HELIX
Environmental Planning

Murrieta Hot Springs Road Improvements Project

Acoustical Analysis Report

Updated May 28, 2020 | SBO-01

Submitted to:

City of Murrieta
1 Town Square
Murrieta, CA 91562

Prepared for:

SB&O, Inc.
41689 Enterprise Circle North, Suite 126
Temecula, CA 92950

Prepared by:

HELIX Environmental Planning, Inc.
7578 El Cajon Boulevard
La Mesa, CA 91942

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ACRONYMS AND ABBREVIATIONS

ANSI	American National Standards Institute
CAD	Computer Aided Design
CadnaA	Computer Aided Noise Abatement
Caltrans	California Department of Transportation
CNEL	Community Noise Equivalent Level
dB	decibel
dBA	A-weighted decibel
FTA	Federal Transit Administration
Hz	Hertz
kHz	kilohertz
L_{DN}	Day Night sound level
L_{EQ}	time-averaged noise level
mph	miles per hour
mPa	micro Pascal
NSLU	noise sensitive land use
PPV	peak particle velocity
RCNM	Roadway Construction Noise Model
SPL	sound pressure level
TIA	Traffic Impact Analysis
TNM	Traffic Noise Model
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service

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EXECUTIVE SUMMARY

This report presents an assessment of potential construction and operational noise impacts associated with the proposed Murrieta Hot Springs Road Improvements Project (project) located in the City of Murrieta (City).

The project proposes to implement various improvements to Murrieta Hot Springs Road between Margarita Road and Winchester Road. The main improvement would be widening the roadway from a 4-lane roadway to a 6-lane roadway between Via Princesa to Winchester Road.

Construction activities would include site preparation, demolition, grading, drainage/utilities/subgrade, and paving. Project construction noise would result in potentially significant noise levels above the City Noise Ordinance construction noise limits for mobile equipment to multi-family residences. This impact would be reduced to less than significant with implementation of mitigation measure NOI-1, which includes various measures to reduce construction noise and a process for registering noise complaints.

Vibration impacts from construction would not exceed thresholds for sensitive receptors.

According to the City of Murrieta General Plan 2035, traffic volumes on Murrieta Hot Springs Road were forecast to be the same under the long-term scenario for either a 4-lane roadway (no project) or a 6-lane roadway (proposed project). Therefore, the project's contribution to noise increase to the adjacent multi-family residences would be from moving the outer roadway lanes (and corresponding vehicle noise) closer to the residences. The project would incorporate retaining walls along the roadway that would reduce vehicle noise in some areas. Noise increases associated with the project would not exceed 1 dBA CNEL, and in several areas noise levels would be reduced due to the proposed retaining walls. Therefore, noise impacts from project operation would be less than significant.

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1.0 INTRODUCTION

1.1 PROJECT LOCATION

The Murrieta Hot Springs Road Improvements Project (project) is located along Murrieta Hot Springs Road, from the intersection of Margarita Road to the intersection of Winchester Road in the City of Murrieta (City; see Figure 1, *Regional Location,* and Figure 2, *Project Alignment*).

1.2 PROJECT DESCRIPTION

The project proposes to implement various improvements to Murrieta Hot Springs Road between Margarita Road and Winchester Road. The roadway would be widened from a 4-lane roadway to a 6-lane roadway between Via Princesa to Winchester Road.

In addition to the roadway widening, additional improvements would occur. Bike lanes would be added in each direction on Murrieta Hot Springs Road. A curbed median would be installed on Murrieta Hot Springs Road between Margarita Road and Winchester Road (except at the intersections). Lighting poles would be installed along the alignment. The project would also construct curbs, gutters, catch basins, storm drains, and sidewalks along most of the alignment and both sides of the roadway. Curb access ramps would be improved at project intersections.

Striping would be updated on the roadway to accommodate the new lanes and widened roadway. Additional crosswalks would be painted at the Via Princesa/Murrieta Hot Springs Road and Calle Del Lago/Murrieta Hot Springs Road intersections to accommodate the improvements. Street signs would be installed along the route.

Retaining walls would be constructed along the northern edge of Murrieta Hot Springs Road adjacent to the Ridgegate community, and along the southern edge of Murrieta Hot Springs Road adjacent to the residences near Calle Del Lago. Retaining wall heights would range from approximately 2 feet to 15 feet. In addition, power poles, dry utilities, and fire hydrants would be relocated along the alignment.

Construction is anticipated to begin in Fall 2019 and be completed by August 2020. The project would cut 16,630 cubic yards and fill 2,030 cubic yards, for a net export of 14,600 cubic yards. Final staging areas have not been determined; however, potential staging areas include the vacant lot between Del Haven Street and Winchester Road, the vacant lot adjacent to the southwest corner of the intersection of Via Princesa and Murrieta Hot Springs Road, and the vacant lot adjacent to the southwest corner of the intersection of Margarita Road and Murrieta Hot Springs Road. Construction activities would take place during daytime hours between 7 a.m. and 8 p.m. on weekdays and Saturdays, in accordance with the City Municipal Code. No construction would take place on Sundays or holidays.

2.0 ENVIRONMENTAL SETTING

2.1 NOISE AND SOUND LEVEL DESCRIPTORS AND TERMINOLOGY

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 sound 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. The maximum sound level (L_{MAX}) is the maximum level during a measurement period or noise event. 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.

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 contribute to 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.

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.

