Noise Technical Report

Pacifica Development Project

City of Oceanside, California

APRIL 2023

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Table of Contents

SECTION **PAGE NO.**

TABLES

FIGURES

APPENDICES

Acronyms and Abbreviations

Acronym/Abbreviation	Definition
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
City	City of Oceanside
CNEL	Community Noise Equivalent Level
dB	decibel
dBA	A-weighted decibel
FTA	Federal Transit Administration
ips	inches per second
L_{dn}	day–night average noise level
L_{eq}	equivalent noise level
L_{max}	maximum sound level
L_{min}	minimum sound level
Pacifica Development Project	proposed project
PPV	peak particle velocity
RCNM	Roadway Construction Noise Model
SLM	Sound level meter
SPL	Sound pressure level
ST	Short-term
STC	Sound Transmission Class
VdB	Velocity Decibel

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1 Introduction

1.1 Report Purpose and Scope

This technical noise report evaluates the potential noise impacts during construction and operation of the proposed Pacifica Housing Project (proposed project). This assessment utilizes the significance thresholds in Appendix G of the California Environmental Quality Act Guidelines (14 CCR 15000 et seq.).

1.2 Project Location and Description

The Pacifica Planned Development Plan planning area encompasses approximately 14.55 gross acres. As illustrated in Figure 1. Project Location, the planning area is situated in the northeast portion of the City of Oceanside in the North Valley neighborhood. The planning area is located approximately 0.5 mile from the San Luis Rey Transit Center and 1.5 miles from Highway 76.

The proposed project consists of a for-sale 164-unit Planned Development Community to be developed on a 14.55 acre site located at the former Pacifica Elementary School site at 4991 Macario Drive. The neighborhood will consist of three-story attached townhomes oriented towards internal paseos and drives throughout the site. New homes will range in size from a minimum of approximately 1200 square feet to 1800 square feet with two (2) to three (3) bedrooms and an attached 2-car garage (either side-by-side or tandem configuration). Each home will include private open space in the form of a patio and/or deck. Common recreational spaces, consisting of approximately 57,900 square feet of open space, will be designed with urban-style amenities such as tot lots, an off-leash dog space, pickle ball courts, bocce ball areas, barbecue areas, and space for a variety of outdoor games.

1.3 Fundamentals of Noise and Vibration

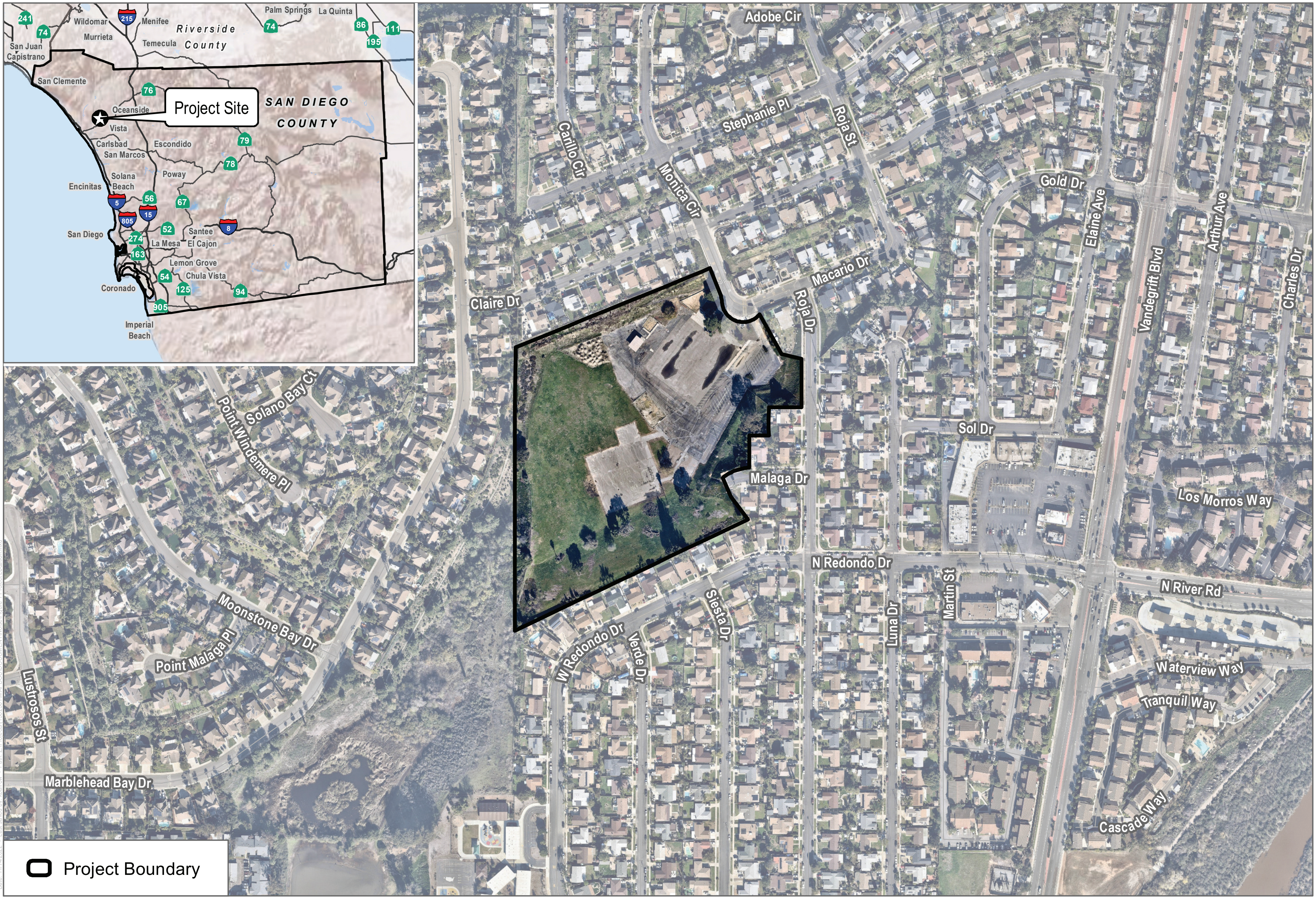
The following is a brief discussion of fundamental noise concepts and terminology.

1.3.1 Sound, Noise, and Acoustics

Sound is actually a process that consists of three components: the sound source, sound path, and sound receiver. All three components must be present for sound to exist. Without a source to produce sound, there is no sound. Similarly, without a medium to transmit sound pressure waves, there is no sound. Finally, sound must be received; a hearing organ, sensor, or object must be present to perceive, register, or be affected by sound or noise. In most situations, there are many different sound sources, paths, and receptors rather than just one of each. Acoustics is the field of science that deals with the production, propagation, reception, effects, and control of sound. Noise is defined as sound that is loud, unpleasant, unexpected, or undesired.

1.3.2 Sound Pressure Levels and Decibels

The amplitude of a sound determines its loudness. Loudness of sound increases with increasing amplitude. Sound pressure amplitude is measured in units of micronewton per square meter, also called micropascal. One micropascal is approximately one-hundred billionth (0.00000000001) of normal atmospheric pressure. The pressure of a very loud sound may be 200 million micropascals, or 10 million times the pressure of the weakest audible sound. Because expressing sound levels in terms of micropascal would be very cumbersome, sound pressure level in logarithmic units is used instead to describe the ratio of actual sound pressure to a reference pressure squared. These units are called Bels. To provide a finer resolution, a Bel is subdivided into 10 decibels (dB).



SOURCE: SanGIS 2019, Open Streets Map 2019

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0 150 300 Feet

FIGURE 1

Project Location

Pacifica Elementary Housing Development Project

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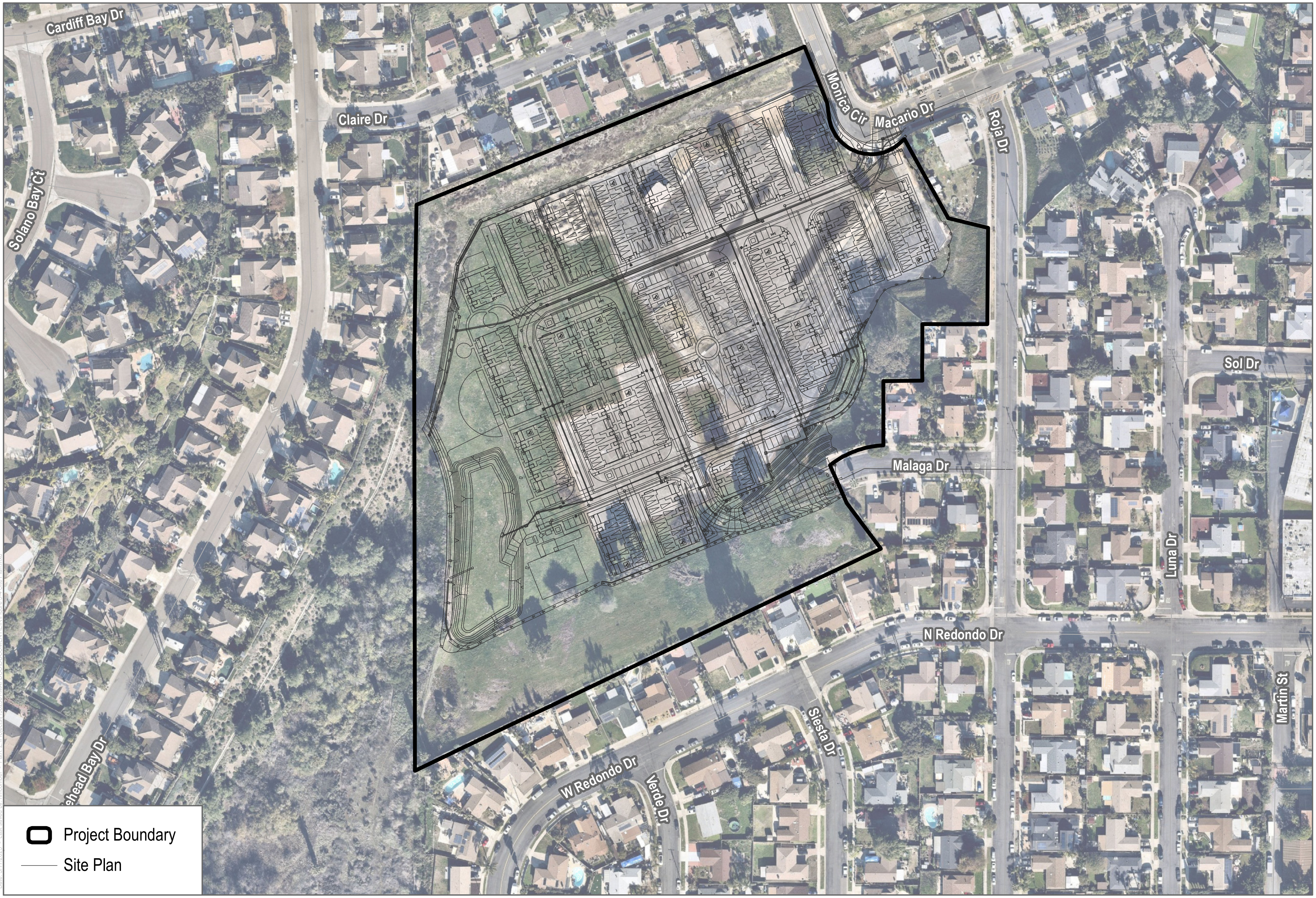

SOURCE: SANGIS 2019; Open Street Maps 2022

DUDEK 0 100 200 Feet

FIGURE 3-4

Site Plan

Pacifica Project EIR

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1.3.3 A-Weighted Sound Level

Sound pressure level alone is not a reliable indicator of loudness. The frequency, or pitch, of a sound also has a substantial effect on how humans will respond. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness, or human response, is determined by the characteristics of the human ear.

Human hearing is limited not only in the range of audible frequencies, but also in the way it perceives the sound in that range. In general, the healthy human ear is most sensitive to sounds between 1,000 and 5,000 hertz, and it perceives a sound within that range as more intense than a sound of higher or lower frequency with the same magnitude. To approximate the frequency response of the human ear, a series of sound level adjustments is usually applied to the sound measured by a sound level meter. The adjustments (referred to as a weighting network) are frequency-dependent.

The A-scale weighting network approximates the frequency response of the average young ear when listening to ordinary sounds. When people make judgments about the relative loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. Other weighting networks have been devised to address high noise levels or other special situations (e.g., B-scale, C-scale, D-scale), but these scales are rarely used in conjunction with most environmental noise. Noise levels are typically reported in terms of A-weighted sound levels. All sound levels discussed in this report are A-weighted decibels (dBA). Examples of typical noise levels for common indoor and outdoor activities are depicted in Table 1.

Table 1. Typical Sound Levels in the Environment and Industry

Common Outdoor Activities	Noise Level (dB)	Common Indoor Activities
—	110	Rock band
Jet fly over at 300 meters (1,000 feet)	100	—
Gas lawn mower at 1 meter (3 feet)	90	—
Diesel truck at 15 meters (50 feet), at 80 kilometers per hour (50 miles per hour)	80	Food blender at 1 meter (3 feet); garbage disposal at 1 meter (3 feet)
Noisy urban area, daytime; gas lawn mower at 30 meters (100 feet)	70	Vacuum cleaner at 3 meters (10 feet)
Commercial area; heavy traffic at 90 meters (300 feet)	60	Normal speech at 1 meter (3 feet)
Quiet urban, daytime	50	Large business office; dishwasher next room
Quiet urban, nighttime	40	Theater; large conference room (background)
Quiet suburban, nighttime	30	Library
Quiet rural, nighttime	20	Bedroom at night; concert hall (background)
—	10	Broadcast/Recording studio
Lowest threshold of human hearing	0	Lowest threshold of human hearing

Source: Caltrans 2013.

1.3.4 Human Response to Changes in Noise Levels

Under controlled conditions in an acoustics laboratory, the trained, healthy human ear is able to discern changes in sound levels of 1 dBA when exposed to steady, single-frequency signals in the mid-frequency range. A change of 5 dBA is readily perceptible, and a change of 10 dBA is *perceived* as twice (if a gain) or half (if a loss) as loud. A doubling of sound energy results in a 3-dBA increase in sound, which means that a doubling of sound energy (e.g., doubling the volume of traffic on a road) would result in a barely perceptible change in sound level.

1.3.5 Noise Descriptors

Units of measure have been developed to evaluate the long-term characteristics of sound. The energy-equivalent sound level (L_{eq}) is also referred to as the time-average sound level. It is the equivalent steady-state or constant sound level that in a stated period of time would contain the same acoustical energy as the time-varying sound level during the same time period. For instance, the 1-hour A-weighted equivalent sound level, L_{eq}(h), is the energy average of the A-weighted sound levels occurring during a 1-hour period, and is the basis for most of the County Noise Ordinance standards.

People are generally more sensitive to and thus potentially more annoyed by noise occurring during the evening and nighttime hours. Hence, another noise descriptor used in community noise assessments—the community noise equivalent level (CNEL)—represents a time-weighted, 24-hour average noise level based on the A-weighted sound level. However, unlike an unmodified 24 hour L_{eq} value, the CNEL descriptor accounts for increased noise sensitivity during the evening (7 p.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.) by adding 5 dBA and 10 dBA, respectively, to the average sound levels occurring during these defined hours within a 24-hour period.

1.3.6 Sound Propagation

Sound propagation (i.e., the traverse of sound from a noise emission source position to a receiver location) is influenced by multiple factors that include geometric spreading, ground absorption, atmospheric effects, and occlusion by natural terrain and/or features of the built environment.

Sound levels attenuate (or diminish) geometrically at a rate of approximately 6 dBA per doubling of distance from an outdoor point-type source due to the spherical spreading of sound energy with increasing distance travelled. The effects of atmospheric conditions such as humidity, temperature, and wind gradients are typically distance-dependent and can also temporarily either increase or decrease sound levels measured or perceived at a receptor location. In general, the greater the distance the receiver is from the source of sound emission, the greater the potential for variation in sound levels at the receptor due to these atmospheric effects. Additional attenuation can result from sound path occlusion and diffraction due to intervention of natural (ridgelines, dense forests, etc.) and built features (such as solid walls, buildings and other structures).

