North Ranch Residential Development

Noise Study

prepared for

West Pointe Homes, Inc.
26500 West Agoura Road #652
Calabasas, California 91302

prepared by

Rincon Consultants, Inc.
180 North Ashwood Avenue
Ventura, California 93003

January 2022

RINCON CONSULTANTS, INC.
Environmental Scientists | Planners | Engineers
rinconconsultants.com

North Ranch Residential Development

Noise Study

prepared for

West Pointe Homes, Inc.
26500 West Agoura Road #652
Calabasas, California 91302

prepared by

Rincon Consultants, Inc.
180 North Ashwood Avenue
Ventura, California 93003

January 2022

RINCON CONSULTANTS, INC.
Environmental Scientists | Planners | Engineers
rinconconsultants.com

This report prepared on 50% recycled paper with 50% post-consumer content.

Table of Contents

Tables

Figures

Appendix

This page intentionally left blank.

1 Introduction

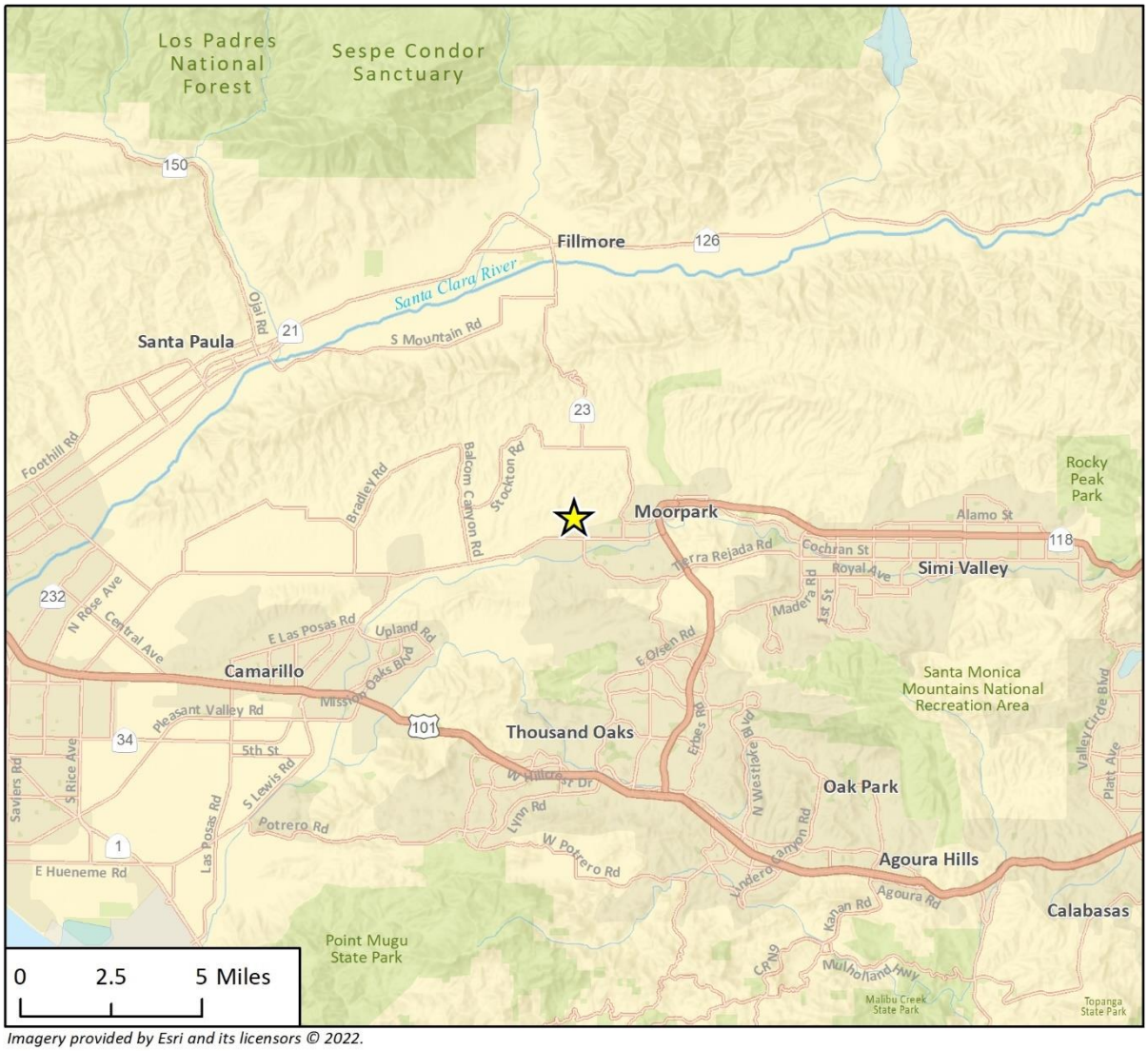
This study analyzes the potential noise impacts of the proposed North Ranch Residential Development (project) located in Moorpark, California. The study has been prepared by Rincon Consultants, Inc. under contract to West Pointe Homes, Inc., and at the request of the City of Moorpark, for use in support of environmental documentation being prepared pursuant to the California Environmental Quality Act (CEQA). The purpose of this study is to evaluate the project's potential temporary noise impacts associated with construction activity, long-term noise impacts associated with project operation, including roadway noise from vehicle trips generated by the project, and the potential exposure of future site residents to traffic noise. The analysis herein is based partially on the Traffic Impact Analysis prepared by K2 Traffic Engineering, Inc. (2021).

2 Project Description

The project site is a 68-acre property in the City of Moorpark and is bounded by Gabbert Road to the east and residential uses to the north. Lands to the east and south are undeveloped. The project site is primarily undeveloped, but is occupied by two residential homes, paved driveways, and a tennis court. Figure 1 shows the project site location and current condition.

The project would involve the construction of a residential development with 139 dwelling units and 5 estate lots in the northern portion of the project site. In addition, the project involves the construction of North Hill Parkway along the southern boundary of the site and a portion of North Village Road along the western boundary of the site. The remaining portions of North Village Drive, south of the intersection with North Hill Parkway and north of the northern project site boundary, would be constructed by developers of other parcels in the project site vicinity.