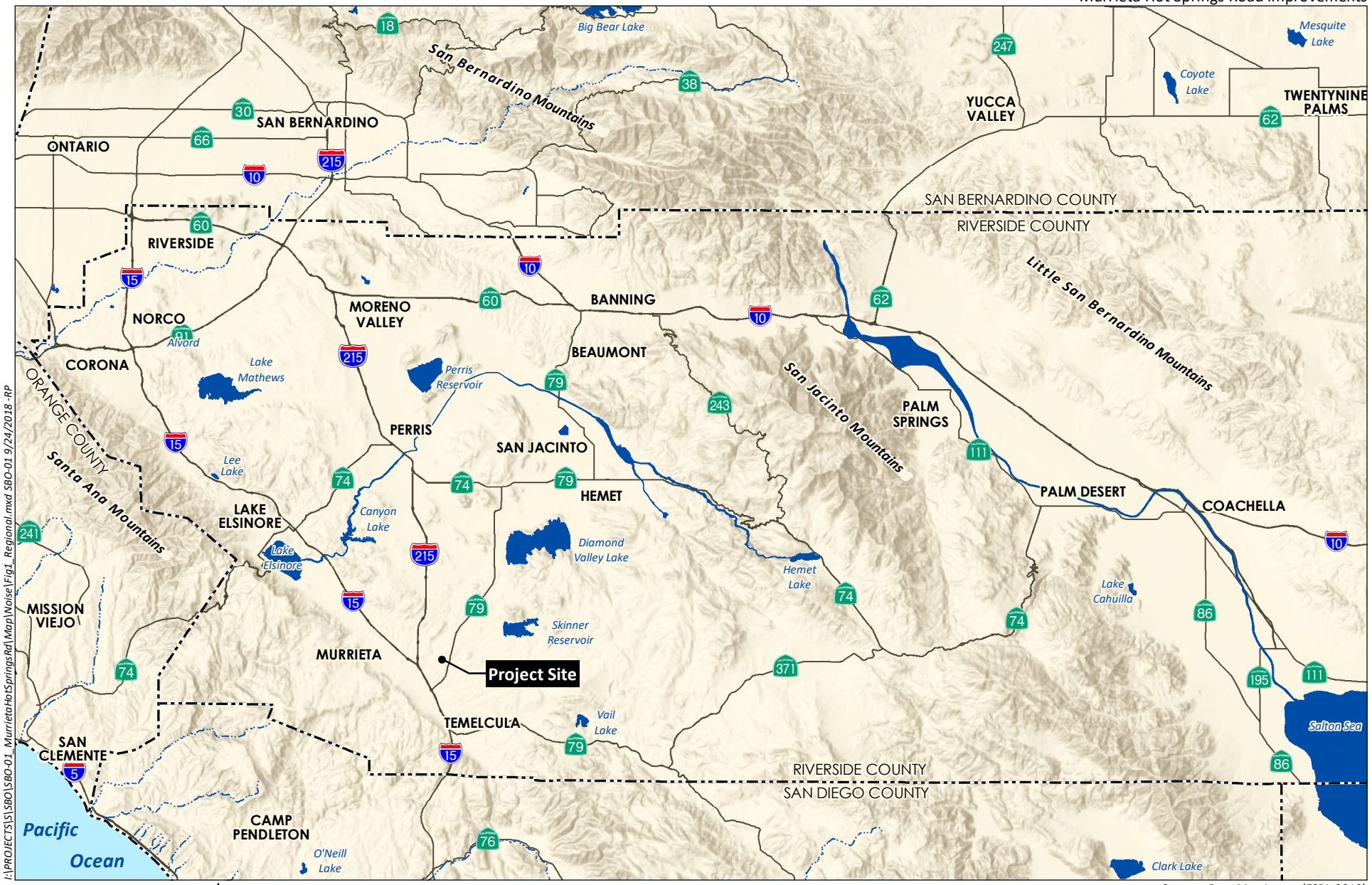
The amplitude of pressure waves generated by a sound source determines the loudness of that source. A logarithmic scale is used to describe sound pressure level (SPL) in terms of dBA units. The threshold of hearing for the human ear is about 0 dBA, which corresponds to 20 micro Pascals (mPa).

Because decibels are logarithmic units, SPL cannot be added or subtracted through ordinary 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 one source under the same conditions.

2.2 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, such as residential dwellings, schools, transient lodging (hotels), hospitals, educational facilities, exterior recreational facilities, and libraries. Noise receptors are individual locations that may be affected by noise. Industrial and commercial land uses are generally not considered sensitive to noise. NSLUs in the project area include multi-family residences located adjacent to Murrieta Hot Springs Road and the Murrieta Tennis Club's court area (see Figure 2 for locations). The nearest single-family residences are located more than 500 feet from the roadway improvements.

Land uses in which ground-borne vibration could potentially interfere with operations or equipment, such as research, manufacturing, hospitals, and university research operations (California Department of Transportation [Caltrans] 2013) are considered "vibration-sensitive." The degree of sensitivity depends



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Source: Base Map Layers (ESRI, 2013)

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Regional Location

Figure 1

Project Area

Potential Construction Staging Areas

Adjacent Residences

1. Ridgegate Community
2. Eagle Glen Apartments
3. Via Princesa Apartments
4. Calle Hermosa Apartments 1
5. Calle Hermosa Apartments 2
6. Calle Hermosa Apartments 3
7. Calle Hermosa Apartments 4
8. Calle Hermosa Apartments 5
9. Calle Del Lago Apartments 1
10. Calle Del Lago Apartments 2

WOODFALL DR
ROYAL BURGH DR
SKY CANYON DR
GANDOLF CT
TORI LN
BRANWIN CT
CLEARBROOK DR
BRANWIN ST
WINCHESTER RD
VIA PRINCESA
MURRIETA HOT SPRINGS RD
VIA LAS FLORES
VIA PALACIO
CALLE HERMOSA
CALLE DEL LAGO
DELHAVEN ST
AGUA VISTA
MARGARITA RD
MONARCH DR
VANDERBILT AVE
MONTICELLO WAY
HERITAGE UNION LN
CHAMBRAY DR
COLLIERUNION DR
ALCOTT UNION DR
SAINT HONORE DR
MONTE CARLO DR
LIDO DR
DE VENDOME CT
CASTLE LN
DATE ST
REDWOOD CIR
HAMILTON CT
REDCLIFFE RD
BAHAMA WAY
WINCHESTER CREEK AVE
ST JULIAN CIR
HOLLY GROVE CT
BONAIRE WAY
RISING HILL DR
WINCHESTER RD

0 400 Feet

Source: Aerial (Nearmap, 2018)

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Project Alignment

Figure 2

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. Land uses in the project area that are subject to annoyance from vibration include multi-family residences located adjacent to Murrieta Hot Springs Road.

