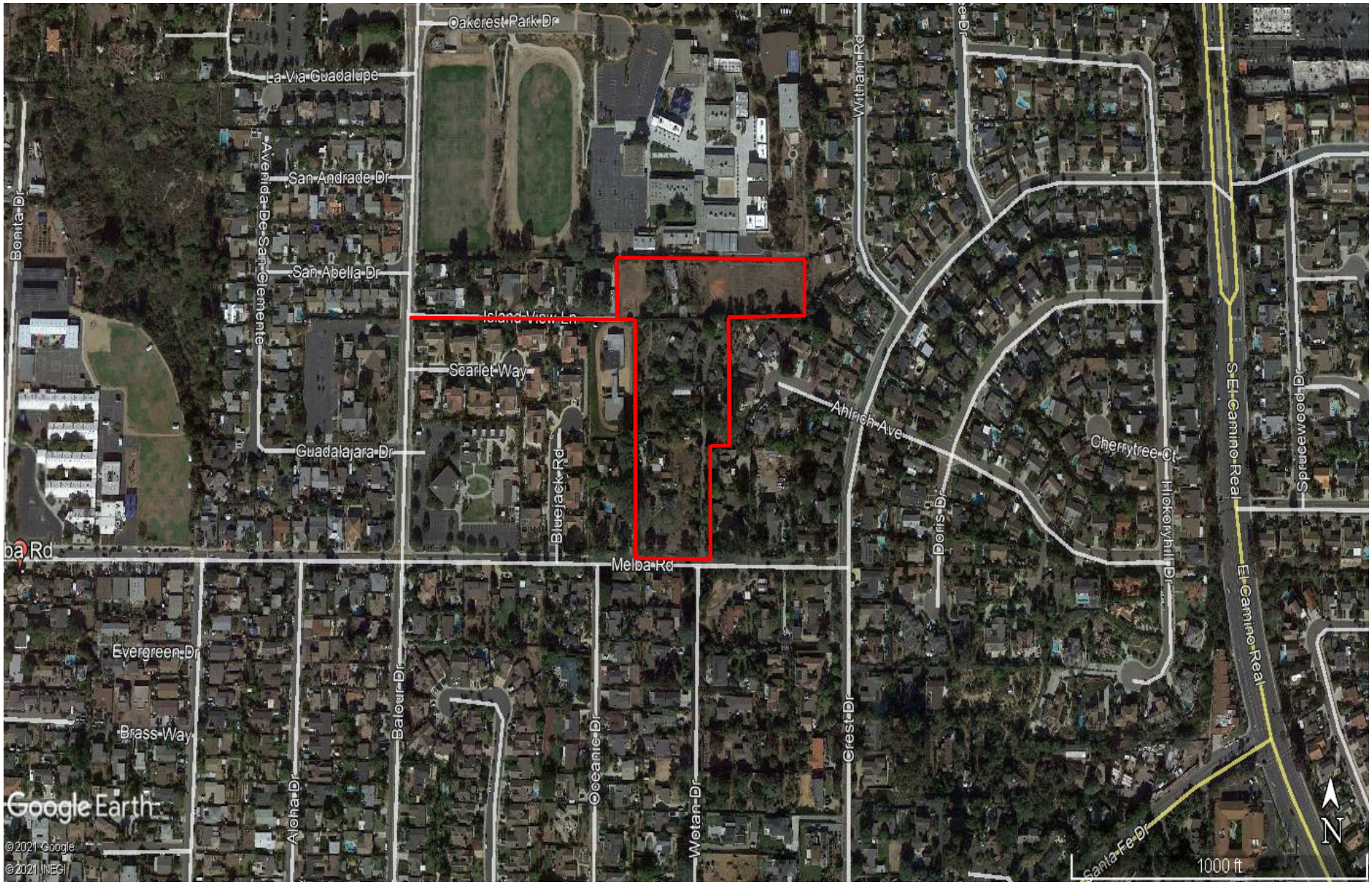

FIGURE 1—Vicinity Map - Project Site

Figure 2— Site Plan

attenuates at about 3 dBA per doubling of distance. Noise levels may also be reduced by intervening structures; generally, a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm reduces noise levels by 5 to 10 dBA. The manner in which older homes in California were constructed (approximately 30 years old or older) generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows. The exterior-to-interior reduction of newer residential units and office buildings construction to California Energy Code standards is generally 30 dBA or more.

In addition to the actual instantaneous measurement of sound levels, the duration of sound is important since sounds that occur over a long period of time are more likely to be an annoyance or cause direct physical damage or environmental stress. One of the most frequently used noise metrics that considers both duration and sound power level is the equivalent noise level (Leq). The Leq is defined as the single steady A-weighted level that is equivalent to the same amount of energy as that contained in the actual fluctuating levels over a period of time (essentially, the average noise level). Typically, Leq is summed over a one-hour period. Lmax is the highest RMS (root mean squared) sound pressure level within the measuring period, and Lmin is the lowest RMS sound pressure level within the measuring period.

The time period in which noise occurs is also important since noise that occurs at night tends to be more disturbing than that which occurs during the day. Community noise is usually measured using Day-Night Average Level (Ldn), which is the 24-hour average noise level with a 10-dBA penalty for noise occurring during nighttime (10 p.m. to 7 a.m.) hours, or Community Noise Equivalent Level (CNEL), which is the 24-hour average noise level with a 5 dBA penalty for noise occurring from 7 p.m. to 10 p.m. and a 10 dBA penalty for noise occurring from 10 p.m. to 7 a.m. Noise levels described by Ldn and CNEL usually do not differ by more than 1 dB. Daytime Leq levels are louder than Ldn or CNEL levels; thus, if the Leq meets noise standards, the Ldn and CNEL are also met. Table 1 shows sounds levels of typical noise sources in Leq.

Sensitive Receptors

Noise exposure goals for various types of land uses reflect the varying noise sensitivities associated with each of these uses. Urban areas contain a variety of land use and development types that are noise sensitive. The City of Encinitas General Plan Noise Element defines noise-sensitive land uses as those associated with indoor and outdoor human activities, including residential, transient lodging facilities, hospitals, convalescent hospitals, nursing facilities, other facilities for long-term medical care; private/public educational facilities, libraries, churches and other places of public gathering. At completion, the residences comprising the project will be sensitive receptors.

