

Bobier Property Project

Noise Assessment Study

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Submitted to:

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ACRONYMS AND ABBREVIATIONS

ADT	average daily traffic
ANSI	American National Standards Institute
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
City	City of Vista
CNEL	Community Noise Equivalent Level
County	County of San Diego
dB	decibel
dBA	A-weighted decibel
FTA	Federal Transit Administration
HVAC	heating, ventilation, and air conditioning
Hz	Hertz
kHz	kilohertz
L _{DN}	Day-Night level
L _{EQ}	equivalent sound level
L _{MAX}	maximum noise level
MD	Medium Density Residential
mPa	micro-Pascals
mph	miles per hour
NSLU	noise-sensitive land use
PPV	peak particle velocity
R-1-B	Single-Family Residential
RCNM	Roadway Construction Noise Model
SANDAG	San Diego Association of Governments
SPL	sound pressure level
STC	Sound Transmission Class
S _{WL}	sound power level
TNM	Traffic Noise Model
USDOT	U.S. Department of Transportation

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EXECUTIVE SUMMARY

This report presents an assessment of potential noise impacts associated with the proposed Bobier Property Project (project) located in the City of Vista (City), California. The project is located at 552 West Bobier Drive on a 1.67-acre vacant lot and involves the construction of 15 single-family attached residential units.

Anticipated construction activities would generate temporary elevated noise levels for nearby residences to the north, east, and south, as well as the future residents of the Modera Melrose Mixed-Use Development to the west. Mitigation measure NOI-1 would require the preparation of a construction management plan to reduce construction noise impacts to less than significant levels. If rock crushing is needed, mitigation measure NOI-2 would require noise reduction of crushing equipment. If blasting is needed, mitigation measure NOI-3 would require a blasting management plan to minimize blasting effects to nearby residences. Construction equipment would not generate substantial vibration.

Operational noise impacts would be less than significant. The project's heating, ventilation, and air conditioning (HVAC) systems would not exceed allowable City limits within the noise ordinance at the nearest property lines. The project would add traffic to nearby roadways, but transportation noise impacts to off-site land uses would be less than significant.

The project includes exterior use areas (backyards) that would be exposed to noise levels exceeding the land use compatibility limits of 65 CNEL. Measure NOI-4 would require the construction of on-site barriers to reduce noise levels at the backyards of Lots 1 through 3.

Through incorporation of mitigation measure NOI-5, which relates to exterior wall and window construction, interior noise levels would not exceed the applicable interior 45 CNEL limit for residential uses.

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1.0 INTRODUCTION

1.1 PURPOSE OF THE REPORT

This report analyzes potential noise and vibration impacts associated with the proposed Bobier Property Project (project). The analysis includes a description of existing conditions in the project vicinity and an assessment of potential impacts associated with project implementation. Analysis within this report addresses the relevant issues listed in the Noise and Land Use sections of Appendix G of the California Environmental Quality Act (CEQA) Guidelines.

1.2 PROJECT LOCATION

The project is proposed on a 1.67-acre site at 552 West Bobier Drive in the City of Vista (City) within the County of San Diego (County). The site is comprised of Assessor's Parcel Number 161-030-07-00 and is located southeast of the intersection of West Bobier Drive and Sports Park Way, directly east of the City's boundary with the City of Oceanside. See Figure 1, *Regional Location*, and Figure 2, *Aerial Photograph*.

The existing site is vacant and is comprised of scattered trees, bushes, and several large rock outcroppings. Multi-family residential uses are to the north, and single-family residential uses are to the south and east. Directly west of the project site is the Modera Melrose Mixed-Use Development site, which is a planned mixed-use project comprised of 323 multi-family residential units and ground-level commercial space on a 7.4-acre site in the City of Oceanside. The Modera Melrose Mixed-Use Development was approved on April 10, 2024, and is currently under construction.

The project site has a General Plan land use designation of Medium Density Residential (MD), which allows for a residential density of up to 10 dwelling units per acre. The project site is zoned Single-Family Residential (R-1-B).

1.3 PROJECT DESCRIPTION

The project proposes the construction of 15 single-family attached residential units. The homes would each be approximately 2,200 square feet (SF). Access would be provided by one driveway north of the project site on West Bobier Drive. Resident parking would be provided via garages along the proposed development's private drive. See Figure 3, *Site Plan*. The project proposes a residential density of 9 dwelling units per acre, which is within the Medium Density Residential (MD) allowable density of 10 dwelling units per acre.

Development of the proposed project would also include the construction of utility connections and drainage improvements. On-site improvements would include biofiltration best management practices (BMPs) including biofiltration basins.

1.4 CONSTRUCTION ACTIVITIES AND PHASING

Project construction activities would consist of grading, site preparation, installation of underground utilities, physical building construction, paving, and application of architectural coatings. Construction of the project would commence in April 2025 and be completed in approximately late December 2025 for a

total construction duration of approximately nine months. Site preparation would require the removal of approximately 200 cubic yards of debris/vegetation. Grading is estimated to require even cut and fill of 6,500 cubic yards with no export.

1.5 NOISE AND SOUND LEVEL DESCRIPTORS AND TERMINOLOGY

1.5.1 Descriptors

All noise level or sound level values presented herein are expressed in terms of decibels (dB), with A-weighting (dBA) to approximate the hearing sensitivity of humans. Time-averaged noise levels are expressed by the symbol L_{EQ} , with a specified duration. The Community Noise Equivalent Level (CNEL) is a 24-hour average, where noise levels during the evening hours of 7:00 p.m. to 10:00 p.m. have an added 5 dBA weighting, and noise levels during the nighttime hours of 10:00 p.m. to 7:00 a.m. have an added 10 dBA weighting. This is similar to the Day Night sound level (L_{DN}), which is a 24-hour average with an added 10 dBA weighting on the same nighttime hours but no added weighting on the evening hours. Sound levels expressed in CNEL are always based on dBA. These metrics are used to express noise levels for both measurement and municipal regulations, as well as for land use guidelines and enforcement of noise ordinances.

1.5.2 Terminology

1.5.2.1 Sound, Noise, and Acoustics

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g., air) to a hearing organ, such as a human ear. Noise is defined as loud, unexpected, or annoying sound.