2.3 REGULATORY FRAMEWORK

Applicable noise standards for the proposed project are codified in the following City regulations:

2.3.1 City of Murrieta Municipal Code

Construction noise is regulated by Section 16.30.130 of the City's Municipal Code. Construction noise limits are shown in Table 1, *City of Murrieta Construction Noise Limits*, below.

Table 1
CITY OF MURRIETA CONSTRUCTION NOISE LIMITS

Period	Single-family Residential		Multi-family Residential		Commercial	
	Mobile Equipment[1]	Stationary Equipment[2]	Mobile Equipment	Stationary Equipment	Mobile Equipment	Stationary Equipment
Daily, except Sundays and legal holidays, 7:00 a.m. to 8:00 p.m.	75 dBA	60 dBA	80 dBA	65 dBA	85 dBA	70 dBA
Daily, 8:00 p.m. to 7:00 a.m. and all day Sunday and legal holidays	60 dBA	50 dBA	64 dBA	55 dBA	70 dBA	60 dBA

Source: City Municipal Code Section 16.30.130

[1] Mobile equipment is defined as nonscheduled, intermittent, short-term operations.

[2] Stationary equipment is defined as repetitively scheduled and relatively long-term operation periods (three days or more).

2.3.2 City of Murrieta General Plan 2035 Noise Element

The Noise Element of the City of Murrieta General Plan 2035 (City of Murrieta 2011a) and the Final EIR for the City of Murrieta General Plan 2035 (City of Murrieta 2011b) provides noise standards for land use compatibility in Murrieta. The normally acceptable exterior noise level in Murrieta for a multi-family residential land use is 65 CNEL. The interior noise standard is 45 CNEL.

2.3.3 Federal Transit Administration Transit Noise and Vibration Impact Assessment Manual

The Federal Transit Administration's (FTA's) Transit Noise and Vibration Impact Assessment Manual (FTA 2018) is a manual, first published in 1995 and last updated in 2018, to provide guidance for predicting and assessing noise and vibration impacts of proposed transit projects for different stages of project development and different levels of analysis. The document includes quantitative thresholds to determine noise impacts based upon varying levels of baseline noise levels, which is used in the noise analysis beginning under Section 4.0.

2.3.4 Caltrans Transportation and Construction Vibration Guidance Manual

Caltrans' Transportation and Vibration Guidance Manual (Caltrans 2013) is a manual that provides guidance on addressing vibration issues associated with the construction, operation, and maintenance of transportation projects in California. The document includes quantitative thresholds to determine vibration impacts from construction equipment, which is used in the vibration analysis beginning under Section 4.0.

2.4 EXISTING CONDITIONS

2.4.1 Surrounding Land Uses

From Margarita Road to Via Princesa, commercial land uses are located to the south and the Calvary Chapel is located to the north. From Via Princesa to Calle Del Lago, land uses include multi-family residences, a golf course, and open space. From Calle Del Lago to Winchester Road, land uses include multi-family residences and large, vacant lots.

2.4.2 Existing Noise Conditions

2.4.2.1 Ambient Noise Survey

Two short-term ambient noise measurements were conducted during a site visit on September 20, 2018, on Murrieta Hot Springs Road. The measured noise levels and related environmental conditions are shown in Table 2, *Noise Measurement Results*. See Appendix A, *Site Survey Measurement Sheets*, for survey notes.

Table 2
NOISE MEASUREMENT RESULTS

Measurement 1	
Date:	September 20, 2018
Conditions:	Temperature: 74°F. Wind Speed: 1 mph. 50 percent humidity.
Time:	9:38 a.m. – 9:48 a.m.
Location:	Southeastern corner of Murrieta Hot Springs Road and Delhaven Street intersection, approximately 45 feet to roadway centerline
Measured Noise Level:	69.8 dBA L_{EQ}
Measurement 2	
Date:	September 20, 2018
Conditions:	Temperature: 75°F. Wind Speed: 4 mph. 50 percent humidity.
Time:	9:58 a.m. to 10:08 a.m.
Location:	Southwestern corner of Murrieta Hot Springs Road and Calle Del Lago intersection, approximately 30 feet to roadway centerline
Measured Noise Level:	76.1 dBA L_{EQ}

dBA = A-weighted decibel; L_{EQ} = time-averaged noise level

Traffic counts were recorded for automobiles, medium-size trucks (double-tires/two axles), and heavy trucks (three or more axles). Traffic counts for the timed measurement and the one-hour equivalent volume are shown in Table 3, *Recorded Traffic Volume and Vehicle Mix*.

Table 3
RECORDED TRAFFIC VOLUME AND VEHICLE MIX

Measurement	Traffic	Autos	MT[1]	HT[2]
Measurement 1	10-minute Count	401	4	2
	One-hour Equivalent	2,406	24	12
	Percent	**98%**	**1%**	**1%**
Measurement 2	10-minute Count	364	6	3
	One-hour Equivalent	2,184	36	18
	Percent	**97%**	**2%**	**1%**

[1] Medium Trucks (double tires/two axles)
[2] Heavy Trucks (three or more axles)
Note: Values have been rounded to nearest whole number.

