Appendix G

Noise and Vibration Impact Analysis

NOISE AND VIBRATION IMPACT ANALYSIS

T.O. Ranch Project
(325 and 391 Hampshire Road, Thousand Oaks, CA)

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TABLES

FIGURES

1.0 INTRODUCTION

1.1 Purpose of Study

The purpose of this study is to describe and evaluate the noise impacts of the T.O. Ranch Specific Plan Project (project), proposed by IMT Residential, in the context of the City of Thousand Oaks (City) regulatory framework.

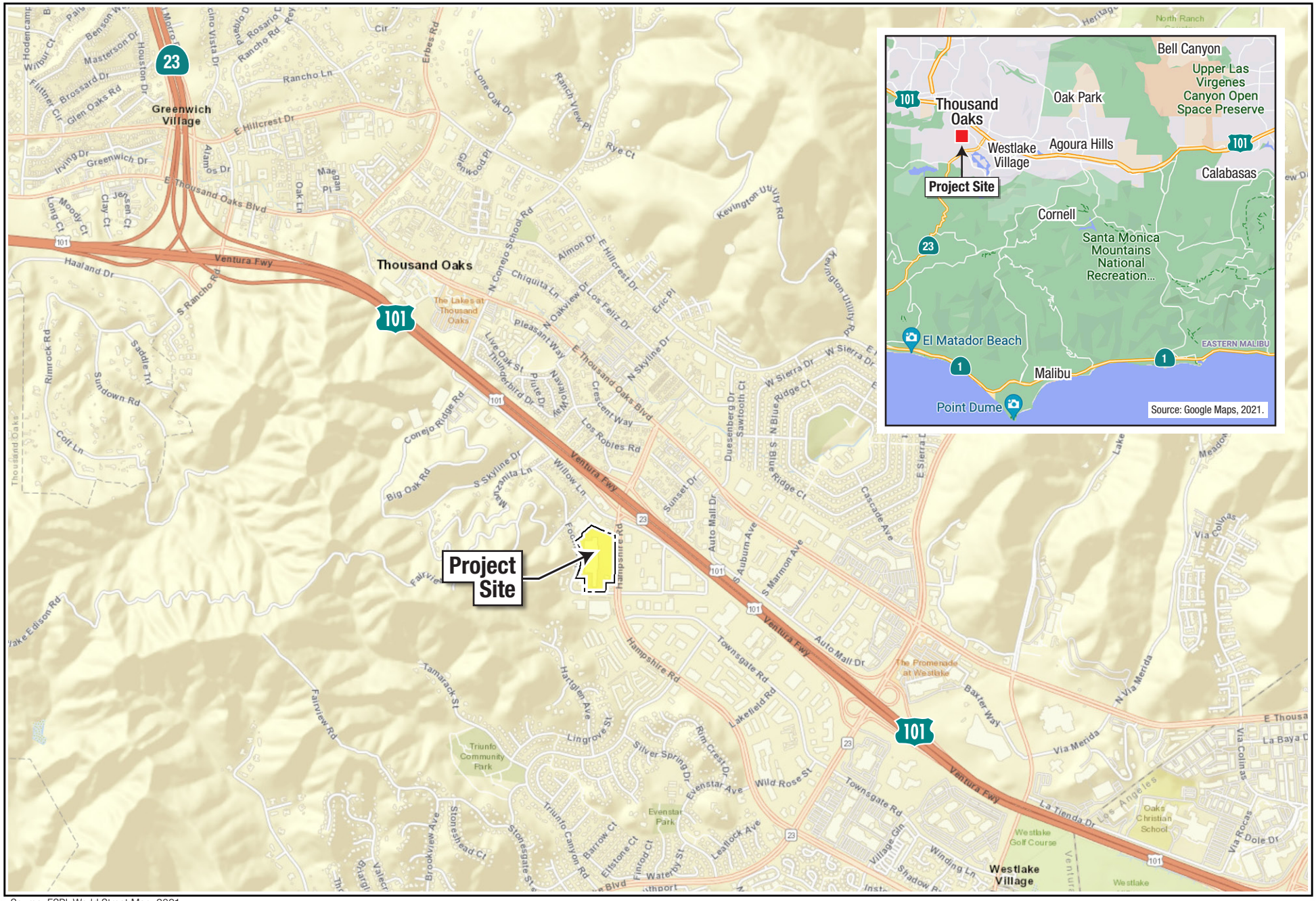
1.2 Project Summary

The proposed project site is located at 325 and 391 Hampshire Road, at the northwest corner of the intersection of Hampshire Road and Foothill Drive, as shown in **Figure 1, Regional Location Map**. The project site was formerly used by Kmart. Following Kmart's closure in 2004, a group of stores attached to Kmart also closed a few years later. The site has remained vacant since, except for occasional seasonal use as a Christmas tree lot.

The project would demolish approximately 118,782 square feet (F) of existing vacant commercial buildings and a vacant fast food restaurant, with associated paving, landscape, and hardscape. An estimated 14,350 tons of demolition debris would be exported from the site. Grading would require export of 126,800 cubic yards (cy) of earth excavation (cut) and import of 1,000 cy of earth. Conceptual grading calculations indicate a total of approximately 126,800 cubic yards of export. The new construction would have a total floor area of approximately 838,553 square feet, consisting of 420 dwelling units and up to 15,000 square feet of restaurant and retail uses on a on a 10.97-acre site. A total of 655 parking spaces would be provided onsite, including 612 enclosed parking spaces and 43 unenclosed parking spaces. Although construction and renovations of various project components would commence and be completed in three distinct stages to allow the shopping center to continue partial operations throughout the redevelopment process, this evaluation will assume a worst case scenario whereby construction and renovation activities for all project components would occur simultaneously.