Table 1. Sound Levels of Typical Noise Sources and Noise Environments

Noise Source (at Given Distance)	Noise Environment	A-Weighted Sound Level (Decibels)	Human Judgment of Noise Loudness (Relative to Reference Loudness of 70 Decibels*)
Military Jet Takeoff with Afterburner (50 ft)	Carrier Flight Deck	140	128 times as loud
Civil Defense Siren (100 ft)		130	64 times as loud
Commercial Jet Take-off (200 ft)		120	32 times as loud **Threshold of Pain**
Pile Driver (50 ft)	Rock Music Concert Inside Subway Station (New York)	110	16 times as loud
Ambulance Siren (100 ft) Newspaper Press (5 ft) Gas Lawn Mower (3 ft)		100	8 times as loud **Very Loud**
Food Blender (3 ft) Propeller Plane Flyover (1,000 ft) Diesel Truck (150 ft)	Boiler Room Printing Press Plant	90	4 times as loud
Garbage Disposal (3 ft)	Noisy Urban Daytime	80	2 times as loud
Passenger Car, 65 mph (25 ft) Living Room Stereo (15 ft) Vacuum Cleaner (10 ft)	Commercial Areas	70	Reference Loudness **Moderately Loud**
Normal Speech (5 ft) Air Conditioning Unit (100 ft)	Data Processing Center Department Store	60	1/2 as loud
Light Traffic (100 ft)	Large Business Office Quiet Urban Daytime	50	1/4 as loud
Bird Calls (distant)	Quiet Urban Nighttime	40	1/8 as loud **Quiet**
Soft Whisper (5 ft)	Library and Bedroom at Night Quiet Rural Nighttime	30	1/16 as loud
	Broadcast and Recording Studio	20	1/32 as loud **Just Audible**
		0	1/64 as loud **Threshold of Hearing**

Source: Compiled by dBF Associates, Inc., 2016

Project Site Setting

The Project site is located within the community of Old Encinitas, one of the five communities in the City. Melba Avenue forms the southern border of the Project site and Oak Crest Middle School is adjacent to the site to the north. To the west is Crest Drive and to the east is Balour Drive. The site is surrounded by various development, mainly single-family residences and road infrastructure.

Currently the Project site contains several single-family residences located in a residential neighborhood. The surrounding Project vicinity includes single-family residences, churches, a horse stable, and a middle school. Of the single-family homes on site, four of the five are currently occupied. Other structures on the site include two personal use greenhouses, a guest house, and several sheds.

The Project site is developed and disturbed and has been intensely utilized as orchard, single family residential and greenhouse uses over several decades. Physically, the Project area is relatively flat to gently sloping at an elevation of 370 to 400 feet above mean sea level.

Existing Noise Environment

To gather data on the general noise environment at the project site, two weekday morning 15-minute noise measurements were taken on June 28, 2021. Three additional 15-minute measurements were taken on the site July 13, 2021. Site 1 is located near the intersection of Melba Road and Blackjack Road. Site 2 is located at the northwest corner of the Melba Road/Balour Drive intersection. Sites 3 and 4 are on the project site. Site 5 is located at the entrance to the project site at 1240 Melba Road. Existing noise at Site 1, Site 2 and Site 5 was measured for traffic model calibration purposes because the primary noise associated with operation of the proposed project will be traffic accessing the site from Melba Road. Sites 3 and 4 were measured to obtain existing sound levels interior to the project site. The 15-minute measurements were taken using an ANSI Type II integrating sound level meter. The predominant noise source was traffic. The temperature during monitoring was 65-70 degrees Fahrenheit with 100% cloud cover and no perceptible wind. Measurement locations are shown in Figure 3.

During monitoring, 23 cars/light trucks, 3 medium (two-axles and six wheels) and zero heavy (more than two-axles and six wheels) trucks passed Site 1. A total of 27 cars/light trucks, zero medium trucks and zero heavy trucks passed Site 2 on Melba Road. A total of 106 cars/light trucks, two medium trucks and zero heavy trucks passed Site 2 on Balour Drive. A total of 16 cars/light trucks, zero medium trucks and zero heavy trucks passed Site 5. Background noise at each site included pedestrian activity and related activities associated with lawn maintenance and activities at Oak Crest Middle School. Measured noise is representative of noise levels occurring at existing residences along Melba Road during a typical daytime scenario. Table 2 identifies the noise measurement locations and measured noise levels. As shown, the Leq was 56.0 dBA at Site 1 and 58.0 dBA at Site 2. Measured noise levels at Sites 3 and 4 were 45.8 and 43.7, respectively. The monitoring data sheet is provided as Appendix A.