1.3.7 Groundborne Vibration Fundamentals

Groundborne vibration is fluctuating or oscillatory motion transmitted through the ground mass (i.e., soils, clays, and rock strata). The strength of groundborne vibration attenuates rapidly over distance. Some soil types transmit vibration quite efficiently; other types (primarily sandy soils) do not. Several basic measurement units are commonly used to describe the intensity of ground vibration. The descriptors used by the Federal Transit Administration (FTA) are peak particle velocity (PPV), in units of inches per second (ips), and velocity decibel (VdB) that is based on a root-mean square (RMS) of the vibration signal magnitude. The calculation to determine PPV at a given distance is as follows:

$$PPV_{distance} = PPV_{ref} * (25/D)^{1.5}$$

where:

$PPV_{distance}$ = the peak particle velocity in inches per second of the equipment adjusted for distance

PPV_{ref} = the reference vibration level in inches per second at 25 feet

D = the distance from the equipment to the receiver

Conversion of PPV to rms VdB involves application of a reference vibration velocity level (also in units of ips) and a "crest factor" of 4 per FTA guidance, which is expressed as follows:

$$VdB = 20*LOG(PPV/(4*0.000001))$$

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2 Regulatory Setting

2.1 Federal

In its Transit Noise and Vibration Impact Assessment guidance manual, the Federal Transit Administration (FTA) recommends a daytime construction noise level threshold of 80 dBA L_{eq} over an 8-hour period (FTA 2018) when detailed construction noise assessments are performed to evaluate potential impacts to community residences surrounding a project. Although this FTA guidance is not a regulation, it can serve as a quantified standard in the absence of such noise limits at the state and local jurisdictional levels.

2.2 State

2.2.1 California Code of Regulations, Title 24

Title 24 of the California Code of Regulations sets standards that new development in California must meet. According to Title 24, interior noise levels are not to exceed 45 dBA CNEL in any habitable room (ICC 2019).

2.2.2 California Department of Health Services Guidelines

The California Department of Health Services has developed guidelines of community noise acceptability for use by local agencies (OPR 2017). Selected relevant levels are listed here:

- Below 60 dBA CNEL: normally acceptable for low-density residential use
- 50 to 70 dBA: conditionally acceptable for low-density residential use
- Below 65 dBA CNEL: normally acceptable for high-density residential use and transient lodging
- 60 to 70 dBA CNEL: conditionally acceptable for high-density residential, transient lodging, churches, educational, and medical facilities

The normally acceptable exterior noise level for high-density residential use is up to 65 dBA CNEL. Conditionally acceptable exterior noise levels range up to 70 dBA CNEL for high-density residential use.

2.2.3 California Department of Transportation

In its Transportation and Construction Vibration Guidance Manual (Caltrans 2013b), the California Department of Transportation (Caltrans) recommends 0.5 ips PPV as a threshold for the avoidance of structural damage to typical newer residential buildings exposed to continuous or frequent intermittent sources of groundborne vibration. For transient vibration events, such as blasting, the damage risk threshold would be 1.0 ips PPV (Caltrans 2013b) at the same type of newer residential structures. For older structures, these guidance thresholds would be more stringent: 0.3 ips PPV for continuous/intermittent vibration sources, and 0.5 ips PPV for transient vibration events. With respect to human annoyance, Caltrans guidance indicates that building occupants exposed to continuous groundborne vibration at 0.2 ips PPV would find it “annoying” and thus a likely significant impact. Although these Caltrans guidance thresholds are not regulations, they can serve as quantified standards in the absence of such limits at the local jurisdictional level.

2.3 Local

2.3.1 City of Oceanside Noise Level Compatibility Standards

The Noise Element of the City's General Plan (City of Oceanside 1974) establishes target maximum noise levels in the City. The Noise Element provides the following limitations on construction noise:

1. It should be unlawful for any person within any residential zone of 500 feet there from to operate any pile driver, power shovel, pneumatic, power hoist, or other construction equipment between 8:00 p.m. and 7:00 a.m. generating an ambient noise levels of 50 dBA at any property line unless an emergency exists.
2. It should be unlawful for any person to operate any construction equipment at a level in excess of 85 dBA at 100 feet from the source.
3. It should be unlawful for any person to engage in construction activities between 6:00 p.m. and 7:00 a.m. when such activities exceed the ambient noise level by 5 dBA. A special permit may be granted by the Director of Public Works if extenuating circumstances exist.

In addition, the Noise Element addresses nuisance noise and states that it should be unlawful for any person to make or continue any loud, unnecessary noise that causes annoyance to any reasonable person of normal sensitivity.

2.3.1 Transportation-Related Noise Standards

The City's Noise Element establishes a policy for exterior sensitive areas to be protected from high noise levels. The Noise Element sets 65 dBA CNEL for the outdoor areas and interior noise levels of less than 45 dBA CNEL as the "normally acceptable" level.

For interior noise, the Noise Element also establishes 45 dBA CNEL as the maximum acceptable level for habitable rooms when exterior noise levels are 60 dBA CNEL or more. If windows and doors are required to be closed to meet this standard, then mechanical ventilation (i.e., air conditioning) shall be included in the project design.

2.3.1 Noise Element Policies

- Noise levels shall not be so loud as to cause danger to public health in all zones except manufacturing zones where noise levels may be greater.
- Noise shall be controlled at the source where possible.
- Noise shall be intercepted by barriers or dissipated by space where other controls fail or are impractical.
- Noise levels shall be considered in any change to the Land Use and Circulation Elements of the General Plan.
- Noise levels of City vehicles, construction equipment, and garbage trucks shall be reduced to acceptable levels.

City of Oceanside Noise Ordinance

Chapter 38 of the Oceanside Municipal Code governs operational noise and contains the maximum one-hour average sound levels for various land uses for operational noise (Table 2) generated by sources within or affecting each land use zone. The Noise Ordinance sets an allowed level for single-family and medium-density residential areas to 50 dBA L_{eq} from 7:00 a.m. to 9:59 p.m., and 45 dBA L_{eq} from 10:00 p.m. to 6:59 a.m. High density residential areas are limited to 55 dBA L_{eq} from 7:00 a.m. to 9:59 p.m. and 50 dBA L_{eq} form 10:00 p.m. to 6:59 a.m. In commercial zones, noise generation is limited to 65 dBA L_{eq} from 7:00 a.m. to 9:59 p.m. and 60 dBA L_{eq} form 10:00 p.m. to 6:59 a.m. Where two land use zones abut one another, the more restrictive noise limit is enforced along the common boundary between the two land uses.

Table 2. City of Oceanside Exterior Noise Standards

Zone	Applicable Limit (decibels)	Time Period
Residential Estate, Single-Family Residential, Medium Density Residential, Agricultural, Open Space	50 45	7:00 a.m. to 9:59 p.m. 10:00 p.m. to 6:59 a.m.
High Density, Residential Tourist	55 50	7:00 a.m. to 9:59 p.m. 10:00 p.m. to 6:59 a.m.
Commercial	65 60	7:00 a.m. to 9:59 p.m. 10:00 p.m. to 6:59 a.m.
Industrial	70 65	7:00 a.m. to 9:59 p.m. 10:00 p.m. to 6:59 a.m.
Downtown	65 55	7:00 a.m. to 9:59 p.m. 10:00 p.m. to 6:59 a.m.

Source: Oceanside Municipal Code, Section 38.12.

Construction activities are subject to Section 38.17 of the Noise Ordinance, which specifically prohibits the operation of any pneumatic or air hammer, pile driver, steam shovel, derrick, steam, or electric hoist, parking lot cleaning equipment or other appliance, the use of which is attended by loud or unusual noise, between the hours of 10:00 p.m. and 7:00 a.m.

Section 38.16 prohibits nuisance noise as recommended in the General Plan Noise Element. It is unlawful for any person to make, continue or cause to be made or continued, within the limits of the City of Oceanside, any disturbing, excessive, or offensive noise that causes discomfort or annoyance to reasonable persons of normal sensitivity.

City of Oceanside Engineering Manual

Construction noise in Oceanside is governed by the City Engineering Manual. Construction is normally limited to the hours between 7:00 a.m. and 6:00 p.m., Monday through Friday. However, Saturday construction is allowed by permit. More specifically, the City Engineering Manual (Engineers Design and Processing Manual Appendix Construction Guidelines and Requirements) states the following on pages 139 and 159:

- All operations conducted on the premises, including the warming up, repair, arrival, departure, or running of trucks, earthmoving equipment, construction equipment, and any other associated equipment shall be limited to the period between 7:00 a.m. and 6:00 p.m. each day, Monday through Friday, and no earthmoving or grading operations shall be conducted on the premises on Saturdays, Sundays or legal holidays, unless waived by the City Engineer.

- Hours of Operation (515)(34): 7:00 am to 6:00 p.m. M-F; including equipment warm-up.

Saturday Operation: Requires filing a permit by 2:30 p.m. on the preceding Thursday.

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3 Existing Conditions

Sound pressure level (SPL) measurements were conducted near the project site on September 12, 2022, to quantify and characterize the existing outdoor ambient noise levels. Table 3 provides the location, date, and time at which these baseline noise level measurements were taken. The SPL measurements were performed by an attending Dudek field investigator using a Rion NL-52 sound level meter equipped with a 0.5-inch, pre-polarized condenser microphone with pre-amplifier. The sound level meter meets the current American National Standards Institute standard for a Type 1 (Precision Grade) sound level meter (SLM). The accuracy of the SLM was verified using a reference sound signal (i.e., field calibrator) before and after the measurements, and the measurements were conducted with the microphone positioned approximately 5 feet above the ground.

Two short-term noise level measurement locations (ST1–ST2) that represent the vicinities of existing sensitive receivers were selected on and near the project site. These locations are depicted as receivers ST1–ST2 on Figure 3, Noise Measurement and Modeled Receptor Locations. The L_{eq} and L_{max} noise levels are provided in Table 3. The primary noise sources at the sites identified in Table 3 consisted of traffic along adjacent roadways, distant aircraft, and birdsong. As shown in Table 3, the measured sound levels ranged from approximately 45.2 dBA L_{eq} at ST1 to 41.4 dBA L_{eq} at ST2. Noise measurement data is also included in Appendix A, Baseline Noise Measurement Field Data. These samples of daytime L_{eq} measured at the two representative receptor positions in Table 3 can be interpreted as approximations of CNEL, since evening SPL would likely be 5 dBA less, and nighttime SPL would be 10 dBA less than the daytime values according to FTA outdoor ambient sound level estimation techniques when a receptor is proximate to a major roadway or railroad (FTA 2018).

Table 3. Measured Baseline Outdoor Ambient Noise Levels

Site	Location/Address	Date/Time	L_{eq} (dBA)	L_{max} (dBA)
ST1	Northeastern entrance to existing project site	2022-09-12, 11:30 AM to 11:45 AM	45.2	54
ST2	Western cul-de-sac of Malaga Drive	2022-09-12, 11:55 AM to 12:10 PM	41.4	51.7

Source: Appendix A.
Notes: L_{eq} = equivalent continuous sound level (time-averaged sound level); L_{max} = maximum sound level during the measurement interval; dBA = A-weighted decibels; ST = short-term noise measurement locations.

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SOURCE: SANGIS 2029, Open Streets Map 2019, Dudek 2022

DUDEK 0 90 180 Feet

FIGURE 3

Noise Measurement Locations

Pacifica Elementary Housing Development Project

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4 Thresholds of Significance

The following significance criteria are based on Appendix G of the California Environmental Quality Act Guidelines (14 CCR 15000 et seq.) and will be used to determine the significance of potential noise and vibration impacts. Impacts associated with noise and vibration would be significant if the proposed project would result in:

- 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.
- Generation of excessive groundborne vibration or groundborne noise levels.
- Expose people residing or working in the project area to excessive noise levels (for a project located within the vicinity of a private airstrip or an airport land use plan, or where such a plan has not been adopted, within 2 miles of a public airport or public use airport).

In light of these above significance criteria, this analysis uses the following standards to evaluate potential noise and vibration impacts.

- Construction noise – Although Chapter 38 of the Oceanside Municipal Code does not quantify a threshold for allowable construction noise, the City's General Plan allows noise from construction equipment operation to be as high as 85 dBA at 100 feet from the source. Applying the principles of sound propagation for a point-type source, this level could be interpreted to mean 91 dBA at 50 feet, which is greater than the maximum sound levels of most operating heavy construction equipment (DOT 2006) and would thus imply all but the loudest construction activities (e.g., pile driving) could be compliant with this standard. However, the apparent proximity of existing residential receptors to the north of the proposed project site suggests that source-to-receiver distances could be as short as 70 feet. Additionally, most construction equipment and vehicles on a project site do not operate continuously. Therefore, consistent with the FTA guidance mentioned in Section 2, Regulatory Setting, this analysis will use 80 dBA L_{eq} over an 8-hour period as the construction noise impact criterion during daytime hours (7:00 a.m. to 6:00 p.m.). If construction work were to occur outside these hours, the impact threshold would align with the City's General Plan requirement during such hours: no more than a 5 dBA increase over existing ambient noise levels.
- Off-site project-attributed transportation noise – For purposes for this analysis, a direct roadway noise impact would be considered significant if increases in roadway traffic noise levels attributed to the proposed project were greater than 3 dBA CNEL at an existing noise-sensitive land use.

- Off-site project-attributed stationary noise – For purposes for this analysis, a noise impact would be considered significant if noise from typical operation of heating, ventilation, and air conditioning and other electro-mechanical systems associated with the proposed project exceeded 50 dBA hourly L_{eq} at the property line from 7:00 a.m. to 9:59 p.m., and 45 dBA hourly L_{eq} from 10:00 p.m. to 6:59 a.m. Note that these are the City's thresholds for the residential zones that characterize the proposed project site and its adjoining lands north and south.
- Construction vibration – Guidance from Caltrans indicates that a vibration velocity level of 0.2 ips PPV received at a structure would be considered annoying by occupants within (Caltrans 2013b). As for the receiving structure itself, aforementioned Caltrans guidance from Section 2 recommends that a vibration level of 0.3 ips PPV would represent the threshold for building damage risk to an older residential structure.

For purposes of disclosure, since current CEQA noise criteria listed above do not consider it, this analysis also evaluates compatibility of on-site noise exposure levels (e.g., from roadway traffic) with the City of Oceanside exterior and interior noise standards of 65 dBA CNEL and 45 dBA CNEL, respectively.

5 Impact Discussion

Potential noise and vibration impacts attributed to project construction and operation are studied in the following subsections that are categorized by the CEQA Guidelines Appendix G significance for noise.

a) ***Would the project result in 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?***

Short-Term Construction

Construction noise and vibration are temporary phenomena, with emission levels varying from hour to hour and day to day, depending on the equipment in use, the operations performed, and the distance between the source and receptor. Equipment that would be in use during construction would include, in part, graders, backhoes, rubber-tired dozers, loaders, cranes, forklifts, pavers, rollers, and air compressors. The typical maximum noise levels at a distance of 50 feet from various pieces of construction equipment and activities anticipated for use on the proposed project site are presented in Table 4. Note that the equipment noise levels presented in Table 4 are maximum noise levels. Usually, construction equipment operates in alternating cycles of full power and low power, producing average noise levels over time that are less than the maximum noise level. The average sound level of construction activity also depends on the amount of time that the equipment operates and the intensity of construction activities during that time.

Table 4 Typical Construction Equipment Maximum Noise Levels

Equipment Type	Typical Equipment (L_{max}, dBA at 50 Feet)
All Other Equipment > 5 HP	85
Backhoe	78
Compressor (air)	78
Concrete Saw	90
Crane	81
Dozer	82
Excavator	81
Flat Bed Truck	74
Front End Loader	79
Generator	72
Grader	85
Man Lift	75
Paver	77
Roller	80
Scraper	84
Welder / Torch	73

Source: DOT 2006.
Note: L_{max} = maximum sound level; dBA = A-weighted decibels.

Aggregate noise emission from proposed project construction activities, broken down by sequential phase, was predicted at two evaluation distances to the nearest existing noise-sensitive receptor: 1) from the nearest position of the construction site boundary and 2) from the geographic center of the construction site, which serves as the time-averaged location or geographic *acoustical centroid* of active construction equipment for the phase under study. The intent of the former distance is to help evaluate anticipated construction noise from a limited quantity of equipment or vehicle activity expected to be at the boundary for some period of time, which would be most appropriate for phases such as site preparation, grading, and paving. The latter distance is used in a manner similar to the general assessment technique as described in the FTA guidance for construction noise assessment, when the location of individual equipment for a given construction phase is uncertain over some extent of (or the entirety of) the construction site area. In this studied scenario, because of the equipment location uncertainty, all the equipment for a construction phase is assumed to operate—on average—from the acoustical centroid position. Table 5 summarizes these two distances to the apparent closest noise-sensitive receptor for each of the nine sequential construction phases. At the site boundary, this analysis assumes that up to only one piece of equipment (conservatively, the loudest) of each listed type per phase will be involved in the construction activity for up to the full 8-hour period at this closest distance to the receptor. In other words, at such proximity, the operating equipment cannot "stack" or crowd the vicinity and still operate. For the acoustical centroid case, which intends to be a geographic average position for all equipment during the indicated phase, this analysis assumes that the equipment may be operating up to all 8 hours per day.