Existing land uses adjacent to the site include a convalescent home, medical offices, and a gas station immediately adjacent to the north; several single-family homes and a multi-family residential development to the west, across Foothill Drive; a multi-family residential development to the south, also across Foothill Drive;[1] a preschool and gas station immediately adjacent to the south; and commercial uses to the east, across Hampshire Road.

[1] Foothill Drive curves around the southern and western sides of the project site.



Source: ESRI, World Street Map, 2021.

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Regional Location Map

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FIGURE 1

2.0 NOISE FUNDAMENTALS

The following introduces the fundamental definitions and concepts used to qualify and quantify noise and impacts.

In a basic sense, noise is unwanted sound as perceived by a receptor. Sound is energy transmitted in waves through a compressible medium such as air. There are a variety of parameters that describe the rates of oscillation of sound waves, the distance between successive troughs or crests, the speed of propagation, and the pressure level, or energy content, of a given sound wave. Sound pressure level is the most common descriptor used to describe the perceived “loudness” of an ambient sound level. The standard measurement unit of sound pressure is called a decibel (dB).

Given that sound pressure levels can vary in intensity by over one million times within the range of human hearing, a logarithmic scale similar to the Richter Scale used to measure seismicity is used to keep sound intensity numbers convenient and manageable. The ear is not equally sensitive to all sound frequencies within the entire spectrum, so sound pressure levels at maximum human sensitivity are factored more heavily into sound descriptions in a process called "A-weighting", written as dBA. Subsequent references to decibels in this discussion written as "dB" should be understood as A-weighted. Doubling the number of noise sources would produce a 3 dB increase in the noise level. A 3 dB increase in noise is considered barely perceptible in an outdoor environment while a 1 dB increase is considered barely perceptible in a controlled laboratory environment. A 5 dB increase in noise is considered readily perceptible, a 10 dB increase is perceived as twice as loud, a 20 dB increase is perceived as four times as loud, and a 30 dB increase is perceived as eight times as loud.

Variations in noise exposure over time are expressed in terms of a steady-state energy level equivalent to the energy content of the time period, called “Leq.” Because human receptors are more sensitive to unwanted noise intrusion during the evening and at night hours, California statute requires, for planning purposes, an additional dB increment be added to quiet time noise levels in a 24-hour noise descriptor: either the Day-Night Average Level (Ldn) or the Community Noise Equivalent Level (CNEL). The Ldn metric adds a penalty of 10 dB for the nighttime hours of 10:00 p.m. to 7:00 a.m., while CNEL adds both the 10 dB nighttime penalty and a penalty of 5 dB for the evening hours of 7:00 p.m. to 10:00 p.m. CNEL levels are less than 1 dB higher than Ldn levels and in practice, the metrics are sometimes used interchangeably.

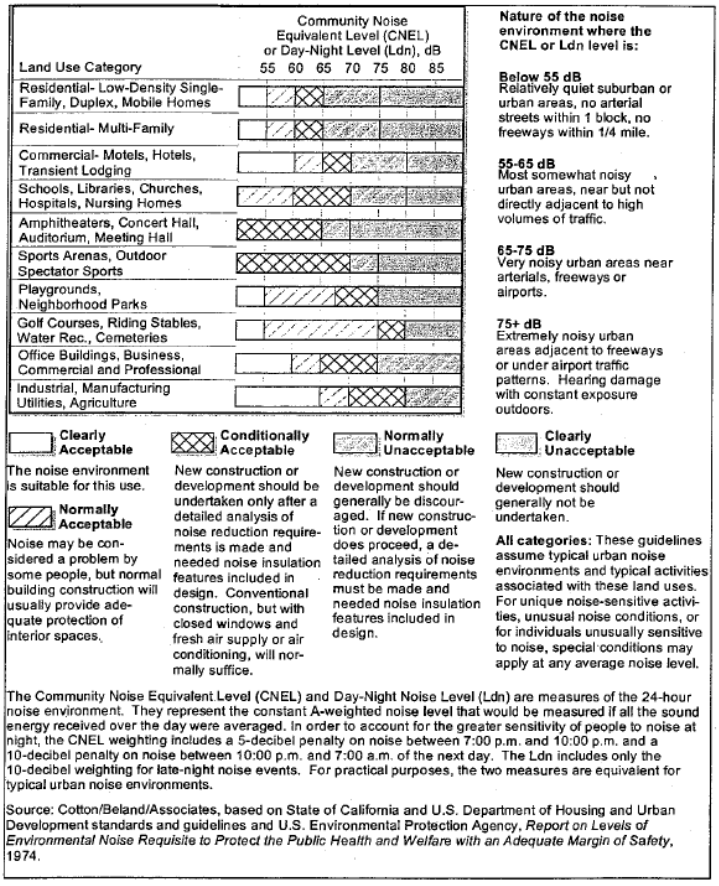
3.0 REGULATORY SETTING

This chapter presents applicable policies from the City General Plan and noise ordinances that pertain to the evaluation and regulation of noise. Project compliance with applicable regulatory requirements is a consideration for the impact analysis presented in Chapter 6.0.