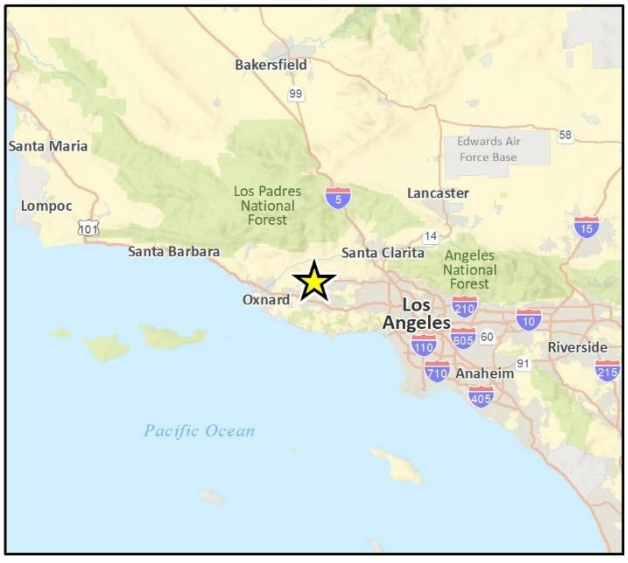
Figure 1 Project Site Location



Imagery provided by Esri and its licensors © 2022.

Project Location

N



3 Setting

3.1 Overview of Noise and Vibration

Noise

Noise level (or volume) is generally measured in decibels (dB) using the A-weighted sound pressure level (dBA). The A-weighting scale is an adjustment to the actual sound pressure levels to be consistent with that of human hearing response, which is most sensitive to frequencies around 4,000 Hertz (about the highest note on a piano) and less sensitive to low frequencies (below 100 Hertz).

Sound pressure level is measured on a logarithmic scale with the 0 dBA level based on the lowest detectable sound pressure level that people can perceive (an audible sound that is not zero sound pressure level). Based on the logarithmic scale, a doubling of sound energy is equivalent to an increase of 3 dBA, and a sound that is 10 dBA less than the ambient sound level would result in a negligible increase (less than 0.5 dB) in total ambient sound levels. In terms of human response to noise, studies have indicated that a noise level increase of 3 dBA is barely perceptible to most people, a 5 dBA increase is readily noticeable, and a difference of 10 dBA is generally perceived as a doubling of loudness. Quiet suburban areas typically have noise levels in the range of 40 to 50 dBA, while areas along arterial streets are typically in the 50 to 60+ dBA range. Normal conversational levels are in the 60-65 dBA range, and ambient noise levels greater than 65 dBA can interrupt conversations.

Noise from stationary or point sources (such as construction equipment and industrial machinery) typically attenuates (or drops off) at a rate of 6 dBA per doubling of distance over acoustically hard surfaces, and at a rate of 7.5 dBA per doubling of distance over acoustically soft surfaces. Noise from lightly traveled roads typically attenuates at a rate of about 4.5 dBA per doubling of distance, while noise from heavily traveled roads typically attenuates at about 3 dBA per doubling of distance. Noise levels may also be reduced by intervening structures. The amount of attenuation provided by this "shielding" depends on the size of the object and the frequencies of the noise levels. Natural terrain features such as hills and dense woods, and man-made features such as buildings and walls, can substantially alter noise levels. Generally, any large structure blocking the line of sight will provide at least a 5-dBA reduction in source noise levels at the receiver (Federal Highway Administration [FHWA] 2011). Structures can substantially reduce exposure to noise as well. The FHWA's guidelines indicate that modern building construction generally provides an exterior-to-interior noise level reduction of 20 to 35 dBA with closed windows.

In addition to the instantaneous measurement of noise levels, the duration of noise is important because noise that occurs over a long period of time are more likely to be an annoyance or cause direct physical damage or environmental stress. One of the most frequently used noise metrics that considers both duration and sound power level is the equivalent noise level (Leq). The Leq is defined as the single steady A-weighted level that is equivalent to the same amount of energy as that contained in the actual fluctuating levels over a period of time (essentially, the average noise level). Typically, Leq is summed over a one-hour period. Lmax is the highest root mean squared (RMS) sound pressure level within the measuring period, and Lmin is the lowest RMS sound pressure level within the measuring period. While L_{10} is the sound pressure level (measured in dBA) exceeded 10 percent of time within the measurement period.

The time period in which noise occurs is also important since noise that occurs at night tends to be more disturbing than that which occurs during the daytime. Community noise is usually measured using Day-Night Average Level (Ldn), which is the 24-hour average noise level with a 10-dBA penalty for noise occurring during nighttime (10 p.m. to 7 a.m.) hours, or Community Noise Equivalent Level (CNEL), which is the 24-hour average noise level with a 5 dBA penalty for noise occurring from 7 p.m. to 10 p.m. and a 10 dBA penalty for noise occurring from 10 p.m. to 7 a.m. Noise levels described by Ldn and CNEL typically do not differ by more than 1 dBA. In practice, CNEL and Ldn are often used interchangeably.

Vibration

Groundborne vibration of concern in environmental analysis consists of the oscillatory waves that move from a source through the ground to adjacent structures. The number of cycles per second of oscillation makes up the vibration frequency, described in terms of Hz. The frequency of a vibrating object describes how rapidly it oscillates. The normal frequency range of most groundborne vibration that can be felt by the human body starts from a low frequency of less than 1 Hz and goes to a high of about 200 Hz (Crocker 2007).

While people have varying sensitivities to vibrations at different frequencies, in general they are most sensitive to low-frequency vibration. Vibration in buildings, such as from nearby construction activities, may cause windows, items on shelves, and pictures on walls to rattle. Vibration of building components can also take the form of an audible low-frequency rumbling noise, referred to as groundborne noise. Groundborne noise is usually only a problem when the originating vibration spectrum is dominated by frequencies in the upper end of the range (60 to 200 Hz), or when foundations or utilities, such as sewer and water pipes, physically connect the structure and the vibration source (FTA 2018). Although groundborne vibration is sometimes noticeable in outdoor environments, it is almost never annoying to people who are outdoors. The primary concern from vibration is that it can be intrusive and annoying to building occupants and vibration-sensitive land uses.

Vibration energy spreads out as it travels through the ground, causing the vibration level to diminish with distance away from the source. High-frequency vibrations diminish much more rapidly than low frequencies, so low frequencies tend to dominate the spectrum at large distances from the source. Discontinuities in the soil strata can also cause diffractions or channeling effects that affect the propagation of vibration over long distances (Caltrans 2020). When a building is affected by vibration, a ground-to-foundation coupling loss will usually reduce the overall vibration level. However, under rare circumstances, the ground-to-foundation coupling may actually amplify the vibration level due to structural resonances of the floors and walls.