This RCNM emulator includes consideration of equipment source elevation and receptor elevations with respect to local grade, and thus captures potential sound path occlusion due to topography and man made barriers.

Table 5. Estimated Distances between Construction Activities and the Nearest Noise-sensitive Receptor

Construction Phase (and Equipment Types Involved)	Distance from Nearest Noise-Sensitive Receptor to Construction Site Boundary (Feet)	Distance from Nearest Noise-Sensitive Receptor to Acoustical Centroid of Site (Feet)
Phase 1		
Demolition (concrete saw/industrial saw, dozer, excavator)	74	240
Site preparation (dozer, tractor, front end loader, backhoe)	74	240
Grading (excavator, grader, scraper, track dozer, tractor, front end loader, backhoe)	74	240
Utilities Installation (excavator, backhoe)	240	240
Paving (paver, roller)	70	240
Phase 2		
Building construction (forklift, generator, tractor, front end loader, backhoe)	70	240
Architectural coating (air compressor)	70	240

Phase 3		
Building construction (forklift, generator, tractor, front end loader, backhoe)	70	240
Architectural coating (air compressor)	70	0

A Microsoft Excel–based noise prediction model emulating and using reference data from the Federal Highway Administration Roadway Construction Noise Model (RCNM) (FHWA 2008) was used to estimate construction noise levels at the nearest occupied noise-sensitive land use. (Although the RCNM was funded and promulgated by the Federal Highway Administration, it is often used for non-roadway projects, because the same types of construction equipment used for roadway projects are often used for other types of construction.) Input variables for the predictive modeling consist of the equipment type and number of each (e.g., two graders, a loader, a tractor), the duty cycle for each piece of equipment (e.g., percentage of time within a specific time period, such as an hour, when the equipment is expected to operate at full power or capacity and thus make noise at a level comparable to what is presented in Table 4), and the distance from the noise-sensitive receiver. The predictive model also considers how many hours that equipment may be on site and operating (or idling) within an established work shift. Conservatively, no topographical or structural shielding was assumed in the modeling. The RCNM has default duty-cycle values for the various pieces of equipment, which were derived from an extensive study of typical construction activity patterns. Those default duty-cycle values were used for this noise analysis, which is detailed in Appendix B, Construction Noise Modeling Input and Output, and produce the predicted results displayed in Table 6.

Table 6. Estimated Distances between Construction Activities and the Nearest Noise-sensitive Receptor

Construction Phase	8-Hour L_{eq} at Nearest Noise-Sensitive Receptor to Construction Site Boundary (dBA)	8-Hour L_{eq} at Nearest Noise-Sensitive Receptor to Acoustical Centroid of Site (dBA)
Phase 1		
Demolition (concrete saw/industrial saw, dozer, excavator)	80	69
Site preparation (dozer, tractor, front end loader, backhoe)	75	67
Grading (excavator, grader, scraper, track dozer, tractor, front end loader, backhoe)	80	70
Utilities Installation (excavator, backhoe)	64	64
Paving (paver, roller)	76	62
Phase 2		
Building construction (forklift, generator, tractor, front end loader, backhoe)	75	59
Architectural coating (air compressor)	75	60

Phase 3		
Building construction (forklift, generator, tractor, front end loader, backhoe)	75	59
Architectural coating (air compressor)	75	60

Notes: L_{eq} = equivalent noise level; dBA = A-weighted decibels. *italicized equipment types are the loudest and used singularly to evaluate noise for the "nearest" assessment scenario.

As presented in Table 6, the estimated construction noise levels are predicted to be nearly as high as 80 dBA L_{eq} over an 8-hour period at the nearest occupied property (as close as 74 feet away) when grading activities take place near the northern project boundaries. Note that these estimated noise levels at a source-to-receiver distance of 74 feet are conservatively high, in that they presume the noted pieces of heavy equipment would each operate, on average at this distance, for a cumulative period of eight hours a day. The reality of construction progress on-site would likely be different. By way of example, a grader might make multiple passes on site that are this close to a receiving occupied property; but, for the remaining time during the day, the grader may be sufficiently farther away and either performing work at a more distant location or simply not operating. Short-term construction noise remains in compliance with the FTA guidance of 80 dBA L_{eq} over an 8-hour period, and therefore is less than significant.

Long-Term Operational

Off-Site Traffic Noise Exposure

The proposed project would result in the creation of additional vehicle trips on local arterial roadways (i.e. Monica Circle, Macario Drive, and Roja Drive), which could result in increased traffic noise levels at adjacent noise-sensitive land uses. Appendix C, Traffic Noise Modeling Input and Output, contains a spreadsheet with traffic volume data (average daily traffic) for Monica Circle. In particular, the proposed project would create additional traffic along Melrose Drive, which according to the Traffic Impact Assessment prepared for the proposed project (CR Associates, 2022) would add 1,312 total average daily trips to adjacent to the project site.

Potential noise effects from vehicular traffic were assessed using the Federal Highway Administration's Traffic Noise Model version 2.5 (FHWA 2004). Information used in the model included the roadway geometry, existing (year 2022), and existing plus project traffic volumes and posted traffic speeds. Noise levels were modeled at representative noise-sensitive receivers ST1 and ST2, as shown in Figure 3. The receivers were modeled to be 5 feet above the local ground elevation. The noise model results are summarized in Table 7. Based on results of the model, implementation of the proposed project would not result in readily perceptible increases in traffic noise.

Table 7. Roadway Traffic Noise Modeling Results

Modeled Receiver No.	Existing (2022) Noise Level	Existing with Project Noise Level	Near-term (2025) Noise Level	Near-term (2025) with Project Noise Level	Horizon (2050) Noise Level	Horizon with Project Noise Level	Maximum Project-Related Noise Level Increase
	(dBA CNEL)	(dBA CNEL)	(dBA CNEL)	(dBA CNEL)	(dBA CNEL)	(dBA CNEL)	(dB)
ST1	53	54	53	54	54	55	1
ST2	46	47	46	47	46	47	1

Source: Appendix C.
Notes: dBA = A-weighted decibel; CNEL = community noise equivalent level; dB = decibel.

Table 7 shows that at both listed representative receivers, the addition of proposed project traffic to the roadway network would result in an increase in the CNEL of less than 3 dB, which is below the discernible level of change for the average healthy human ear. Thus, a less-than-significant impact is expected for proposed project-related off-site traffic noise increases affecting existing residences in the vicinity.

On-site Traffic Interior Noise Exposure

Aside from exposure to aviation traffic noise, current CEQA noise-related guidelines at the state level do not require an assessment of exterior-to-interior noise intrusion, environmental noise exposure to occupants of newly-created project residences, or environmental noise exposure to exterior non-residential uses attributed to the development of the proposed project. Nevertheless, the City's General Plan and the California Building Code requires that interior background noise levels not exceed a CNEL of 45 dB within habitable rooms. Hence, the following predictive analysis of traffic noise exposure at the exteriors of occupied residences and outdoor living areas is provided below.

In addition to the prediction results presented in Table 7, the FHWA TNM software was also used to predict the existing-with-project scenario traffic noise levels at multiple on-site exterior areas, as listed in Table 8. These on-site modeled receptor locations, which appear in Appendix C, include representative positions for the exteriors of multiple floors and positions of five of the proposed project building facades. Predicted exterior sound levels that are higher than 60 dBA CNEL indicate locations where an exterior-to-interior noise analysis should be performed for the proximate occupied residential unit. According to Table 8, there are no modeled receptors that exceed 60 dBA CNEL, therefore additional exterior-to interior noise analysis is not needed. Individual Modeling locations appear in Figure 3 and Appendix C.

Table 8. Future Ambient Noise Levels at Residential Facades

Modeled Receptor	Noise Level (A-weighted CNEL)		
	1st Floor	2nd Floor	3rd Floor
M1	52.7	54.2	54.1
M2	50.7	51.7	51.5
M3	48.6	49.5	49.8
M4	50	51.5	51.8
M5	48.3	51.2	51.7
OS-1	42.4		

Dog Park	38.8

Typically, with the windows open, building shells provide approximately 15 dB (i.e., an average of 12-18 dB [OPR 2017]) of exterior-to-interior noise reduction; while with windows closed residential construction generally provides a minimum of 25 dB attenuation (FHWA 2011). Therefore, rooms exposed to an exterior CNEL not greater than 60 dB would result in an interior background CNEL of 45 dB or less, even with open fenestration. In other words, the arithmetic difference of an exterior noise level less than 60 dBA CNEL and an exposed building façade that provides 15 dB of sound insulation results in an interior background sound level less than 45 dBA CNEL. Table 8 shows that none of the residential rooms modeled will be exposed to a CNEL of above 60 dB and thus interior background noise levels will not exceed a CNEL of 45 dB within habitable rooms.

Onsite Open Spaces

As analyzed herein and with prediction results presented in Table 8, shared outdoor project spaces such as “OS-1” and “Dog Park” are expected to experience noise levels that are compliant with the City’s General Plan Noise Element guidance of 65 dBA CNEL for “parks” and “playgrounds”.

Stationary Noise Sources

The incorporation of new multi-family homes and a mix of open space uses attributed to development of the proposed project will add a variety of noise-producing electro-mechanical equipment that include those presented and discussed in the following paragraphs. Most of these noise-producing equipment or sound sources would be considered stationary, or limited in mobility to a defined area. Using a Microsoft Excel–based outdoor sound propagation prediction model, project-attributed operational noise at nearby community receptors was predicted using several assumptions:

- Treatment of exposed at-grade air-cooled condensing units as point-type sound emission sources; and,
- Point-source sound propagation (i.e., 6 dB per doubling of distance) that conservatively ignores acoustical absorption from atmospheric and ground surface effects.

Please see Appendix E for quantitative details of the inputs and outputs that form the basis of the following assessment presentations.

Night-time Residential Unit Heating, Ventilation, and Air Conditioning Noise

For purposes of this analysis, each of the new occupied residential units would be expected to feature a split-system type air-conditioning unit, with an air-cooled refrigeration (3-ton capacity) condenser unit. Assuming each condenser unit has an SPL of 68 dBA at 3 feet based on available data from a likely manufacturer (Carrier 2012), and the units would generally be installed at grade near the apparent “front porch” areas. Therefore, the closest existing noise-sensitive residential receptor to the north of the proposed project’s northern unit would be as close as 105 horizontal feet to the nearest of these condenser units. The predicted sound emission level from the combination of all operating condenser units as received by this offsite single-family home would be 45 dBA L_{eq} and thus be compliant with the City’s nighttime threshold of 45 dBA hourly L_{eq}. Under such conditions, the operation of residential air-conditioning units would result in a **less-than-significant noise impact.**

Pickleball noise and Daytime HVAC

In addition to noise from onsite HVAC units discussed in the preceding paragraph, during the daytime hours there is a potential for onsite pickleball activities near the southern boundary of the project (as shown in the Figure 2). For purposes of this analysis, each pickleball court will have players making intermittent paddle-to-pickleball contact for which a measured one-second reference noise level of 77.4 dBA L_{eq} at 1 meter would apply (Dudek 2020). The closest existing noise-sensitive residential receptor to the south of the proposed project's pickleball courts would be as close as 200 horizontal feet away. The predicted sound emission level from the combination of all operating condenser units and pickleball activity as received by this offsite single-family home would be 45 dBA L_{eq} and thus be compliant with the City's daytime threshold of 50 dBA hourly L_{eq}. Under such conditions, the concurrence of pickleball noise and operation of daytime residential air-conditioning units would result in a **less-than-significant noise impact.**

Emergency Generator

The proposed project also features a backup generator that will be installed on ground level north of the pickleball courts. Noise emission from regular testing at an expected frequency of up to one half-hour test per month during daytime hours would need to comply with the City's established noise limit at the property line: 50 dBA hourly L_{eq}.

For Purposes of this analysis, the generator is using a reference noise level of 69 dBA L_{eq} at 50 feet (FHWA, 2008). The closest existing noise-sensitive residential receptor to the south of the proposed project's emergency generator would be as close as 260 horizontal feet away. The predicted sound emission level from the combination of all operating condenser units, pickleball noise, and emergency generator operation as received by this offsite single-family home would be 50 dBA L_{eq} and thus be compliant with the City's daytime threshold of 50 dBA hourly L_{eq}. Under such conditions, the operation of all stationary equipment and activities would result in a **less-than-significant noise impact.**

b) Would the project result in generation of excessive groundborne vibration or groundborne noise levels?

Construction activities may expose persons to excessive groundborne vibration, causing a potentially significant impact. Caltrans has collected groundborne vibration information related to construction activities (Caltrans 2013b). Information from Caltrans indicates that continuous vibrations with a PPV of approximately 0.2 ips is considered "annoying." For context, heavier pieces of construction equipment, such as a bulldozer that may be expected on the project site, have peak particle velocities of approximately 0.089 ips or less at a reference distance of 25 feet (DOT 2006).

Groundborne vibration attenuates rapidly—even over short distances. And when groundborne vibration encounters a building foundation, a coupling loss occurs depending on its mass and design. For typical wood-framed houses, like those near the proposed project, this coupling loss is expected to be 5 vibration velocity decibels (VdB) according to FTA guidance (FTA 2006).

The attenuation of groundborne vibration as it propagates from source to receptor through intervening soils and rock strata can be estimated with expressions found in FTA and Caltrans guidance. By way of example, for a bulldozer operating onsite and as close as the northern project boundary (that is 70 feet from the nearest receiving sensitive land use) the estimated groundborne vibration velocity level would be 0.028 ips as received by the residential structure, and would be compliant with the 0.3 ips PPV threshold per Caltrans guidance with respect to building damage risk. Therefore, vibration-induced annoyance to occupants of nearby existing homes would be considered less than significant.

Once operational, the proposed project would not be expected to feature major producers of groundborne vibration. Anticipated mechanical systems like heating, ventilation, and air-conditioning units are designed and manufactured to feature rotating (fans, motors) and reciprocating (compressors) components that are well-balanced with isolated vibration within or external to the equipment casings. On this basis, vibration due to proposed project operation should be **less than significant.**

C) For a project 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, would the project expose people residing or working in the project area to excessive noise levels?

There are no private airstrips within the vicinity of the project site. The closest airport to the project site is the Oceanside Municipal Airport, approximately 3.5 miles northeast of the site. According to the Airport Land Use Compatibility Plan Exhibit IV-10, Compatibility Data Map: Noise, the project site is not located within a noise exposure of 60 dB CNEL and would therefore not expose people residing or working in the project area to excessive noise levels (San Diego County Regional Airport Authority 2010). Impacts from aviation overflight noise exposure would be **less than significant.**

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6 Summary of Findings

This noise report was conducted for the proposed project. The predicted analysis results indicate that potential impacts during construction would be less than significant. Noise impacts due to operation of the proposed project (including traffic noise) would be less than significant. No noise or vibration mitigation is required.