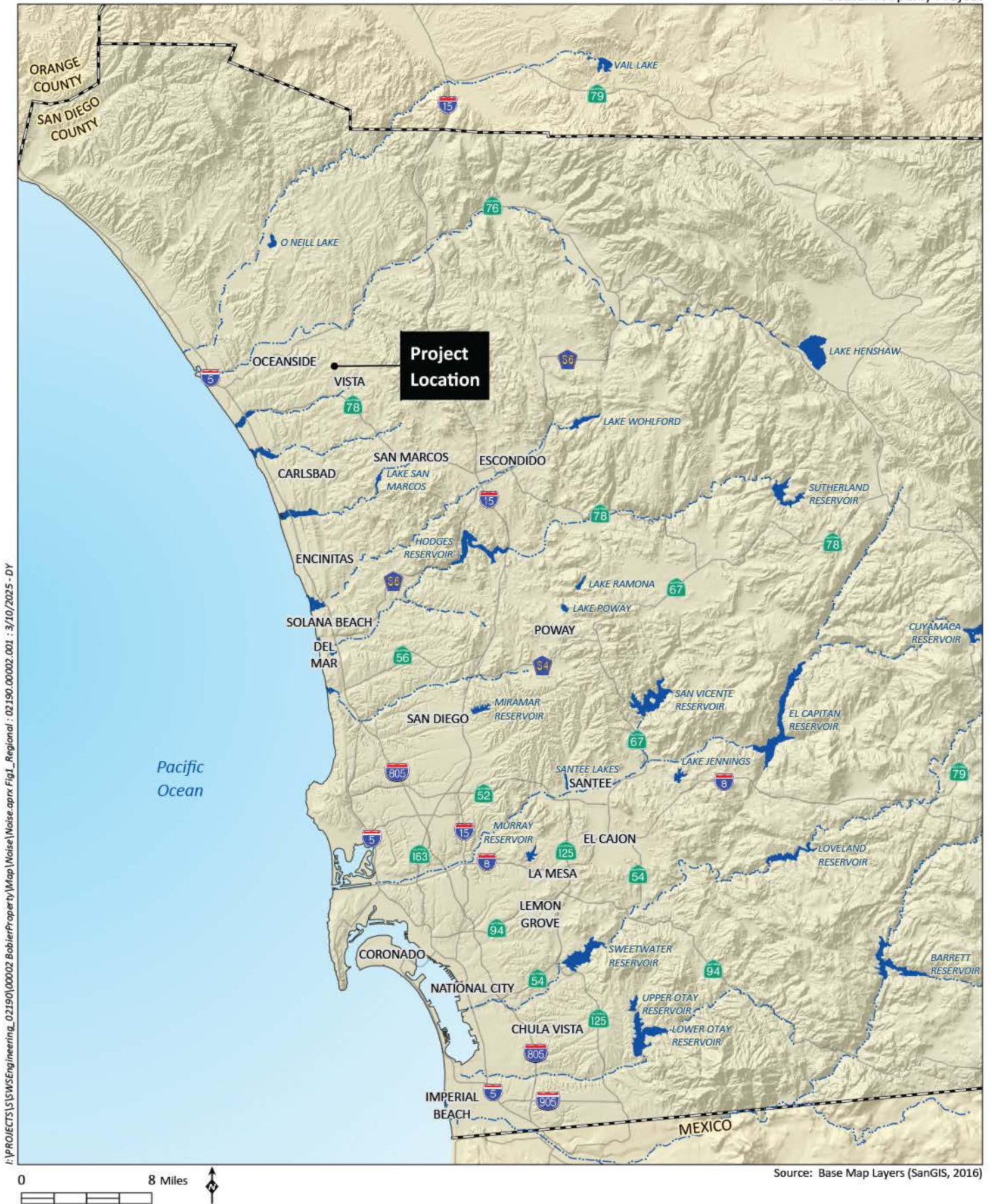
In the science of acoustics, the fundamental model consists of a sound (or noise) source, a receiver, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receiver determines the sound level and characteristics of the noise perceived by the receiver. The field of acoustics deals primarily with the propagation and control of sound.

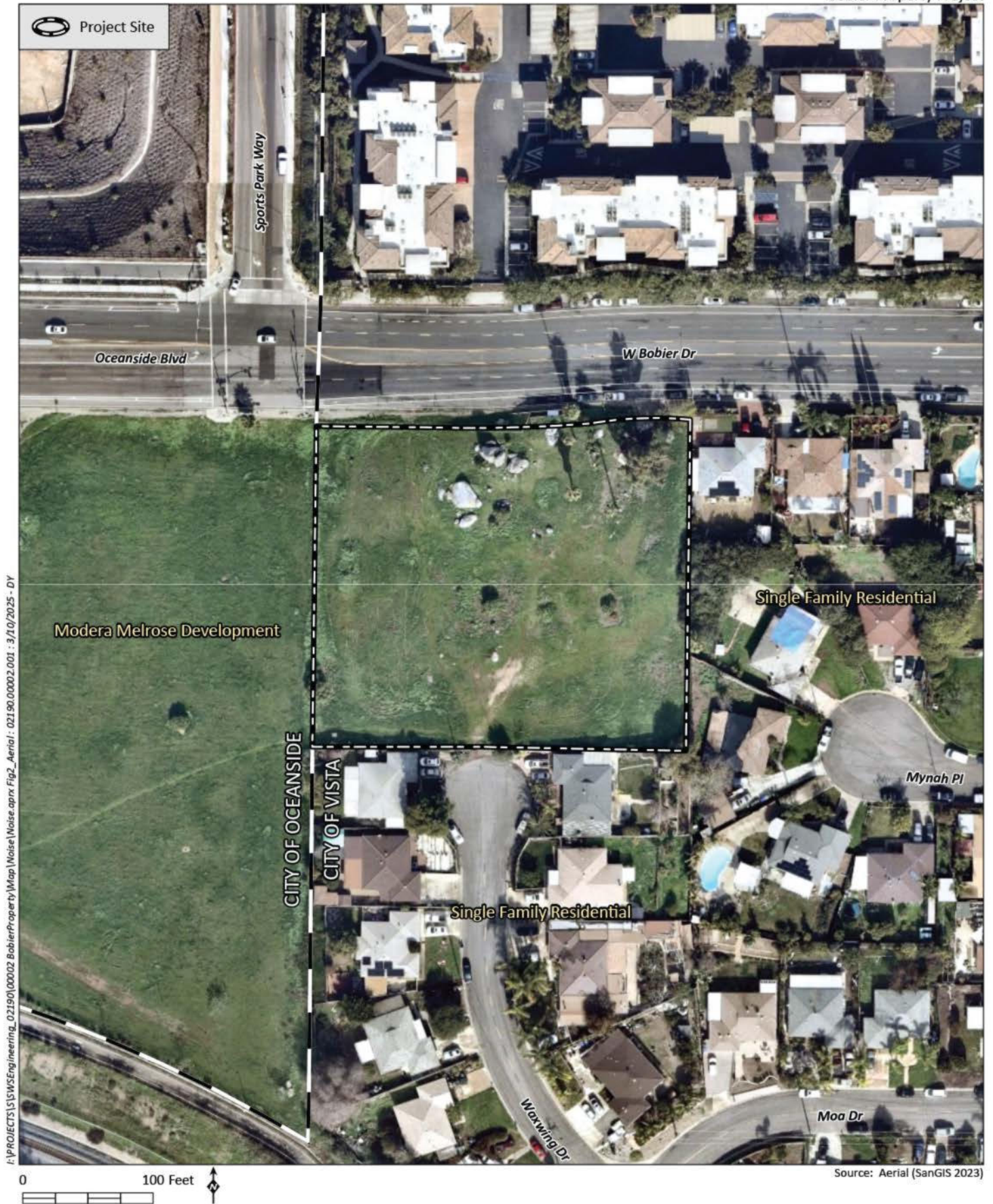
1.5.2.2 Frequency

Continuous sound can be described by frequency (pitch) and amplitude (loudness). A low-frequency sound is perceived as low in pitch. Frequency is expressed in terms of cycles per second, or Hertz (Hz) (e.g., a frequency of 250 cycles per second is referred to as 250 Hz). High frequencies are sometimes more conveniently expressed in kilohertz (kHz), or thousands of Hertz. The audible frequency range for humans is generally between 20 Hz and 20,000 Hz.

Sound Pressure Levels and Decibels

The amplitude of pressure waves generated by a sound source determines the loudness of that source. Sound pressure amplitude is measured in micro-Pascals (mPa). One mPa is approximately one hundred billionth (0.0000000001) of normal atmospheric pressure. Sound pressure amplitudes for different kinds of noise environments can range from less than 100 to 100,000,000 mPa. Because of this wide range of values, sound is rarely expressed in terms of mPa. Instead, a logarithmic scale is used to







describe sound pressure level (SPL) in terms of dBA. The threshold of hearing for the human ear is about 0 dBA, which corresponds to 20 mPa.

1.5.2.3 Addition of Decibels

Because decibels are logarithmic units, SPL cannot be added or subtracted through standard arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3 dBA increase. In other words, when two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dBA higher than from one source under the same conditions. For example, if one automobile produces an SPL of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dBA—rather, they would combine to produce 73 dBA. Under the decibel scale, three sources of equal loudness together produce a sound level 5 dBA louder than one source.