3.0 ANALYSIS METHODOLOGY AND ASSUMPTIONS

3.1 METHODOLOGY AND EQUIPMENT

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

- Larson Davis System LxT Integrating Sound Level Meters
- Larson Davis Model CAL250 Calibrator
- Windscreen and tripod for the sound level meter
- Digital camera

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 SI.4-1983 R2006). All instruments were maintained with National Institute of Standards and Technology traceable calibration per the manufacturers' standards.

Modeling of the exterior noise environment for this report was accomplished using two computer noise models: Computer Aided Noise Abatement (CadnaA) Version 2018 and Traffic Noise Model (TNM) version 2.5. CadnaA is a model-based computer program developed by DataKustik for predicting noise impacts in a wide variety of conditions. CadnaA assists in the calculation, presentation, assessment, and mitigation of noise exposure. It allows for the input of project related information, such as noise source data, barriers, structures, and topography to create a detailed CadnaA model, and uses the most up-to-date calculation standards to predict outdoor noise impacts. CadnaA traffic noise prediction is based on the data and methodology used in the TNM. 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). Computer Aided Design (CAD) plans provided by the project applicant were inputted into the models. Input variables included road alignment, elevation, lane configuration, area topography, retaining walls, projected traffic volumes, estimated truck composition percentages, and vehicle speeds.

The one-hour L_{EQ} noise level is calculated utilizing peak-hour traffic; peak-hour traffic volumes can be estimated based on the assumption that 10 percent of the average daily traffic would occur during a peak hour. The model-calculated one-hour L_{EQ} noise output is the equivalent to the CNEL (Caltrans 2009).

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. Construction activities would include site preparation, demolition, grading, drainage/utilities/subgrade, and paving. Equipment used on site includes the use of excavators, backhoes, loaders, generators, pavers, and rollers.

The most likely source of vibration during project construction would be a vibratory roller, which may be used to achieve soil compaction as part of fill compaction.

3.2.2 Operation

Vehicular Traffic Volumes

The Traffic Impact Analysis (TIA) for the project (Linscott, Law, & Greenspan Engineers[LLG] 2018) provides average daily traffic volumes for the surrounding street segments, under both existing and long-term scenarios. The traffic volumes are the same without the project (a 4-lane roadway) and with the project (a 6-lane roadway), as the project itself does not generate vehicle trips. The long-term traffic volume is based upon the forecasted traffic in the City General Plan 2035. These traffic volumes are shown in Table 4*, Traffic Volumes*. Anticipated future traffic noise levels are based on the long-term traffic volumes.

Table 4
TRAFFIC VOLUMES

Roadway Segment	Existing (2018)	Long-term (2035)
Murrieta Hot Springs Road		
Margarita Road to Via Princesa	38,450	56,800
Via Princesa to Calle Del Lago	34,680	52,600
Calle Del Lago to Delhaven Street	35,680	54,200
Delhaven Street to Winchester Road	34,170	66,500

Source: LLG 2018. Project volumes are provided as average daily trips.

The posted speed limit for Murrieta Hot Springs Road is 45 miles per hour (mph). Site visit observations, shown in Table 3, revealed relatively low numbers of heavy and medium trucks near the project site. A breakdown of 97 percent automobiles, 2 percent medium trucks, and 1 percent heavy trucks was used for modeling noise conditions in the vicinity of the project.

4.0 IMPACTS

4.1 GUIDELINES FOR THE DETERMINATION OF SIGNIFICANCE AND CONDITIONS OF APPROVAL

The following thresholds are based on the City of Murrieta's General Plan 2035 Noise Element, General Plan 2035 Final EIR, and Noise Ordinance. A significant noise impact would occur if the project would:

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

    - A substantial permanent increase would occur from traffic noise if implementation of the proposed project results in an ambient noise level that meets or exceeds the noise compatibility standards established in the City of Murrieta General Plan 2035, which includes 65 CNEL for multi-family residential exterior noise, and 45 CNEL for multi-family residential interior noise. Because the City does not have specific thresholds for traffic-related noise, this report uses the FTA's Transit Noise and Vibration Impact Assessment criteria (FTA 2018). A permanent increase in traffic noise at the following levels would be substantial and significant with a:

        i. 3 dBA increase on roadways where the baseline noise level is less than 60 CNEL

        ii. 2 dBA for roadways where the baseline noise level is 60-64 CNEL

        iii. 1 dBA for roadways where the baseline noise level is 65 CNEL or over

2. Result in temporary construction noise that violates the limits established in the City Noise Ordinance (Table 1). The time period for the construction noise level limits are not specified in Table 1; analyzed noise levels are assumed to have a duration of one hour.

3. Expose persons to or generation of excessive ground-borne vibration or ground-borne noise levels.

    - Excessive ground-borne vibration would occur if construction-related ground-borne vibration exceeds the "severe" vibration annoyance potential criteria for human receptors, as specified by Caltrans (2013), of 0.4 inches per second peak particle velocity (PPV), and 0.5 inches per second PPV for damage to older residential structures for continuous/frequent intermittent construction sources (such as impact pile drivers, vibratory pile drivers, and vibratory compaction equipment).

4.2 ISSUE 1: PERMANENT INCREASE IN AMBIENT NOISE LEVELS

The primary operational noise source would be vehicular traffic. However, as noted in Section 3.2.2, traffic volumes in the City General Plan 2035 on Murrieta Hot Springs Road were forecasted to be the same under the long-term scenario (2035) for either a 4-lane roadway (no project) or a 6-lane roadway (proposed project). Therefore, the project's contribution to noise increases to the adjacent multi-family residences would be due to moving the outer roadway lanes (and corresponding vehicle noise) closer to

the residences. In addition, the anticipated locations and approximate heights for the project's retaining walls were added in the modeling for the 6-lane roadway. The results of this analysis for receivers at the nearest NSLUs to Murrieta Hot Springs Road are shown below in Table 5, *Traffic Noise Levels,* and the receiver locations are shown in Figure 3a through 3e, *Receiver Locations*.