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Appendix A
Baseline Noise Measurement Field Data

FORMS DUDEK FIELD DATA REPORT

Field Noise Measurement Data

Record: 1465

Project Name	*Pacifica*
Observer(s)	*Connor Burke*
Date	*2022-09-12*

Monitoring

Record #	*1*
Site ID	*ST1*
Site Location Lat/Long	*33.257004, -117.303193*
Begin (Time)	*11:30:00*
End (Time)	*11:45:00*
Leq	*45.2*
Lmax	*54*
Lmin	*33.4*
Other Lx?	*L90, L50, L10*
L90	*35.3*
L50	*42.9*
L10	*48.20*
Other Lx (Specify Metric)	*L*
Primary Noise Source	*Traffic*
Other Noise Sources (Background)	*Birds, Distant Traffic, Rustling Leaves*
Is the same instrument and calibrator being used as previously noted?	*Yes*
Are the meteorological conditions the same as previously noted?	*Yes*

Description / Photos

Site Photos

FORMS DUDEK FIELD DATA REPORT

Photo	

Monitoring

Record #	*2*
Site ID	*ST2*
Site Location Lat/Long	*33.255655, -117.303137*
Begin (Time)	*11:55:00*
End (Time)	*12:10:00*
Leq	*41.4*
Lmax	*51.7*
Lmin	*36.1*
Other Lx?	*L90, L50, L10*
L90	*37.7*
L50	*40*
L10	*42.7*
Other Lx (Specify Metric)	*L*
Primary Noise Source	*Birds*
Other Noise Sources (Background)	*Birds, Distant Dog Barking, Distant Gardener / Landscape Noise, Distant Kids Playing, Distant Traffic*
Is the same instrument and calibrator being used as previously noted?	*Yes*
Are the meteorological conditions the same as previously noted?	*Yes*

Description / Photos

FORMS FIELD DATA REPORT

Site Photos

Photo	

Appendix B
Construction Noise Modeling Input and Output

Construction Activity	Equipment	Total Equipment Qty	AUF % (from FHWA RCNM)	Reference Lmax @ 50 ft. from FHWA RCNM	Client Equipment Description, Data Source and/or Notes	Source to NSR Distance (ft.)	*Temporary Barrier Insertion Loss (dB)*	*Additional Noise Reduction*	Distance-Adjusted Lmax	Allowable Operation Time (hours)	Allowable Operation Time (minutes)	Predicted 8-hour Leq	Source Elevation (ft)	Receiver Elevation (ft)	Barrier Height (ft)	Source to Barr. ("A") Horiz. (ft)	Rcvr. to Barr. ("B") Horiz. (ft)	Source to Rcvr. ("C") Horiz. (ft)	"A" (ft)	"B" (ft)	"C" (ft)	Path Length Diff. "P" (ft)	Abarr (dB)	ILbarr (dB)	Notes
Phase 1																									
Demolition	concrete saw	1	20	90		74	0.0		85.8	6	360	78	5	35	30	70	4	74	74.3	6.4	79.8	0.00	0.1	0.0	
	excavator	1	40	81		74	0.0		76.8	6	360	72	5	35	30	70	4	74	74.3	6.4	79.8	0.00	0.1	0.0	
	dozer	1	40	82		74	0.0		77.8	6	360	73	5	35	30	70	4	74	74.3	6.4	79.8	0.00	0.1	0.0	
									Total for Demolition Phase:			**79.5**													
Site Prep	dozer	1	40	82		74	0.0		77.8	8	480	74	5	35	30	70	4	74	74.3	6.4	79.8	0.00	0.1	0.0	
	backhoe	1	40	78		74	0.0		73.8	8	480	70	5	35	30	70	4	74	74.3	6.4	79.8	0.00	0.1	0.0	
												75.3													
Grading	excavator	1	40	81		74	0.0		76.8	6	360	72	5	35	30	70	4	74	74.3	6.4	79.8	0.00	0.1	0.0	
	grader	1	40	85		74	0.0		80.8	6	360	76	5	35	30	70	4	74	74.3	6.4	79.8	0.00	0.1	0.0	
	dozer	1	40	82		74	0.0		77.8	6	360	73	5	35	30	70	4	74	74.3	6.4	79.8	0.00	0.1	0.0	
	scraper	1	40	84		74	0.0		79.8	6	360	75	5	35	30	70	4	74	74.3	6.4	79.8	0.00	0.1	0.0	
	backhoe	1	40	78		74	0.0		73.8	6	360	69	5	35	30	70	4	74	74.3	6.4	79.8	0.00	0.1	0.0	
									Total for Grading Phase:			**80.2**													
Utility Installation	excavator	2	40	81		240	0.0		63.2	8	480	62	5	35	30	236	4	240	237.3	6.4	241.9	0.00	0.1	0.0	
	Backhoe	2	40	78		240	0.0		60.2	8	480	59	5	35	30	236	4	240	237.3	6.4	241.9	0.00	0.1	0.0	
												64.0													
Paving	paver	2	50	77		70	0.0		73.6	8	480	74	5	35	30	65	5	70	69.6	7.1	76.2	0.00	0.1	0.0	
	roller	2	20	80		70	0.0		76.6	8	480	73	5	35	30	65	5	70	69.6	7.1	76.2	0.00	0.1	0.0	
									Total for Paving Phase:			**76.2**													
Phase 2																									
Building Construction	crane	0	16	81		70	0.0		77.6	8	480	0	5	35	30	65	5	70	69.6	7.1	76.2	0.00	0.1	0.0	
	Man lift	1	20	75		70	0.0		71.6	8	480	65	5	35	30	65	5	70	69.6	7.1	76.2	0.00	0.1	0.0	
	Generator	1	50	72		70	0.0		68.6	8	480	66	5	35	30	65	5	70	69.6	7.1	76.2	0.00	0.1	0.0	
	Backhoe	2	40	78		70	0.0		74.6	8	480	74	5	35	0	65	5	70	65.2	35.4	76.2	0.00	0.1	0.0	
									Total for Building Construction Phase:			**74.8**													
Architectural Coating	Compressor (Air)	3	40	78		70	0.0		74.6	8	480	75	5	35	0	65	5	70	65.2	35.4	76.2	0.00	0.1	0.0	
									Total for Architectural Coating Phase:			**75.4**													
Phase 3																									
Building Construction	crane	0	16	81		70	0.0		77.6	8	480	0	5	35	0	65	5	70	65.2	35.4	76.2	0.00	0.1	0.0	
	Man lift	1	20	75		70	0.0		71.6	8	480	65	5	35	0	65	5	70	65.2	35.4	76.2	0.00	0.1	0.0	
	Generator	1	50	72		70	0.0		68.6	8	480	66	5	35	0	65	5	70	65.2	35.4	76.2	0.00	0.1	0.0	
	Backhoe	2	40	78		70	0.0		74.6	8	480	74	5	35	0	65	5	70	65.2	35.4	76.2	0.00	0.1	0.0	
									Total for Building Construction Phase:			**74.8**													
Architectural Coating	Compressor (Air)	3	40	78		70	0.0		74.6	8	480	75	5	35	0	65	5	70	65.2	35.4	76.2	0.00	0.1	0.0	
									Total for Architectural Coating Phase:			**75.4**													

To User: bordered cells are inputs, unbordered cells have formulae

noise level limit for construction phase at occupied building, per San Diego County (36.409) = 80
allowable hours over which Leq is to be averaged (example: 8 per SD County 36.409) = 8

Construction Activity	Equipment	Total Equipment Qty	AUF % (from FHWA RCNM)	Reference Lmax @ 50 ft. from FHWA RCNM	Client Equipment Description, Data Source and/or Notes	Source to NSR Distance (ft.)	*Temporary Barrier Insertion Loss (dB)*	*Additional Noise Reduction*	Distance-Adjusted Lmax	Allowable Operation Time (hours)	Allowable Operation Time (minutes)	Predicted 8-hour Leq	Source Elevation (ft)	Receiver Elevation (ft)	Barrier Height (ft)	Source to Barr. ("A") Horiz. (ft)	Rcvr. to Barr. ("B") Horiz. (ft)	Source to Rcvr. ("C") Horiz. (ft)	"A" (ft)	"B" (ft)	"C" (ft)	Path Length Diff. "P" (ft)	Abarr (dB)	ILbarr (dB)	Notes
Phase 1																									
Demolition	concrete saw	1	20	90		240	0.0		72.2	8	480	65	5	35	30	236	4	240	237.3	6.4	241.9	0.00	0.1	0.0	
	excavator	3	40	81		240	0.0		63.2	8	480	64	5	35	30	236	4	240	237.3	6.4	241.9	0.00	0.1	0.0	
	dozer	2	40	82		240	0.0		64.2	8	480	63	5	35	30	236	4	240	237.3	6.4	241.9	0.00	0.1	0.0	
									Total for Demolition Phase:			**69.0**													
Site Prep	dozer	3	40	82		240	0.0		64.2	8	480	65	5	35	30	236	4	240	237.3	6.4	241.9	0.00	0.1	0.0	
	backhoe	4	40	78		240	0.0		60.2	8	480	62	5	35	30	236	4	240	237.3	6.4	241.9	0.00	0.1	0.0	
										8		**66.9**													
Grading	excavator	2	40	81		240	0.0		63.2	8	480	62	5	35	30	236	4	240	237.3	6.4	241.9	0.00	0.1	0.0	
	grader	1	40	85		240	0.0		67.2	8	480	63	5	35	30	236	4	240	237.3	6.4	241.9	0.00	0.1	0.0	
	dozer	1	40	82		240	0.0		64.2	8	480	60	5	35	30	236	4	240	237.3	6.4	241.9	0.00	0.1	0.0	
	scraper	2	40	84		240	0.0		66.2	8	480	65	5	35	30	236	4	240	237.3	6.4	241.9	0.00	0.1	0.0	
	backhoe	2	40	78		240	0.0		60.2	8	480	59	5	35	30	236	4	240	237.3	6.4	241.9	0.00	0.1	0.0	
									Total for Grading Phase:			**69.6**													
Utility Installation	excavator	2	40	81		240	0.0		63.2	8	480	62	5	35	30	236	4	240	237.3	6.4	241.9	0.00	0.1	0.0	
	Backhoe	2	40	78		240	0.0		60.2	8	480	59	5	35	30	236	4	240	237.3	6.4	241.9	0.00	0.1	0.0	
										8		**64.0**													
Paving	paver	2	50	77		240	0.0		59.2	8	480	59	5	35	30	236	4	240	237.3	6.4	241.9	0.00	0.1	0.0	
	roller	2	20	80		240	0.0		62.2	8	480	58	5	35	30	236	4	240	237.3	6.4	241.9	0.00	0.1	0.0	
									Total for Paving Phase:			**61.8**													
Phase 2																									
Building Construction	crane	0	16	81		240	0.0		63.2	6	360	0	5	35	30	236	4	240	237.3	6.4	241.9	0.00	0.1	0.0	
	Man lift	1	20	75		240	0.0		57.2	6	360	49	5	35	30	236	4	240	237.3	6.4	241.9	0.00	0.1	0.0	
	Generator	1	50	72		240	0.0		54.2	8	480	51	5	35	30	236	4	240	237.3	6.4	241.9	0.00	0.1	0.0	
	Backhoe	2	40	78		240	0.0		60.2	6	360	58	5	35	0	236	4	240	236.1	35.2	241.9	0.00	0.1	0.0	
									Total for Building Construction Phase:			**59.2**													
Architectural Coating	Compressor (Air)	3	40	78		240	0.0		60.2	6	360	60	5	35	0	236	4	240	236.1	35.2	241.9	0.00	0.1	0.0	
									Total for Architectural Coating Phase:			**59.8**													
Phase 3																									
Building Construction	crane	0	16	81		240	0.0		63.2	6	360	0	5	35	0	236	4	240	236.1	35.2	241.9	0.00	0.1	0.0	
	Man lift	1	20	75		240	0.0		57.2	6	360	49	5	35	0	236	4	240	236.1	35.2	241.9	0.00	0.1	0.0	
	Generator	1	50	72		240	0.0		54.2	8	480	51	5	35	0	236	4	240	236.1	35.2	241.9	0.00	0.1	0.0	
	Backhoe	2	40	78		240	0.0		60.2	6	360	58	5	35	0	236	4	240	236.1	35.2	241.9	0.00	0.1	0.0	
									Total for Building Construction Phase:			**59.2**													
Architectural Coating	Compressor (Air)	3	40	78		240	0.0		60.2	6	360	60	5	35	0	236	4	240	236.1	35.2	241.9	0.00	0.1	0.0	
									Total for Architectural Coating Phase:			**59.8**													

Equipment Description	Impact Device?	Acoustical Use Factor (%)	Lesser of or available Lmax	Spec. 721 Lmax	Measured L_{max} @50ft (dBA, slow)
All Other Equipment > 5 HP	No	50	85	85	-- N/A --
Auger Drill Rig	No	20	84	85	84
Backhoe	No	40	78	80	78
Phase 1					
Demolition	concrete saw	20	80	80	-- N/A --
Blasting	excavator	-- N/A --	94	94	-- N/A --
Boring Jack Power Unit	dozer	50	80	80	83
Chain Saw	No	20	84	85	84
Site Prep	dozer	20	87	93	87
Compactor (ground)	backhoe	20	80	80	83
Concrete Batch Plant	No	15	83	83	-- N/A --
Concrete Mixer Truck	No	40	79	85	79
Grading	excavator	20	81	82	81
Concrete Saw	grader	20	90	90	90
Crane	dozer	16	81	85	81
Dozer	scraper	40	82	85	82
Drill Rig Truck	backhoe	20	79	84	79
Drum Mixer	No	50	80	80	80
Paving	paver	40	76	84	76
Excavator	roller	40	81	85	81
Generator	No	50	72	72	81
Generator (<25KVA, VMS signs)	No	50	70	70	73
Phase 2					
Building Construction	crane	20	80	80	-- N/A --
Blasting	Man lift	-- N/A --	94	94	-- N/A --
Boring Jack Power Unit	Generator	50	80	80	83
Boring Jack Power Unit	Bakhoe	50	80	80	83
Chain Saw	No	20	84	85	84
Architectural Coating	Yes	20	87	93	87
Compactor (ground)	No	20	80	80	83
Compressor (air)	No	40	78	80	78
Concrete Batch Plant	No	15	83	83	-- N/A --
Phase 3					
Building Construction	No	20	80	80	-- N/A --
Blasting	Yes	-- N/A --	94	94	-- N/A --
Boring Jack Power Unit	No	50	80	80	83
Chain Saw	No	20	84	85	84
Architectural Coating	Yes	20	87	93	87
Compactor (ground)	No	20	80	80	83
Compressor (air)	No	40	78	80	78
Concrete Batch Plant	No	15	83	83	-- N/A --
Concrete Mixer Truck	No	40	79	85	79
Grader	No	40	85	85	-- N/A --
Grapple (on backhoe)	No	40	85	85	87
Horizontal Boring Hydr. Jack	No	25	80	80	82
Hydra Break Ram	Yes	10	90	90	-- N/A --
Impact Pile Driver	Yes	20	95	95	101
Jackhammer	Yes	20	85	85	89
Man Lift	No	20	75	85	75
Mounted Impact Hammer (hoe ram)	Yes	20	90	90	90
Pavement Scarafier	No	20	85	85	90
Paver	No	50	77	85	77
Pickup Truck	No	40	55	55	75
Pneumatic Tools	No	50	85	85	85
Pumps	No	50	77	77	81
Refrigerator Unit	No	100	73	82	73
Rivit Buster/chipping gun	Yes	20	79	85	79
Rock Drill	No	20	81	85	81
Roller	No	20	80	85	80
Sand Blasting (Single Nozzle)	No	20	85	85	96
Scraper	No	40	84	85	84
Shears (on backhoe)	No	40	85	85	96
Slurry Plant	No	100	78	78	78
Slurry Trenching Machine	No	50	80	82	80
Soil Mix Drill Rig	No	50	80	80	-- N/A --
Tractor	No	40	84	84	-- N/A --
Vacuum Excavator (Vac-truck)	No	40	85	85	85
Vacuum Street Sweeper	No	10	80	80	82
Ventilation Fan	No	100	79	85	79
Vibrating Hopper	No	50	85	85	87
Vibratory Concrete Mixer	No	20	80	80	80
Vibratory Pile Driver	No	20	95	95	101
Warning Horn	No	5	83	85	83
Welder / Torch	No	40	73	73	74

Appendix C
Traffic Noise Modeling Input and Output

<Organization?> 12 December 2022
<Analysis By?> TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: <Project Name?>
RUN: <Run Title?>

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

Roadway		Points								Segment	
Name	Width	Name	No.	Coordinates (pavement)			Flow Control			Segment	
				X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Macario Drive	40.0	point1	1	6,239,927.5	2,038,855.9	0.00				Average	
		point2	2	6,239,846.5	2,038,825.0	0.00				Average	
		point3	3	6,239,780.0	2,038,802.2	0.00					
Roja Dr	35.0	point9	9	6,239,976.0	2,038,041.2	25.00				Average	
		point10	10	6,239,976.0	2,038,214.6	25.00				Average	
		point11	11	6,239,978.5	2,038,348.2	20.00				Average	
		point12	12	6,239,977.0	2,038,486.4	15.00				Average	
		point13	13	6,239,979.0	2,038,668.5	10.00				Average	
		point14	14	6,239,979.5	2,038,728.0	5.00				Average	
		point15	15	6,239,954.5	2,038,834.9	0.00					
Redondo	45.0	point16	16	6,239,187.5	2,037,476.8	25.00				Average	
		point17	17	6,239,185.5	2,037,620.4	25.00				Average	
		point18	18	6,239,204.5	2,037,667.8	25.00				Average	
		point19	19	6,239,235.0	2,037,708.0	25.00				Average	
		point20	20	6,239,275.5	2,037,754.6	25.00				Average	
		point21	21	6,239,368.5	2,037,797.9	25.00				Average	
		point22	22	6,239,444.5	2,037,835.5	25.00				Average	
		point23	23	6,239,602.0	2,037,911.1	25.00				Average	
		point24	24	6,239,675.0	2,037,940.2	25.00				Average	
		point25	25	6,239,721.5	2,037,965.0	25.00				Average	
		point26	26	6,239,776.5	2,037,991.6	25.00				Average	
		point27	27	6,239,839.0	2,038,008.1	25.00				Average	
		point28	28	6,239,949.0	2,038,007.0	25.00					
Monica Cir-2	40.0	point29	29	6,239,780.0	2,038,802.2	0.00				Average	
		point4	4	6,239,744.0	2,038,813.5	0.00				Average	

		point5	5	6,239,714.5	2,038,853.5	5.00				Average	
		point6	6	6,239,691.5	2,038,907.9	10.00				Average	
		point7	7	6,239,666.5	2,038,966.9	15.00				Average	
		point8	8	6,239,634.5	2,039,046.6	20.00					