Under controlled conditions in an acoustical laboratory, the trained, healthy human ear is able to discern 1 dBA changes in sound levels, when exposed to steady, single-frequency (“pure-tone”) signals in the mid-frequency (1,000 Hz to 8,000 Hz) range. In typical noisy environments, changes in noise of 1 to 2 dBA are generally not perceptible. It is widely accepted, however, that people begin to detect sound level increases of 3 dB in typical noisy environments. Further, a 5 dBA increase is generally perceived as a distinctly noticeable increase, and a 10 dBA increase is generally perceived as a doubling of loudness.

No known studies have directly correlated the ability of a healthy human ear to discern specific levels of change in traffic noise over a 24-hour period. Many ordinances, however, specify a change of 3 CNEL as the significant impact threshold. This is based on the concept of a doubling in noise energy resulting in a 3 dBA change in noise, which is the amount of change in noise necessary for the increase to be perceptible to the average healthy human ear.

1.6 NOISE AND VIBRATION-SENSITIVE LAND USES

Noise-sensitive land uses (NSLUs) are land uses that may be subject to stress and/or interference from excessive noise, including residences, hospitals, schools, hotels, resorts, libraries, sensitive wildlife habitat, or similar facilities where quiet is an important attribute of the environment. Noise receptors are individual locations that may be affected by noise. NSLUs in the project vicinity include the existing multi-family residential uses to the north across West Bobier Drive and single-family residential uses directly to the south and east of the project site, in addition to the future Modera Melrose Mixed-Use Development directly to the west of the project site.

Land uses in which ground-borne vibration could potentially interfere with operations or equipment, such as research, manufacturing, hospitals, and university research operations (Federal Transit Administration [FTA] 2018) are considered “vibration-sensitive.” The degree of sensitivity depends on the specific equipment that would be affected by the ground-borne vibration. In addition, excessive levels of ground-borne vibration of either a regular or an intermittent nature can result in annoyance to residential uses or schools. Vibration-sensitive land uses in the project area additionally include the existing multi-family residential uses to the north across West Bobier Drive and single-family residential uses to the south and east of the project site, in addition to the future Modera Melrose Mixed-Use Development directly to the west of the project site.

1.7 REGULATORY FRAMEWORK

1.7.1 California Noise Control Act

The California Noise Control Act is a section within the California Health and Safety Code that describes excessive noise as a serious hazard to the public health and welfare and that exposure to certain levels of noise can result in physiological, psychological, and economic damage. It also finds that there is a continuous and increasing bombardment of noise in the urban, suburban, and rural areas. The California Noise Control Act declares that the State of California has a responsibility to protect the health and welfare of its citizens by the control, prevention, and abatement of noise. It is the policy of the State to provide an environment for all Californians free from noise that jeopardizes their health or welfare.

1.7.2 City of Vista General Plan, Noise Element

The Noise Element of the City's General Plan includes a noise/land use compatibility matrix for assessing the suitability of different categories of planned land uses based on exterior noise level exposure (Table NE-3 from the City General Plan; City 2012). For the project's land use (Single Family Residential), the Noise Element specifies exterior noise levels up to 60 CNEL as normally acceptable and up to 70 CNEL is conditionally acceptable. Noise levels exceeding 70 CNEL are generally unacceptable for single-family residential uses.

In addition, the City defines specific maximum noise levels that shall not be exceeded for both interior and exterior use areas. A proposed project shall not generate noise levels that exceed these standards. The City limits interior noise levels to 45 CNEL for single-family residential development. Table 1, *Interior and Exterior Noise Guidelines*, provides limits for various types of land uses.

Table 1
INTERIOR AND EXTERIOR NOISE GUIDELINES

Land Use	Maximum Noise Level (L_{DN} or CNEL, dBA) Interior^{1,2}	Maximum Noise Level (L_{DN} or CNEL, dBA) Exterior
Residential – Single Family, Multi-family, Duplex	45	65 ³
Residential – Nursing Homes, Hospital	45	65 ³
Private Offices, Church Sanctuaries, Libraries, Board Rooms, Conference Rooms, Theaters, Auditoriums, Concert Halls, Meeting Halls, etc.	45	-
Schools	45	65 ⁴
General Offices, Reception, Clerical, etc.	50	-
Bank Lobby, Retail Store, Restaurant, Typing Pool, etc.	60	-
Manufacturing, Kitchen, Warehousing, etc.	65	-
Parks, Playgrounds, etc.	-	65 ⁴
Golf Courses, Outdoor Spectator Sports, Amusement Parks, etc.	-	70 ⁴

Source: City of Vista, 2012

¹ Noise standard with windows closed. Mechanical ventilation shall be provided per UBC requirements to provide a habitable environment.

² Indoor environment excluding bathrooms, toilets, closets, and corridors.

³ Outdoor environment limited to rear yard of single-family homes, multi-family patios and balconies (with a depth of 6 feet or more) and common recreation areas.

⁴ Outdoor environment limited to playground areas, picnic areas, and other areas of frequent human use.

L_{DN}=Day-Night Level; CNEL=Community Noise Equivalent Level; dBA=A-weighted decibel

1.7.3 City of Vista Noise Ordinance (Municipal Code, Chapter 8.32, Noise Control)

Sections 8.32.010 through 8.32.060 of the City of Vista Municipal Code pertain to City noise requirements and enforcement of violations. The City has adopted the County of San Diego Noise Ordinance for the purpose of controlling excessive noise levels, including noise from construction activities.

Table 2, *Applicable Exterior Property Line Noise Limits*, lists the applicable exterior property line noise limits. This table is specific to the City of Vista and replaces the table in Section 36.404 of the County of San Diego noise ordinance. It is unlawful for any person to cause or allow the creation of any noise to the extent that the one-hour average sound level at any point on or beyond the boundaries of the property exceeds these limits. The sound level limit at a location on a boundary between two zones is the arithmetic mean of the respective limits for the two zones.

Table 2
APPLICABLE EXTERIOR PROPERTY LINE NOISE LIMITS

Zone	Time	Applicable Limit One-hour Average Sound Level (Decibels)
A-1, E-1, O, OSR	7:00 a.m. – 10:00 p. m.	50
R-1-B, MHP	10:00 p.m. – 7:00 a. m.	45
R-M	7:00 a.m. – 10:00 p.m.	55
	10:00 p.m. – 7:00 a.m.	50
C-1, C-2, O-3, C-T, OP, M-U and Downtown Specific Plan	7:00 a.m. – 10:00 p.m.	60
	10:00 p.m. – 7:00 a.m.	55
M-1, I-P, all areas of the Vista Business Park Specific Plan and Specific Plan 14	Any time	70

Source: City 2014

A-1 = Agricultural; C-1 and C-3 = Commercial; C-T = Commercial Transient; E-1 = Estate; I-P = Industrial;

M-1 = Light Manufacturing; MHP = Mobile Home Park; M-U = Mixed Use; O = Open Space; O-3 = Office Park;

OP = Office Professional; OSR = Open Space Residential; R-1 and R-1B = Single-family Residential;

R-M = Multi-family Residential

The proposed project site is zoned Single-Family Residential (R-1-B). Neighboring parcels to the south and east are zoned Single-Family Residential (R-1-B), and the parcel to the north is zoned Mixed-Use (M-U). The parcel to the west of the project site is comprised of the Modera Melrose Mixed-Use Development Project, which is within the City of Oceanside and zoned Neighborhood Commercial (CN).

The adopted County of San Diego Noise Ordinance also stipulates controlling construction noise. San Diego County Code Sections 36.408 and 36.409, Construction Equipment, state that, except for emergency work, it shall be unlawful for any person to operate or cause to be operated, construction equipment:

- A. Between 7:00 p.m. and 7:00 a.m.
- B. On Sunday or a holiday. For the purposes of this section, a holiday means January 1, the last Monday in May, July 4, the first Monday in September, December 25, and any day appointed by the President as a special national holiday or the Governor of the State as a special State holiday. A person may, however, operate construction equipment on a Sunday or holiday between the hours of 10:00 a.m. and 5:00 p.m. at the person's residence or for the purpose of construction of a residence for himself or herself, provided that the operation of construction equipment is not carried out for financial consideration or other consideration of any kind and does not violate the limits in Sections 36.409 and 36.410.
- C. Except for emergency work, it shall be unlawful for any person to operate construction equipment or cause construction equipment to be operated, that exceeds an average sound level of 75 dBA for an 8-hour period, between 7:00 a.m. and 7:00 p.m., when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is being received.