City of Thousand Oaks General Plan

The Noise Element of the City General Plan, which applies to the City as a whole, addresses noise mitigation regulations, goals, and polices. The noise and land use compatibility guidelines from Figure 1 of the Noise Element are provided in **Table 3-1, Noise/Land Use Compatibility Matrix**.

Table 3-1
Noise/Land Use Compatibility Matrix



Source: City Thousand Oaks General Plan, Noise Element, May 2000, Figure 1.

The General Plan Noise Element discusses "Noise Considerations in Environmental Impact Reports and Negative Declarations" which establish thresholds of significance for project and cumulative noise impacts, shown in **Table 3-2, Thresholds of Significance for Noise Impact**. It should be noted that the discussion of exceptions includes language regarding the effects of the environment on the project, which predates the California Supreme Court ruling in *California Building Industry Association v. Bay Area Air Quality*

Management District, which held that "CEQA generally does not require an analysis of how existing environmental conditions will impact a project's future users or residents."[2]

Table 3-2
Thresholds of Significance for Noise Impact

If the annual average noise level with the proposed project, cumulative projects and General Plan buildout in an area currently used for or designated in the General Plan for a noise-sensitive land use[1] is expected to be:	A significant project or cumulative impact may result if the change in annual average noise levels from existing conditions due to all sources in an area currently used for or designated in the General Plan for a noise-sensitive land use[1] is:	The project alone may be considered to make a substantial contribution to significant cumulative impact if the change in annual average noise level due to the project is:
Less than 55 dB CNEL	Not significant for any change in noise level	Not significant for any change in noise level
55-60 dB CNEL	Equal to or greater than 3.0 decibels	Equal to or greater than 1.0 decibels
60-70 dB CNEL	Equal to or greater than 1.5 decibels	Equal to or greater than 0.5 decibels
Greater than 70 dB CNEL	Equal to or greater than 1.0 decibels	Equal to or greater than 0.5 decibels

1. A noise-sensitive land use is a use for which the lower limit of the noise level considered "normally unacceptable" for development because of noise impact is 70 dB CNEL or lower. In identifying land use areas, areas which are undevelopable for noise-sensitive uses because of slope, devopment restriction, easement, etc., or which are used for non-noise-sensitive components of a multiple-use or mixed-use project, should not be considered noise-sensitive.

Exceptions.

1. Development of single-family or multi-family residential uses in an infill project in an existing residential area which is designated for development for residential uses in the General Plan, and for which a sound insulation study has been prepared by a qualified acoustical engineer or other sound insulation specialist, and for which sound insulation is included in the proposed project to meet state standards for interior noise levels for multi-family residential development, shall not be considered to have a significant adverse effect when considering the exposure of the project itself to noise levels exceeding the standards of this Noise Element. (Off-site impacts of such projects should still be considered in determining the potential significance of noise impacts.)

For projects which would result in a potentially significant impact, the City may require an acoustical study to identify mitigation measures to reduce impacts to a less-than-significant level.

Source: City Thousand Oaks General Plan, Noise Element, May 2000, Table 9.

Municipal Code

Operational Noise

The TOMC regulates powered equipment in Section 5-21.02: "Powered equipment in residential areas," which states the following:

> "Between the hours of 9:00 p.m. and 7:00 a.m. of the following day, no person shall operate any lawn mower, backpack blower, lawn edger, riding tractor, or any other machinery, equipment, or other mechanical or electrical device, or any hand tool which creates a loud, raucous or impulsive sound,

[2] California Building Industry Assn. v. Bay Area Air Quality Management District (2015) 62 Cal.4th 369,392 (Building Association), Accessed on November 4, 2021, at https://ceqaportal.org/decisions/1225/California%20Building%20Industry%20Assoc.%20v.%20Bay%20Area%20Air%20Quality%20Management%20District%20(Dec.%2017%202015)%2062%20Cal.4th%20369.pdf.

within any residential zone or within any commercial zone which can be heard from any inhabited real property in a residential zone."

Construction Noise

As stated in the Noise Element of the General Plan, the City limits the impact of construction noise by regulating the hours of construction activity. TOMC Title 8, Section 8-11.01, "Construction activities restricted to certain hours," states the following:

> "It shall be unlawful for any person to engage in or conduct any activity in the construction of any building or structure, the moving of earth, or the laying of any pavement, including, but not limited to, the making of any excavation, clearing or grading of surface land, and loading or unloading material, equipment, or supplies, except between the hours of 7:00 a.m. and 7:00 p.m., Monday through Saturday, unless a permit for each work at different hours or days has first been issued by the Public Works Director."[3]

In addition, TOMC Section 4-3.804(a) requires vehicles propelled by an internal combustion engine on private property to have state-approved spark arrestors or a noise-muffling device approved by the state.

Caltrans Groundborne Vibration Criteria

There are no local standards for vibration. Although there are no officially adopted regulatory standards for the point at which ground-borne vibration levels could cause structural damage, Caltrans provides vibration guidelines for structural damage, found in **Table 3-3, Vibration Damage Criteria Guidelines**.

Table 3-3
Vibration Damage Criteria Guidelines

Structure and Condition	Maximum PPV (in/sec)	
	Transient [1]	Intermittent [2]
Extremely fragile historic buildings	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	**0.3**
New residential structures	1.0	**0.5**
Modern industrial/commercial buildings	2.0	**0.5**

Source: California Department of Transportation, Transportation and Construction Vibration Guidance Manual, April 2020, Table 19.

[1] Sources create a single isolated vibration event, such as blasting or drop balls.