<Organization?> **12 December 2022**
<Analysis By?> **TNM 2.5**

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: **<Project Name?>**
RUN: **<Run Title?>**

Roadway	Points		Segment									
Name	Name	No.	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Macario Drive	point1	1	144	25	2	25	1	25	0	0	0	0
	point2	2	144	25	2	25	1	25	0	0	0	0
	point3	3										
Roja Dr	point9	9	219	25	4	25	2	25	0	0	0	0
	point10	10	219	25	4	25	2	25	0	0	0	0
	point11	11	219	25	4	25	2	25	0	0	0	0
	point12	12	219	25	4	25	2	25	0	0	0	0
	point13	13	219	25	4	25	2	25	0	0	0	0
	point14	14	219	25	4	25	2	25	0	0	0	0
	point15	15										
Redondo	point16	16	435	25	8	25	4	25	0	0	0	0
	point17	17	435	25	8	25	4	25	0	0	0	0
	point18	18	435	25	8	25	4	25	0	0	0	0
	point19	19	435	25	8	25	4	25	0	0	0	0
	point20	20	435	25	8	25	4	25	0	0	0	0
	point21	21	435	25	8	25	4	25	0	0	0	0
	point22	22	435	25	8	25	4	25	0	0	0	0
	point23	23	435	25	8	25	4	25	0	0	0	0
	point24	24	435	25	8	25	4	25	0	0	0	0
	point25	25	435	25	8	25	4	25	0	0	0	0
	point26	26	435	25	8	25	4	25	0	0	0	0
	point27	27	435	25	8	25	4	25	0	0	0	0
	point28	28										

Monica Cir-2		point29	29	144	25	2	25	1	25	0	0	0	0
		point4	4	144	25	2	25	1	25	0	0	0	0
		point5	5	144	25	2	25	1	25	0	0	0	0
		point6	6	144	25	2	25	1	25	0	0	0	0
		point7	7	144	25	2	25	1	25	0	0	0	0
		point8	8										

<Organization?> **12 December 2022**
<Analysis By?> **TNM 2.5**

INPUT: RECEIVERS
PROJECT/CONTRACT: **<Project Name?>**
RUN: **<Run Title?>**

Receiver Name	No.	#DUs	Coordinates (ground) X			Height above Ground	Input Sound Levels and Criteria Existing LAeq1h	Impact Criteria LAeq1h	Sub'l	NR Goal	Active in Calc.
			X	Y	Z						
			ft	ft	ft	ft	dBA	dBA	dB	dB	
DP	1	1	6,239,178.5	2,038,383.1	0.00	4.92	0.00	66	10.0	8.0	Y
OS-1	2	1	6,239,289.5	2,038,112.1	0.00	4.92	0.00	66	10.0	8.0	Y
ST1	3	1	6,239,693.0	2,038,822.5	0.00	4.92	45.20	66	10.0	8.0	Y
ST2	4	1	6,239,701.0	2,038,264.6	25.00	4.92	41.40	66	10.0	8.0	Y

<Organization?> 12 December 2022
<Analysis By?> TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: <Project Name?>
RUN: <Run Title?>

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per Unit Area	$ per Unit Vol.	Top Width	Run:Rise	$ per Unit Length			X	Y	Z	at Point	Seg Ht Perturbs Increment	#Up	#Dn	On Struct?	Important Reflections?
		ft	ft	$/sq ft	$/cu yd	ft	ft:ft	$/ft			ft	ft	ft	ft	ft				
Barrier1	W	0.00	99.99	0.00				0.00	point1	1	6,239,619.0	2,038,822.5	0.00	30.00	0.00	0	0		
									point2	2	6,239,667.0	2,038,700.2	0.00	30.00	0.00	0	0		
									point3	3	6,239,716.5	2,038,720.2	0.00	30.00	0.00	0	0		
									point4	4	6,239,666.0	2,038,845.2	0.00	30.00	0.00	0	0		
									point5	5	6,239,619.0	2,038,822.5	0.00	30.00					
Barrier2	W	0.00	99.99	0.00				0.00	point6	6	6,239,667.0	2,038,670.8	0.00	30.00	0.00	0	0		
									point7	7	6,239,685.5	2,038,622.0	0.00	30.00	0.00	0	0		
									point8	8	6,239,797.0	2,038,662.6	0.00	30.00	0.00	0	0		
									point9	9	6,239,778.5	2,038,714.9	0.00	30.00	0.00	0	0		
									point10	10	6,239,667.0	2,038,670.8	0.00	30.00					
Barrier3	W	0.00	99.99	0.00				0.00	point11	11	6,239,701.0	2,038,593.8	0.00	30.00	0.00	0	0		
									point12	12	6,239,717.5	2,038,545.0	0.00	30.00	0.00	0	0		
									point13	13	6,239,830.5	2,038,585.0	0.00	30.00	0.00	0	0		
									point14	14	6,239,814.5	2,038,636.5	0.00	30.00	0.00	0	0		
									point15	15	6,239,701.0	2,038,593.8	0.00	30.00					

<Organization?>				12 December 2022	
<Analysis By?>				TNM 2.5	
INPUT: TERRAIN LINES					
PROJECT/CONTRACT:	**<Project Name?>**				
RUN:	**<Run Title?>**				
Terrain Line	**Points**				
Name	**No.**	**Coordinates (ground)**			
		X	**Y**	**Z**	
		ft	ft	ft	
Terrain Line1	1	6,239,091.0	2,038,352.2	0.00	
	2	6,239,089.0	2,038,293.1	0.00	
	3	6,239,106.5	2,038,144.6	0.00	
	4	6,239,117.0	2,037,955.4	0.00	
	5	6,239,310.5	2,038,035.6	0.00	
	6	6,239,552.0	2,038,144.6	0.00	
	7	6,239,670.5	2,038,203.6	0.00	
	8	6,239,663.5	2,038,257.9	0.00	
	9	6,239,655.0	2,038,312.9	0.00	
	10	6,239,704.5	2,038,394.5	0.00	
	11	6,239,784.5	2,038,551.4	0.00	
	12	6,239,864.0	2,038,581.2	0.00	
	13	6,239,891.5	2,038,631.1	0.00	
	14	6,239,839.0	2,038,716.8	0.00	
	15	6,239,818.0	2,038,783.0	0.00	
	16	6,239,721.0	2,038,803.4	0.00	
	17	6,239,663.5	2,038,878.5	0.00	
	18	6,239,446.5	2,038,782.4	0.00	
	19	6,239,313.0	2,038,719.1	0.00	
	20	6,239,138.5	2,038,656.4	0.00	
	21	6,239,119.5	2,038,531.9	0.00	
	22	6,239,098.0	2,038,410.8	0.00	

<Organization?>			12 December 2022
<Analysis By?>			TNM 2.5
			Calculated with TNM 2.5
RESULTS: SOUND LEVELS			
PROJECT/CONTRACT:	<Project Name?>		
RUN:	<Run Title?>		
BARRIER DESIGN:	INPUT HEIGHTS		Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.
ATMOSPHERICS:	68 deg F, 50% RH		

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
DP	1	1	0.0	37.6	66	37.6	10	----	37.6	0.0	8	-8.0
OS-1	2	1	0.0	41.3	66	41.3	10	----	41.3	0.0	8	-8.0
ST1	3	1	45.2	53.0	66	7.8	10	----	53.0	0.0	8	-8.0
ST2	4	1	41.4	46.0	66	4.6	10	----	46.0	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?> 12 December 2022
<Analysis By?> TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: <Project Name?>
RUN: <Run Title?>

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

Roadway		Points									
Name	Width	Name	No.	Coordinates (pavement)			Flow Control			Segment	
				X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Macario Drive	40.0	point1	1	6,239,927.5	2,038,855.9	0.00				Average	
		point2	2	6,239,846.5	2,038,825.0	0.00				Average	
		point3	3	6,239,780.0	2,038,802.2	0.00					
Roja Dr	35.0	point9	9	6,239,976.0	2,038,041.2	25.00				Average	
		point10	10	6,239,976.0	2,038,214.6	25.00				Average	
		point11	11	6,239,978.5	2,038,348.2	20.00				Average	
		point12	12	6,239,977.0	2,038,486.4	15.00				Average	
		point13	13	6,239,979.0	2,038,668.5	10.00				Average	
		point14	14	6,239,979.5	2,038,728.0	5.00				Average	
		point15	15	6,239,954.5	2,038,834.9	0.00					
Redondo	45.0	point16	16	6,239,187.5	2,037,476.8	25.00				Average	
		point17	17	6,239,185.5	2,037,620.4	25.00				Average	
		point18	18	6,239,204.5	2,037,667.8	25.00				Average	
		point19	19	6,239,235.0	2,037,708.0	25.00				Average	
		point20	20	6,239,275.5	2,037,754.6	25.00				Average	
		point21	21	6,239,368.5	2,037,797.9	25.00				Average	
		point22	22	6,239,444.5	2,037,835.5	25.00				Average	
		point23	23	6,239,602.0	2,037,911.1	25.00				Average	
		point24	24	6,239,675.0	2,037,940.2	25.00				Average	
		point25	25	6,239,721.5	2,037,965.0	25.00				Average	
		point26	26	6,239,776.5	2,037,991.6	25.00				Average	
		point27	27	6,239,839.0	2,038,008.1	25.00				Average	
		point28	28	6,239,949.0	2,038,007.0	25.00					
Monica Cir-2	40.0	point29	29	6,239,780.0	2,038,802.2	0.00				Average	
		point4	4	6,239,744.0	2,038,813.5	0.00				Average	

			point5	5	6,239,714.5	2,038,853.5	5.00				Average	
			point6	6	6,239,691.5	2,038,907.9	10.00				Average	
			point7	7	6,239,666.5	2,038,966.9	15.00				Average	
			point8	8	6,239,634.5	2,039,046.6	20.00					

<Organization?> 12 December 2022
<Analysis By?> TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: <Project Name?>
RUN: <Run Title?>

Roadway	Points												
Name	Name	No.	Segment										
			Autos		MTrucks		HTrucks		Buses		Motorcycles		
			V	S	V	S	V	S	V	S	V	S	
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	
Macario Drive	point1	1	258	25	5	25	2	25	0	0	0	0	
	point2	2	258	25	5	25	2	25	0	0	0	0	
	point3	3											
Roja Dr	point9	9	321	25	6	25	3	25	0	0	0	0	
	point10	10	321	25	6	25	3	25	0	0	0	0	
	point11	11	321	25	6	25	3	25	0	0	0	0	
	point12	12	321	25	6	25	3	25	0	0	0	0	
	point13	13	321	25	6	25	3	25	0	0	0	0	
	point14	14	321	25	6	25	3	25	0	0	0	0	
	point15	15											
Redondo	point16	16	524	25	10	25	5	25	0	0	0	0	
	point17	17	524	25	10	25	5	25	0	0	0	0	
	point18	18	524	25	10	25	5	25	0	0	0	0	
	point19	19	524	25	10	25	5	25	0	0	0	0	
	point20	20	524	25	10	25	5	25	0	0	0	0	
	point21	21	524	25	10	25	5	25	0	0	0	0	
	point22	22	524	25	10	25	5	25	0	0	0	0	
	point23	23	524	25	10	25	5	25	0	0	0	0	
	point24	24	524	25	10	25	5	25	0	0	0	0	
	point25	25	524	25	10	25	5	25	0	0	0	0	
	point26	26	524	25	10	25	5	25	0	0	0	0	
	point27	27	524	25	10	25	5	25	0	0	0	0	
	point28	28											

Monica Cir-2		point29	29	156	25	3	25	1	25	0	0	0	0
		point4	4	156	25	3	25	1	25	0	0	0	0
		point5	5	156	25	3	25	1	25	0	0	0	0
		point6	6	156	25	3	25	1	25	0	0	0	0
		point7	7	156	25	3	25	1	25	0	0	0	0
		point8	8										

<Organization?> 12 December 2022
<Analysis By?> TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: <Project Name?>
RUN: <Run Title?>

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria Existing LAeq1h	Impact Criteria LAeq1h	Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
DP	1	1	6,239,178.5	2,038,383.1	0.00	4.92	0.00	66	10.0	8.0	Y
OS-1	2	1	6,239,289.5	2,038,112.1	0.00	4.92	0.00	66	10.0	8.0	Y
ST1	3	1	6,239,693.0	2,038,822.5	0.00	4.92	45.20	66	10.0	8.0	Y
ST2	4	1	6,239,701.0	2,038,264.6	25.00	4.92	41.40	66	10.0	8.0	Y

<Organization?> **12 December 2022**
<Analysis By?> **TNM 2.5**

INPUT: BARRIERS
PROJECT/CONTRACT: **<Project Name?>**
RUN: **<Run Title?>**

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per Unit Area	$ per Unit Vol.	Top Width	Run:Rise	$ per Unit Length			X	Y	Z	at Point	Seg Ht Increment	Perturbs #Up	#Dn	On Struct?	Important Reflections?
		ft	ft	$/sq ft	$/cu yd	ft	ft:ft	$/ft			ft	ft	ft	ft	ft				
Barrier1	W	0.00	99.99	0.00				0.00	point1	1	6,239,619.0	2,038,822.5	0.00	30.00	0.00	0	0		
									point2	2	6,239,667.0	2,038,700.2	0.00	30.00	0.00	0	0		
									point3	3	6,239,716.5	2,038,720.2	0.00	30.00	0.00	0	0		
									point4	4	6,239,666.0	2,038,845.2	0.00	30.00	0.00	0	0		
									point5	5	6,239,619.0	2,038,822.5	0.00	30.00					
Barrier2	W	0.00	99.99	0.00				0.00	point6	6	6,239,667.0	2,038,670.8	0.00	30.00	0.00	0	0		
									point7	7	6,239,685.5	2,038,622.0	0.00	30.00	0.00	0	0		
									point8	8	6,239,797.0	2,038,662.6	0.00	30.00	0.00	0	0		
									point9	9	6,239,778.5	2,038,714.9	0.00	30.00	0.00	0	0		
									point10	10	6,239,667.0	2,038,670.8	0.00	30.00					
Barrier3	W	0.00	99.99	0.00				0.00	point11	11	6,239,701.0	2,038,593.8	0.00	30.00	0.00	0	0		
									point12	12	6,239,717.5	2,038,545.0	0.00	30.00	0.00	0	0		
									point13	13	6,239,830.5	2,038,585.0	0.00	30.00	0.00	0	0		
									point14	14	6,239,814.5	2,038,636.5	0.00	30.00	0.00	0	0		
									point15	15	6,239,701.0	2,038,593.8	0.00	30.00					

<Organization?>			**12 December 2022**	
<Analysis By?>			**TNM 2.5**	
INPUT: TERRAIN LINES				
PROJECT/CONTRACT:	**<Project Name?>**			
RUN:	**<Run Title?>**			
Terrain Line	**Points**			
Name	**No.**	**Coordinates (ground)**		
		X	**Y**	**Z**
		ft	ft	ft
Terrain Line1	1	6,239,091.0	2,038,352.2	0.00
	2	6,239,089.0	2,038,293.1	0.00
	3	6,239,106.5	2,038,144.6	0.00
	4	6,239,117.0	2,037,955.4	0.00
	5	6,239,310.5	2,038,035.6	0.00
	6	6,239,552.0	2,038,144.6	0.00
	7	6,239,670.5	2,038,203.6	0.00
	8	6,239,663.5	2,038,257.9	0.00
	9	6,239,655.0	2,038,312.9	0.00
	10	6,239,704.5	2,038,394.5	0.00
	11	6,239,784.5	2,038,551.4	0.00
	12	6,239,864.0	2,038,581.2	0.00
	13	6,239,891.5	2,038,631.1	0.00
	14	6,239,839.0	2,038,716.8	0.00
	15	6,239,818.0	2,038,783.0	0.00
	16	6,239,721.0	2,038,803.4	0.00
	17	6,239,663.5	2,038,878.5	0.00
	18	6,239,446.5	2,038,782.4	0.00
	19	6,239,313.0	2,038,719.1	0.00
	20	6,239,138.5	2,038,656.4	0.00
	21	6,239,119.5	2,038,531.9	0.00
	22	6,239,098.0	2,038,410.8	0.00