Vibration amplitudes are usually expressed in peak particle velocity (PPV) or RMS vibration velocity. The PPV and RMS velocity are normally described in inches per second. PPV is defined as the maximum instantaneous positive or negative peak of a vibration signal. PPV is often used in monitoring of blasting vibration because it is related to the stresses that are experienced by buildings (Caltrans 2020).

3.2 Sensitive Receivers

Noise exposure goals for various types of land uses reflect the varying noise sensitivities associated with those uses. The City of Moorpark General Plan states that noise sensitive land uses include, but

are not limited to, residential areas, libraries, churches, hospitals, schools, guest lodging, libraries, and parks (City of Moorpark 1998).

The predominant noise sensitive land uses in the project site vicinity are residences, the nearest of which are located east of the project site across Gabbert Road and north of the project site boundary. The closest residences are approximately 150 feet from the northeast corner of the project site. Other adjacent land uses to the north and east of the site include horse and animal stables and other agricultural structures.

The project would involve constructing new residential uses on the project site. These proposed residential units would be new sensitive receivers. The existing noise source closest to the proposed residential units would be Gabbert Road (approximately 300 feet from roadway centerline to the nearest proposed onsite receiver). In addition to the existing roadways near the project site, the project also involves the construction of North Village Road along the western boundary of the site and North Hill Parkway along the southern boundary of the site.

3.3 Project Site Setting

The project site is located in the City of Moorpark and is bordered by single-family residential uses to the east and north and undeveloped land to the south and east. The project site is zoned as Rural Low Density Residential (1 DU/5AC). There are no substantial existing sources of noise on the project site. Existing uses onsite include two existing residences, paved driveways, and a tennis court. The remainder of the site is primarily undeveloped land consisting of low-lying vegetation and dispersed trees. The primary sources of noise in the project site vicinity are motor vehicles (e.g., automobiles, buses, trucks, and motorcycles) along Gabbert Road and Poindexter Avenue. The project site is located on the northside of West Los Angeles Avenue/State Route 118, approximately one-half mile south of the project. The project site is located approximately 1,300 feet north of an existing railroad. The closest airport to the project site is located 11 miles to the southwest in Camarillo.

To determine existing noise levels on the project site, Rincon staff conducted two peak-hour weekday morning 15-minute noise measurements near the project site using an ANSI Type II integrating sound level meter on September 21, 2016. In addition, while conducting these measurements, Rincon staff collected 15-minute traffic counts along Gabbert Road. In general, the immediate area has not substantially changed in terms of noise environment since 2016, and these measurements are able to provide a picture of current noise levels. These noise measurements represent peak-hour traffic noise and, therefore, provide a conservative estimate of existing on-site noise levels on the project site, which are primarily due to roadway noise from Gabbert Road. Table 1 identifies the noise levels and traffic counts during the measurement periods. Figure 2 shows the on-site noise measurement locations.

Figure 2 On-Site Noise Measurements

Imagery provided by Microsoft Bing and its licensors © 2022.

Table 1 Noise Monitoring Results

Measurement Number	Measurement Location	Primary Noise Source [1]	Traffic Count	Sample Time	Leq [15] (dBA)
1	Northeast corner of project site	Gabbert Road (approximately 40 feet) Los Angeles Avenue (3,500 feet)	Cars: 4 Medium Trucks: 2	8:37 a.m. – 8:52 a.m.	54.7
2	Southeast corner of project site	Gabbert Road (approximately 400 feet) Los Angeles Avenue (3,000 feet)	Cars: n/a [2] Medium Trucks: n/a [2]	8:13 a.m. – 8:28 a.m.	39.9

[1] Measured to the center of the roadway. Distances are from centerlines of each street.

[2] Traffic Counts n/a due to distance from Los Angeles Avenue

Source: Field visit using ANSI Type II Integrating sound level meter, September 21, 2016

Refer to Figure 2 for noise measurement locations.

Refer to Appendix A for noise monitoring data sheets.

3.4 Regulatory Setting

City of Moorpark General Plan Noise Element

The Noise Element of the Moorpark General Plan identifies existing sources of noise in Moorpark, as well as noise-related goals, policies, and implementation. The Noise Element establishes noise standards for residential land use classifications. The goal of the City's noise standards is to maintain identified ambient noise levels and to limit, mitigate, or eliminate intrusive noise that exceeds the ambient noise levels within a specified zone. Table 2 shows the adopted interior and exterior noise standards for different land uses within the City.

Table 2 Interior and Exterior Noise Standards

Land Use Categories		CNEL	
Categories	**Uses**	**Interior**	**Exterior**
Residential	Single Family	45 (windows closed)/55 (windows open)	65

Source: Moorpark General Plan: Noise Element (1998)

City of Moorpark Municipal Code

The City of Moorpark Municipal Code addresses noise generation and regulations applicable to the proposed project in the following sections:

Title 9.28.010

The municipal code states that "it shall be unlawful for any person within any residential zone of the city to use or operate any radio, musical instrument, phonograph, television receiver, or other machine or device for the production, reproduction or amplification of the human voice or any other sound in such a manner as to create a noise level that disturbs the reasonable peace, quiet, or

comfort of any person who is more than fifty (50) feet away from the noise source. (Ord. 157 § 1, 1992)

Title 15.26 A

The municipal code states that "it is unlawful within the incorporated limits of the city to engage in or conduct any outdoor work relative to construction, except between the hours of seven (7:00) a.m. and seven (7:00) p.m., Monday through Saturday, unless a permit for different hours has first been issued by the public works director for projects within the public right-of-way; or by the community development director for projects on private property. Application for such a permit would be made in writing to the appropriate department director and should state the name and business address of the applicant, the location of the proposed work, the reason for seeking a permit to do the work on Sunday or between seven (7:00) p.m. and seven (7:00) a.m. on other days, and the estimated duration of the work. For purposes of this section "construction" means the erection, maintenance or repair of any building or structure, the moving or excavation of earth, the laying of pavement, the loading or unloading of material, equipment or supplies or any other construction activity."

4 Significance Thresholds and Methodology

To determine whether a project would have a significant impact to noise, Appendix G of the CEQA Guidelines asks whether a project would result in:

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

b. *Generation of excessive groundborne vibration or groundborne noise levels?*

c. *For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?*

Because the project site is located 11 miles from the nearest airport/airstrip, the project would not be exposed to substantial aircraft noise and would not result in a significant impact from this impact area. Therefore, checklist question c is not discussed further.