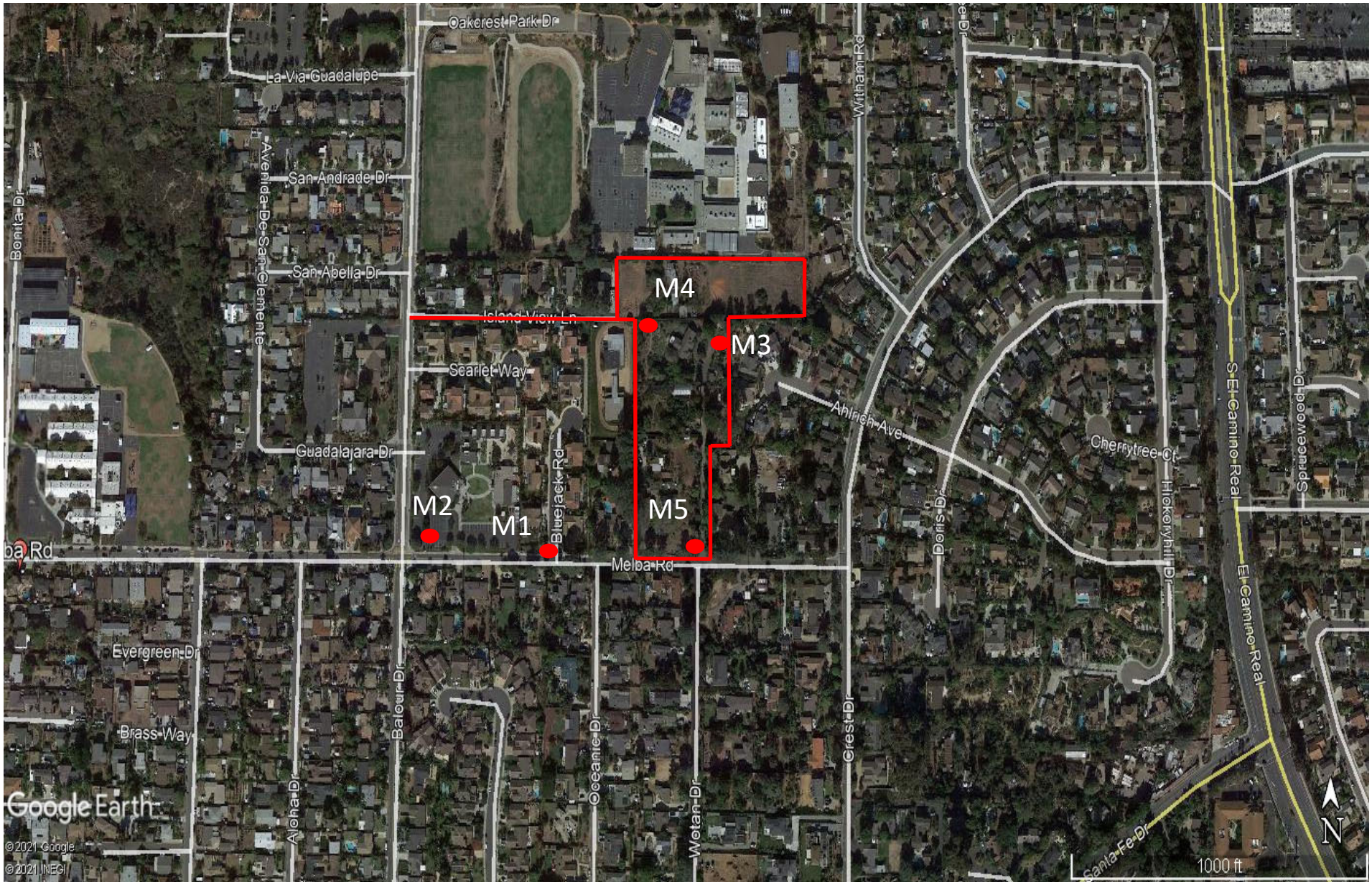

FIGURE 3—Noise Monitoring Locations ▭ - Project Site ● - Monitoring Locations

Table 2
Noise Monitoring Results

Measurement Location	Primary Noise Source	Sample Time	Leq (dBA)
1. Northwest corner of Melba Road and Bluejack Road adjacent existing residence.	Traffic and pedestrian activity	Weekday morning	56.0
2. Northeast corner of Melba Road and Balour Drive in the Bethlehem Church parking lot.	Traffic/lawn maintenance activity	Weekday morning	59.0
3. On-site proximal to proposed Lot 24	Distant construction noise	Weekday morning	45.8
4. On-site proximal to proposed Lots 11 and 12	Distant construction noise	Weekday morning	43.7
5. Site entrance at 1240 Melba Road	Traffic	Weekday morning	49.9

Source: Field visit using ANSI Type II Integrating sound level meter.

Regulatory Setting

Federal Noise Policies. There are no federal noise requirements or regulations that apply directly to the City of Encinitas. However, there are federal regulations that influence the audible landscape, especially for projects where federal funding is involved. For example, the FHWA requires abatement of highway traffic noise for highway projects through rules in the Code of Federal Regulations (23 CFR Part 772), the Federal Transit Administration (FTA), and Federal Railroad Administration (FRA). Each agency recommends thorough noise and vibration assessments through comprehensive guidelines for any highway, mass transit, or high-speed railroad projects that would pass by residential areas.

Federal Vibration Policies. The Federal Transit Administration (FTA) has published guidelines for assessing the impacts of groundborne vibration associated with construction activities, which have been applied by other jurisdictions to other types of projects. The FTA measure of the threshold of architectural damage for non-engineered timber and mason buildings (e.g., residential units) is 0.2 in/sec PPV. The threshold of perception of vibration is 0.01 in/sec PPV (Federal Transit Administration, September 2018).

State Noise Policies. Title 24, Section 3501 et. seq. of the California Code of Regulations codifies California Noise Insulation Standards. This code section uses the Community Noise Equivalency Level (CNEL) as its primary noise evaluation measurement. The CNEL measurement assesses noise variation during different times of the day for the purposes of averaging noise over a 24-hour period. Essentially, CNEL takes average sound levels at an observation point and adds a weighted penalty to those sounds that occur during the evening (+5 dBA) and nighttime hours (+10 dBA). An interior noise level of 45 dBA CNEL is often considered the desirable noise exposure level for single-family residential units. An exterior

noise level of 65 dBA is generally considered an acceptable level for residential and other noise-sensitive land uses.

State Vibration Policies. There are no state standards for traffic-related vibrations. California Department of Transportation's (Caltrans) position is that highway traffic and construction vibrations generally pose no threat to buildings and structures. For continuous (or steady-state) vibrations; however, Caltrans considers the architectural damage risk level to be between 0.2 and 2.0 inches/second (California Department of Transportation, 2013).

City of Encinitas Noise Ordinance. Chapter 9.32.410 of the Encinitas Municipal Code prohibits the operation of commercial construction equipment on Sundays or between the hours of 7:00 p.m. and 7:00 a.m. Monday through Saturday. Construction noise cannot exceed 75 decibels for more than 8 hours during any 24-hour period when the construction site is located in proximity to residential properties.

Per Chapter 30.40.010 (A), of the Encinitas Municipal Code, the maximum allowable exterior noise level at residences is 50 dBA from 7 a.m. to 10 p.m., and 45 dBA from 10 p.m. to 7 a.m.

City of Encinitas General Plan Noise Element

Figure 2 in the City of Encinitas General Plan Noise Element is adapted from the State of California General Plan Guidelines, published by the state Governor's Office of Planning and Research (OPR). OPR provides guidance for the acceptability of specific land use types within areas of specific noise exposure. Table 3 presents the General Plan Noise Element guidelines for determining acceptable and unacceptable community noise exposure limits for various land use categories. The guidelines also present adjustment factors that may be used to arrive at noise acceptability standards that reflect the noise control goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution.