RESULTS: SOUND LEVELS **<Project Name?>**

<Organization?>							**12 December 2022**					
<Analysis By?>							**TNM 2.5**					
							Calculated with TNM 2.5					
RESULTS: SOUND LEVELS												
PROJECT/CONTRACT:		**<Project Name?>**										
RUN:		**<Run Title?>**										
BARRIER DESIGN:		**INPUT HEIGHTS**						**Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.**				
ATMOSPHERICS:		**68 deg F, 50% RH**										
Receiver												
Name	**No.**	**#DUs**	**Existing**	**No Barrier**					**With Barrier**			
			LAeq1h	**LAeq1h**		**Increase over existing**		**Type**	**Calculated**	**Noise Reduction**		
				Calculated	**Crit'n**	**Calculated**	**Crit'n**	**Impact**	**LAeq1h**	**Calculated**	**Goal**	**Calculated**
							Sub'l Inc					**minus**
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
DP	1	1	0.0	38.6	66	38.6	10	----	38.6	0.0	8	-8.0
OS-1	2	1	0.0	42.2	66	42.2	10	----	42.2	0.0	8	-8.0
ST1	3	1	45.2	54.1	66	8.9	10	----	54.1	0.0	8	-8.0
ST2	4	1	41.4	47.2	66	5.8	10	----	47.2	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?>					**12 December 2022**						
<Analysis By?>					**TNM 2.5**						
INPUT: ROADWAYS							**Average pavement type shall be used unless**				
PROJECT/CONTRACT:	**<Project Name?>**						**a State highway agency substantiates the use**				
RUN:	**<Run Title?>**						**of a different type with the approval of FHWA**				
Roadway		**Points**									
Name	**Width**	**Name**	**No.**	**Coordinates (pavement)**			**Flow Control**			**Segment**	
				X	**Y**	**Z**	**Control Device**	**Speed Constraint**	**Percent Vehicles Affected**	**Pvmt Type**	**On Struct?**
	ft			ft	ft	ft		mph	%		
Macario Drive	40.0	point1	1	6,239,927.5	2,038,855.9	0.00				Average	
		point2	2	6,239,846.5	2,038,825.0	0.00				Average	
		point3	3	6,239,780.0	2,038,802.2	0.00					
Roja Dr	35.0	point9	9	6,239,976.0	2,038,041.2	25.00				Average	
		point10	10	6,239,976.0	2,038,214.6	25.00				Average	
		point11	11	6,239,978.5	2,038,348.2	20.00				Average	
		point12	12	6,239,977.0	2,038,486.4	15.00				Average	
		point13	13	6,239,979.0	2,038,668.5	10.00				Average	
		point14	14	6,239,979.5	2,038,728.0	5.00				Average	
		point15	15	6,239,954.5	2,038,834.9	0.00					
Redondo	45.0	point16	16	6,239,187.5	2,037,476.8	25.00				Average	
		point17	17	6,239,185.5	2,037,620.4	25.00				Average	
		point18	18	6,239,204.5	2,037,667.8	25.00				Average	
		point19	19	6,239,235.0	2,037,708.0	25.00				Average	
		point20	20	6,239,275.5	2,037,754.6	25.00				Average	
		point21	21	6,239,368.5	2,037,797.9	25.00				Average	
		point22	22	6,239,444.5	2,037,835.5	25.00				Average	
		point23	23	6,239,602.0	2,037,911.1	25.00				Average	
		point24	24	6,239,675.0	2,037,940.2	25.00				Average	
		point25	25	6,239,721.5	2,037,965.0	25.00				Average	
		point26	26	6,239,776.5	2,037,991.6	25.00				Average	
		point27	27	6,239,839.0	2,038,008.1	25.00				Average	
		point28	28	6,239,949.0	2,038,007.0	25.00					
Monica Cir-2	40.0	point29	29	6,239,780.0	2,038,802.2	0.00				Average	
		point4	4	6,239,744.0	2,038,813.5	0.00				Average	

		point5	5	6,239,714.5	2,038,853.5	5.00				Average	
		point6	6	6,239,691.5	2,038,907.9	10.00				Average	
		point7	7	6,239,666.5	2,038,966.9	15.00				Average	
		point8	8	6,239,634.5	2,039,046.6	20.00					

<Organization?> **12 December 2022**
<Analysis By?> **TNM 2.5**

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: **<Project Name?>**
RUN: **<Run Title?>**

Roadway	Points											
Name	Name	No.	Segment									
			Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Macario Drive	point1	1	144	25	2	25	1	25	0	0	0	0
	point2	2	144	25	2	25	1	25	0	0	0	0
	point3	3										
Roja Dr	point9	9	220	25	4	25	2	25	0	0	0	0
	point10	10	220	25	4	25	2	25	0	0	0	0
	point11	11	220	25	4	25	2	25	0	0	0	0
	point12	12	220	25	4	25	2	25	0	0	0	0
	point13	13	220	25	4	25	2	25	0	0	0	0
	point14	14	220	25	4	25	2	25	0	0	0	0
	point15	15										
Redondo	point16	16	436	25	9	25	4	25	0	0	0	0
	point17	17	436	25	9	25	4	25	0	0	0	0
	point18	18	436	25	9	25	4	25	0	0	0	0
	point19	19	436	25	9	25	4	25	0	0	0	0
	point20	20	436	25	9	25	4	25	0	0	0	0
	point21	21	436	25	9	25	4	25	0	0	0	0
	point22	22	436	25	9	25	4	25	0	0	0	0
	point23	23	436	25	9	25	4	25	0	0	0	0
	point24	24	436	25	9	25	4	25	0	0	0	0
	point25	25	436	25	9	25	4	25	0	0	0	0
	point26	26	436	25	9	25	4	25	0	0	0	0
	point27	27	436	25	9	25	4	25	0	0	0	0
	point28	28										

Monica Cir-2	point29	29	144	25	2	25	1	25	0	0	0	0
	point4	4	144	25	2	25	1	25	0	0	0	0
	point5	5	144	25	2	25	1	25	0	0	0	0
	point6	6	144	25	2	25	1	25	0	0	0	0
	point7	7	144	25	2	25	1	25	0	0	0	0
	point8	8										

<Organization?> 12 December 2022
<Analysis By?> TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: <Project Name?>
RUN: <Run Title?>

Receiver											
Name	No.	#DUs	Coordinates (ground)			Height	Input Sound Levels and Criteria				Active
			X	Y	Z	above	Existing	Impact Criteria		NR	in
						Ground	LAeq1h	LAeq1h	Sub'l	Goal	Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
DP	1	1	6,239,178.5	2,038,383.1	0.00	4.92	0.00	66	10.0	8.0	Y
OS-1	2	1	6,239,289.5	2,038,112.1	0.00	4.92	0.00	66	10.0	8.0	Y
ST1	3	1	6,239,693.0	2,038,822.5	0.00	4.92	45.20	66	10.0	8.0	Y
ST2	4	1	6,239,701.0	2,038,264.6	25.00	4.92	41.40	66	10.0	8.0	Y

<Organization?> **12 December 2022**
<Analysis By?> **TNM 2.5**

INPUT: BARRIERS
PROJECT/CONTRACT: **<Project Name?>**
RUN: **<Run Title?>**

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per Unit Area	$ per Unit Vol.	Top Width	Run:Rise	$ per Unit Length			X	Y	Z	at Point	Seg Ht Perturbs Incre-ment	#Up	#Dn	On Struct?	Important Reflec-tions?
		ft	ft	$/sq ft	$/cu yd	ft	ft:ft	$/ft			ft	ft	ft	ft	ft				
Barrier1	W	0.00	99.99	0.00				0.00	point1	1	6,239,619.0	2,038,822.5	0.00	30.00	0.00	0	0		
									point2	2	6,239,667.0	2,038,700.2	0.00	30.00	0.00	0	0		
									point3	3	6,239,716.5	2,038,720.2	0.00	30.00	0.00	0	0		
									point4	4	6,239,666.0	2,038,845.2	0.00	30.00	0.00	0	0		
									point5	5	6,239,619.0	2,038,822.5	0.00	30.00					
Barrier2	W	0.00	99.99	0.00				0.00	point6	6	6,239,667.0	2,038,670.8	0.00	30.00	0.00	0	0		
									point7	7	6,239,685.5	2,038,622.0	0.00	30.00	0.00	0	0		
									point8	8	6,239,797.0	2,038,662.6	0.00	30.00	0.00	0	0		
									point9	9	6,239,778.5	2,038,714.9	0.00	30.00	0.00	0	0		
									point10	10	6,239,667.0	2,038,670.8	0.00	30.00					
Barrier3	W	0.00	99.99	0.00				0.00	point11	11	6,239,701.0	2,038,593.8	0.00	30.00	0.00	0	0		
									point12	12	6,239,717.5	2,038,545.0	0.00	30.00	0.00	0	0		
									point13	13	6,239,830.5	2,038,585.0	0.00	30.00	0.00	0	0		
									point14	14	6,239,814.5	2,038,636.5	0.00	30.00	0.00	0	0		
									point15	15	6,239,701.0	2,038,593.8	0.00	30.00					

<Organization?>			12 December 2022	
<Analysis By?>			TNM 2.5	
INPUT: TERRAIN LINES				
PROJECT/CONTRACT:	<Project Name?>			
RUN:	<Run Title?>			
Terrain Line	**Points**			
Name	**No.**	**Coordinates (ground)**		
		X	**Y**	**Z**
		ft	ft	ft
Terrain Line1	1	6,239,091.0	2,038,352.2	0.00
	2	6,239,089.0	2,038,293.1	0.00
	3	6,239,106.5	2,038,144.6	0.00
	4	6,239,117.0	2,037,955.4	0.00
	5	6,239,310.5	2,038,035.6	0.00
	6	6,239,552.0	2,038,144.6	0.00
	7	6,239,670.5	2,038,203.6	0.00
	8	6,239,663.5	2,038,257.9	0.00
	9	6,239,655.0	2,038,312.9	0.00
	10	6,239,704.5	2,038,394.5	0.00
	11	6,239,784.5	2,038,551.4	0.00
	12	6,239,864.0	2,038,581.2	0.00
	13	6,239,891.5	2,038,631.1	0.00
	14	6,239,839.0	2,038,716.8	0.00
	15	6,239,818.0	2,038,783.0	0.00
	16	6,239,721.0	2,038,803.4	0.00
	17	6,239,663.5	2,038,878.5	0.00
	18	6,239,446.5	2,038,782.4	0.00
	19	6,239,313.0	2,038,719.1	0.00
	20	6,239,138.5	2,038,656.4	0.00
	21	6,239,119.5	2,038,531.9	0.00
	22	6,239,098.0	2,038,410.8	0.00

<Organization?>
<Analysis By?>

12 December 2022
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT: <Project Name?>
RUN: <Run Title?>
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 LAeq1h Calculated	No Barrier LAeq1h Crit'n	Increase over existing Calculated	Increase over existing Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
DP	1	1	0.0	37.7	66	37.7	10	----	37.7	0.0	8	-8.0
OS-1	2	1	0.0	41.3	66	41.3	10	----	41.3	0.0	8	-8.0
ST1	3	1	45.2	53.0	66	7.8	10	----	53.0	0.0	8	-8.0
ST2	4	1	41.4	46.1	66	4.7	10	----	46.1	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Noise Reduction Avg	Noise Reduction 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?> 12 December 2022
<Analysis By?> TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: <Project Name?>
RUN: <Run Title?>

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

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Macario Drive	40.0	point1	1	6,239,927.5	2,038,855.9	0.00				Average	
		point2	2	6,239,846.5	2,038,825.0	0.00				Average	
		point3	3	6,239,780.0	2,038,802.2	0.00					
Roja Dr	35.0	point9	9	6,239,976.0	2,038,041.2	25.00				Average	
		point10	10	6,239,976.0	2,038,214.6	25.00				Average	
		point11	11	6,239,978.5	2,038,348.2	20.00				Average	
		point12	12	6,239,977.0	2,038,486.4	15.00				Average	
		point13	13	6,239,979.0	2,038,668.5	10.00				Average	
		point14	14	6,239,979.5	2,038,728.0	5.00				Average	
		point15	15	6,239,954.5	2,038,834.9	0.00					
Redondo	45.0	point16	16	6,239,187.5	2,037,476.8	25.00				Average	
		point17	17	6,239,185.5	2,037,620.4	25.00				Average	
		point18	18	6,239,204.5	2,037,667.8	25.00				Average	
		point19	19	6,239,235.0	2,037,708.0	25.00				Average	
		point20	20	6,239,275.5	2,037,754.6	25.00				Average	
		point21	21	6,239,368.5	2,037,797.9	25.00				Average	
		point22	22	6,239,444.5	2,037,835.5	25.00				Average	
		point23	23	6,239,602.0	2,037,911.1	25.00				Average	
		point24	24	6,239,675.0	2,037,940.2	25.00				Average	
		point25	25	6,239,721.5	2,037,965.0	25.00				Average	
		point26	26	6,239,776.5	2,037,991.6	25.00				Average	
		point27	27	6,239,839.0	2,038,008.1	25.00				Average	
		point28	28	6,239,949.0	2,038,007.0	25.00					
Monica Cir-2	40.0	point29	29	6,239,780.0	2,038,802.2	0.00				Average	
		point4	4	6,239,744.0	2,038,813.5	0.00				Average	

			point5	5	6,239,714.5	2,038,853.5	5.00				Average	
			point6	6	6,239,691.5	2,038,907.9	10.00				Average	
			point7	7	6,239,666.5	2,038,966.9	15.00				Average	
			point8	8	6,239,634.5	2,039,046.6	20.00					

<Organization?> 12 December 2022
<Analysis By?> TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: <Project Name?>
RUN: <Run Title?>

Roadway	Points												
Name	Name	No.	Segment										
			Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Macario Drive	point1	1	259	25	5	25	2	25	0	0	0	0
	point2	2	259	25	5	25	2	25	0	0	0	0
	point3	3										
Roja Dr	point9	9	322	25	6	25	3	25	0	0	0	0
	point10	10	322	25	6	25	3	25	0	0	0	0
	point11	11	322	25	6	25	3	25	0	0	0	0
	point12	12	322	25	6	25	3	25	0	0	0	0
	point13	13	322	25	6	25	3	25	0	0	0	0
	point14	14	322	25	6	25	3	25	0	0	0	0
	point15	15										
Redondo	point16	16	525	25	10	25	5	25	0	0	0	0
	point17	17	525	25	10	25	5	25	0	0	0	0
	point18	18	525	25	10	25	5	25	0	0	0	0
	point19	19	525	25	10	25	5	25	0	0	0	0
	point20	20	525	25	10	25	5	25	0	0	0	0
	point21	21	525	25	10	25	5	25	0	0	0	0
	point22	22	525	25	10	25	5	25	0	0	0	0
	point23	23	525	25	10	25	5	25	0	0	0	0
	point24	24	525	25	10	25	5	25	0	0	0	0
	point25	25	525	25	10	25	5	25	0	0	0	0
	point26	26	525	25	10	25	5	25	0	0	0	0
	point27	27	525	25	10	25	5	25	0	0	0	0
	point28	28										

Monica Cir-2	point29	29	157	25	3	25	1	25	0	0	0	0
	point4	4	157	25	3	25	1	25	0	0	0	0
	point5	5	157	25	3	25	1	25	0	0	0	0
	point6	6	157	25	3	25	1	25	0	0	0	0
	point7	7	157	25	3	25	1	25	0	0	0	0
	point8	8										

<Organization?> **12 December 2022**
<Analysis By?> **TNM 2.5**

INPUT: RECEIVERS
PROJECT/CONTRACT: **<Project Name?>**
RUN: **<Run Title?>**

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria Existing LAeq1h	Impact Criteria LAeq1h	Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
DP	1	1	6,239,178.5	2,038,383.1	0.00	4.92	0.00	66	10.0	8.0	Y
OS-1	2	1	6,239,289.5	2,038,112.1	0.00	4.92	0.00	66	10.0	8.0	Y
ST1	3	1	6,239,693.0	2,038,822.5	0.00	4.92	45.20	66	10.0	8.0	Y
ST2	4	1	6,239,701.0	2,038,264.6	25.00	4.92	41.40	66	10.0	8.0	Y
M1-1	8	1	6,239,680.5	2,038,819.1	0.00	4.92	0.00	66	10.0	8.0	Y
M1-2	9	1	6,239,680.5	2,038,819.1	0.00	14.92	0.00	66	10.0	8.0	Y
M1-3	10	1	6,239,680.5	2,038,819.1	0.00	24.92	0.00	66	10.0	8.0	Y
M2-1	11	1	6,239,705.5	2,038,757.4	0.00	4.92	0.00	66	10.0	8.0	Y
M2-2	12	1	6,239,705.5	2,038,757.4	0.00	14.92	0.00	66	10.0	8.0	Y
M2-3	13	1	6,239,705.5	2,038,757.4	0.00	24.92	0.00	66	10.0	8.0	Y
M3-1	14	1	6,239,750.0	2,038,708.5	0.00	4.92	0.00	66	10.0	8.0	Y
M3-2	15	1	6,239,750.0	2,038,708.5	0.00	14.92	0.00	66	10.0	8.0	Y
M3-3	16	1	6,239,750.0	2,038,708.5	0.00	24.92	0.00	66	10.0	8.0	Y
M4-1	17	1	6,239,825.5	2,038,611.4	0.00	4.92	0.00	66	10.0	8.0	Y
M4-2	18	1	6,239,825.5	2,038,611.4	0.00	14.92	0.00	66	10.0	8.0	Y
M4-3	19	1	6,239,825.5	2,038,611.4	0.00	24.92	0.00	66	10.0	8.0	Y