Construction

Construction noise was estimated using the FHWA Roadway Construction Noise Model (RCNM) (FHWA 2006). RCNM predicts construction noise levels for a variety of construction operations based on empirical data and the application of acoustical propagation formulas. Using RCNM, construction noise levels were estimated at noise sensitive receivers near the project site. RCNM provides reference noise levels for standard construction equipment, with an attenuation rate of 6 dBA per doubling of distance for stationary equipment.

Variation in power imposes additional complexity in characterizing the noise source level from construction equipment. Power variation is accounted for by describing the noise at a reference distance from the equipment operating at full power and adjusting it based on the duty cycle of the activity to determine the Leq of the operation (FHWA 2006). Each phase of construction has a specific equipment mix, depending on the work to be accomplished during that phase.

Construction activity would result in temporary noise in the project site vicinity, exposing surrounding nearby receivers to increased noise levels. Construction noise would typically be higher during the heavier periods of initial construction (i.e., site preparation and grading) and would be lower during the later construction phases (i.e., building construction and paving). Typical heavy construction equipment during project grading could include loaders, graders, and dump trucks. It is assumed that diesel engines would power all construction equipment. Construction equipment would not all operate at the same time or location. In addition, construction equipment would not be in constant use during the 8-hour operating day.

Project construction would occur nearest to the noise-sensitive uses (residences) located approximately 150 feet to the east of the project site boundary. Over the course of a typical construction day, construction equipment would be located as close as 150 feet but would typically be located at an average distance farther away due to the nature of construction and the lot size of

the project. For example, during a typical construction day, the equipment may operate across the horizontal distance of the site or vertical distance from a nearby noise receiver. Therefore, it is assumed that over the course of a typical construction day, the construction equipment would operate at an average distance of 300 feet from the nearest sensitive receivers.

Construction noise is typically loudest during activities that involve excavation and move soil, such as site preparation and grading. A potential high-intensity construction scenario includes a grader, loader, and dump truck working during grading to excavate and move soil. At a distance of 300 feet, a grader, loader, and a dump truck would generate a noise level of 67 dBA Leq (RCNM calculations are included in Appendix B).

The Moorpark Municipal Code does not state a quantitative threshold for construction. The FTA provides reasonable criteria for assessing construction noise impacts based on the potential for adverse community reaction in their *Transit and Noise Vibration Impact Assessment Manual* (FTA 2018). For residential uses, the daytime noise threshold is 80 dBA Leq and is used for this analysis.

Stationary Noise

Stationary noise sources associated with operation of the proposed project would consist of landscaping maintenance, general conversations, and mechanical equipment (e.g., heating, ventilation, and air conditioning [HVAC] units). Due to the distances and low noise levels associated with general site activities and landscape maintenance, these sources are not considered substantial and are not analyzed further.

Each HVAC unit would likely contain a screened split system HVAC unit located on the ground. In the modeling, it was assumed the closest distance between an HVAC unit and the nearest sensitive receiver would be 150 feet for the residences to the east of the project site. The unit used in this analysis is a typical to larger-sized residential condenser, a Carrier 38HDR060 split system condenser (Carrier 2011). The manufacturer's noise data is provided below in Table 3.

Table 3 HVAC Noise Levels

Noise Levels in dB[1] 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] Noise Levels for a Carrier 38HDR060 split system condenser (Carrier 2011).

Hz = Hertz; KHz = kilohertz

Traffic Noise

For analyzing the project's traffic-related noise increase to off-site receivers, impacts would be considered significant if project-generated traffic would result in exposure of sensitive receptors to an unacceptable increase in noise levels. For purposes of this analysis, a significant impact would occur if project-related traffic increases the ambient noise environment of noise-sensitive locations by 3 dBA or more, which is considered a barely perceptible noise increase.

Analysis of impacts of the environment on a project is generally not required for CEQA compliance (*Ballona Wetlands Land Trust et al. v. City of Los Angeles*). Therefore, noise exposure to new noise-sensitive land uses from transportation noise sources has been analyzed for informational purposes only. The project would be subject to transportation noise levels primarily from roadway noise. The railroad is located 1,300 feet south of the project site, with substantial topography intervening

between the trains and where project site residences would be located; at this distance and with this shielding, rail noise levels would be negligible at the project site and are not analyzed further. The Moorpark General Plan establishes noise standards for residential, commercial, and institutional land uses. The standard for interior noise at residential uses is 45 CNEL and the standard for exterior noise at single family residential uses is 65 CNEL.

Vibration

The project does not include any substantial vibration sources associated with operation. Thus, construction activities have the greatest potential to generate groundborne vibration affecting nearby receivers, especially during grading and excavation of the project site. The greatest vibratory source during construction within the project vicinity would be a vibratory roller. Neither blasting nor pile driving would be required for construction of the project. Construction vibration estimates are based on vibration levels reported by Caltrans and the FTA (Caltrans 2020, FTA 2018). A vibratory roller would generate an estimated vibration level of 0.210 inches per second at 25 feet (Caltrans 2020).

Although groundborne vibration is sometimes noticeable in outdoor environments, it is almost never annoying to people who are outdoors; therefore, the vibration level threshold is assessed at occupied structures (FTA 2018). Therefore, all vibration impacts are assessed at the structure of an affected property.

The City of Moorpark Municipal Code does not provide a quantitative threshold for vibration impacts. Therefore, vibration standards from Caltrans' *Transportation and Construction Vibration Guidance Manual* are used for this analysis (Caltrans 2020). Vibration levels equal to or below 0.4 inches per second PPV at residential structures would prevent structural damage for most residential building and vibration levels equal to or less than 1.0 inches per second PPV would prevent damage to more substantial construction, such as high-rise, commercial, and industrial buildings. For human annoyance, the vibration level threshold at which transient, or temporary, vibration sources are considered to be distinctly perceptible is 0.24 inches per second PPV.

5 Impact Analysis

5.1 Item 1 – Temporary and Permanent Noise Increase

Item:	Would the project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies? *(Less Than Significant)*

Construction Noise

As described in Section 3.1, at a distance of 300 feet, a grader, loader, and a dump truck would generate a noise level of 67 dBA Leq at the nearest single-family residences to the project site. The FTA's daytime construction noise limit is 80 dBA Leq for residential uses; therefore, project construction noise levels would not exceed construction noise thresholds. In addition, the project would comply with the allowed construction hours in the City of Moorpark Municipal Code of between the hours of 7:00 a.m. and 7:00 p.m., Monday through Saturday, Therefore, impacts from construction noise would be less than significant.