Table 3
Land Use Compatibility for Community Noise Environments

Land Use	Normally Acceptable[a]	Conditionally Acceptable[b]	Normally Unacceptable[c]	Clearly Unacceptable[d]
Single-Family, Duplex, Mobile Homes	50-60	60-70	70-75	Above 70
Multifamily	50-60	60-70	70-75	Above 70
Transient Lodging – Hotels, Motels	50-65	65-70	70-80	Above 80
School, Libraries, Churches, Hospitals, Nursing Homes	50-60	60-70	70-80	Above 80
Auditoriums, Concert Halls, Amphitheaters	50-65	-	-	Above 65
Sports Arena, Outdoor Spectator Sports	50-70	-	-	Above 70
Playgrounds, Neighborhood Parks	50-70	-	70-75	Above 75
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50-70		70-80	Above 80
Office Building, Business and Professional, Commercial	55-67	67-75	75-85	-
Industrial, Manufacturing, Utilities, Agriculture	50-70	70-75	75-85	-

[a] Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.
[b] Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning would normally suffice.
[c] Normally Unacceptable: New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
[d] Clearly Unacceptable: New construction or development should generally not be undertaken.

Note: Noise levels are provided in A-weighted decibels, CNEL.
Source: Office of Noise Control, California Department of Health

Ambient conditions along Melba Road are within the compatible and conditionally compatible range shown above for single-family and multifamily residences referenced in Table 2. Noise levels interior to the project site are within the normally compatible range. Thus, whether a traffic-related noise impact would occur is based on whether project traffic, when added to the existing traffic, would cause noise to noticeably increase over ambient conditions (i.e., +3 dBA) and/or exceed the single- and multifamily residential compatibility criteria for residences along Melba Road.

Vibration Standards

Vibration is a unique form of noise as the energy is transmitted through buildings, structures and the ground whereas audible noise energy is transmitted through the air. Thus, vibration is generally felt rather than heard. The ground motion caused by vibration is measured as particle velocity in inches per second and is referenced as vibration decibels (VdB). The vibration velocity level threshold of perception for humans is approximately 65 VdB. A vibration velocity of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels.

The City's General Plan Noise Element, Municipal Code and the CEQA Significance Determination Thresholds do not provide vibration standards. The Federal Transit Administration's (FTA) *Transit Noise and Vibration Impact Assessment* (September 2018) uses a threshold of 65 VdB for buildings where low ambient vibration is essential for interior operations. These buildings include hospitals and recording studios. A threshold of 72 VdB is used for residences and buildings where people normally sleep (i.e., hotels and rest homes). A threshold of 75 VdB is used for institutional land uses where activities occur primarily during the daytime (i.e., churches and schools). The threshold used for the proposed project is 72 VdB.

Construction activities such as blasting, pile driving, demolition, excavation or drilling have the potential to generate ground vibrations near structures. With respect to ground-borne vibration impacts on structures, the FTA states that ground-born vibration levels in excess of 100 VdB would damage fragile buildings and levels in excess of 95 VdB would damage extremely fragile historic buildings. There are no fragile or historic buildings located in proximity to the project site; thus, 100 VdB is used to quantify potential vibration impacts to neighboring structures.

Construction activities referenced above that would generate significant vibration levels are not proposed. However, to provide information for use in completing the CEQA evaluation, construction-related vibration impacts are evaluated using the above referenced criteria.

IMPACT ANALYSIS

Project Noise Sources

Project construction would occur in phases. The initial phase would require demolition of existing structures, hardscape and related improvements located within the construction site. The second phase would focus on site preparation, grading and installation of underground improvements including utility infrastructure. The next phase would construct the new residences, apply architectural coating (i.e., paint) and paving new streets.

The initial site preparation phases of the construction process would take between 2-4 months to complete and generate the highest noise levels as heavy equipment would be required to perform this work. The type of equipment used and duration of use would vary depending upon the construction activities planned throughout the course of a work day. The work would begin in mid-2022 and be completed by mid-2023.

At completion, the project will result in a net increase in traffic of 260 average daily trips. The total number of trips would be 300; however, the project will replace four existing occupied residences. Thus, 40 existing trips are subtracted from 300 to equal 260. The project would generate a total of 21 a.m. peak hour and 26 p.m. peak hour trips along Melba Road. Traffic volumes would disperse to Melba Road; the majority (90%), would travel west to Balour Drive. The remaining 10% would disperse eastbound to Crest Avenue LOS Engineering, Inc., (September 2021). Traffic related impacts are addressed herein based on the difference in volumes between existing conditions and the proposed use referenced above. A doubling of traffic volumes would be required to cause a noticeable increase (3 dBA) in the Leq associated with traffic noise.

Significance Thresholds

The following criteria identified in Appendix G of the CEQA Guidelines, are used to determine with noise-related impacts would occur as a result of project construction and operation:

Would the project:

- Result in the generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

- Result in the generation of excessive groundborne vibration or groundborne noise levels? and/or

- If located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, result in the exposure of people residing or working in the project area to excessive noise levels?

Temporary Construction Noise

Construction noise estimates are based upon noise levels reported by the FTA, Office of Planning and Environment, and the distance to nearby sensitive receptors. Reference noise levels from that document were used to estimate noise levels at nearby sensitive receptors based on a standard noise attenuation rate of 3 dB per doubling of distance (line-of-sight method of sound attenuation) for hardscape conditions.

The main sources of noise during construction activities would include heavy machinery used during demolition of existing buildings, pavement, sidewalks and general clearing of the site, as well as equipment used for construction. Table 4 shows the typical noise levels associated with heavy construction equipment. As shown, average noise levels associated with the use of heavy equipment at construction sites can range from about 81 to 95 dBA at 25 feet from the source, depending upon the types of equipment in operation at any given time and phase of construction.

As referenced above, the City of Encinitas noise ordinance states that construction noise cannot exceed 75 decibels for more than 8 hours during any 24-hour period when the construction site is located in proximity to residential properties. Noise-sensitive uses near the project site are existing single-family residences located adjacent to the south, west and east property lines. The Oak Crest Elementary School is located adjacent to and north of the site. The average distance from the center of the site to the nearest receiver (i.e., single-family residences adjacent to the project site) is approximately 100 feet. However, the site boundary shares property lines with adjacent parcels. The distance from the property line to the nearest structures are approximately 30 feet. As referenced, it is assumed demolition, grading and site preparation work would require the simultaneous use of several pieces of heavy equipment. Building construction and finishing would utilize hand tools; however, equipment would also be required to deliver materials to the project site and work areas.