<Organization?> 12 December 2022
<Analysis By?> TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: <Project Name?>
RUN: <Run Title?>

Barrier Name	Type	Height Min	Max	If Wall $ per Unit Area	If Berm $ per Unit Vol.	Top Width	Run:Rise	Add'tnl $ per Unit Length	Points Name	No.	Coordinates (bottom) X	Y	Z	Height at Point	Segment Seg Ht Incre-ment	Perturbs #Up	#Dn	On Struct?	Important Reflec-tions?
		ft	ft	$/sq ft	$/cu yd	ft	ft:ft	$/ft			ft	ft	ft	ft	ft				
Barrier1	W	0.00	99.99	0.00				0.00	point1	1	6,239,619.0	2,038,822.5	0.00	30.00	0.00	0	0		
									point2	2	6,239,667.0	2,038,700.2	0.00	30.00	0.00	0	0		
									point3	3	6,239,716.5	2,038,720.2	0.00	30.00	0.00	0	0		
									point4	4	6,239,666.0	2,038,845.2	0.00	30.00	0.00	0	0		
									point5	5	6,239,619.0	2,038,822.5	0.00	30.00					
Barrier2	W	0.00	99.99	0.00				0.00	point6	6	6,239,667.0	2,038,670.8	0.00	30.00	0.00	0	0		
									point7	7	6,239,685.5	2,038,622.0	0.00	30.00	0.00	0	0		
									point8	8	6,239,797.0	2,038,662.6	0.00	30.00	0.00	0	0		
									point9	9	6,239,778.5	2,038,714.9	0.00	30.00	0.00	0	0		
									point10	10	6,239,667.0	2,038,670.8	0.00	30.00					
Barrier3	W	0.00	99.99	0.00				0.00	point11	11	6,239,701.0	2,038,593.8	0.00	30.00	0.00	0	0		
									point12	12	6,239,717.5	2,038,545.0	0.00	30.00	0.00	0	0		
									point13	13	6,239,830.5	2,038,585.0	0.00	30.00	0.00	0	0		
									point14	14	6,239,814.5	2,038,636.5	0.00	30.00	0.00	0	0		
									point15	15	6,239,701.0	2,038,593.8	0.00	30.00					

<Organization?>			12 December 2022	
<Analysis By?>			TNM 2.5	
INPUT: TERRAIN LINES				
PROJECT/CONTRACT:	<Project Name?>			
RUN:	<Run Title?>			
Terrain Line	**Points**			
Name	**No.**	**Coordinates (ground)**		
		X	**Y**	**Z**
		ft	ft	ft
Terrain Line1	1	6,239,091.0	2,038,352.2	0.00
	2	6,239,089.0	2,038,293.1	0.00
	3	6,239,106.5	2,038,144.6	0.00
	4	6,239,117.0	2,037,955.4	0.00
	5	6,239,310.5	2,038,035.6	0.00
	6	6,239,552.0	2,038,144.6	0.00
	7	6,239,670.5	2,038,203.6	0.00
	8	6,239,663.5	2,038,257.9	0.00
	9	6,239,655.0	2,038,312.9	0.00
	10	6,239,704.5	2,038,394.5	0.00
	11	6,239,784.5	2,038,551.4	0.00
	12	6,239,864.0	2,038,581.2	0.00
	13	6,239,891.5	2,038,631.1	0.00
	14	6,239,839.0	2,038,716.8	0.00
	15	6,239,818.0	2,038,783.0	0.00
	16	6,239,721.0	2,038,803.4	0.00
	17	6,239,663.5	2,038,878.5	0.00
	18	6,239,446.5	2,038,782.4	0.00
	19	6,239,313.0	2,038,719.1	0.00
	20	6,239,138.5	2,038,656.4	0.00
	21	6,239,119.5	2,038,531.9	0.00
	22	6,239,098.0	2,038,410.8	0.00

<Organization?>							**12 December 2022**					
<Analysis By?>							**TNM 2.5**					
							Calculated with TNM 2.5					
RESULTS: SOUND LEVELS												
PROJECT/CONTRACT:		**<Project Name?>**										
RUN:		**<Run Title?>**										
BARRIER DESIGN:		**INPUT HEIGHTS**						**Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.**				
ATMOSPHERICS:		**68 deg F, 50% RH**										

Receiver												
Name	**No.**	**#DUs**	**Existing LAeq1h**	**No Barrier LAeq1h Calculated**	**Crit'n**	**Increase over existing Calculated**	**Crit'n Sub'l Inc**	**Type Impact**	**With Barrier Calculated LAeq1h**	**Noise Reduction Calculated**	**Goal**	**Calculated minus Goal**
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
DP	1	1	0.0	38.6	66	38.6	10	----	38.6	0.0	8	-8.0
OS-1	2	1	0.0	42.2	66	42.2	10	----	42.2	0.0	8	-8.0
ST1	3	1	45.2	54.1	66	8.9	10	----	54.1	0.0	8	-8.0
ST2	4	1	41.4	47.2	66	5.8	10	----	47.2	0.0	8	-8.0
M1-1	8	1	0.0	52.1	66	52.1	10	----	52.1	0.0	8	-8.0
M1-2	9	1	0.0	53.7	66	53.7	10	----	53.7	0.0	8	-8.0
M1-3	10	1	0.0	53.6	66	53.6	10	----	53.6	0.0	8	-8.0
M2-1	11	1	0.0	50.4	66	50.4	10	----	50.4	0.0	8	-8.0
M2-2	12	1	0.0	51.7	66	51.7	10	----	51.7	0.0	8	-8.0
M2-3	13	1	0.0	51.5	66	51.5	10	----	51.5	0.0	8	-8.0
M3-1	14	1	0.0	48.4	66	48.4	10	----	48.4	0.0	8	-8.0
M3-2	15	1	0.0	49.4	66	49.4	10	----	49.4	0.0	8	-8.0
M3-3	16	1	0.0	49.7	66	49.7	10	----	49.7	0.0	8	-8.0
M4-1	17	1	0.0	47.7	66	47.7	10	----	47.7	0.0	8	-8.0
M4-2	18	1	0.0	50.4	66	50.4	10	----	50.4	0.0	8	-8.0
M4-3	19	1	0.0	50.9	66	50.9	10	----	50.9	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction Min**	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	16	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?> **12 December 2022**
<Analysis By?> **TNM 2.5**

INPUT: ROADWAYS
PROJECT/CONTRACT: **<Project Name?>**
RUN: **<Run Title?>**

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

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Macario Drive	40.0	point1	1	6,239,927.5	2,038,855.9	0.00				Average	
		point2	2	6,239,846.5	2,038,825.0	0.00				Average	
		point3	3	6,239,780.0	2,038,802.2	0.00					
Roja Dr	35.0	point9	9	6,239,976.0	2,038,041.2	25.00				Average	
		point10	10	6,239,976.0	2,038,214.6	25.00				Average	
		point11	11	6,239,978.5	2,038,348.2	20.00				Average	
		point12	12	6,239,977.0	2,038,486.4	15.00				Average	
		point13	13	6,239,979.0	2,038,668.5	10.00				Average	
		point14	14	6,239,979.5	2,038,728.0	5.00				Average	
		point15	15	6,239,954.5	2,038,834.9	0.00					
Redondo	45.0	point16	16	6,239,187.5	2,037,476.8	25.00				Average	
		point17	17	6,239,185.5	2,037,620.4	25.00				Average	
		point18	18	6,239,204.5	2,037,667.8	25.00				Average	
		point19	19	6,239,235.0	2,037,708.0	25.00				Average	
		point20	20	6,239,275.5	2,037,754.6	25.00				Average	
		point21	21	6,239,368.5	2,037,797.9	25.00				Average	
		point22	22	6,239,444.5	2,037,835.5	25.00				Average	
		point23	23	6,239,602.0	2,037,911.1	25.00				Average	
		point24	24	6,239,675.0	2,037,940.2	25.00				Average	
		point25	25	6,239,721.5	2,037,965.0	25.00				Average	
		point26	26	6,239,776.5	2,037,991.6	25.00				Average	
		point27	27	6,239,839.0	2,038,008.1	25.00				Average	
		point28	28	6,239,949.0	2,038,007.0	25.00					
Monica Cir-2	40.0	point29	29	6,239,780.0	2,038,802.2	0.00				Average	
		point4	4	6,239,744.0	2,038,813.5	0.00				Average	

		point5	5	6,239,714.5	2,038,853.5	5.00				Average	
		point6	6	6,239,691.5	2,038,907.9	10.00				Average	
		point7	7	6,239,666.5	2,038,966.9	15.00				Average	
		point8	8	6,239,634.5	2,039,046.6	20.00					

<Organization?> 12 December 2022
<Analysis By?> TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: <Project Name?>
RUN: <Run Title?>

Roadway	Points												
Name	Name	No.	Segment										
			Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Macario Drive	point1	1	174	25	3	25	1	25	0	0	0	0
	point2	2	174	25	3	25	1	25	0	0	0	0
	point3	3										
Roja Dr	point9	9	271	25	5	25	2	25	0	0	0	0
	point10	10	271	25	5	25	2	25	0	0	0	0
	point11	11	271	25	5	25	2	25	0	0	0	0
	point12	12	271	25	5	25	2	25	0	0	0	0
	point13	13	271	25	5	25	2	25	0	0	0	0
	point14	14	271	25	5	25	2	25	0	0	0	0
	point15	15										
Redondo	point16	16	465	25	9	25	4	25	0	0	0	0
	point17	17	465	25	9	25	4	25	0	0	0	0
	point18	18	465	25	9	25	4	25	0	0	0	0
	point19	19	465	25	9	25	4	25	0	0	0	0
	point20	20	465	25	9	25	4	25	0	0	0	0
	point21	21	465	25	9	25	4	25	0	0	0	0
	point22	22	465	25	9	25	4	25	0	0	0	0
	point23	23	465	25	9	25	4	25	0	0	0	0
	point24	24	465	25	9	25	4	25	0	0	0	0
	point25	25	465	25	9	25	4	25	0	0	0	0
	point26	26	465	25	9	25	4	25	0	0	0	0
	point27	27	465	25	9	25	4	25	0	0	0	0
	point28	28										

Monica Cir-2	point29	29	176	25	3	25	1	25	0	0	0	0
	point4	4	176	25	3	25	1	25	0	0	0	0
	point5	5	176	25	3	25	1	25	0	0	0	0
	point6	6	176	25	3	25	1	25	0	0	0	0
	point7	7	176	25	3	25	1	25	0	0	0	0
	point8	8										

<Organization?> 12 December 2022
<Analysis By?> TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: <Project Name?>
RUN: <Run Title?>

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria Existing LAeq1h	Impact Criteria LAeq1h	Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
DP	1	1	6,239,178.5	2,038,383.1	0.00	4.92	0.00	66	10.0	8.0	Y
OS-1	2	1	6,239,289.5	2,038,112.1	0.00	4.92	0.00	66	10.0	8.0	Y
ST1	3	1	6,239,693.0	2,038,822.5	0.00	4.92	45.20	66	10.0	8.0	Y
ST2	4	1	6,239,701.0	2,038,264.6	25.00	4.92	41.40	66	10.0	8.0	Y

<Organization?> **12 December 2022**
<Analysis By?> **TNM 2.5**

INPUT: BARRIERS
PROJECT/CONTRACT: **<Project Name?>**
RUN: **<Run Title?>**

Barrier Name	Type	Height Min	Max	If Wall $ per Unit Area	If Berm $ per Unit Vol.	Top Width	Run:Rise	Add'tnl $ per Unit Length	Points Name	No.	Coordinates (bottom) X	Y	Z	Height at Point	Segment Seg Ht Perturbs Incre-ment	#Up	#Dn	On Struct?	Important Reflec-tions?
		ft	ft	$/sq ft	$/cu yd	ft	ft:ft	$/ft			ft	ft	ft	ft	ft				
Barrier1	W	0.00	99.99	0.00				0.00	point1	1	6,239,619.0	2,038,822.5	0.00	30.00	0.00	0	0		
									point2	2	6,239,667.0	2,038,700.2	0.00	30.00	0.00	0	0		
									point3	3	6,239,716.5	2,038,720.2	0.00	30.00	0.00	0	0		
									point4	4	6,239,666.0	2,038,845.2	0.00	30.00	0.00	0	0		
									point5	5	6,239,619.0	2,038,822.5	0.00	30.00					
Barrier2	W	0.00	99.99	0.00				0.00	point6	6	6,239,667.0	2,038,670.8	0.00	30.00	0.00	0	0		
									point7	7	6,239,685.5	2,038,622.0	0.00	30.00	0.00	0	0		
									point8	8	6,239,797.0	2,038,662.6	0.00	30.00	0.00	0	0		
									point9	9	6,239,778.5	2,038,714.9	0.00	30.00	0.00	0	0		
									point10	10	6,239,667.0	2,038,670.8	0.00	30.00					
Barrier3	W	0.00	99.99	0.00				0.00	point11	11	6,239,701.0	2,038,593.8	0.00	30.00	0.00	0	0		
									point12	12	6,239,717.5	2,038,545.0	0.00	30.00	0.00	0	0		
									point13	13	6,239,830.5	2,038,585.0	0.00	30.00	0.00	0	0		
									point14	14	6,239,814.5	2,038,636.5	0.00	30.00	0.00	0	0		
									point15	15	6,239,701.0	2,038,593.8	0.00	30.00					

<Organization?>			12 December 2022	
<Analysis By?>			TNM 2.5	
INPUT: TERRAIN LINES				
PROJECT/CONTRACT:	<Project Name?>			
RUN:	<Run Title?>			
Terrain Line	**Points**			
Name	**No.**	**Coordinates (ground)**		
		X	**Y**	**Z**
		ft	ft	ft
Terrain Line1	1	6,239,091.0	2,038,352.2	0.00
	2	6,239,089.0	2,038,293.1	0.00
	3	6,239,106.5	2,038,144.6	0.00
	4	6,239,117.0	2,037,955.4	0.00
	5	6,239,310.5	2,038,035.6	0.00
	6	6,239,552.0	2,038,144.6	0.00
	7	6,239,670.5	2,038,203.6	0.00
	8	6,239,663.5	2,038,257.9	0.00
	9	6,239,655.0	2,038,312.9	0.00
	10	6,239,704.5	2,038,394.5	0.00
	11	6,239,784.5	2,038,551.4	0.00
	12	6,239,864.0	2,038,581.2	0.00
	13	6,239,891.5	2,038,631.1	0.00
	14	6,239,839.0	2,038,716.8	0.00
	15	6,239,818.0	2,038,783.0	0.00
	16	6,239,721.0	2,038,803.4	0.00
	17	6,239,663.5	2,038,878.5	0.00
	18	6,239,446.5	2,038,782.4	0.00
	19	6,239,313.0	2,038,719.1	0.00
	20	6,239,138.5	2,038,656.4	0.00
	21	6,239,119.5	2,038,531.9	0.00
	22	6,239,098.0	2,038,410.8	0.00

<Organization?> 12 December 2022
<Analysis By?> TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT: <Project Name?>
RUN: <Run Title?>
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 LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
DP	1	1	0.0	37.9	66	37.9	10	----	37.9	0.0	8	-8.0
OS-1	2	1	0.0	41.5	66	41.5	10	----	41.5	0.0	8	-8.0
ST1	3	1	45.2	53.6	66	8.4	10	----	53.6	0.0	8	-8.0
ST2	4	1	41.4	46.4	66	5.0	10	----	46.4	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?> 12 December 2022
<Analysis By?> TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: <Project Name?>
RUN: <Run Title?>