Section 36.410 of the County of San Diego's ordinance provides additional limitation on construction equipment beyond Section 36.404 pertaining to impulsive noise. Except for emergency work or work on a public road project, no person shall produce or cause to be produced an impulsive noise that exceeds

the maximum sound level shown in Table 3, *Maximum Sound Levels (Impulsive)*, when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is received, for 25 percent of the minutes in the measurement period.

Table 3
MAXIMUM SOUND LEVELS (IMPULSIVE)

Occupied Property Use	Decibels (dBA) L_{MAX}
Residential, village zoning or civic use	82
Agricultural, commercial or industrial use	85

Source: County of San Diego Municipal Code Section 36.410

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

2.0 ENVIRONMENTAL SETTING

2.1 SURROUNDING LAND USES

Land uses surrounding the project site include multi-family residential uses to the north and single-family residential uses to the south and east, in addition to the future Modera Melrose Mixed-Use Development directly to the west. See Figure 2 for nearby land uses.

2.2 EXISTING NOISE ENVIRONMENT

The existing noise environment is dominated by traffic noise from West Bobier Drive. The project is subject to some distant aircraft noise, though the site is not located near an active airport. The nearest airports are Oceanside Municipal Airport, located approximately 5.2 miles to the west, and McClellan-Palomar Airport, located approximately 6.2 miles to the southwest.

2.2.1 Ambient Noise Survey

Two measurements were taken for the ambient noise survey. One measurement was taken along the northern portion of the project site, approximately 30 feet south of West Bobier Drive, and another measurement was taken along the southern portion of the project side along Waxwing Drive. The measured noise levels are shown in Table 4, *Noise Measurement Results*. Measurement locations are shown in Figure 2.

Table 4
NOISE MEASUREMENT RESULTS

Measurement 1	
Date:	December 17, 2024
Conditions:	Temperature: 66°F. Wind Speed: 3 mph. 34% humidity.
Time:	11:02 a.m. – 11:17 a.m.
Location:	Along the northern boundary of the project site 30 feet south of West Bobier Drive.
Measured Noise Level:	69.4 dBA L_{EQ}
Notes:	Some noise from a dog barking at adjacent residential property to the east and distant aircraft noise. Minimal noise from adjacent property under construction to the west. Noise primarily from traffic on West Bobier Drive.
Measurement 2	
Date:	December 17, 2024
Conditions:	Temperature: 68°F. Wind Speed: 3 mph. 34% humidity.
Time:	11:25 a.m. – 11:40 a.m.
Location:	Along the southern boundary of the project site adjacent to Waxwing Drive.
Measured Noise Level:	53.9 dBA L_{EQ}
Notes:	Distant train noise to the southwest and distant aircraft noise.

3.0 ANALYSIS, METHODOLOGY, AND ASSUMPTIONS

3.1 METHODOLOGY

3.1.1 Ambient Noise Survey

The following equipment was used to measure existing noise levels at the project site:

- Piccolo II Noise Meter
- Larson Davis Model CA250 Calibrator
- Windscreen and tripod for the sound level meter

The sound level meter was field-calibrated immediately prior to the noise measurements to ensure accuracy. All sound level measurements conducted and presented in this report were made with a sound level meter that conforms to the American National Standards Institute (ANSI) specifications for sound level meters (ANSI S1.4-1983 R2006). All instruments were maintained with National Institute of Standards and Technology traceable calibration per the manufacturers' standards.

3.1.2 Noise Modeling Software

Modeling of the exterior noise environment for this report was accomplished using the Traffic Noise Model (TNM) version 2.5. The TNM was released in February 2004 by the U.S. Department of Transportation (USDOT) and calculates the daytime average hourly L_{EQ} from three-dimensional model inputs and traffic data (Caltrans 2004).

Peak-hour traffic volumes are estimated based on the assumption that approximately 10 percent of the average daily traffic would occur during a peak hour. The one-hour L_{EQ} noise level is calculated utilizing peak-hour traffic. Peak hour L_{EQ} can be converted to CNEL using the following equation, where $L_{EQ}(h)pk$ is the peak hour L_{EQ} , P is the peak hour volume percentage of the average daily trips (ADT), d and e are divisions of the daytime fraction of ADT to account for daytime and evening hours, and N is the nighttime fraction of ADT:

$$CNEL = L_{EQ}(h)pk + 10\log_{10} 4.17/P + 10\log_{10}(d + 4.77e + 10N)$$

The model-calculated one-hour L_{EQ} noise output is therefore approximately equal to the CNEL (Caltrans 2013).

Project construction noise was analyzed using the Roadway Construction Noise Model (RCNM; USDOT 2008), which utilizes estimates of sound levels from standard construction equipment.

3.2 ASSUMPTIONS

3.2.1 Construction

Construction would require the use of equipment throughout the site for the full term of construction. General project construction activities would include grading, site preparation, installation of underground utilities, physical building construction, paving, and application of architectural coatings. The most prominent noise-generating standard construction equipment anticipated to be used on the site includes dozers, excavators, graders, backhoes, cement and mortar mixers, pavers, rollers, cranes, forklifts, generators, and air compressors.

Site preparation would require the removal of approximately 200 cubic yards of debris/vegetation, which is anticipated to be exported via 24 haul truck trips over the course of 24 days (HELIX Environmental Planning 2024).

It is not known if blasting would be required. If needed, small areas of rock may require blasting during grading. During blasting operations, all other construction activities on the project site would be halted while explosives are prepared and detonated. As of the time of this analysis, the area and depth of potential blasting has not been determined.

Blasting operations would be conducted through the use of drilling and blasting to fracture rocks. Blasting operations would be conducted by a licensed blasting contractor, in strict compliance with pertinent federal, state, and local requirements. All blasting materials would be transported to the site for each blasting sequence and no explosives would be stored at the site. A single drill rig would be used to drill a pattern of boreholes each with a 3- to 6-inch diameter. A contractor then loads the holes with carefully metered explosives. The “shot” is timed to detonate each of the holes in sequence. This minimizes the ground vibration and noise of the blast, while maximizing fracture of the rock. Some dust is created as a result of the blast. However, the dust would be fully dissipated within 30 to 60 seconds following the shot. The rock would be broken up to sizes less than 18 inches in diameter. Following blasting, the rock resource would be fractured into gravel using a crusher and can be moved with conventional earthmoving equipment.

Blasting typically includes three components that can result in impacts: flyrock, vibration, and airblast, as described below.

Flyrock: Flyrock is debris (smaller and potentially larger chunks of rock) ejected from the blast. Outside the immediate area of the blast itself, flyrock is potentially the most dangerous portion of blasting; it has the ability to damage structures and maim or kill humans or other animals at great distances from the blast.

Vibration: Both air and ground vibrations create waves that disturb the material in which they travel. When these waves encounter a structure, they cause it to shake and may cause structural damage. Ground vibrations enter the house through the foundation.

Airblast: Airblast is a pressure wave that creates a push (positive pressure) and pull (negative pressure) effect; it may be audible (noise) or inaudible (concussion). A blast occurring outside of a residence may be heard inside because of the audible noise; however, noise has little impact on the structure. The concussion wave causes the structure to shake and rattle and can break windows at higher pressure levels.

3.2.2 Operations

The proposed project's operational noise sources are anticipated to include heating, ventilation, and air conditioning (HVAC) systems and vehicular traffic.