Stationary Noise

An HVAC unit that has a sound power level of 72 dBA would result in a noise level of approximately 31 dBA at a distance of 150 feet. This noise level would be well below the ambient noise levels measured in the area of 54.7 dBA and 39.9 dBA (as shown in Table 1). It would also be well below the residential land use compatibility standard of 65 CNEL for residential land uses in the city. Therefore, stationary noise levels from the project site would not exceed applicable thresholds, and impacts would be less than significant.

Traffic Noise

Off-site Traffic Noise

PM Peak hour trips on Gabbert Road were determined to be 473 trips (K2 Traffic Engineering 2021). The project's addition of 143 PM peak hour trips would increase noise levels by 30 percent, which would result in an approximate noise increase of 1 dBA. This would not exceed the significance threshold of a greater than 3 dBA increase over existing noise levels; therefore, traffic noise increases from the proposed project would be less than significant.

On-Site Traffic Noise

The proposed improvements on the project site include two new roadways. North Hills Parkway, along the southern boundary of the site, would align east/west and give access to the project site from Gabbert Road. North Village Drive, along the western boundary of the site, would align north/south, and connect to North Hills Parkway at the southwestern corner of the project site. Since Gabbert Road would be the primary point of entrance for vehicles traveling to and from the project site, this analysis assumes that all of the project-generated vehicle trips estimated in the traffic study would travel along the two new proposed roads. As described in the traffic study, the

project would result in a PM peak hour increase of 143 new vehicle trips on Gabbert Road. Therefore, this analysis assumes that there would be up to 143 daily trips on both North Hills Parkway and North Village Drive. Project traffic included with Gabbert Road traffic under the cumulative traffic scenario would be 714 PM peak hour trips. It was assumed that the peak hour traffic would be equivalent to the CNEL. The nearest project residences would be located approximately 100 feet from North Hills Parkway, 200 feet from North Village Drive, and 300 feet from Gabbert Road.

With these assumptions, the closest project residences to each roadway would be exposed to noise levels of 55 CNEL, 52 CNEL, and 61 CNEL, respectively. Therefore, noise levels at exterior use areas of the project would not exceed the City's 65 CNEL normally acceptable exterior noise standard for residential uses and would not conflict with the City General Plan.

Standard construction techniques for buildings under the California Building Code typically achieve a minimum 25-dBA reduction from exterior sources at interior locations when the windows are in a closed position. Therefore, if building façade noise levels exceed 70 CNEL, interior noise levels would potentially exceed the City's interior noise standard of 45 CNEL for residences. As projected noise levels would not exceed 70 CNEL, interior noise levels would not exceed 45 CNEL. Therefore, interior noise levels at the project would not conflict with the City's interior noise standard of 45 CNEL.

5.2 Item 2 – Vibration

Item:	Would the project result in generation of excessive groundborne vibration or groundborne noise levels? *(Less Than Significant Impact)*

Construction activities known to generate excessive groundborne vibration, such as pile driving, would not be conducted by the project. The greatest anticipated source of vibration during general project construction activities would be from a vibratory roller, which may be used within 150 feet of the nearest off-site residence. A vibratory roller creates approximately 0.210 inches per second PPV at a distance of 25 feet (Caltrans 2020). This would attenuate to a vibration level of 0.029 inches per second PPV at a distance of 150 feet. This vibration level is lower than the human annoyance threshold of 0.24 inches per second PPV. Therefore, vibration impacts associated with construction would be less than significant.

The project does not include any substantial vibration sources associated with operation. Therefore, operational vibration impacts would be less than significant.

6 References

California Department of Transportation (Caltrans). 2020 *Transportation and Construction Vibration Guidance Manual*. (CT-HWANP-RT-20-365.01.01) September. Available at: https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf.

Carrier. 2011. 38HDR Performance Series Air Conditioner with Puron Refrigerant, 1.5-5 Nominal Tons. Available at: https://www.americancoolingandheating.com/wp-content/uploads/carrier-product-data-specifications/38hdr-5pd.pdf

Federal Highway Administration. 2006. FHWA Highway Construction Noise Handbook. (FHWAHEP-06-015; DOT-VNTSC-FHWA-06-02). Available at: http://www.fhwa.dot.gov/environment/construction_noise/handbook.

_____. 2011. *Highway Traffic Noise: Analysis and Abatement Guidance.* (FHWAHEP-10-025). December. Available at: https://www.codot.gov/programs/environmental/noise/assets/fhwa-noise-guidance-dec-2011

Federal Transit Administration (FTA). 2018. *Transit Noise and Vibration Impact Assessment*. November. Available at: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf

K2 Traffic Engineering, Inc. 2021. Traffic Impact Analysis, North Ranch Residential Development. December 17.

Malcolm J. Crocker (Editor). 2007. *Handbook of Noise and Vibration Control Book*, ISBN: 978-0-471-39599-7, Wiley-VCH, October.

Moorpark, City of. 1998. City of Moorpark General Plan: Noise Element. Available at: https://moorparkca.gov/DocumentCenter/View/171.

This page intentionally left blank.

Appendix A

Noise Measurement Data

AMBIENT NOISE SURVEY DATA SHEET

Project: Rasmussen Res Project - 16-02891 Job Number: 16-02891
Date: 9.21.2016
Operator: Hannah Mize

	Station 1	Station 2
Begin	8.37AM	8.13
Measurement No.	1	2
Finish	8.52AM	8.28
Wind	0.0 mph	0.0 mph
Direction	NA	NA
Temperature	70 °F	70 °F
Cloud Cover Class		
Daytime	☐ 1 - Overcast >80%	☐ 1 - Overcast >80%
	☐ 2 - Light 20-80%	☐ 2 - Light 20-80%
	☒ 3 - Sunny <20%	☒ 3 - Sunny <20%
Nighttime	☐ 4 - Clear <50%	☐ 4 - Clear <50%
	☐ 5 - Overcast >50%	☐ 5 - Overcast >50%
Primary Noise Source	vehicles on Gabbert	traffic from LA Avenue
Distance	37 ft – centerline	.58 miles to centerline
Secondary Noise Sources	farm noise from adjacent property approx 200 ft	airplane @ 9.20
Notes	corral door slam @ 8.47AM	
Traffic *LDA/T*	2-headed S, 1-N	NA
MDT	2-headed S	
HDT		
Leq	54.7	39.9
Lmin		
Lmax		
Peak		
L(10)		
L(33)		
L(50)		
L(90)		
Calibration Start	94.0 dB	94.0 dB
Calibration End	94.0 dB	94.0 dB
	30-90 Range	30-90 Range
Response	☐ Slow ☒ Fast ☐ Peak ☐ Impulse	☐ Slow ☒ Fast ☐ Peak ☐ Impulse
Weighting	☒ A ☐ B ☐ C ☐ Linear	☒ A ☐ B ☐ C ☐ Linear
Octave Filter	☐ NA ☐ _____ Hz	☐ NA ☐ _____ Hz

Note: Provide Sketch of Location on Back.