Based on EPA noise emissions, empirical data from existing noise studies as well as the amount and type of equipment needed for construction of the proposed project, worst-case noise levels from the construction equipment would occur during demolition and grading activities. The anticipated equipment used on-site would include a jackhammer, bobcat/dozer, backhoe/tractor, grader/excavator and dump trucks. Typically, equipment is spread out over the site when performing various operations. Based upon the site plan, construction operations would occur between 30 and 100 feet from the sensitive receptors neighboring the site.

Table 4
Typical Construction Equipment Noise Levels

Equipment Onsite	Typical Level (dBA) 25 Feet from the Source	Typical Level (dBA) 50 Feet from the Source	Typical Level (dBA) 100 Feet from the Source
Air Compressor	84	78	64
Backhoe	84	78	64
Bobcat Tractor	84	78	64
Concrete Mixer	85	79	73
Bulldozer	88	82	76
Jack Hammer	95	89	83
Pavement Roller	86	80	74
Street Sweeper	88	82	76
Man Lift	81	75	69
Dump Truck	82	76	70

Source: Hanson, Towers and Meister, May 2006
Noise levels based on FHWA Roadway Construction Noise Model (2006) Users Guide Table 1.
Noise levels based on actual maximum measured noise levels at 50 feet (Lmax).
Noise levels assume a noise attenuation rate of 6 dBA per doubling of distance.

Demolition Noise Levels

Construction equipment will not operate continuously during the workday. Equipment would be used as needed depending on the activity. For example, jackhammers and loaders may be used to break up asphalt areas and load material into trucks for transport off-site. Noise levels from the demolition activities can reach short-term peak levels exceeding 90 dBA but will be periodic rather than constant. For reference purposes, empirical data obtained from the *Point Loma High School Whole Site Modernization and Athletic Facilities Upgrade Project Noise Study* (Ldn Consulting 2016) states that worst-case hourly construction noise levels are approximately 80.8 dBA Leq at an average distance of 25 feet. However, noise levels vary considerably throughout the day because equipment is used periodically rather than constantly and the equipment is moved around the site. The daily 12-hour average noise level at the Point Loma High School site was measured to be 76 dBA at a distance of 25 feet. Assuming a reference level of 76 dBA at 25 feet and a 3 dBA decrease per doubling of distance, the average noise level over a 12-hour period would be approximately 73 dBA. As stated, the City's noise ordinance states that 75 dBA cannot be exceed continuously over an 8-hour period. Construction noise levels during demolition for the project are expected to be similar to what occurs at other urban fill sites; thus, provided demolition activities are limited to a typical 8-hour workday, noise levels should be within the acceptable limits required by the City of Encinitas.

Construction Noise Levels

The project site is 6.67 acres in size which allows equipment to disperse throughout the site. This typically minimizes noise levels at a specific location. If during site preparation and grading, a bobcat tractor (78 dBA), a backhoe (78 dBA) and a dump truck (82 dBA) were

working simultaneously generally in the center of the site over the workday, the Leq would be approximately 85 dBA at 50 feet and 82 dBA at 25 feet. This would exceed the 75-dBA average at the sensitive properties located east of the site. For reference purposes, noise levels associated with the above construction scenario are shown at varying distances in Table 5. As shown, noise levels at 100 feet or more from the active construction site would attenuate to below 75-dBA.

Table 5
Typical Maximum Construction Noise Levels at Various Distances from Project Construction

Distance from Construction	Maximum Noise Level at Receptor (dBA)
25 feet	88
50 feet	85
100 feet	72
250 feet	66
500 feet	60
1,000 feet	54

As referenced, construction noise is unlikely to be continuous in one location over a typical workday; thus, while it is possible that the 75-dBA standard could be exceeded, it is unlikely. Mitigation Measure NOI-1 is recommended during project construction to avoid or reduce potential temporary construction noise impacts to less than significant.

Mitigation Measure NOI-1: Noise Control Plan. Construction contractors shall develop and implement a noise control plan that includes a noise control monitoring program to ensure sustained construction noise levels do not exceed 75 decibels over an 8-hour workday at the nearest sensitive receivers. The plan shall include the following requirements:

Construction Equipment. Construction equipment noise shall be controlled using a combination of the following methods:

- Electrical power shall be used to run air compressors and similar power tools where feasible;
- Internal combustion engines shall be equipped with a muffler of a type recommended by the manufacturer and in good repair;
- All diesel equipment shall be operated with closed engine doors and be equipped with factory recommended mufflers;

- Any construction equipment that continues to generate substantial noise at the eastern project boundary shall be shielded with temporary noise barriers, such as barriers that meet a sound transmission class (STC) rating of 25, sound absorptive panels, or sound blankets on individual pieces of construction equipment;

- Stationary noise-generating equipment, such as generators and compressors, shall be located as far as practically possible from the nearest residential property lines;

- Contractor shall turn off idling equipment while not being used for operations after idling for five minutes; and

- Contractor shall perform noisier operation during the times least sensitive to nearby residential receptors.

Neighbor Notification. Designate a noise control monitor to oversee construction operations in proximity to sensitive receivers. Provide notification to residential occupants adjacent to the project site at least 24 hours prior to initiation of construction activities that could result in substantial noise levels at outdoor or indoor living areas. This notification should include the anticipated hours and duration of construction and a description of noise reduction measures being implemented at the project site. The notification should include the telephone number and/or contact information for the on-site noise control monitor that residents can use for inquiries and/or to submit complaints associated with construction noise.

Temporary Construction-Related Vibration

Activities associated with residences do not generate vibration. Thus, this discussion focuses on temporary vibration caused by construction. As referenced, the closest residences to the site are located approximately 30 feet from the property line. Based on the information presented in Table 6, vibration levels from operation of a loaded truck or bulldozer bobcat/backhoe would attenuate to 87 VdB or less at 25 feet. As discussed below, 100 VdB is the threshold where minor damage can occur in fragile buildings. Vibration levels are projected to be under this threshold; thus, structural damage is not expected to occur as a result of construction activities associated with the proposed project.

As referenced, 72 VdB is the vibration threshold for residences and/or buildings where people sleep. Table 8 shows construction equipment, with the exception of a small bulldozer could exceed 72 VdB at varying distances across the site. Construction activities would occur during daytime hours which would minimize nighttime sleep disturbance; however, to minimize vibration impacts, it is recommended that small dozers and similar equipment be used when working in proximity to the property lines. While vibration impacts are unlikely,

implementation of the Mitigation Measures NOI-1 would minimize short-term disturbances associated with vibration impacts at receivers located in proximity to the site.