3.2.2.1 Heating, Ventilation, and Air Conditioning Units

The analysis assumes that the buildings would use a typical to larger-sized residential condenser mounted on ground level pads. The unit used in this analysis is a Carrier 38HDR060 split system condenser (see Appendix A, *Carrier 38HDR060 Split System Condenser*). The manufacturer's noise data is provided below in Table 5, *Carrier HDR060 Condenser Noise*.

Table 5
CARRIER HDR060 CONDENSER NOISE

Noise Levels in Decibels ¹ (dB) Measured at Octave Frequencies							Overall Noise Level in A-weighted Scale (dBA) ¹
125 Hz	250 Hz	500 Hz	1 KHz	2 KHz	4 KHz	8 KHz	
63.0	61.5	64.0	66.5	66.0	64.5	55.5	72.0

¹ Sound Power Level (S_{WL})

KHz = kilohertz

3.2.2.2 Vehicular Traffic

Based on SANDAG's trip generation guide (SANDAG 2002), the daily trip generation for single family residential land uses is 10 trips per dwelling unit. Using this metric, the anticipated trip generation for the proposed project's 15 single-family homes would be 150 average daily trips (ADT). Because exact distribution of traffic is not available, this analysis conservatively assumes the entire length of each modeled roadway would receive the project's entire ADT. Based on traffic observations completed by HELIX staff along West Bobier Drive, a traffic distribution of 95.5 percent automobiles, 2.5 percent medium trucks, and 2 percent heavy trucks was used in this analysis for the existing traffic.

Project-generated traffic is assumed to be comprised entirely of automobiles. West Bobier Drive has a

posted speed limit of 40 miles per hour (mph). Average daily traffic data for West Bobier Drive was based on volumes identified for the adjacent Modera Melrose Mixed-Use Development project (Dudek 2022). Table 6, *Existing Plus Project Traffic Volumes*, summarizes the ADT data for the segments of West Bobier Drive from Melrose Drive to Sports Park Way and Sports Park Way to Sante Fe Avenue, both with and without the project.

Table 6
EXISTING PLUS PROJECT TRAFFIC VOLUMES

Roadway Segment	ADT		
	Existing	Project	Existing + Project
West Bobier Drive			
Melrose Drive to Sports Park Way	24,240	150	24,390
Sports Park Way to Sante Fe Avenue	21,050	150	21,200

Source: Dudek 2022; SANDAG 2002

3.3 GUIDELINES FOR THE DETERMINATION OF SIGNIFICANCE

Based on Appendix G of the CEQA Guidelines, implementation of the project would result in a significant adverse impact if it would:

Threshold 1: *Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the Vista General Plan or noise ordinance.*

Per the Vista Noise Ordinance, impacts would be significant if the project would generate noise levels at a common property line with the adjacent residential zones to the west, south and east that would exceed the following one-hour average exterior noise levels: 50 dBA from 7:00 a.m. to 10:00 p.m. and 45 dBA from 10:00 p.m. to 7:00 a.m.

For traffic-related noise, impacts are considered significant in areas where traffic noise at single-family residential uses exceeds 65 CNEL and implementation of the project would result in an increase of the noise level by 3 CNEL or more.

Construction activity would be considered significant for nearby residences if it exceeds an 8-hour average exterior noise level of 75 dBA, or a maximum impulsive noise level of 82 dBA on an occupied residential use. The ordinance prohibits construction and building work between the hours of 7:00 p.m. and 7:00 a.m. of the next day, on Sundays, or on a holiday. Construction noise exceeding 10 dBA above ambient noise levels at nearby sensitive receptors would be considered a substantial increase.

Threshold 2: *Generate excessive ground-borne vibration or ground-borne noise levels.*

Excessive ground-borne vibration would occur if construction-related ground-borne vibration exceeds the “strongly perceptible” vibration annoyance potential criteria for human receptors of 0.1 inch per second peak particle velocity (PPV) or the damage potential criteria to relatively old residential structures 0.5 inch per second PPV for continuous/frequent intermittent construction sources (such as impact pile drivers, vibratory pile drivers, and vibratory compaction equipment), as specific by Caltrans (2020).

Threshold 3: *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 use airport or private airstrip, expose people residing or working in the project area to excessive noise.*

Excessive noise exposure is defined as noise levels that exceed the standards in the City General Plan Noise Element for the associated land use.

Threshold 4: *Noise compliance for new uses.*

Future land uses would be compliant with the City General Plan Noise Element if the project's residential exterior use areas are exposed to noise levels below 65 CNEL and interior noise levels below 45 CNEL.

4.0 IMPACTS

4.1 ISSUE 1: EXCESSIVE NOISE LEVELS

Would the project generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the Vista General Plan or noise ordinance.

4.1.1 Operational On-Site Noise Generation

Specific planning data for the future HVAC systems and exact building site locations are not available; however, analysis using a typical to larger-sized residential condenser mounted on ground level pads provides a reasonable basis for analysis. As mentioned in Section 3.2.2, modeling assumed that the HVAC unit would be a Carrier 38HDR060 split system condenser. This unit typically generates a noise level of 56 dBA at a distance of 7 feet. Based on the site plan shown in Figure 3, HVAC units, if placed on the proposed patios, would be located approximately 25 feet from the project boundary to the south. At this distance, a single HVAC would generate a noise level of approximately 44.9 dBA. Therefore, operational noise from HVAC units would not exceed the City's nighttime allowable hourly limit of 45 dBA and impacts would be less than significant.

4.1.2 Operational Off-Site Transportation Noise Generation

The project would generate vehicular traffic that would utilize West Bobier Drive and have the potential to result in increased noise levels at existing residences along the roadway. As noted in Section 3.2 above, existing and future traffic noise levels presented in this analysis are based on traffic volumes estimated for the adjacent Modera Melrose Mixed-Use Development by Dudek (2022). Refer to Table 6 above for the forecasted ADT data for existing and project-added traffic volumes.

TNM software was used to calculate the noise contour distances for Existing and Existing + Project conditions. The off-site roadway modeling represents a conservative analysis that does not consider topography or attenuation provided by existing structures. The results of this analysis for the CNEL at the nearest NSLUs to the roadway centerline are shown below in Table 7, *Off-site Traffic Noise Levels*. Full modeling inputs and outputs can be found in Appendix B, *Existing and Future Traffic Noise Levels*.

Table 7
OFF-SITE TRAFFIC NOISE LEVELS

Roadway Segment	CNEL @ 50 feet			Direct Impact ¹
	Existing	Existing + Project	Change from Existing	
West Bobier Drive				
Melrose Drive to Sports Park Way	70.6	70.6	+0.0	No
Sports Park Way to North Santa Fe Avenue	69.9	70.0	+0.1	No

¹ A direct impact to off-site uses would occur if the project more than doubles (increases by more than 3 CNEL) the existing noise level.

As noted in Section 3.3, a significant direct impact would occur if existing conditions approach or exceed City standards and the project more than doubles (increases by more than 3 CNEL) the existing noise level. The project would not cause roadway noise levels to exceed 65 CNEL and would not increase roadway noise levels by more than 3 CNEL, as specified in Threshold 1. Furthermore, this analysis conservatively assumes the unlikely scenario where all project traffic is directed down a given roadway segment. Therefore, exterior off-site direct transportation noise impacts would be less than significant.

4.1.3 On-Site Construction Noise Generation

Construction of the project would require grading, site preparation, installation of underground utilities, physical building construction, paving, and application of architectural coatings. The magnitude of the noise impact would depend on the type of construction activity, equipment, duration of each construction phase, distance between the noise source and receiver, and any intervening structures. Construction would generate elevated noise levels that may disrupt nearby residences north, east, south, and west of the project site. Construction equipment would be continuously moving across the site, and equipment is not anticipated to be located at a single location during a typical workday. Therefore, construction equipment is modeled at an average distance of 100 feet from the nearest NSLUs. Table 8, *Construction Equipment Noise Levels*, provides the 100-foot distance noise levels for equipment anticipated to be used for general construction activities.