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

Roadway		Points									
Name	Width	Name	No.	Coordinates (pavement)			Flow Control			Segment	
				X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Macario Drive	40.0	point1	1	6,239,927.5	2,038,855.9	0.00				Average	
		point2	2	6,239,846.5	2,038,825.0	0.00				Average	
		point3	3	6,239,780.0	2,038,802.2	0.00					
Roja Dr	35.0	point9	9	6,239,976.0	2,038,041.2	25.00				Average	
		point10	10	6,239,976.0	2,038,214.6	25.00				Average	
		point11	11	6,239,978.5	2,038,348.2	20.00				Average	
		point12	12	6,239,977.0	2,038,486.4	15.00				Average	
		point13	13	6,239,979.0	2,038,668.5	10.00				Average	
		point14	14	6,239,979.5	2,038,728.0	5.00				Average	
		point15	15	6,239,954.5	2,038,834.9	0.00					
Redondo	45.0	point16	16	6,239,187.5	2,037,476.8	25.00				Average	
		point17	17	6,239,185.5	2,037,620.4	25.00				Average	
		point18	18	6,239,204.5	2,037,667.8	25.00				Average	
		point19	19	6,239,235.0	2,037,708.0	25.00				Average	
		point20	20	6,239,275.5	2,037,754.6	25.00				Average	
		point21	21	6,239,368.5	2,037,797.9	25.00				Average	
		point22	22	6,239,444.5	2,037,835.5	25.00				Average	
		point23	23	6,239,602.0	2,037,911.1	25.00				Average	
		point24	24	6,239,675.0	2,037,940.2	25.00				Average	
		point25	25	6,239,721.5	2,037,965.0	25.00				Average	
		point26	26	6,239,776.5	2,037,991.6	25.00				Average	
		point27	27	6,239,839.0	2,038,008.1	25.00				Average	
		point28	28	6,239,949.0	2,038,007.0	25.00					
Monica Cir-2	40.0	point29	29	6,239,780.0	2,038,802.2	0.00				Average	
		point4	4	6,239,744.0	2,038,813.5	0.00				Average	

			point5	5	6,239,714.5	2,038,853.5	5.00				Average	
			point6	6	6,239,691.5	2,038,907.9	10.00				Average	
			point7	7	6,239,666.5	2,038,966.9	15.00				Average	
			point8	8	6,239,634.5	2,039,046.6	20.00					

<Organization?> **12 December 2022**
<Analysis By?> **TNM 2.5**

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: **<Project Name?>**
RUN: **<Run Title?>**

Roadway	Points												
Name	Name	No.	Segment										
			Autos		MTrucks		HTrucks		Buses		Motorcycles		
			V	S	V	S	V	S	V	S	V	S	
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	
Macario Drive	point1	1	289	25	5	25	2	25	0	0	0	0	
	point2	2	289	25	5	25	2	25	0	0	0	0	
	point3	3											
Roja Dr	point9	9	373	25	7	25	3	25	0	0	0	0	
	point10	10	373	25	7	25	3	25	0	0	0	0	
	point11	11	373	25	7	25	3	25	0	0	0	0	
	point12	12	373	25	7	25	3	25	0	0	0	0	
	point13	13	373	25	7	25	3	25	0	0	0	0	
	point14	14	373	25	7	25	3	25	0	0	0	0	
	point15	15											
Redondo	point16	16	554	25	11	25	5	25	0	0	0	0	
	point17	17	554	25	11	25	5	25	0	0	0	0	
	point18	18	554	25	11	25	5	25	0	0	0	0	
	point19	19	554	25	11	25	5	25	0	0	0	0	
	point20	20	554	25	11	25	5	25	0	0	0	0	
	point21	21	554	25	11	25	5	25	0	0	0	0	
	point22	22	554	25	11	25	5	25	0	0	0	0	
	point23	23	554	25	11	25	5	25	0	0	0	0	
	point24	24	554	25	11	25	5	25	0	0	0	0	
	point25	25	554	25	11	25	5	25	0	0	0	0	
	point26	26	554	25	11	25	5	25	0	0	0	0	
	point27	27	554	25	11	25	5	25	0	0	0	0	
	point28	28											

Monica Cir-2	point29	29	187	25	3	25	1	25	0	0	0	0
	point4	4	187	25	3	25	1	25	0	0	0	0
	point5	5	187	25	3	25	1	25	0	0	0	0
	point6	6	187	25	3	25	1	25	0	0	0	0
	point7	7	187	25	3	25	1	25	0	0	0	0
	point8	8										

<Organization?> 12 December 2022
<Analysis By?> TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: <Project Name?>
RUN: <Run Title?>

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria Existing LAeq1h	Impact Criteria LAeq1h	Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
DP	1	1	6,239,178.5	2,038,383.1	0.00	4.92	0.00	66	10.0	8.0	Y
OS-1	2	1	6,239,289.5	2,038,112.1	0.00	4.92	0.00	66	10.0	8.0	Y
ST1	3	1	6,239,693.0	2,038,822.5	0.00	4.92	45.20	66	10.0	8.0	Y
ST2	4	1	6,239,701.0	2,038,264.6	25.00	4.92	41.40	66	10.0	8.0	Y
M1-1	8	1	6,239,675.0	2,038,829.4	0.00	4.92	0.00	66	10.0	8.0	Y
M1-2	9	1	6,239,675.0	2,038,829.4	0.00	14.92	0.00	66	10.0	8.0	Y
M1-3	10	1	6,239,675.0	2,038,829.4	0.00	24.92	0.00	66	10.0	8.0	Y
M2-1	11	1	6,239,707.0	2,038,749.6	0.00	4.92	0.00	66	10.0	8.0	Y
M2-2	12	1	6,239,707.0	2,038,749.6	0.00	14.92	0.00	66	10.0	8.0	Y
M2-3	13	1	6,239,707.0	2,038,749.6	0.00	24.92	0.00	66	10.0	8.0	Y
M3-1	14	1	6,239,745.0	2,038,706.1	0.00	4.92	0.00	66	10.0	8.0	Y
M3-2	15	1	6,239,745.0	2,038,706.1	0.00	14.92	0.00	66	10.0	8.0	Y
M3-3	16	1	6,239,745.0	2,038,706.1	0.00	24.92	0.00	66	10.0	8.0	Y
M4-1	17	1	6,239,791.5	2,038,690.0	0.00	4.92	0.00	66	10.0	8.0	Y
M4-2	18	1	6,239,791.5	2,038,690.0	0.00	14.92	0.00	66	10.0	8.0	Y
M4-3	19	1	6,239,791.5	2,038,690.0	0.00	24.92	0.00	66	10.0	8.0	Y
M5-1	20	1	6,239,828.0	2,038,607.4	0.00	4.92	0.00	66	10.0	8.0	Y
M5-2	21	1	6,239,828.0	2,038,607.4	0.00	14.92	0.00	66	10.0	8.0	Y
M5-3	22	1	6,239,828.0	2,038,607.4	0.00	24.92	0.00	66	10.0	8.0	Y

<Organization?> **12 December 2022**
<Analysis By?> **TNM 2.5**

INPUT: BARRIERS
PROJECT/CONTRACT: **<Project Name?>**
RUN: **<Run Title?>**

Barrier Name	Type	Height Min	Height Max	If Wall $ per Unit Area	If Berm $ per Unit Vol.	If Berm Top Width	If Berm Run:Rise	Add'tnl $ per Unit Length	Points Name	No.	Coordinates (bottom) X	Coordinates (bottom) Y	Coordinates (bottom) Z	Height at Point	Segment Seg Ht Increment	Segment Perturbs #Up	Segment Perturbs #Dn	On Struct?	Important Reflections?
		ft	ft	$/sq ft	$/cu yd	ft	ft:ft	$/ft			ft	ft	ft	ft	ft				
Barrier1	W	0.00	99.99	0.00				0.00	point1	1	6,239,619.0	2,038,822.5	0.00	30.00	0.00	0	0		
									point2	2	6,239,667.0	2,038,700.2	0.00	30.00	0.00	0	0		
									point3	3	6,239,716.5	2,038,720.2	0.00	30.00	0.00	0	0		
									point4	4	6,239,666.0	2,038,845.2	0.00	30.00	0.00	0	0		
									point5	5	6,239,619.0	2,038,822.5	0.00	30.00					
Barrier2	W	0.00	99.99	0.00				0.00	point6	6	6,239,667.0	2,038,670.8	0.00	30.00	0.00	0	0		
									point7	7	6,239,685.5	2,038,622.0	0.00	30.00	0.00	0	0		
									point8	8	6,239,797.0	2,038,662.6	0.00	30.00	0.00	0	0		
									point9	9	6,239,778.5	2,038,714.9	0.00	30.00	0.00	0	0		
									point10	10	6,239,667.0	2,038,670.8	0.00	30.00					
Barrier3	W	0.00	99.99	0.00				0.00	point11	11	6,239,701.0	2,038,593.8	0.00	30.00	0.00	0	0		
									point12	12	6,239,717.5	2,038,545.0	0.00	30.00	0.00	0	0		
									point13	13	6,239,830.5	2,038,585.0	0.00	30.00	0.00	0	0		
									point14	14	6,239,814.5	2,038,636.5	0.00	30.00	0.00	0	0		
									point15	15	6,239,701.0	2,038,593.8	0.00	30.00					

<Organization?> 12 December 2022
<Analysis By?> TNM 2.5

INPUT: TERRAIN LINES
PROJECT/CONTRACT: <Project Name?>
RUN: <Run Title?>

Terrain Line	Points			
Name	No.	Coordinates (ground)		
		X	Y	Z
		ft	ft	ft
Terrain Line1	1	6,239,091.0	2,038,352.2	0.00
	2	6,239,089.0	2,038,293.1	0.00
	3	6,239,106.5	2,038,144.6	0.00
	4	6,239,117.0	2,037,955.4	0.00
	5	6,239,310.5	2,038,035.6	0.00
	6	6,239,552.0	2,038,144.6	0.00
	7	6,239,670.5	2,038,203.6	0.00
	8	6,239,663.5	2,038,257.9	0.00
	9	6,239,655.0	2,038,312.9	0.00
	10	6,239,704.5	2,038,394.5	0.00
	11	6,239,784.5	2,038,551.4	0.00
	12	6,239,864.0	2,038,581.2	0.00
	13	6,239,891.5	2,038,631.1	0.00
	14	6,239,839.0	2,038,716.8	0.00
	15	6,239,818.0	2,038,783.0	0.00
	16	6,239,721.0	2,038,803.4	0.00
	17	6,239,663.5	2,038,878.5	0.00
	18	6,239,446.5	2,038,782.4	0.00
	19	6,239,313.0	2,038,719.1	0.00
	20	6,239,138.5	2,038,656.4	0.00
	21	6,239,119.5	2,038,531.9	0.00
	22	6,239,098.0	2,038,410.8	0.00

<Organization?>
<Analysis By?>

12 December 2022
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT:	<Project Name?>
RUN:	<Run Title?>
BARRIER DESIGN:	INPUT HEIGHTS
ATMOSPHERICS:	68 deg F, 50% RH

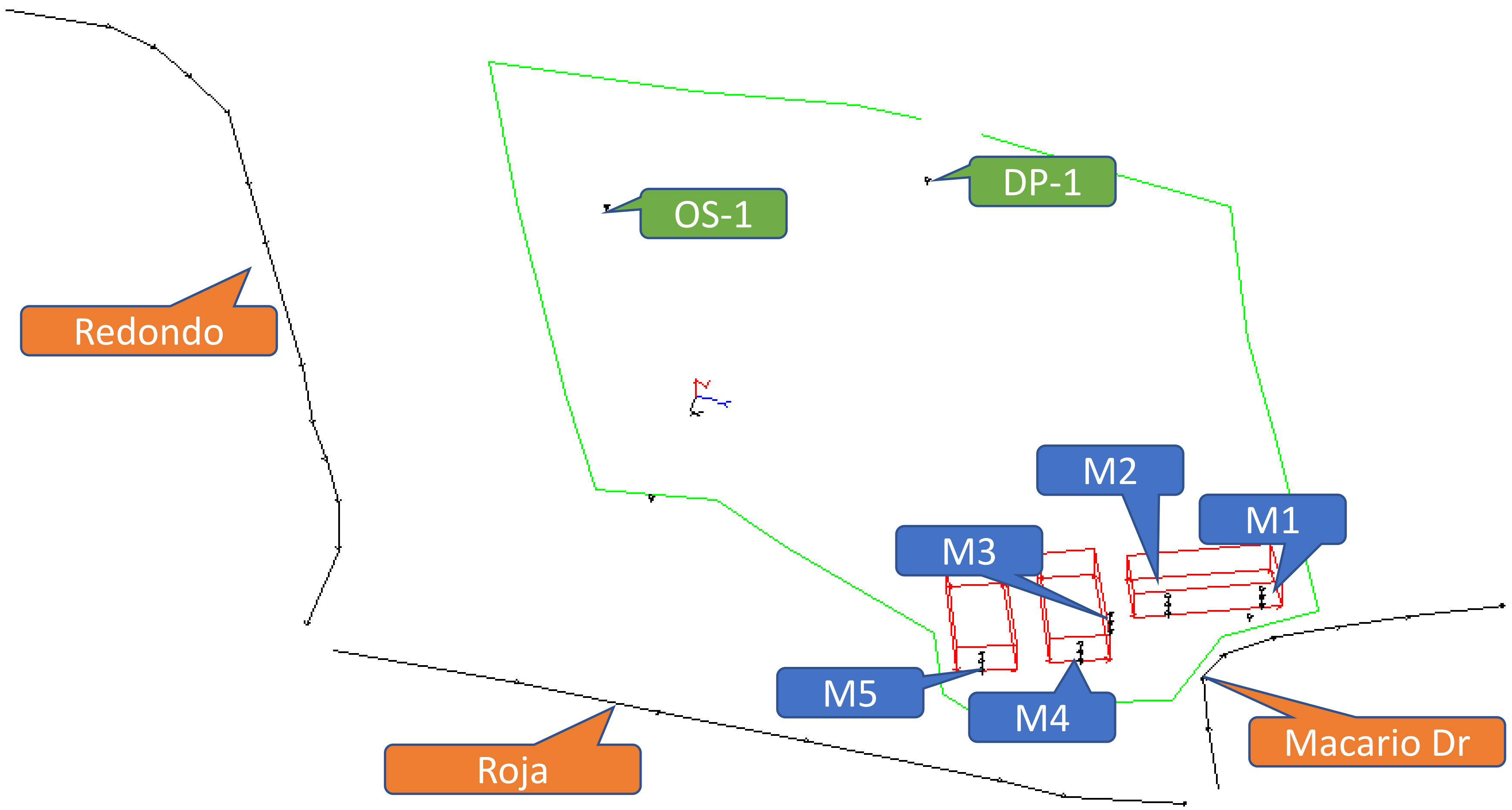
Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	No Barrier LAeq1h Crit'n	Increase over existing Calculated	Increase over existing Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
DP	1	1	0.0	38.8	66	38.8	10	----	38.8	0.0	8	-8.0
OS-1	2	1	0.0	42.4	66	42.4	10	----	42.4	0.0	8	-8.0
ST1	3	1	45.2	54.5	66	9.3	10	----	54.5	0.0	8	-8.0
ST2	4	1	41.4	47.4	66	6.0	10	----	47.4	0.0	8	-8.0
M1-1	8	1	0.0	52.7	66	52.7	10	----	52.7	0.0	8	-8.0
M1-2	9	1	0.0	54.2	66	54.2	10	----	54.2	0.0	8	-8.0
M1-3	10	1	0.0	54.1	66	54.1	10	----	54.1	0.0	8	-8.0
M2-1	11	1	0.0	50.7	66	50.7	10	----	50.7	0.0	8	-8.0
M2-2	12	1	0.0	51.7	66	51.7	10	----	51.7	0.0	8	-8.0
M2-3	13	1	0.0	51.5	66	51.5	10	----	51.5	0.0	8	-8.0
M3-1	14	1	0.0	48.6	66	48.6	10	----	48.6	0.0	8	-8.0
M3-2	15	1	0.0	49.5	66	49.5	10	----	49.5	0.0	8	-8.0
M3-3	16	1	0.0	49.8	66	49.8	10	----	49.8	0.0	8	-8.0
M4-1	17	1	0.0	50.0	66	50.0	10	----	50.0	0.0	8	-8.0
M4-2	18	1	0.0	51.5	66	51.5	10	----	51.5	0.0	8	-8.0
M4-3	19	1	0.0	51.8	66	51.8	10	----	51.8	0.0	8	-8.0
M5-1	20	1	0.0	48.3	66	48.3	10	----	48.3	0.0	8	-8.0
M5-2	21	1	0.0	51.2	66	51.2	10	----	51.2	0.0	8	-8.0
M5-3	22	1	0.0	51.7	66	51.7	10	----	51.7	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Noise Reduction Avg	Noise Reduction Max
		dB	dB	dB
All Selected	19	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							

Appendix C: Modeled Receptor Locations



Appendix D
Residential HVAC Noise Prediction

SOURCE: Dudek 2021

DUDEK

0 150 300 Feet

FIGURE 1

Nighttime Operation Noise Levels

Pacifica Development Project

SOURCE: Dudek 2021

DUDEK

0 150 300 Feet

FIGURE 2

Daytime Operations Noise Levels

Pacifica Development Project