[2] Frequent or intermittent sources include impact or vibratory pile drivers, pogo-stick compactors, crack-and-seat equipment, and vibratory compaction equipment.

The vibration sources generated during construction would be "intermittent" (i.e., occurring at irregular intervals) rather than "transient" (i.e., single isolated events); thus, the right hand column is relevant to this analysis. As shown in Table 3-3, the intermittent effect criteria for structural vibration damage is 0.5 PPV in/sec for modern industrial/commercial structures for intermittent sources, 0.3 PPV in/sec for older residential structures for intermittent sources, and 0.5 PPV in/sec for new residential structures for

[3] City of Thousand Oaks, Municipal Code. Accessed on September 22, 2021 at https://codelibrary.amlegal.com/codes/thousandoaks/latest/overview.

intermittent sources. Based on the types of structures in the vicinity of the project site, all three of these standards are used in this analysis for this project.[4]

In terms of human response, groundborne vibration can range from severe to barely perceptible depending on whether the source is transient or intermittent, the distance between the source and receptor, and the composition of the ground material. Criteria for assessing human response is provided in **Table 3-4, Human Response to Groundborne Vibration Criteria**.

Table 3-4
Human Response to Groundborne Vibration Criteria

Human Response	Maximum PPV (in/sec)	
	Transient [1]	Intermittent [2]
Severe	2.00	0.40
Strongly perceptible	0.90	**0.10**
Distinctly perceptible	0.25	0.04
Barely perceptible	0.04	0.01

Source: Caltrans, Transportation and Construction Vibration Guidance Manual, April 2020, Table 20.
[1] Sources of transient vibration create a single isolated vibration event, such as blasting or drop balls.
[2] Frequent or intermittent sources include impact or vibratory pile drivers, pogo-stick compactors, crack-and-seat equipment, and vibratory compaction equipment.

As shown in Table 3-4, human responses to intermittent ground-borne vibration vary from severe at 2.0 PPV in/sec for transient sources to barely perceptible at 0.01 PPV in/sec for intermittent sources. The Caltrans vibration criteria suggests the thresholds for human perception and annoyance are higher for transient vibration than for frequent or intermittent vibration. For this analysis, intermittent levels that could cause a strongly perceptible human response (i.e., 0.1 PPV in/sec) are the applicable standard.

[4] The Caltrans guidance manual does not explicitly define older residences, but provides example analyses which categorize residences constructed in the 1940s as older.

4.0 EXISTING CONDITIONS

4.1 Ambient Noise Levels

Transportation systems are a primary source of urban noise. Management of noise from the most significant of these sources (aircraft, trains and freeways) is generally preempted by federal and state authority. The primary local authority is regulation of land use (i.e., land use planning) and establishment and enforcement of noise ordinances. Management of noise emanating from freeways is generally within the authority of federal and state jurisdictions, namely, the Federal Highway Administration and California Department of Transportation (Caltrans).

Existing sources of noise in the vicinity of the project site include traffic, in particular traffic noise on the 101 Freeway and Hampshire Road, and operational noise from the surrounding commercial uses, such as parking, occasional garbage pickups, and activity at the preschool. The City of Thousand Oaks General Plan Noise Element provides modeled roadway noise contours for an existing year scenario and a future year of 2035, representing the General Plan Build Out scenario. According to the existing and future year noise contours from the City's Noise Element, most of the site is within the 65+ dB CNEL traffic noise contour from the nearest freeway, the 101 Freeway, but a portion of the project site is only within the existing 60+ dB CNEL noise contour of the 101 Freeway.[5] In addition, some of the project site is within the 60+ dB CNEL noise contour of Hampshire Road. However, these modeled noise contours do not account for intervening topography, buildings, or walls, which are present between the project site and the 101 Freeway, and which reduce on-site traffic noise levels.

The closest noise-sensitive receptors to the project site are: the Little Dreamers Early Childhood preschool at 3277 Foothill Drive located approximately 15 feet to the south of the project site, the Windsor Terrace of Westlake Village convalescent home at 250 Fairview Road located approximately 20 feet to the north of the project site; several single-family homes and a multi-family residential development (The Verona) on Foothill Drive located approximately 95 feet to the west of the project site, across Foothill Drive; and the Westlake Villas multi-family residential development at 525 Hampshire Road located approximately 150 feet to the south of the project site, also across Foothill Drive.[6] The vibration-sensitive receptors in the project vicinity are the preceding listed receptors and the All Eyecare Optometry medical office building at 277 Hampshire Road located approximately 10 feet to the north.

To establish existing conditions, Envicom Corporation staff measured ambient noise levels in 15-minute intervals (short term, or ST) at five locations. Aircraft noise was observed on site, but was filtered out from the noise measurements (measurement lengths were extended to correct for filtering time), resulting in conservative baseline noise levels. Envicom Corporation also obtained a 24-hour (long term, or LT) measurement at one location. The results of ambient noise measurements at the project site are provided in **Table 4-1, Ambient Noise Measurements** and **Table 4-2, 24-hour Noise Levels at LT-1**, and their locations are shown in **Figure 2, Noise Measurement Locations**. During these measurements, measured average wind speeds ranged from 1.1 miles per hour (mph) to 2.7 mph and maximum wind speeds ranged from 3.5 mph to 7.4 mph. Temperatures ranged from 71.7° Fahrenheit (F) to 79.5° F and humidity ranged from 31.8% to 59.2%.

[5] City of Thousand Oaks, Department of Planning and Community Development, Noise Element of the Thousand Oaks General Plan, May 2000, Figure 3 and Figure 4.