Table 6
Vibration Source Levels for Construction Equipment

Equipment	Approximate VdB				
	25 Feet	50 Feet	60 Feet	75 Feet	100 Feet
Large Bulldozer	87	81	79	77	75
Loaded Trucks	86	80	78	76	74
Jackhammer	79	73	71	69	67
Small Bulldozer	58	52	50	48	46

Source: Federal Railroad Administration, 1998

Operational Noise Exposure

Long-term operation of the proposed project was evaluated for potential exterior traffic related impacts caused by increased traffic volumes associated with the project.

Exterior Traffic Noise. Traffic is the primary noise source that would be generated by the proposed project. Existing measured noise levels are within the normally compatible criteria for single-family residences located in proximity to the site. As referenced, the highest measured noise level is 59.0 dBA (see Table 2) at the intersection of Melba Road and Balour Drive. Noise levels proximal to the nearest residences along Melba Road range from 49.9 dBA to 56.0 dBA and are dependent on the frequency and speed of traffic. Whether a traffic-related noise impact would occur is based on whether project traffic, when added to the existing traffic, would cause the Leq to noticeably increase (+3 dBA).

Melba Road was modeled using the Federal Highway Administration Traffic Noise Model (TNM) version 2.5 software (see Appendix A). The model calculates traffic noise at receiver locations based on traffic volumes, travel speed, mix of vehicle types operating on the roadways (i.e., cars/trucks, medium trucks and heavy trucks) and related factors. Traffic volumes and vehicle mix used to calibrate TNM were based on vehicle counts obtained during the monitoring period. The 15-minute counts were multiplied by four to obtain hourly traffic counts. The model was calibrated to calculate noise levels that are +/- 2 dBA those measured on-site and reported in Table 2.

Traffic volumes for peak hour existing and project operation were obtained from the Traffic Study (LOS Engineering, February 2021). Evening (PM) peak hour project trips for existing conditions were modeled to determine baseline noise conditions. Project trips were then added to the baseline trips to determine whether the Leq at neighboring receivers would noticeably change as a result of project-related traffic. As referenced, the project would generate 270 ADT. Peak hour

volumes are estimated to be 21 AM peak hour trips (6 inbound and 15 outbound), and 26 PM peak hour trips (18 inbound and 8 outbound). The PM peak hour trips are higher; and thus, were used in the analysis. Noise levels were calculated at the following receivers and are intended to represent conditions at multiple receivers within proximity to these locations:

1. Single-family residence at 1250 Melba Road;
2. Single-family residence at 1202 Melba Road;
3. Single-family residence at 939 Bluejack Road; and
4. Single-family residence at 1205 Melba Road.

The receiver locations are shown in Figure 4. As shown in Table 7, the daytime hourly average (Leq) does not exceed the 60-dBA compatibility standard at the receivers modeled along Melba Road under baseline conditions.

Table 7
Modeled Noise Levels

Receptor	Existing Leq	Exceed Standard?	With Project Leq	dBA Change	Significant Impact
Site 1	57.0	No	57.5	+0.5	No
Site 2	58.7	No	59.5	+0.7	No
Site 3	58.9	No	59.7	+0.8	No
Site 4	59.0	No	59.8	+0.8	No

As shown, the increase in noise levels would range from 0.5 to 0.8 dBA. To cause a significant noise impact related to traffic noise, project-related traffic would have to cause the existing Leq at one or more receivers to exceed the compatibility standard (i.e., 50-60 dBA) shown in Table 3 or increase by 3 or more dBA. A change of 3 dBA requires a doubling or halving of sound energy. Thus, for the project to noticeably change existing traffic related noise, it would have to generate enough traffic to double volumes on the adjacent roadways. Further, existing vehicle speeds would have to be maintained. As shown in Table 7, traffic associated with the project would increase ambient conditions; however, the increase would be less than one decibel and not discernible from existing noise levels. Operation traffic from the proposed project would have no adverse impact on sound levels at existing receivers in proximity to the site.

Interior Noise. California Energy Code Title 24 standards specify construction methods and materials that result in energy efficient structures and up to a 30-dBA reduction in exterior noise levels (assuming windows are closed). This includes operation of mechanical ventilation (e.g. heating and air conditioning), in combination with standard building construction that includes dual-glazed windows with a minimum Sound Transmission Class (STC) rating of 26 or higher. When windows are open, the insertion loss drops to about 10 dBA.

Assuming windows are closed, interior noise levels at project residences that front Melba Road would be approximately 27.5 to 29.8 dBA and less at residences located further north of Melba Road. The proposed units would be designed to achieve an STC of 26 or higher. Thus, noise levels would be below the 45-dBA interior standard.