AMBIENT NOISE SURVEY DATA SHEET

Project: Rasmussen Project Job Number: 16-02891

Date: 9.21.2016

Operator: Hannah Miz

Station:	Train	Begin :	8.02
Measurement	No. Train	Finish:	8.11
Wind:	0.0 mph	Direction:	NA
Temperature:	70 °F		

Cloud Cover Class

Daytime
- ☐ 1 - Overcast >80%
- ☐ 2 - Light 20-80%
- ☒ ~~3~~ - Sunny <20%

Nighttime
- ☐ 4 - Clear <50%
- ☐ 5 - Overcast >50%

Primary Noise Source: Train

Distance: .28 miles

Secondary Noise Sources: LA

Notes:

Traffic *LDA/T*:

MDT:

HDT:

Leq:	42.5 NA	L(10):	
Lmin:		L(33):	
Lmax:		L(50):	
Peak:		L(90):	

Calibration Start: 94.0 dB End: 94.0 dB 40-100 Range

Response: ☐ Slow ☑ Fast ☐ Peak ☐ Impulse

Weighting: ☒ A ☐ B ☐ C ☐ Linear

Octave Filter: ☐ NA ☐ _____ Hz

Station:		Begin :	
Measurement	No.	Finish:	
Wind:	mph	Direction:	
Temperature:			

Cloud Cover Class

Daytime
- ☐ 1 - Overcast >80%
- ☐ 2 - Light 20-80%
- ☐ 3 - Sunny <20%

Nighttime
- ☐ 4 - Clear <50%
- ☐ 5 - Overcast >50%

Primary Noise Source:

Distance:

Secondary Noise Sources:

Notes:

Traffic *LDA/T*:

MDT:

HDT:

Leq:		L(10):	
Lmin:		L(33):	
Lmax:		L(50):	
Peak:		L(90):	

Calibration Start: _____ dB End: _____ dB

Response: ☐ Slow ☐ Fast ☐ Peak ☐ Impulse

Weighting: ☐ A ☐ B ☐ C ☐ Linear

Octave Filter: ☐ NA ☐ _____ Hz

Note: Provide Sketch of Location on Back.

- Freq Weight : A
- Time Weight : FAST
- Level Range : 30-90
- Max dB : 84.1 - 2016/09/21 08:38:22
- Level Range : 30-90
- SEL : 84.2
- Leq : 54.7
-