Table 8
CONSTRUCTION EQUIPMENT NOISE LEVELS

Unit	Percent Operating Time	L _{MAX} at 100 feet	dBA L _{EQ} at 100 feet
Grader	40	79.0	75.0
Dozer	40	75.6	71.7
Backhoe	40	71.5	67.6
Excavator	40	74.7	70.7
Crane	16	74.5	66.6
Generator	50	74.6	71.6
Welder/Torch	40	68.0	64.0
Paver	50	71.2	68.2
Roller	20	74.0	67.0
Concrete Mixer Truck	40	72.8	68.8
Air Compressor	40	71.6	67.7
Breaker	10	84.0	74.0

Source: RCNM; USDOT 2008

L_{MAX} = maximum noise level; dBA = A-weighted decibel; L_{EQ} = equivalent sound level

Construction equipment would not all operate at the same time or location and would not be in constant use during the 8-hour operating day. Further, not all the pieces of equipment included in Table 8 would be used within 100 feet of off-site residences. A backhoe, grader, and dozer may be working on the site simultaneously but would not be working near one another at a given time due to the nature of their respective operations. A backhoe, grader, and dozer were analyzed together for construction noise impacts due to their likelihood of being used in conjunction with one another.

Based on these assumptions, site preparation operations using a backhoe, a grader, and a dozer at the nearest NSLU would be 77.2 dBA L_{EQ} at 100 feet (see Appendix C, *Construction Noise Modeling Outputs*). Therefore, construction noise from this equipment was modeled to exceed the noise ordinance limit defined in Threshold 4 of 75 dBA L_{EQ} (8-hour).

NOI-1 Construction Noise Management Plan. Noise levels from project-related construction activities shall not exceed the noise limit specified in San Diego County Code Sections 36.408 and 36.409 of 75 dBA (8-hour average), when measured at the boundary line of the property where the noise is located or any occupied property where noise is being received. A Construction Management Plan that describes the measures included on the construction plans to ensure compliance with the noise limit shall be prepared by the project applicant and submitted to the City of Vista Planning Division for approval prior to issuance of the grading permit. The following measures may be included to reduce construction noise:

- Construction equipment to be properly outfitted and maintained with manufacturer-recommended noise-reduction devices.
- Diesel equipment to be operated with closed engine doors and equipped with factory-recommended mufflers.

- Mobile or fixed “package” equipment (e.g., arc-welders and air compressors) to be equipped with shrouds and noise control features that are readily available for that type of equipment.
- Electrically powered equipment to be used instead of pneumatic or internal-combustion powered equipment, where feasible.
- Unnecessary idling of internal combustion engines (e.g., in excess of 5 minutes) to be prohibited.
- Material stockpiles and mobile equipment staging, parking, and maintenance areas to be located as far as practicable from noise sensitive receptors.
- The use of noise-producing signals, including horns, whistles, alarms, and bells, shall be for safety warning purposes only.
- No project-related public address or music system shall be audible at any adjacent sensitive receptor.
- Temporary sound barriers or sound blankets may be installed between construction operations and adjacent noise-sensitive receptors. Due to equipment exhaust pipes being approximately 7 to 8 feet above ground, a sound wall at least 10 feet in height above grade, to block the line-of-sight between project construction activities and residences along the southern, western, and eastern property lines. These barriers would mitigate noise levels to within acceptable levels. To effectively reduce noise levels, the sound barrier should be constructed of a material with a minimum weight of two pounds per square foot with no gaps or perforations and remain in place until the conclusion of demolition, grading, and construction activities.
- The project applicant shall notify residences within 100 feet of the project’s property line in writing within one week of any construction activity such as demolition, hard rock handling, concrete sawing, asphalt removal, and/or heavy grading operations. The notification shall describe the activities anticipated, provide dates and hours, and provide contact information with a description of a complaint and response procedure.
- The on-site construction supervisor shall have the responsibility and authority to receive and resolve noise complaints. A clear appeal process for the affected resident shall be established prior to construction commencement to allow for resolution of noise problems that cannot be immediately solved by the site supervisor.

4.1.4 Rock Crushing

Rock crushing may be required for large material. If rock crushing is to be conducted on-site, machinery should be located at the furthest distance from surrounding residences. Rock crushing machinery may emit noise levels up to 95 dBA at 50 feet (Medlin & Associates 2014). A rock crusher, if located on-site, would be at most 140 feet from nearby residences. Assuming a noise attenuation rate of 6 dBA per doubling of distance, noise levels from the breaker would reduce to 75 dBA L_{EQ} at a distance of 500 feet. At 140 feet, construction noise from a crusher would be 86.1 dBA L_{EQ} . This would be above the limit in

Threshold 2 of 75 dBA L_{EQ} and 82 dBA L_{MAX} . If on-site rock crushing is required, impacts would be potentially significant. Mitigation measure NOI-2 would ensure that potential impacts are reduced to a less than significant level.

NOI-2 Rock Crushing Noise Reduction Measures. If on-site use of a rock crusher is required, noise levels generated shall not exceed 75 dBA L_{EQ} or 82 dBA L_{MAX} . The crusher should be located in the furthest feasible point from nearby residences. A temporary sound barrier should be placed around the rock crusher which shields receivers to the north, east, south, and west. The barrier should stand at least as tall as the highest part of the crusher, at a minimum of eight feet. Prior to operation of the crushing machinery, a verified acoustician shall verify noise levels from equipment shall not exceed the limits noted above.

4.1.5 Blasting

If blasting is required, a full blasting analysis cannot be done until after the site is cleared of all surface material (including any rippable material) to expose the specific type of material to be blasted, and until the extent of the area of blasting and the required blasting charge type are known. Single-family residences are located on adjacent lots; however, the precise location of blasting cannot be known at this time. For this analysis, it is conservatively assumed blasting would occur 100 feet from off-site residences for safety purposes.

In accordance with the Code of Federal Regulations Section 816.67(b), flyrock is not allowed at this site beyond the direct area of the blast, under any circumstances. This analysis assumes that proper blast planning would be used, that all flyrock would be controlled with blast mats or other flyrock control techniques, and proper stemming materials for the charge hole would be utilized.

As with flyrock, control of airblast is dependent on the skill of the Blasting Supervisor, along with many factors including but not limited to: the depth of the charge, the type of rock, the amount of fractures in the rock, and the length of correct stemming materials. Airblast is regulated by the limits from 30 CFR 816.61-68, which are provided below in Table 9, *Maximum Allowable Airblast Limits*.

Table 9
MAXIMUM ALLOWABLE AIRBLAST LIMITS

Lower Frequency Limit of Measuring System (Hz)	Maximum Level (± 3 dB)
0.1 Hz or lower	134 peak
2 Hz or lower	133 peak
6 Hz or lower	128 peak
C-weighted noise level (dBC)	105 dBC

Hz = Hertz, dB = decibel

The following analysis is based on a general description of potential impacts that would result from blasting activities. The information is based on guidance for calculating the scaled distance in blasting provided by the Office of Surface Mining Reclamation and Enforcement (OSM; 2009).

Based on an assumption of 0.5 pounds of explosive material required per ton of material removed and a typical granite weight of 166.5 pounds per cubic foot, or 2.25 tons per cubic yard (CY), a typical shot designed to break up 10 CY of material (typical truckload) would require about 11.25 pounds of explosive charge. The charge would typically consist of a 0.5-pound or less of detonation charge per

hole, and the remainder of the charge would be provided by TOVEX or other similar water gel explosive slurry.