Murrieta Hot Springs Road Improvements

- Project Area
- Modeled Receiver Location
- Site Measurement Locations

Adjacent Residences

- 2 Eagle Glen Apartments

R1 R2 R3 R4 R5 R6 R7 R8 R9 R10 R11 R12 R13 R14 R15 R16

2

WINCHESTER RD

DELHAVEN ST

0 80 Feet

Source: Aerial (Nearmap, 2018)

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Receiver Locations

Figure 3a

Murrieta Hot Springs Road Improvements

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Receiver Locations

Figure 3b

Murrieta Hot Springs Road Improvements

- Project Area
- Proposed Retaining Wall
- Modeled Receiver Location
- Site Measurement Locations

Adjacent Residences

1. Ridgegate Community
5. Calle Hermosa Apartments 2
6. Calle Hermosa Apartments 3
7. Calle Hermosa Apartments 4
8. Calle Hermosa Apartments 5
9. Calle Del Lago Apartments 1
10. Calle Del Lago Apartments 2

R19 R20 R21 R22 R23 R24 R25 R26 R27 R28 R29 R30 R31 R32 R33 R34 R35 R36 R42 R43 R44 R45 R46 R47 R48 R49 R50 R51 R52 R53 R54 R55 R56 R57 R58

VIA FRONTERA

MURRIETA HOT SPRINGS RD

CALLE HERMOSA

CALLE DEL LAGO

0 80 Feet

Source: Aerial (Nearmap, 2018)

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Receiver Locations

Figure 3c

Murrieta Hot Springs Road Improvements

Project Area

Proposed Retaining Wall

Modeled Receiver Location

Adjacent Residences

3 Via Princesa Apartments

4 Calle Hermosa Apartments 1

5 Calle Hermosa Apartments 2

6 Calle Hermosa Apartments 3

R34

R36

R38

R39

R40

R41

R42

R43

CALL

0 80 Feet

Source: Aerial (Nearmap, 2018)

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Receiver Locations

Figure 3d

Murrieta Hot Springs Road Improvements

Project Area

Modeled Receiver Location

VIA PALACIO

R37

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0 80 Feet

Source: Aerial (Nearmap, 2018)

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Receiver Locations

Figure 3e

Table 5
TRAFFIC NOISE LEVELS

Receiver	Description[1]	Existing (2018)			Long-term (2035)		
		Noise Level without Project (CNEL)	Noise Level with Project (CNEL)	CNEL change[2] (dBA)	Noise Level without Project (CNEL)	Noise Level with Project (CNEL)	CNEL change[2] (dBA)
R1	Eagle Glen Patio 1/BF	65.6	65.8	0.2	68.5	68.7	0.2
R2	Eagle Glen Patio 2/BF	65.4	65.5	0.1	68.3	68.4	0.1
R3	Eagle Glen Patio 3/BF	65.3	65.4	0.1	68.2	68.3	0.1
R4	Eagle Glen Patio 4/BF	65.2	65.5	0.3	68.1	68.3	0.2
R5	Eagle Glen 2nd floor Balcony 1/BF	66.5	67.0	0.5	69.4	69.8	0.4
R6	Eagle Glen 2nd floor Balcony 2/BF	66.6	67.0	0.4	69.5	69.9	0.4
R7	Eagle Glen 2nd floor Balcony 3/BF	66.5	66.9	0.4	69.4	69.8	0.4
R8	Eagle Glen 2nd floor Balcony 4/BF	66.7	67.2	0.5	69.6	70.1	0.5
R9	Eagle Glen 3rd Floor Balcony 1/BF	67.1	67.4	0.3	69.9	70.2	0.3
R10	Eagle Glen 3rd Floor Balcony 2/BF	66.9	67.3	0.4	69.8	70.1	0.3
R11	Eagle Glen 3rd Floor Balcony 3/BF	66.9	67.3	0.4	69.8	70.1	0.3
R12	Eagle Glen 3rd Floor Balcony 4/BF	67.3	67.7	0.4	70.1	70.5	0.4
R13	Eagle Glen North Patio	56.7	56.5	-0.2	59.5	59.3	-0.2
R14	Eagle Glen 2nd floor balcony/BF	56.5	56.3	-0.2	59.3	59.1	-0.2
R15	Eagle Glen North 3rd floor balcony	56.5	56.3	-0.2	59.3	59.1	-0.2
R16	Eagle Glen Exterior Use Area	61.8	61.8	0	64.5	64.5	0
R17	Ridgegate Patio SW 1/BF	62.4	62.2	-0.2	64.3	64.0	-0.3
R18	Ridgegate Balcony SW 1/BF	63.3	63.0	-0.3	65.2	64.8	-0.4
R19	Ridgegate Patio Central 1/BF	64.5	61.4	-3.1	66.3	63.3	-3
R20	Ridgegate Patio Central 2/BF	65.4	62.6	-2.8	67.2	64.5	-2.7
R21	Ridgegate Patio Central 3/BF	65.0	62.1	-2.9	66.8	63.9	-2.9
R22	Ridgegate Patio Central 4/BF	65.9	64.7	-1.2	67.7	66.5	-1.2
R23	Ridgegate Balcony Central 1/BF	66.7	65.9	-0.8	68.5	67.7	-0.8
R24	Ridgegate Balcony Central 2/BF	66.5	65.4	-1.1	68.3	67.2	-1.1
R25	Ridgegate Middle Patio 1/BF	58.5	54.7	-3.8	60.3	56.5	-3.8
R26	Ridgegate Middle Patio 2/BF	60.5	55.9	-4.6	62.3	57.7	-4.6
R27	Ridgegate Center Middle Patio 1/BF	61.2	56.9	-4.3	63.0	58.7	-4.3