[6] Foothill Drive curves around the southern and western sides of the project site.

As shown in Table 4-1, measured ambient 15-minute noise levels on the project site and project vicinity range from 47.3 dB to 67.6 dB Leq. As shown on Tables 4-1 and 4-2, measured ambient hourly average noise levels at the northwestern edge of the project site range from 54.4 dB to 63.8 dB Leq and the measured 24-hour average noise level is 65.2 dB CNEL. Based on these estimates, the estimated CNEL in the project site and vicinity ranges from 56.2 dB to 76.9 dB CNEL.

Table 4-1
Ambient Noise Measurements

Number	Location	Time and Date	dB Leq[1]	dB CNEL	Primary Noise Sources
ST-1	Project Site – Northeast corner of site, near Hampshire Road	1:10 p.m. – 1:26 p.m., 10/06/2021	67.6	76.9 [b]	Traffic on Hampshire Road and the 101 Freeway.
ST-2	West of Project Site – In front of the Residence at 3142 Foothill Drive	9:57 a.m. – 10:13 a.m., 10/20/2021	57.9	65.1 [b]	Traffic on the 101 Freeway, birds, and occasional vehicles on Foothill Drive.
ST-3	West of Project Site – In front of the Residence at 3168 Foothill Drive	9:59 a.m. – 10:15 a.m., 10/06/2021	56.6	65.1 [b]	Distant traffic on the 101 Freeway, activity at Little Dreamers Early Childhood preschool, and occasional vehicles on Foothill Drive.
ST-4	Project Site - East of Little Dreamers Early Childhood Preschool, in line with south façade	11:12 a.m. – 11:42 a.m., 10/06/2021	47.3	56.2 [b]	Distant Traffic on the 101 Freeway and Hampshire Road and activity at Little Dreamers Early Childhood preschool.
ST-5	Project Site – In front of former Freddy's restaurant at 391 Hampshire Road and north of existing Shell gas station	12:26 p.m. – 12:41 p.m., 10/06/2021	62.3	71.3 [b]	Traffic on Hampshire Road. Distant traffic on the 101 Freeway is usually not audible over traffic on Hampshire Road.
LT-1	Project Site – Northern Edge, near Windsor Terrace of Westlake Village convalescent home	12:00 p.m., 10/20/2021– 12:00 p.m., 10/21/2021	54.4 – 63.8 [a]	65.2	Traffic on the 101 Freeway and Heating, Ventilation and Cooling (HVAC) at convalescent home.

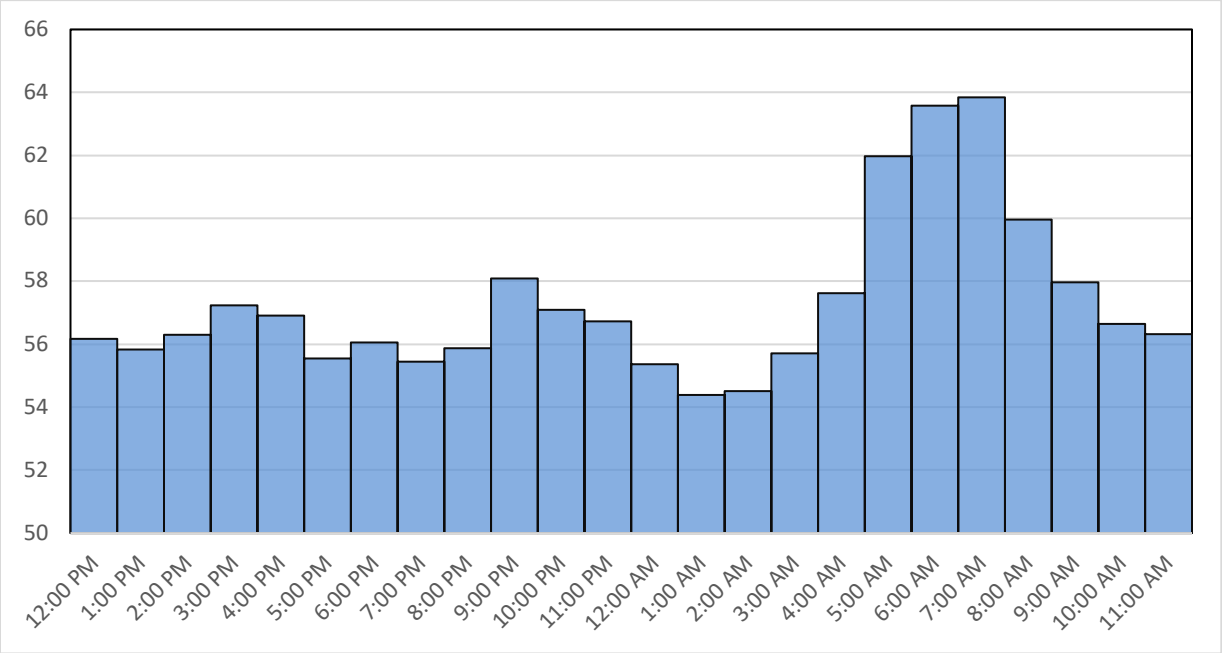
Source: Envicom Corporation, field visits October 6, October 20, and October 21, 2021. Measured using a Larson Davis LxT Sound Level Meter meeting the American National Standards Institute (ANSI) S1.4 Class 1 standard.