No.s	Date Time	(dB)				
1	2016/09/21 08:36:04	76.0	67.4	67.9	53.0	50.4
6	2016/09/21 08:36:14	48.3	49.1	48.3	45.2	42.9
11	2016/09/21 08:36:24	44.5	43.5	47.9	46.4	45.7
16	2016/09/21 08:36:34	45.0	47.8	44.3	43.2	42.3
21	2016/09/21 08:36:44	41.4	43.3	44.7	47.5	44.9
26	2016/09/21 08:36:54	44.6	42.9	44.5	46.3	44.4
31	2016/09/21 08:37:04	46.5	46.3	45.1	45.7	45.5
36	2016/09/21 08:37:14	47.9	43.5	39.5	42.7	45.6
41	2016/09/21 08:37:24	47.1	45.4	44.6	44.7	48.6
46	2016/09/21 08:37:34	43.7	43.4	42.8	41.5	43.7
51	2016/09/21 08:37:44	46.2	46.9	55.0	70.6	59.5
56	2016/09/21 08:37:54	50.9	47.2	45.5	52.4	46.2
61	2016/09/21 08:38:04	45.2	47.6	45.6	46.6	42.7
66	2016/09/21 08:38:14	41.9	45.1	51.4	61.6	70.1
71	2016/09/21 08:38:24	58.5	52.0	48.6	48.1	45.5
76	2016/09/21 08:38:34	44.7	43.1	43.6	45.9	44.6
81	2016/09/21 08:38:44	44.4	43.2	42.5	41.7	42.2
86	2016/09/21 08:38:54	44.2	44.6	47.1	45.6	44.2
91	2016/09/21 08:39:04	44.7	45.2	46.4	41.3	40.3
96	2016/09/21 08:39:14	44.5	46.4	44.5	44.1	45.5
101	2016/09/21 08:39:24	45.3	44.4	45.3	43.3	43.7
106	2016/09/21 08:39:34	44.7	45.1	45.4	43.2	42.6
111	2016/09/21 08:39:44	43.3	43.0	44.7	44.8	44.4
116	2016/09/21 08:39:54	44.7	46.9	46.7	44.8	41.9
121	2016/09/21 08:40:04	42.9	45.7	44.6	44.1	46.3
126	2016/09/21 08:40:14	45.4	45.6	43.6	43.0	43.0
131	2016/09/21 08:40:24	46.7	57.0	72.3	57.2	49.6
136	2016/09/21 08:40:34	49.7	45.7	44.6	45.9	45.6
141	2016/09/21 08:40:44	46.4	45.5	50.6	53.1	45.0
146	2016/09/21 08:40:54	44.2	44.7	45.2	43.1	44.8
151	2016/09/21 08:41:04	45.3	44.6	44.4	42.8	42.6
156	2016/09/21 08:41:14	42.1	44.2	44.8	44.6	43.2
161	2016/09/21 08:41:24	44.7	43.4	42.2	43.5	42.8
166	2016/09/21 08:41:34	43.2	44.7	44.1	46.0	43.9
171	2016/09/21 08:41:44	40.1	46.1	41.9	43.0	42.9
176	2016/09/21 08:41:54	43.7	42.4	41.8	45.0	40.8
181	2016/09/21 08:42:04	44.2	42.2	43.3	45.7	43.7
186	2016/09/21 08:42:14	42.4	43.4	43.0	44.3	43.1
191	2016/09/21 08:42:24	42.7	43.8	44.2	44.1	43.7
196	2016/09/21 08:42:34	39.7	40.5	41.7	43.6	44.0
201	2016/09/21 08:42:44	42.9	44.8	41.7	40.3	40.0
206	2016/09/21 08:42:54	41.4	41.5	44.9	44.1	43.4
211	2016/09/21 08:43:04	42.5	41.6	44.5	45.3	46.9
216	2016/09/21 08:43:14	47.9	52.8	55.3	56.7	53.2
221	2016/09/21 08:43:24	48.4	42.9	42.2	43.9	44.1
226	2016/09/21 08:43:34	42.4	42.1	41.2	43.0	43.2
231	2016/09/21 08:43:44	42.3	43.7	44.9	43.7	42.4
236	2016/09/21 08:43:54	43.7	42.3	42.6	43.3	43.6
241	2016/09/21 08:44:04	45.0	42.4	44.3	44.5	42.1
246	2016/09/21 08:44:14	43.5	42.4	44.2	43.6	43.3
251	2016/09/21 08:44:24	42.6	42.0	41.0	42.8	42.1
256	2016/09/21 08:44:34	41.8	44.6	44.9	45.2	45.3
261	2016/09/21 08:44:44	42.9	42.2	43.8	44.1	43.7
266	2016/09/21 08:44:54	44.9	42.1	43.6	44.0	40.1
271	2016/09/21 08:45:04	43.8	42.2	44.1	43.2	43.6
276	2016/09/21 08:45:14	44.1	42.0	41.0	40.6	40.2
281	2016/09/21 08:45:24	41.6	44.2	43.2	41.6	43.0
286	2016/09/21 08:45:34	44.2	43.8	42.7	44.9	43.1
291	2016/09/21 08:45:44	42.9	42.5	42.2	41.9	41.8
296	2016/09/21 08:45:54	42.7	41.7	41.6	39.7	40.8
301	2016/09/21 08:46:04	39.4	39.9	42.3	44.9	44.0
306	2016/09/21 08:46:14	43.6	43.2	41.8	43.5	43.4
311	2016/09/21 08:46:24	42.0	43.3	42.6	42.9	41.1
316	2016/09/21 08:46:34	41.8	43.4	43.9	43.2	42.8
321	2016/09/21 08:46:44	42.3	35.5	39.6	37.0	38.0
326	2016/09/21 08:46:54	37.5	40.4	36.9	35.0	39.8
331	2016/09/21 08:47:04	38.1	34.4	39.2	32.3	32.6
336	2016/09/21 08:47:14	37.2	32.3	31.9	31.8	38.0
341	2016/09/21 08:47:24	32.2	32.8	32.3	40.0	32.0
346	2016/09/21 08:47:34	32.8	32.6	41.2	33.9	32.5
351	2016/09/21 08:47:44	32.8	32.6	33.2	32.6	33.4
356	2016/09/21 08:47:54	36.5	37.1	36.8	35.5	38.0
361	2016/09/21 08:48:04	38.0	43.5	45.3	41.1	41.8
366	2016/09/21 08:48:14	41.3	42.9	43.0	42.1	43.0
371	2016/09/21 08:48:24	39.5	37.9	38.6	39.0	37.8
376	2016/09/21 08:48:34	38.2	39.5	37.4	38.1	36.3
381	2016/09/21 08:48:44	36.9	37.2	36.2	38.2	38.5
386	2016/09/21 08:48:54	38.3	35.6	35.4	35.7	36.1
391	2016/09/21 08:49:04	36.9	34.7	38.7	35.9	33.6
396	2016/09/21 08:49:14	33.0	33.0	33.5	32.3	33.3
401	2016/09/21 08:49:24	33.0	32.5	33.3	33.2	32.1
406	2016/09/21 08:49:34	31.8	31.7	31.7	33.2	32.5
411	2016/09/21 08:49:44	34.0	32.2	45.4	34.8	33.1
416	2016/09/21 08:49:54	32.4	33.2	31.8	31.9	31.7
421	2016/09/21 08:50:04	31.8	32.1	32.9	32.6	31.9

426	2016/09/21	08:50:14	32.6	33.7	33.6	35.1	38.5
431	2016/09/21	08:50:24	43.8	53.7	70.6	60.1	53.0
436	2016/09/21	08:50:34	43.6	42.7	39.0	37.1	37.9
441	2016/09/21	08:50:44	37.1	35.0	34.5	34.6	34.8
446	2016/09/21	08:50:54	32.7	35.0	32.9	32.1	32.3

- Freq Weight : A
- Time Weight : FAST
- Level Range : 30-90
- Max dB : 59.5 - 2016/09/21 08:25:35
- Level Range : 30-90
- SEL : 69.4
- Leq : 39.9
-