Table 5 (cont.)
TRAFFIC NOISE LEVELS

Receiver	Description[1]	Existing (2018)			Long-term (2035)		
		Noise Level without Project (CNEL)	Noise Level with Project (CNEL)	CNEL change[2] (dBA)	Noise Level without Project (CNEL)	Noise Level with Project (CNEL)	CNEL change[2] (dBA)
R28	Ridgegate Center Middle Patio 2/BF	61.4	58.4	-3	63.2	60.2	-3
R29	Ridgegate West Middle Patio 1/BF	60.0	57.3	-2.7	61.8	59.1	-2.7
R30	Ridgegate Center Middle Patio 2/BF	61.2	58.7	-2.5	63.0	60.5	-2.5
R31	Ridgegate Exterior Use Area (Pool)	60.3	59.3	-1	62.1	61.1	-1
R32	Ridgegate West-Center Patio 1/BF	59.7	59.4	-0.3	61.5	61.2	-0.3
R33	Ridgegate West-Center Patio 2/BF	60.8	60.3	-0.5	62.6	62.1	-0.5
R34	Ridgegate West-Center-North Patio 1/BF	61.3	61.2	-0.1	63.1	63.0	-0.1
R35	Ridgegate West Patio 1/BF	67.2	68.1	0.9	69.0	69.9	0.9
R36	Ridgegate West Patio 2/BF	63.3	62.6	-0.7	65.1	64.4	-0.7
R37	Tennis Courts (exterior only)	62.4	62.4	0	64.1	64.1	0
R38	Multifamily Apartments off Via Princesa	61.4	61.6	0.2	63.2	63.4	0.2
R39	Calle Hermosa - Apartment 1 BF1	66.2	64.7	-1.5	68.1	66.5	-1.6
R40	Calle Hermosa - Apartment 1 BF2	67.1	64.1	-3	68.9	65.9	-3
R41	Calle Hermosa Exterior Use Area West (Pool)	58.3	57.8	-0.5	60.1	59.6	-0.5
R42	Calle Hermosa - Apartment 2 BF1	60.3	55.5	-4.8	62.1	57.3	-4.8
R43	Calle Hermosa - Apartment 3 BF1	65.4	58.9	-6.5	67.2	60.7	-6.5
R44	Calle Hermosa - Apartment 4 Patio 1/BF	68.0	66.0	-2	69.8	67.9	-1.9
R45	Calle Hermosa - Apartment 4 Patio 2/BF	68.1	66.1	-2	69.9	67.9	-2
R46	Calle Hermosa - Apartment 4 Patio 3/BF	68.2	66.2	-2	70.0	68.0	-2
R47	Calle Hermosa - Apartment 4 Balcony 1/BF	69.2	68.9	-0.3	71.0	70.7	-0.3
R48	Calle Hermosa - Apartment 4 Balcony 2/BF	69.1	69.0	-0.1	70.9	70.8	-0.1
R49	Calle Hermosa - Apartment 4 Balcony 3/BF	69.0	69.0	0	70.9	70.8	-0.1
R50	Calle Hermosa Exterior Use Area East (Pool)	55.9	54.7	-1.2	57.7	56.5	-1.2
R51	Calle Hermosa - Apartment 5 BF	68.2	63.2	-5	70.0	65.0	-5
R52	Calle Hermosa - Apartment 5 Patio 1/BF	63.5	58.6	-4.9	65.3	60.4	-4.9
R53	Calle Hermosa - Apartment 5 Patio 2/BF	63.1	58.1	-5	64.9	59.9	-5
R54	Calle Hermosa - Apartment 5 Balcony 1/BF	66.5	64.6	-1.9	68.3	66.4	-1.9
R55	Calle Hermosa - Apartment 5 Balcony 2/BF	66.6	65.3	-1.3	68.4	67.1	-1.3

Table 5 (cont.)
TRAFFIC NOISE LEVELS

Receiver	Description[1]	Existing (2018)			Long-term (2035)		
		Noise Level without Project (CNEL)	Noise Level with Project (CNEL)	CNEL change[2] (dBA)	Noise Level without Project (CNEL)	Noise Level with Project (CNEL)	CNEL change[2] (dBA)
R56	Calle Del Lago Apartments 1 Patio 1/BF	69.5	69.7	0.2	71.3	71.5	0.2
R57	Calle Del Lago Apartments 1 Patio 1/BF	67.9	68.1	0.2	69.7	69.9	0.2
R58	Calle Del Lago Apartments 2 BF	67.5	68.0	0.5	69.3	69.8	0.5

[1] Apartments listed as "Calle Hermosa" and "Calle Del Lago" are located off those streets; they do not have the streets in the actual apartment names; receivers with "BF" in their title represent noise levels at both potential exterior areas and the building façade.

[2] Some receivers showed lower noise levels with a widened roadway because of one or a combination of the following: (1) the project retaining walls would provide minor to substantial attenuation of vehicle noise; and (2) the roadway traffic on the outer lanes would be more greatly attenuated by topography than the existing 4-lane alignment.

Note: A permanent increase in traffic noise at the following levels would be substantial and significant: 3 dBA increase on roadways where the baseline noise level is less than 60 CNEL; 2 dBA for roadways where the baseline noise level is 60-64 CNEL; or 1 dBA for roadways where the baseline noise level is 65 CNEL or over.
See Figure 3a through 3-e for receiver locations.

A direct significant impact would occur if exterior and interior noise levels are exposed to a 3 dBA increase on roadways where the baseline noise level is less than 60 CNEL; a 2 dBA for roadways where the baseline noise level is 60 to 64 CNEL; and a 1 dBA for roadways where the baseline noise level is 65 CNEL or over. As shown in Table 5, the majority of the receivers modeled would be exposed to noise levels in excess of 65 CNEL under future noise levels with a 4-lane roadway (the "no project" scenario). For these receivers, the greatest noise increase due to the widened 6-lane roadway would be 0.9 CNEL, which is below the 1 dBA noise increase threshold. In addition, some locations would see minor to substantial noise attenuation due to the project's retaining walls, and some locations would see minor noise attenuation due to topography shielding the vehicles in the outer lanes (e.g., at the Eagle Glen Apartment receivers set farthest back from the roadway). For the receivers with noise levels below 65 CNEL for the 4-lane alignment, noise level increases would be minor or would be reduced and would not exceed thresholds. Therefore, transportation noise impacts to exterior and interior noise from the proposed project would be less than significant.