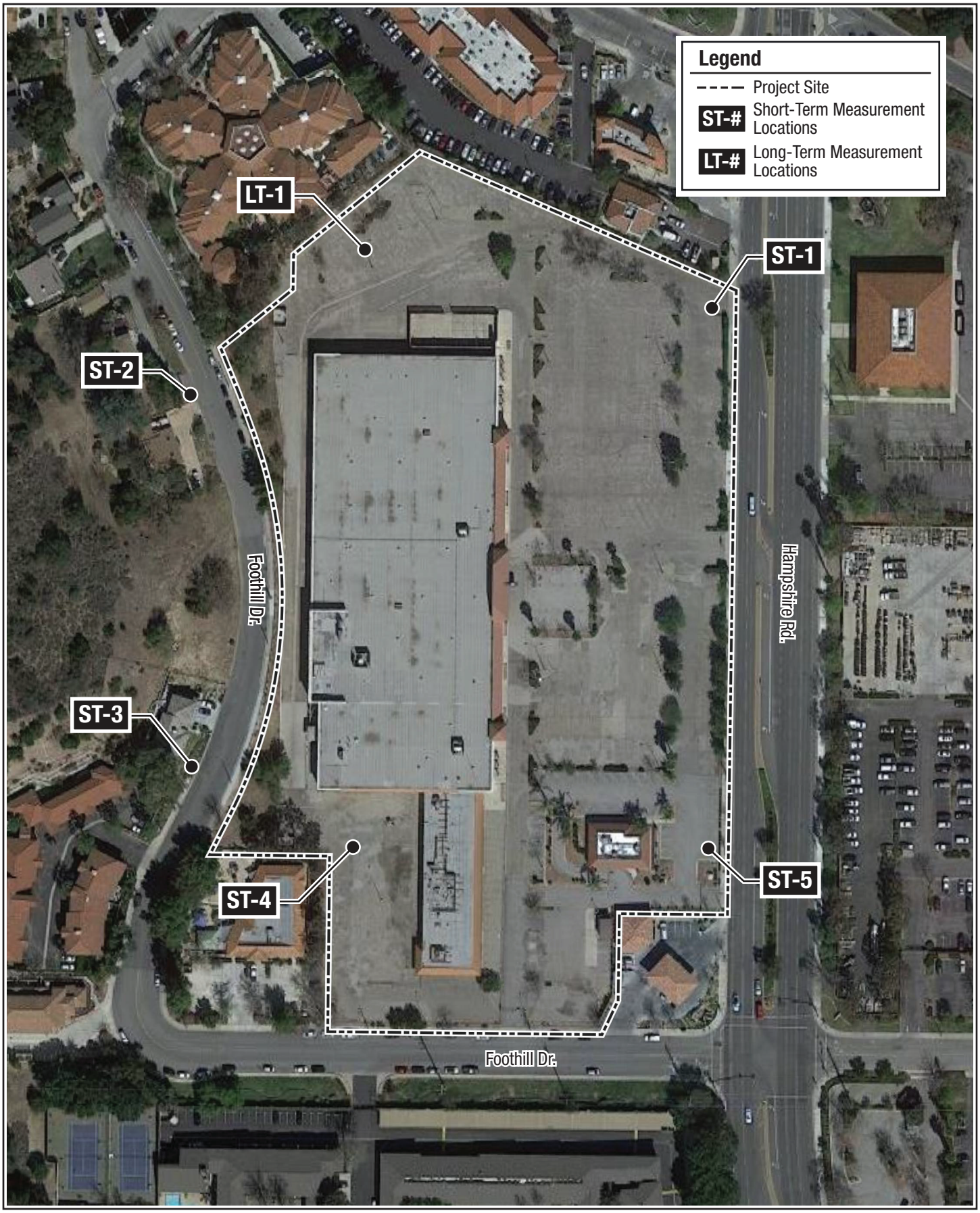
[1] Leq is the average noise level equivalent to the energy content of the time period.

[a] Range of hourly averages from 24-hour measurement.

[b] CNEL at ST-1 through ST-5 was estimated by taking the difference between the short-term measurement and the corresponding hour of the 24-hour measurement and applying it to the 24-hour noise level.

Table 4-2
24-hour Noise Levels at LT-1





Aerial Source: Google Earth Pro, Feb. 28, 2021.

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Noise Measurement Locations

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FIGURE 2

5.0 THRESHOLDS OF SIGNIFICANCE

This chapter presents thresholds of significance for noise from the State California Environmental Quality Act (CEQA) Guidelines (December 28, 2018). Project noise impacts are measured against these thresholds of significance. Local standards codified in the City's General Plan and municipal code refine these thresholds by establishing standards.

5.1 Thresholds of Significance

The following thresholds of significance for this project analysis are based upon Section XII. Noise, in Appendix G of the State CEQA Guidelines:

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?
- Generation of excessive groundborne vibration or groundborne noise levels?
- For a project located within the vicinity of a private airstrip or an airport land use plan, or where such 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?

6.0 IMPACT ANALYSIS

6.1 Temporary or Permanent Increase in Ambient Noise Levels

Temporary increases in ambient noise levels would be due to construction equipment used while constructing the proposed project. Permanent increases in ambient noise levels would be due to operation of project components, such as HVAC units and vehicle trips generated on local roadways. The following impact analysis considers each of these types of noise impacts by topic.