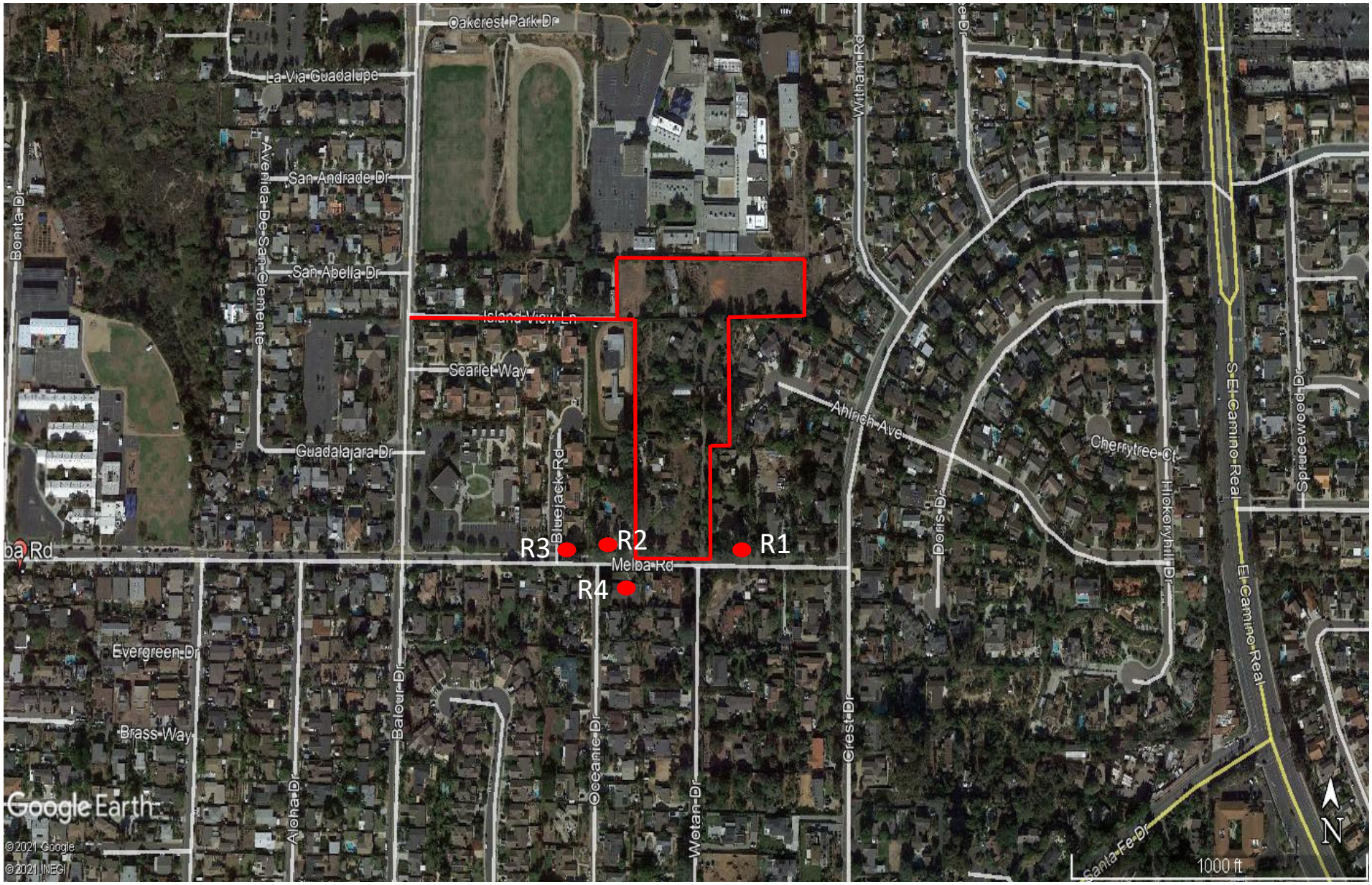

FIGURE 4—Noise Receiver Locations ▭ - Project Site ● - Receiver Locations

Airport Land Use Compatibility Plan Compatibility. McClellan- Palomar Airport is located approximately 6.0 miles north of the project site. Based on the noise contour maps provided in the McClellan-Palomar Airport Land Use Compatibility Plan Exhibit III-1 (County of San Diego County amended December 2011), the project site is located outside the 60-65 dBA CNEL contours; and thus, is not affected by airport noise. For this reason, the project site is not located in an area that is affected by aircraft noise; and thus, compatibility with an adopted Airport Land Use Compatibility Plan is not required.

CONCLUSION

While unlikely, the proposed project has the potential to exceed the construction noise standard specified in Chapter 9.32.410 of the Municipal Code; thus, causing a temporary adverse noise impact at adjacent receivers. With implementation of Mitigation Measure NOI-1, noise levels exceeding the 75 dBA over an 8-hour period would be avoided. Thus, a **less than significant** construction noise impact would occur.

Exterior noise levels caused by traffic sources are not expected to noticeably change existing noise levels at the project site or at existing residential properties located proximal to the site. Assuming a 30-dBA reduction in noise levels between exterior and interior levels, the project would be compatible with the future noise environment in the project area and the 45-dBA interior standard would be met at all residential receivers modeled with operation of the proposed project. As referenced, an exterior to interior noise study would be prepared during the building permit process to confirm projected attenuation associated with wall, window and door assemblies would achieve the required 45-dBA interior standard. Thus, a **less than significant** operational noise impact would occur.

REFERENCES

California Office of Planning and Research. *OPR General Plan Guidelines*, 2017.

California Department of Transportation, *Transportation-Related Earthborn Vibration Technical Advisory*, April 2013.

City of Encinitas Municipal Code, Chapter 9.32.410 Chapter 30.40.010 (A)

City of Encinitas. *General Plan Noise Element. Figure 2*, September 2010.

County of San Diego Regional Airport Authority, *McClellan-Palomar Airport, Airport Land Use Compatibility Plan*, amended December 1, 2011.

dBF & Associates, Inc., Reference Noise Level Compilation Table, 2016.

Federal Highway Administration. *Roadway Construction Noise Model. 2006.* Users Guide Table 1.

Federal Highway Administration, Transportation Noise Model Version 2.5, 2004.

Federal Transit Administration. *Transit Noise and Vibration Impact Assessment*. September 2018.

Federal Rail Administration (FRA) *Guidelines (Report Number 293630-1),* December 1998.

Ldn Consulting, Inc. *Point Loma High School Environmental Impact Report Noise Study*, February 2016
.

LOS Engineering, Inc., *Melba Road Residential Subdivision Traffic Study*, February 2021.

United States Environmental Protection Agency. *Federal Noise Control Act of 1972, 42 U.S.C. §4901 et seq.,* 1972

United States Department of Housing and Urban Development. *Noise Control Guidebook*, 2009.

Appendix A

Monitoring Data Sheet and Modeling Results

FIELD NOISE MEASUREMENT DATA

Project Name: Melba Road Residential Subdivision Page 1 of
Project #: Day / Date My Name.