No.s	Date Time	(dB)				
1	2016/09/21 08:13:18	39.8	37.2	36.7	37.1	36.7
6	2016/09/21 08:13:28	38.8	37.5	36.9	37.1	36.3
11	2016/09/21 08:13:38	36.9	37.0	37.3	37.1	38.4
16	2016/09/21 08:13:48	39.8	40.7	39.5	41.1	38.9
21	2016/09/21 08:13:58	42.2	37.8	38.3	41.2	39.9
26	2016/09/21 08:14:08	38.9	39.0	38.2	37.6	38.0
31	2016/09/21 08:14:18	39.0	36.6	36.8	38.3	37.8
36	2016/09/21 08:14:28	37.8	39.3	39.6	37.5	37.5
41	2016/09/21 08:14:38	36.4	35.9	36.4	35.9	36.0
46	2016/09/21 08:14:48	36.0	36.9	37.3	38.1	37.5
51	2016/09/21 08:14:58	38.2	38.4	37.7	38.4	39.3
56	2016/09/21 08:15:08	39.1	39.5	37.5	38.6	39.7
61	2016/09/21 08:15:18	38.7	39.0	37.5	37.8	37.3
66	2016/09/21 08:15:28	36.9	37.9	38.4	38.1	37.1
71	2016/09/21 08:15:38	37.1	37.3	37.0	37.5	37.4
76	2016/09/21 08:15:48	37.4	37.4	38.9	38.6	38.6
81	2016/09/21 08:15:58	39.1	38.9	37.9	38.3	37.9
86	2016/09/21 08:16:08	38.6	38.7	38.3	38.4	38.8
91	2016/09/21 08:16:18	39.1	38.7	37.7	37.6	37.2
96	2016/09/21 08:16:28	37.3	37.4	38.3	38.4	38.2
101	2016/09/21 08:16:38	38.6	38.4	37.2	37.6	35.8
106	2016/09/21 08:16:48	36.8	39.3	36.9	36.3	39.5
111	2016/09/21 08:16:58	40.7	38.8	40.3	42.3	41.5
116	2016/09/21 08:17:08	42.7	42.3	41.9	42.9	42.6
121	2016/09/21 08:17:18	43.0	42.0	42.3	42.5	43.2
126	2016/09/21 08:17:28	42.9	42.9	41.7	41.1	42.1
131	2016/09/21 08:17:38	41.7	39.3	41.8	40.1	42.8
136	2016/09/21 08:17:48	40.8	39.8	40.7	39.5	39.0
141	2016/09/21 08:17:58	38.8	38.2	40.8	39.6	39.9
146	2016/09/21 08:18:08	39.2	39.8	39.8	39.4	38.2
151	2016/09/21 08:18:18	38.4	38.1	37.6	36.9	36.6
156	2016/09/21 08:18:28	36.0	36.9	36.8	38.5	38.2
161	2016/09/21 08:18:38	37.2	36.5	35.6	36.4	37.0
166	2016/09/21 08:18:48	37.3	37.1	38.0	36.7	36.7
171	2016/09/21 08:18:58	36.6	39.4	38.6	37.2	36.7
176	2016/09/21 08:19:08	35.9	36.5	35.8	36.5	35.1
181	2016/09/21 08:19:18	36.4	35.7	34.8	34.6	35.1
186	2016/09/21 08:19:28	34.9	35.6	35.9	35.5	35.7
191	2016/09/21 08:19:38	35.1	35.0	35.5	37.0	36.1
196	2016/09/21 08:19:48	37.3	37.4	37.3	37.8	37.9
201	2016/09/21 08:19:58	37.8	37.6	38.9	42.2	39.0
206	2016/09/21 08:20:08	38.6	38.1	37.7	38.3	40.6
211	2016/09/21 08:20:18	38.9	36.9	38.5	38.9	36.1
216	2016/09/21 08:20:28	38.0	37.2	36.4	36.7	36.0
221	2016/09/21 08:20:38	39.1	37.6	37.1	36.5	36.9
226	2016/09/21 08:20:48	37.3	37.4	36.2	38.0	37.0
231	2016/09/21 08:20:58	38.4	37.4	38.3	37.0	36.7
236	2016/09/21 08:21:08	38.0	37.6	39.2	40.1	39.2
241	2016/09/21 08:21:18	40.1	39.0	38.5	39.5	39.1
246	2016/09/21 08:21:28	37.9	37.0	35.9	37.3	37.4
251	2016/09/21 08:21:38	37.6	38.0	38.0	38.9	39.4
256	2016/09/21 08:21:48	39.4	41.2	39.0	40.0	39.6
261	2016/09/21 08:21:58	39.0	38.6	40.1	37.2	39.5
266	2016/09/21 08:22:08	38.0	40.1	39.9	40.8	43.4
271	2016/09/21 08:22:18	43.6	45.8	43.2	44.2	44.7
276	2016/09/21 08:22:28	43.5	44.1	44.5	43.0	42.4
281	2016/09/21 08:22:38	43.1	45.6	45.2	44.4	42.9
286	2016/09/21 08:22:48	43.2	44.2	43.9	45.1	45.8
291	2016/09/21 08:22:58	43.4	46.2	46.2	44.6	45.1
296	2016/09/21 08:23:08	45.6	43.8	44.2	41.3	45.5
301	2016/09/21 08:23:18	41.4	43.1	40.6	41.8	42.1
306	2016/09/21 08:23:28	40.0	39.4	40.3	42.4	39.9
311	2016/09/21 08:23:38	40.0	40.5	41.0	39.5	40.5
316	2016/09/21 08:23:48	40.1	39.4	40.0	38.6	38.9
321	2016/09/21 08:23:58	39.0	39.1	39.2	39.6	40.2
326	2016/09/21 08:24:08	39.6	39.7	38.4	38.9	37.7
331	2016/09/21 08:24:18	38.1	38.4	38.4	38.1	38.5
336	2016/09/21 08:24:28	38.7	39.7	38.2	38.3	38.9
341	2016/09/21 08:24:38	38.5	38.4	37.4	39.2	38.5
346	2016/09/21 08:24:48	39.6	38.4	39.7	39.4	39.2
351	2016/09/21 08:24:58	39.2	38.9	40.0	41.1	40.0
356	2016/09/21 08:25:08	38.9	38.4	39.2	40.6	38.4
361	2016/09/21 08:25:18	41.5	40.0	40.9	40.7	38.8
366	2016/09/21 08:25:28	38.8	41.0	43.0	42.6	46.2
371	2016/09/21 08:25:38	40.6	39.5	42.2	43.6	42.2
376	2016/09/21 08:25:48	41.9	41.2	42.3	44.4	43.2
381	2016/09/21 08:25:58	42.3	44.4	42.4	41.7	42.9
386	2016/09/21 08:26:08	39.8	40.1	38.9	37.6	37.3
391	2016/09/21 08:26:18	37.2	38.0	38.5	39.0	38.9
396	2016/09/21 08:26:28	38.5	38.3	40.6	40.1	39.4
401	2016/09/21 08:26:38	38.3	38.0	38.2	38.8	39.2
406	2016/09/21 08:26:48	38.1	38.4	38.3	39.3	40.3
411	2016/09/21 08:26:58	44.5	43.0	42.0	41.4	41.5
416	2016/09/21 08:27:08	41.2	40.7	40.3	39.5	39.5
421	2016/09/21 08:27:18	40.2	39.7	40.9	40.1	39.7

426	2016/09/21	08:27:28	39.4	39.5	40.9	40.7	41.5
431	2016/09/21	08:27:38	42.6	40.6	40.9	42.7	42.3
436	2016/09/21	08:27:48	43.2	41.4	43.9	43.2	43.6
441	2016/09/21	08:27:58	44.3	43.9	43.4	43.4	41.9
446	2016/09/21	08:28:08	42.4	44.0	44.0	45.3	45.5

Appendix B

RCNM Results

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 1/19/2022
Case Description: North Ranch Residential

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

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85		300	0
Front End Loader	No	40		79.1	300	0
Dump Truck	No	40		76.5	300	0

Results

	Calculated (dBA)	
Equipment	*Lmax	Leq
Grader	69.4	65.5
Front End Loader	63.5	59.6
Dump Truck	60.9	56.9
Total	69.4	66.9

*Calculated Lmax is the Loudest value.