Construction Noise

The Construction Noise Handbook prepared by the Federal Highway Administration includes a national database of construction equipment noise levels. The Federal Highway Administration uses these reference noise emission levels in the Roadway Construction Noise Model (RCNM). **Table 6-1, Construction Equipment Noise Levels,** identifies highest (Lmax) noise levels associated with quantity and type of construction equipment. The RCNM also provides an acoustical usage factor which estimates the fraction of time each piece of equipment is operating at full power during construction. The acoustical usage factor (U.F.), is a key input used to calculate sound levels averaged over time expressed as Leq. Table 6-1 adjusts the maximum noise levels (Lmax) using the U.F. published in the Federal Highway Administration Construction Noise Handbook. The sound level prediction equation is expressed as follows for the hourly average sound level (Leq) at distance (D) between the source and receiver.

$$Leq = Lmax - 20 \bullet \log (D/50) + 10 \bullet \log (U.F./100) - I.L.$$

Where:

Lmax is the published reference noise level at 50 feet
U.F. is the acoustical usage factor for full power operation per hour
I.L. is the insertion loss for intervening barriers, if applicable

Table 6-1 lists equipment types and quantities similar to those anticipated to be used for the project. Table 6-1 is organized by equipment and describes the noise level for each individual piece of equipment at a 50-foot distance between the equipment and receptor, as provided in the RCNM.

As shown below in Table 6-1, the pieces of construction equipment that could generate the highest noise level is the pile vibration rig, which would each generate a maximum noise level of 101 dB Lmax at 50 feet and an average noise level of 94 dB Leq at 50 feet. Construction would proceed in phases such as demolition, site preparation, grading, building construction, paving, and architectural coating (painting). Therefore, at any particular phase of construction, contractors would use only the types of equipment needed as shown in Table 6-1, which applies the U.F.s, rather than using all the equipment throughout all phases. Furthermore, as decibels are logarithmic units sound levels cannot be added by ordinary arithmetic means. When the noise level of two sources is equal, the resulting noise level is 3 dB greater than the noise level of one source. The noise levels shown in Table 6-1 are used for calculation of noise levels at the locations of sensitive receptor.

Table 6-1
Construction Equipment Noise Levels

Phase	Quantity and Equipment Type [1]	Lmax at 50 feet (dB) [2, 3]	Usage Factor (U.F.) [4]	Leq at 50 feet (dB) [5]
Demolition	1 Concrete/Industrial Saw	90	20	83
	2 Dozers	82	40	78
	3 Excavators	81	40	77
Site Preparation	3 Dozers	85	40	81
	4 Tractor/Loader/Backhoes	78	40	74
Grading	2 Excavators	81	40	77
	1 Grader	85	40	81
	1 Dozer	82	40	78
	2 Scrapers	84	40	80
	2 Loaders	79	40	75
	2 Tractor/Loader/Backhoes	78	40	74
Building Construction	1 Crane	81	16	73
	1 Pile Vibration Rig	101	20	94
	3 Forklifts	75	20	68
	1 Generator Set	81	50	78
	3 Tractor/Loader/Backhoes	78	40	74
	1 Concrete Pump	81	50	78
	1 Welder	74	40	70
Paving	2 Pavers	77	50	74
	2 Paving Equipment	83	20	76
	2 Rollers	80	20	73
Architectural Coating	1 Compressor	78	40	74

[1] Construction Equipment List from IMT Residential, October 25, 2021.
[2] Noise levels are for individual equipment pieces. Each piece of equipment would operate at a distance from other equipment.
[3] Source: Federal Highway Administration, Roadway Construction Noise Model User's Guide, January 2006.
[4] Usage Factor (U.F.) is the portion of time equipment is operating at full power.

The highest construction noise levels would be generated by vibratory pile driving during the building construction phase. The average noise levels from construction equipment at the nearest property line of the closest sensitive receptor location, which is the Little Dreamers Early Childhood preschool, are shown below in **Table 6-2, Construction Equipment Noise Levels at Nearest Sensitive Receptor**. These noise levels are based on the previously described FHWA RCNM with an individual piece of construction equipment operating at the edge of construction activity.

Table 6-2
Construction Equipment Noise Levels at Nearest Sensitive Receptors

Receptor	Phase	Equipment	Leq at 50 feet (dB) [a]	Distance (ft) [b]	Construction Equipment Noise Level (dB Leq)	Existing Ambient Noise Level (dB Leq)	With Project Construction Noise Level (dB Leq)	Project Construction Related Noise Increase (dB)	Significant Increase?
Little Dreamers Early Childhood Preschool	Demolition	Concrete Saw	83	15	93	47.3	93.5	**46.2**	Yes
		Dozer	78	15	88	47.3	88.5	**41.2**	Yes
		Excavator	77	15	87	47.3	87.5	**40.2**	Yes
	Site Preparation	Dozer	78	15	88	47.3	88.5	**41.2**	Yes
		Backhoe	74	15	84	47.3	84.5	**37.2**	Yes
	Grading	Excavator	77	15	87	47.3	87.5	**40.2**	Yes
		Grader	81	15	91	47.3	91.5	**44.2**	Yes
		Dozer	78	15	88	47.3	88.5	**41.2**	Yes
		Scraper	80	15	90	47.3	90.5	**43.2**	Yes
		Front End Loader	75	15	85	47.3	85.5	**38.2**	Yes
		Backhoe	74	15	84	47.3	84.5	**37.2**	Yes
	Building Construction	Crane	73	75	70	47.3	69.5	**22.2**	Yes
		Vibratory Pile Driver	94	75	90	47.3	90.5	**43.2**	Yes
		Man Lift	68	75	64	47.3	64.6	**17.3**	Yes
		Generator	78	75	74	47.3	74.5	**27.2**	Yes
		Backhoe	74	75	70	47.3	70.5	**23.2**	Yes
		Pumps	78	75	74	47.3	74.5	**27.2**	Yes
		Welder/Torch	70	75	66	47.3	66.6	**19.3**	Yes
	Paving	Paver	74	15	84	47.3	84.4	**37.1**	Yes
		Compactor	76	15	86	47.3	86.5	**39.2**	Yes
		Roller	73	15	83	47.3	83.5	**36.2**	Yes
	Architectural Coating	Compressor (air)	74	75	70	47.3	70.5	**23.2**	Yes
Single Family		Concrete Saw	83	120	75	57.9	75.5	**17.6**	Yes