4.2.1 Mitigation Measures

Because impacts related to Issue 1 would be less than significant, no mitigation is required.

4.2.2 Significance of Impacts After Mitigation

Impacts would be less than significant without mitigation.

4.3 ISSUE 2: TEMPORARY INCREASE IN AMBIENT NOISE LEVELS

4.3.1 Construction Noise

4.3.1.1 Construction Equipment

The most substantial noise increases from construction activities that may affect off-site uses would occur during the grading phase. The loudest equipment used during this phase would be an excavator. While some grading may occur as close as 25 feet to the nearest multi-family residences off Murrieta Hot Springs Road.

The excavator would be in operation for 40 percent of a typical construction hour. At a distance of 25 feet, the excavator would generate a noise level of 82.8 dBA L_{EQ}. Therefore, use of construction equipment during grading may exceed the City Noise Ordinance construction threshold of 80 dBA L_{EQ} for mobile equipment at multi-family residences for a portion of a given day, when the equipment is at its closest to the residence. As the equipment gets further from the residence, noise levels would decrease at an approximate rate of 6 dBA per doubling of distance (i.e., at distance of 50 feet, noise levels would decrease to approximately 76 dBA). In addition, the existing noise receptors adjacent to the roadway are currently exposed to high noise levels from Murrieta Hot Springs Road (e.g., noise levels approaching 70 dBA). The equipment would not exceed the 85 dBA L_{EQ} threshold for mobile equipment at commercial uses. No stationary construction noise sources are anticipated for the project. Therefore, project construction noise impacts would be potentially significant. See Appendix B, *Construction Noise Model Outputs*, for RCNM output.

4.3.2 Mitigation Measures

The following mitigation measure would be implemented to reduce impacts from construction noise levels to less than significant:

NOI-1 Construction Noise Reduction Measures. The following measures shall be implemented during project construction:

- Heavy equipment shall be repaired at sites as far as practical from nearby residences.
- Construction equipment, including vehicles, generators and compressors, shall be maintained in proper operating condition and shall be equipped with manufacturers' standard noise control devices or better (e.g., mufflers, acoustical lagging, and/or engine enclosures).
- Electrical power shall be supplied from commercial power supply, wherever feasible, in order to avoid or minimize the use of engine-driven generators.
- Paging and alarm systems used by the City shall be installed so that noise emissions are directed away from, and shielded from, sensitive receptors. Personal paging systems and light alarms shall be used where feasible.
- If lighted traffic control devices are to be located within 500 feet of residences, the devices shall be powered by batteries, solar power, or similar sources, and not by an internal combustion engine.
- The City shall identify and provide a public liaison person before and during construction to respond to concerns of neighboring residents about noise and other construction disturbance. The City shall also establish a program for receiving questions or complaints during construction and develop procedures for responding to callers. Procedures for reaching the public liaison officer via telephone or in person shall be included in notices distributed to the public in accordance with the information above.

4.3.3 Significance of Impacts After Mitigation

Impacts would be less than significant with implementation of mitigation measure NOI-1.

4.4 ISSUE 3: EXCESSIVE GROUND-BORNE VIBRATION

4.4.1 Impact Analysis

Construction activities known to generate excessive ground-borne vibration, such as pile driving or blasting, would not be conducted by the project. A possible source of vibration during general project construction activities would be a vibratory roller, which may be used at a distance of 25 feet from the nearest off-site residence. A vibratory roller would create approximately 0.210 inch per second PPV at a distance of 25 feet (Caltrans 2013). This would be lower than what is considered a "severe" impact for humans of 0.4 inches per second PPV, and the structural damage impact to older residential structures of 0.5 inches per second PPV. Therefore, although a vibratory roller may be perceptible to nearby

human receptors, temporary impacts associated with the roller (and other potential equipment) would be less than significant.

4.4.2 Mitigation Measures

Because impacts related to Issue 3 would be less than significant, no mitigation is required.

4.4.3 Significance of Impacts After Mitigation

Impacts would be less than significant without mitigation.

5.0 LIST OF PREPARERS

Bill Vosti	Noise Analyst
Charles Terry	Senior Acoustic Specialist
Joanne M. Dramko, AICP	Senior Technical Specialist, Quality Assurance Reviewer