The following scaled distance factors in Table 10, *Scaled Distance Factors*, are based on the relationship between peak particle velocity and frequency. Analysis of scaled distance for the charge weight is based on the following:

Table 10
SCALED DISTANCE FACTORS

Distance from the Blasting Site (feet)	Scaled Distance Factor
0 to 300	50
300 to 5,000	55
5,001 and beyond	65

The allowable charge weight is calculated by: $W = (D/D_s)^2$

W = Allowable charge weight in pounds

D = Distance to the nearest structure in feet

D_s = Value from table based on D

A distance (D) of 100 feet was used in the calculation. At a distance of 100 feet, the scaled distance factor (D_s) would be 50. Therefore, for the control of ground-borne vibration impacts to the closest off-site residence, the maximum charge weight would be 4 pounds at a minimum distance of 100 feet.¹

Because project-specific details regarding blasting operations are not available at this time, impacts to off-site residences are conservatively assessed as potentially significant. The basic planning for blasting discussed in this report provides an estimate of distances and does not constitute a final project-specific analysis. The blasting contractor would be required to determine the allowable distances and charge weights. This analysis is general in nature and does not substitute for proper planning of any blasting and/or responsibility for any potential damages caused by the blaster. Implementation of measure NOI-3 would ensure that potential impacts are reduced to a less than significant level.

NOI-3 Blasting Management Plan. Should blasting be required on the project site, the project applicant shall prepare a Blasting Management Plan that minimizes potential blasting effects to adjacent residences within 100 feet. All blast planning must be done by a City of Vista-approved blasting contractor, and submitted to the City with the appropriate blasting permits, and all other applicable local, state, and federal permits, licenses, and bonding. The blasting contractor or owner must conduct all notifications, inspections, monitoring, and major or minor blasting requirements planning with seismograph reports, as necessary.

¹ This analysis is based on basic planning assumptions and does not provide final project-specific analysis for allowable blasting charges, nor is it intended to limit the blasting company to the minimum distance or maximum charge weight listed. This analysis is provided as general guidance and is not intended to provide final blasting planning for any specific blast nor does it imply acceptance of any liability for the proper or improper planning of any blasting and/or responsibility for any damages caused by the blaster. All blasting planning and impacts and/or damages that may occur are the sole responsibility of the owner and blasting planning company. The project applicant may also choose alternative options to blasting, such as the use of non-explosive chemical fracturing techniques.

4.1.6 Construction Traffic Noise

As discussed in Section 3.2.1., it is anticipated that 12 round trips, or 24 one-way haul truck trips would be required for the clearing and export of existing vegetation over the course of 24 workdays during the site preparation phase of construction. Up to two one-way haul truck trips, or passes, would occur per day. This daily traffic level associated with vegetation export is anticipated to be the highest daily traffic level associated with project construction. As a conservative estimate, four passes by a haul truck are used for all roadway segments.

The additional four construction trips were added to the existing traffic volumes on Bobier Drive north of the project site. Using TNM, receivers were modeled at 50 feet from the roadway centerline, and construction haul trips were modeled as heavy trucks. As presented above in Table 7, the modeled existing traffic noise levels along Bobier Drive are 70.6 CNEL for the segment between Melrose Drive and Sports Park Way, and 69.9 between Sports Park Way to North Santa Fe Avenue. The addition of the project's four haul truck trips during the grading phase of construction would not increase these noise levels. This would not be a perceptible increase and impacts from construction traffic noise to existing NSLUs would be less than significant.

4.2 ISSUE 2: EXCESSIVE GROUND-BORNE VIBRATION

Would the project expose persons to or generate excessive ground-borne vibration or noise levels?

4.2.1 Construction Vibration

A possible source of vibration during general project construction activities would be a vibratory roller, which may be used for compaction of soil beneath building foundations and could be used within 50 feet of the existing off-site residences east and south of the project site and the future residences of the Modera Melrose Mixed-Use Development west of the project site. Most usage of a vibratory roller, however, would occur at distances greater than 50 feet from any single residence due to the mobile nature of its use across the project site. A vibratory roller would create approximately 0.210 inch per second PPV at a distance of 25 feet (Caltrans 2020). A 0.210 inch per second PPV vibration level would equal 0.098 inch per second PPV at a distance of 50 feet.² This would be lower than the structural damage impact to older structures of 0.5 inch per second PPV and the "strongly perceptible" impact for humans of 0.1 inch per second PPV. Additionally, off-site exposure to such ground-borne vibration would be temporary as it would be limited to the short-term construction period. Therefore, even though vibration may be perceptible at nearby residences, temporary impacts associated with the roller (and other potential equipment) would be less than significant.

4.2.2 Operational Vibration

As a residential development, the project would not generate excessive ground-borne vibration during operations; therefore, no impacts would occur.

² Equipment PPV = Reference PPV * (25/D)ⁿ (inches per second), where Reference PPV is PPV at 25 feet, D is distance from equipment to the receiver in feet, and n = 1.1 (the value related to the attenuation rate through the ground); formula from Caltrans 2013b.

4.3 ISSUE 3: AIRPORT NOISE EXPOSURE

Would the project expose people residing or working in the project area to excessive noise from a nearby public use airport or private airstrip?

4.3.1 Aircraft Noise

The project is subject to some distant aircraft noise, though the site is not located near an active airport. The nearest airports are Oceanside Municipal Airport, located approximately 5.2 miles to the west, and McClellan-Palomar Airport, located approximately 6.2 miles to the southwest. At these distances, no effects related to airport noise would occur at the project site, and impacts would be less than significant.

4.4 ISSUE 4: NOISE COMPLIANCE FOR NEW USES

4.4.1 Exterior Noise Levels

The City General Plan Noise Element provides exterior noise level limits for multi-family patios and balconies (with a depth of 6 feet or more). As shown in Table 1, the General Plan requires the exterior use areas of new residential uses to be exposed to noise levels of 65 CNEL or less. The exterior use areas proposed by the project include back patios and yards. No balconies are proposed.

The closest exterior use areas to Bobier Drive would be the backyards of Lots 1 through 3 as depicted in Figure 3. These yards, assuming they extend to the proposed sidewalk, would be approximately 60 feet from the roadway centerline of Bobier Drive. The exterior use areas of Lots 4 through 6 would be located at a distance of approximately 100 feet from Bobier Drive. Modeling using Existing + Project traffic conditions was conducted using TNM. The model assumed no attenuation from existing topography as a conservative analysis, but Lots 4 through 6 were modeled with loose soil to account for the areas of the project site left to be undisturbed. At these distances, noise levels at the exterior use areas of Lots 1 through 3 would be approximately 69 CNEL. At Lots 4 through 6, noise levels would be 63.4 CNEL. Therefore, the exterior use areas for Lots 1 through 3 may not be compatible with the City General Plan limits for residential developments. Mitigation measure NOI-4 would require the placement of permanent noise walls to reduce noise levels at these locations.

NOI-4 On-Site Noise Barriers. Noise levels within the backyard areas of Lots 1, 2, and 3 may be exposed to noise levels exceeding the City General Plan noise compatibility standards and shall be reduced to below 65 CNEL.

Noise reduction for these exterior use areas shall be accomplished through on-site noise barriers (walls). The wall shall be at least 6 feet in height and would break the line-of-sight between the backyards and Bobier Drive. To appropriately reduce noise levels, the wall should be constructed at the pad elevation for each lot.

The sound attenuation barrier must be solid. It can be constructed of masonry, wood, plastic, fiberglass, steel, or a combination of those materials, as long as there are no cracks or gaps, through or below the wall. Any seams or cracks must be filled or caulked. If wood is used, it can be tongue and groove and must have a minimum Sound Transmission Class (STC) 22 rating.

Where architectural or aesthetic factors allow, glass or clear plastic 3/8 of an inch thick or thicker may be used on the upper portion, if it is desirable to preserve a view.

4.4.2 Interior Noise Levels

Traditional architectural materials are conservatively estimated to attenuate noise levels by 15 CNEL; therefore, if exterior noise levels at a building façade exceed 60 CNEL, interior noise levels may exceed the 45 CNEL limit set forth in the City General Plan Noise Element for residential uses. Modeling using Existing + Project traffic conditions was conducted using TNM to assess the noise levels that would affect the project's future residences. Residences would be approximately 120 feet from the roadway centerline. At these distances, noise levels at the façades of the homes for Lots 1 through 6 would be approximately 65.3 CNEL. Because noise levels at project buildings would exceed 60 CNEL, interior spaces may exceed 45 CNEL. To ensure that the project's habitable rooms do not exceed 45 CNEL, mitigation measure NOI-5 would be required.