Sound Level Meter	Calibrator	Weather Meter
Model #: Piccolo II	Model #	Model # Serial #
Serial #	Serial #	
Weighting: (A) / C / Flat	Pre-Test: dBA SPL	Terrain: Hard / Soft / (Mixed)
Response: (Slow) / Fast / Impl	Post-Test: dBA SPL	Topo: (Flat) / Hilly (describe)
Windscreen: (Yes) / No		Wind: (Steady) / Gusty

ID	Time Start	Time Stop	Leq	Lmin	Lmax	L10	L50	L90	Wind Spd/ Dir (mph)	Temp (°F)	RH (%)	Bar Psr (in Hg)	Cloud Cover (%)
1	8:00	8:15	56.1	41.7	69.2				0	65			100
2	8:20	8:35	58.2	42.8	71.4				0	65			100
3	8:00	8:15	45.8	39.4	66.3								
4	8:20	8:35	43.7	40.3	55.6								
5	8:40	8:55	49.9	41.2	64.7				0	70			60%

Roadway Name	MELBA/Blackjack	Melba/Baker	Location(s) / GPS Reading(s):
Speed (post/obs)	35		35
Number of Lanes	2		2
Width (pave/row)	24		24
1- or 2- way	2		2
Grade	+ 1%	+5	0%
Bus Stops	+0		+0
Stoplights	+0		4 WAY STOP
Street Parking	+0	9/13/2021	+0
Automobiles	23	116	27 106
Medium Trucks	3	0	0 2
Heavy Trucks	0	0	0 0

Other Noise Sources: distant (aircraft) / (roadway traffic) / trains / landscaping / rustling leaves / children playing / dogs barking / birds vocalizing

Notes and Sketches on Reverse

Site 1

Start Date	6/29/2021
Start Time	7:57:46 AM
End Time	8:12:45 AM
Duration	00:14:59
Meas Mode	Single
Input Range	High
Input Type	Mic
SPL Time Weight	Slow
LN% Freq Weight	dBA
Overload	No
UnderRange	Yes
Sensitivity	18.44mV/Pa

LZeq	65.3
LCeq	63.8
LAeq	56.0
LZSmax	79.2
LCSmax	76.8
LASmax	69.2
LZSmin	54.8
LCSmin	52.0
LASmin	41.7
LZE	94.8
LCE	93.3
LAE	85.5
LZpeak	91.3
LCpeak	89.4
LApeak	87.8
1%	67.9
2%	66.3
5%	63.5
8%	61.4
10%	60.4
25%	53.0
50%	45.9
90%	42.9
95%	42.6
99%	42.1

Site 2

Start Date	6/29/2021
Start Time	8:18:57 AM
End Time	8:33:56 AM
Duration	00:14:59
Meas Mode	Single
Input Range	High
Input Type	Mic
SPL Time Weight	Slow
LN% Freq Weight	dBA
Overload	No
UnderRange	Yes
Sensitivity	18.44mV/Pa

LZeq	73.0
LCeq	71.9
LAeq	58.0
LZSmax	90.4
LCSmax	88.7
LASmax	71.4
LZSmin	56.3
LCSmin	54.2
LASmin	42.8
LZE	102.5
LCE	101.4
LAE	87.5
LZpeak	103.2
LCpeak	101.0
LApeak	88.5
1%	67.7
2%	64.9
5%	62.2
8%	61.2
10%	60.7
25%	58.4
50%	56.0
90%	49.7
95%	48.0
99%	44.3

Site 3

Start Date	7/13/2021
Start Time	7:59:15 AM
End Time	8:14:14 AM
Duration	00:14:59
Meas Mode	Single
Input Range	High
Input Type	Mic
SPL Time Weight	Slow
LN% Freq Weight	dBA
Overload	No
UnderRange	Yes
Sensitivity	18.44mV/Pa

LZeq	62.8
LCeq	61.3
LAeq	45.8
LZSmax	70.5
LCSmax	67.9
LASmax	66.3
LZSmin	59.9
LCSmin	58.3
LASmin	39.4
LZE	92.3
LCE	90.8
LAE	75.3
LZpeak	86.7
LCpeak	84.2
LApeak	82.9
1%	55.0
2%	52.4
5%	49.8
8%	49.1
10%	48.7
25%	46.7
50%	42.9
90%	40.1
95%	39.9
99%	39.5

Site 4

Start Date	7/13/2021
Start Time	8:20:10 AM
End Time	8:35:09 AM
Duration	00:14:59
Meas Mode	Single
Input Range	High
Input Type	Mic
SPL Time Weight	Slow
LN% Freq Weight	dBA
Overload	No
UnderRange	Yes
Sensitivity	18.44mV/Pa

LZeq	62.0
LCeq	59.1
LAeq	43.7
LZSmax	73.5
LCSmax	66.3
LASmax	55.6
LZSmin	58.4
LCSmin	56.0
LASmin	40.8
LZE	91.5
LCE	88.6
LAE	73.2
LZpeak	87.9
LCpeak	81.0
LApeak	76.8
1%	52.0
2%	50.2
5%	46.7
8%	45.2
10%	44.7
25%	43.4
50%	42.5
90%	41.5
95%	41.3
99%	41.0

Site 5

Start Date	7/13/2021
Start Time	8:40:53 AM
End Time	8:55:52 AM
Duration	00:14:59
Meas Mode	Single
Input Range	High
Input Type	Mic
SPL Time Weight	Slow
LN% Freq Weight	dBA
Overload	No
UnderRange	Yes
Sensitivity	18.44mV/Pa

LZeq	67.0
LCeq	62.2
LAeq	49.9
LZSmax	80.1
LCSmax	74.9
LASmax	64.7
LZSmin	57.1
LCSmin	54.5
LASmin	41.2
LZE	96.5
LCE	91.7
LAE	79.4
LZpeak	95.3
LCpeak	92.3
LApeak	88.0
1%	61.6
2%	60.2
5%	57.0
8%	53.9
10%	52.3
25%	46.7
50%	43.7
90%	42.0
95%	41.8
99%	41.3

<Organization?>
<Analysis By?>

13 July 2021
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: <Project Name?>
RUN: Melba Road Subdivision - Existing
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type Impact	Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
1250 Melba Road	1	1	0.0	57.0	66	57.0	10	----	57.0	0.0	8	-8.0
1202 Melba Road	2	1	0.0	58.7	66	58.7	10	----	58.7	0.0	8	-8.0
939 Bluejack Road	3	1	0.0	58.9	66	58.9	10	----	58.9	0.0	8	-8.0
1205 Melba Road	4	1	0.0	59.0	66	59.0	10	----	59.0	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	4	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

<Organization?>
<Analysis By?>

13 July 2021
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: <Project Name?>
RUN: Melba Road Subdivision - w-Project
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type Impact	Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
1250 Melba Road	1	1	0.0	57.9	66	57.9	10	----	57.9	0.0	8	-8.0
1202 Melba Road	2	1	0.0	59.5	66	59.5	10	----	59.5	0.0	8	-8.0
939 Bluejack Road	3	1	0.0	59.7	66	59.7	10	----	59.7	0.0	8	-8.0
1205 Melba Road	4	1	0.0	59.8	66	59.8	10	----	59.8	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	4	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

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