6.0 REFERENCES

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Appendix A

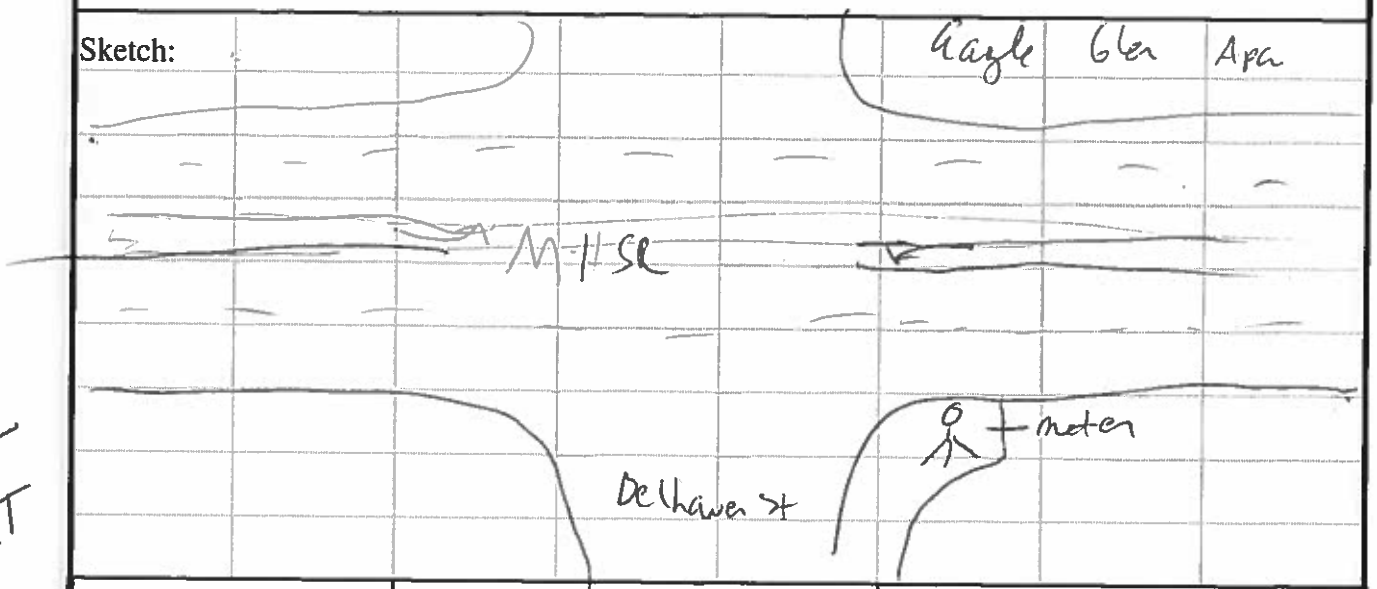
On-site Noise Measurement Sheets

Site Survey

Job # SBO-01	Project Name: MHSR Widening		
Date: 9-20	Site #: 1	Engineer: Bill D.	
Address: MHSR & Delhaven St			
Meter: Lxt	Serial #: 0001741	Calibrator: CAL250	Serial #: 4371

Notes: Survey

Sketch:



Temp: 74	Wind Spd: SE 1mph mph	Humidity: 50 %	
Start of Measurement: 9:38	End of Measurement: 9:48	69.8 dBA L_{EQ}	

Cars (tally per 5 cars)	Medium Trucks (MT)	Heavy Trucks (HT)
	III	II

Noise Measurement for Information Only

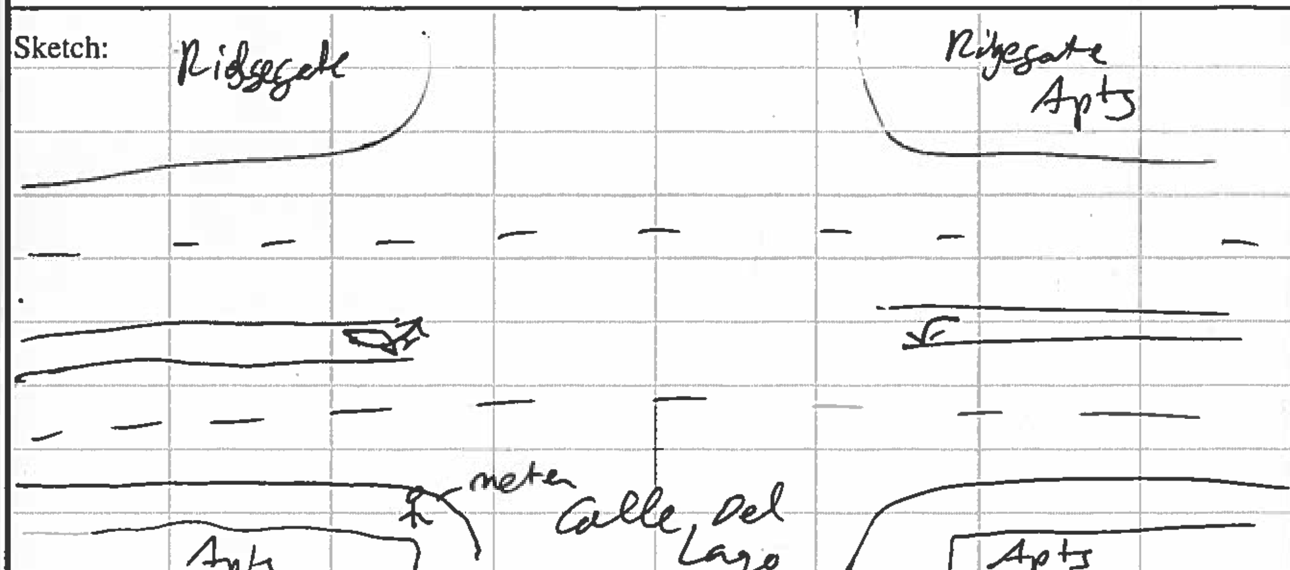
No Through Roadways

No Calibration Analysis Will Be Provided

Site Survey

Job # SBO-01	Project Name: MHSR	
Date: 9-2019	Site #: 2	Engineer: Bill V
Address: MSHR & Calle Del Lago		
Meter: Lxt	Serial #: 0001741	Calibrator: CAL250	Serial #: 4371
Notes: Sunny		

Sketch:



Temp: 75°	Wind Spd: E 4 mph	Humidity: 50 %
Start of Measurement: 9:58	End of Measurement: 10:08	74.1 dBA L_{EQ}

Cars (tally per 5 cars)	Medium Trucks (MT)	Heavy Trucks (HT)
	(6)	(3)

Noise Measurement for Information Only

No Through Roadways

No Calibration Analysis Will Be Provided

Appendix B

Construction Noise Model Outputs

Report date: 10/5/2018
Case Description: SBO-01

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Residential MF	Residential	80	80	80

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	25	0

Calculated (dBA)

Equipment		*Lmax	Leq
Excavator		86.7	82.8
	Total	86.7	82.8

*Calculated Lmax is the Loudest value.