NOI-5 On-site Interior Noise Level Reduction. For the project's Lots 1 through 6 habitable areas (living rooms and bedrooms), interior noise levels shall be reduced to 45 CNEL or less. The following measures may be incorporated in the design of the project to reduce interior noise levels:

- Minimum exterior wall requirement of STC 46 with a construction of standard 3/8-inch exterior one coat stucco over 1.0-inch rigid R-4 insulation over 1/2-inch shear wall on 2x6 studs with 5/8-inch Type "X" Drywall.
- Minimum window requirement of STC 28 with a vinyl frame window construction of dual glazing window thickness 1/8-inch and 1/2-inch air gap.
- Appropriate means of air circulation and provision of fresh air intake shall be incorporated in the project to allow windows to remain closed for extended intervals of time so that acceptable levels of noise can be maintained on the interior.
- Buildings shall provide mechanical ventilation in accordance with the 2022 California Mechanical Code.

5.0 LIST OF PREPARERS

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Appendix A

Carrier 38HDR060 Split System Condenser

ELECTRICAL DATA

38HDR UNIT SIZE	V-PH-Hz	VOLTAGE RANGE*		COMPRESSOR		OUTDOOR FAN MOTOR			MIN CKT AMPS	FUSE/ HACR BKR AMPS
		Min	Max	RLA	LRA	FLA	NEC Hp	kW Out		
018	208/230-1-60	187	253	9.0	48.0	0.80	0.125	0.09	12.1	20
024	208/230-1-60	187	253	12.8	58.3	0.80	0.125	0.09	16.8	25
030	208/230-1-60	187	253	14.1	73.0	1.45	0.25	0.19	19.1	30
036	208/230-1-60	187	253	14.1	77.0	1.45	0.25	0.19	19.1	30
	208/230-3-60	187	253	9.0	71.0	1.45	0.25	0.19	12.7	20
	460-3-60	414	506	5.6	38.0	0.80	0.25	0.19	7.8	15
048	208/230-1-60	187	253	21.8	117.0	1.45	0.25	0.19	28.7	50
	208/230-3-60	187	253	13.7	83.1	1.45	0.25	0.19	18.6	30
	460-3-60	414	506	6.2	41.0	0.80	0.25	0.19	8.6	15
060	208/230-1-60	187	253	26.4	134.0	1.45	0.25	0.19	34.5	60
	208/230-3-60	187	253	16.0	110.0	1.45	0.25	0.19	21.5	35
	460-3-60	414	506	7.8	52.0	0.80	0.25	0.19	10.6	15

* Permissible limits of the voltage range at which the unit will operate satisfactorily

FLA – Full Load Amps

HACR – Heating, Air Conditioning, Refrigeration

LRA – Locked Rotor Amps

NEC – National Electrical Code

RLA – Rated Load Amps (compressor)

NOTE: Control circuit is 24-V on all units and requires external power source. Copper wire must be used from service disconnect to unit. All motors/compressors contain internal overload protection.

SOUND LEVEL

Unit Size	Standard Rating (dB)	Typical Octave Band Spectrum (dBA) (without tone adjustment)						
		125	250	500	1000	2000	4000	8000
018	68	52.0	57.5	60.5	63.5	60.5	57.5	46.5
024	69	57.5	61.5	63.0	61.0	60.0	56.0	45.0
030	72	56.5	63.0	65.0	66.0	64.0	62.5	57.0
036	72	65.0	61.5	63.5	65.0	64.5	61.0	54.5
048	72	58.5	61.0	64.0	67.5	66.0	64.0	57.0
060	72	63.0	61.5	64.0	66.5	66.0	64.5	55.5

CHARGING SUBCOOLING (TXV-TYPE EXPANSION DEVICE)

UNIT SIZE – VOLTAGE, SERIES	REQUIRED SUBCOOLING °F (°C)
018	12 (6.7)
024	12 (6.7)
030	12 (6.7)
036	12 (6.7)
048	12 (6.7)
060	12 (6.7)

Appendix B

Existing and Future Traffic Noise Levels

Existing and Future Traffic Volumes																
Roadway /Segment	ADT	Existing					Existing + Project					2030 + Project				Posted Speed (mph)
		Peak Hour Traffic	Traffic Breakdown			ADT	Peak Hour Traffic	Traffic Breakdown			ADT	Peak Hour Traffic	Traffic Breakdown			
			Cars 95.5%	MT 2.5%	HT 2.0%			Cars 95.5%	MT 2.5%	HT 2.0%			Cars 95.5%	MT 2.5%	HT 2.0%	
West Bobier Drive																
Melrose to Sports Park	24240	2424	2315	61	48	24390	2439	2329	61	49	24540	2454	2344	61	49	40
Sports Park to Santa Fe	21050	2105	2010	53	42	21200	2120	2025	53	42	28960	2896	2766	72	58	40

ADT from Modera Melrose traffic study (That project's Existing + Project = our project's Existing)

Peak Hour = 10% of ADT

Traffic Breakdown based on counts

Use Traffic Breakdown numbers in TNM

Existing and Future Traffic Noise Levels													
Roadway/Segment	Existing				Existing + Project					2030 + Project			
	CNEL @ 50 ft	70 CNEL (ft.)	65 CNEL (ft.)	60 CNEL (ft.)	CNEL @ 50 ft	Δ at 50. (dBA)	70 CNEL (ft.)	65 CNEL (ft.)	60 CNEL (ft.)	CNEL @ 50 ft	70 CNEL (ft.)	65 CNEL (ft.)	60 CNEL (ft.)
West Bobier Drive													
Melrose to Sports Park	70.6	55	140	330	70.6	0.0	55	140	330	70.6	55	140	330
Sports Park to Santa Fe	69.9	50	125	300	70.0	0.1	49.9	125	300	71.3	65	160	370

Appendix C

Construction Noise Modeling Outputs

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 12/18/2024
Case Description: Bobier Property Project

---- Receptor #1 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Nearby Residences	Residential	60	60	60

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40		85	100	0
Dozer	No	40		81.7	100	0
Backhoe	No	40		77.6	100	0
Excavator	No	40		80.7	100	0
Crane	No	16		80.6	100	0
Generator	No	50		80.6	100	0
Welder / Torch	No	40		74	100	0
Paver	No	50		77.2	100	0
Roller	No	20		80	100	0
Concrete Mixer Truck	No	40		78.8	100	0
Compressor (air)	No	40		77.7	100	0

Results

Calculated (dBA)

Equipment	*Lmax	Leq
Grader	79	75
Dozer	75.6	71.7
Backhoe	71.5	67.6
Excavator	74.7	70.7
Crane	74.5	66.6
Generator	74.6	71.6
Welder / Torch	68	64
Paver	71.2	68.2
Roller	74	67
Concrete Mixer Truck	72.8	68.8
Compressor (air)	71.6	67.7
Total	79	80.4

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 12/18/2024
Case Description: Bobier Property Project

---- Receptor #2 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Site Preparation	Residential	60	60	60

Description	Equipment					
	Impact Device	Usage(%)	Spec Lmax	Actual Lmax	Receptor Distance	Estimated Shielding
			(dBA)	(dBA)	(feet)	(dBA)
Grader	No	40		85	100	0
Dozer	No	40		81.7	100	0
Backhoe	No	40		77.6	100	0

Results

Calculated (dBA)		
Equipment	*Lmax	Leq
Grader	79	75
Dozer	75.6	71.7
Backhoe	71.5	67.6
Total	79	77.2

*Calculated Lmax is the Loudest value.