Receptor	Phase	Equipment	Leq at 50 feet (dB) [a]	Distance (ft) [b]	Construction Equipment Noise Level (dB Leq)	Existing Ambient Noise Level (dB Leq)	With Project Construction Noise Level (dB Leq)	Project Construction Related Noise Increase (dB)	Significant Increase?
Residence at 3152 Foothill Drive and Other Single-Family Residences on Foothill Drive, South of Fairview Road	Demolition	Dozer	78	120	70	57.9	70.7	**12.8**	Yes
		Excavator	77	120	69	57.9	69.7	**11.8**	Yes
	Site Preparation	Dozer	78	120	70	57.9	70.7	**12.8**	Yes
		Backhoe	74	120	66	57.9	67.0	9.1	No
	Grading	Excavator	77	120	69	57.9	69.7	**11.8**	Yes
		Grader	81	120	73	57.9	73.5	**15.6**	Yes
		Dozer	78	120	70	57.9	70.7	**12.8**	Yes
		Scraper	80	120	72	57.9	72.6	**14.7**	Yes
		Front End Loader	75	120	67	57.9	67.9	**10.0**	Yes
		Backhoe	74	120	66	57.9	67.0	9.1	No
	Building Construction	Crane	73	145	64	57.9	64.8	6.9	No
		Vibratory Pile Driver	94	145	85	57.9	84.8	**26.9**	Yes
		Man Lift	68	145	59	57.9	61.4	3.5	No
		Generator	78	145	69	57.9	69.1	**11.2**	Yes
		Backhoe	74	145	65	57.9	65.6	7.7	No
		Pumps	78	145	69	57.9	69.1	**11.2**	Yes
		Welder/Torch	70	145	61	57.9	62.6	4.7	No
	Paving	Paver	74	120	66	57.9	67.0	9.1	No
		Compactor (ground)	76	120	68	57.9	68.8	**10.9**	Yes
		Roller	73	120	65	57.9	66.1	8.2	No
	Architectural Coating	Compressor (air)	74	145	65	57.9	65.6	7.7	No
Single Family		Concrete Saw	83	95	77	56.6	77.5	**20.9**	Yes

Receptor	Phase	Equipment	Leq at 50 feet (dB) [a]	Distance (ft) [b]	Construction Equipment Noise Level (dB Leq)	Existing Ambient Noise Level (dB Leq)	With Project Construction Noise Level (dB Leq)	Project Construction Related Noise Increase (dB)	Significant Increase?
Residence at 3168 Foothill Drive and The Verona Multifamily Residences at 3200 Foothill Drive	Demolition	Dozer	78	95	72	56.6	72.6	**16.0**	Yes
		Excavator	77	95	71	56.6	71.6	**15.0**	Yes
	Site Preparation	Dozer	78	95	72	56.6	72.6	**16.0**	Yes
		Backhoe	74	95	68	56.6	68.7	**12.1**	Yes
	Grading	Excavator	77	95	71	56.6	71.6	**15.0**	Yes
		Grader	81	95	75	56.6	75.5	**18.9**	Yes
		Dozer	78	95	72	56.6	72.6	**16.0**	Yes
		Scraper	80	95	74	56.6	74.5	**17.9**	Yes
		Front End Loader	75	95	69	56.6	69.7	**13.1**	Yes
		Backhoe	74	95	68	56.6	68.7	**12.1**	Yes
	Building Construction	Crane	73	150	63	56.6	64.3	7.7	No
		Vibratory Pile Driver	94	150	84	56.6	84.5	**27.9**	Yes
		Man Lift	68	150	58	56.6	60.6	4.0	No
		Generator	78	150	68	56.6	68.7	**12.1**	Yes
		Backhoe	74	150	64	56.6	65.1	8.5	No
		Pumps	78	150	68	56.6	68.7	**12.1**	Yes
		Welder/Torch	70	150	60	56.6	62.0	5.4	No
	Paving	Paver	74	95	68	56.6	68.7	**12.1**	Yes
		Compactor (ground)	76	95	70	56.6	70.6	**14.0**	Yes
		Roller	73	95	67	56.6	67.8	**11.2**	Yes
	Architectural Coating	Compressor (air)	74	150	64	56.6	65.1	8.5	No
Windsor		Concrete Saw	83	20	91	57.4	91.0	**33.6**	Yes

Receptor	Phase	Equipment	Leq at 50 feet (dB) [a]	Distance (ft) [b]	Construction Equipment Noise Level (dB Leq)	Existing Ambient Noise Level (dB Leq)	With Project Construction Noise Level (dB Leq)	Project Construction Related Noise Increase (dB)	Significant Increase?
Terrace of Westlake Village Convalescent Home	Demolition	Dozer	78	20	86	57.4	86.0	**28.6**	Yes
		Excavator	77	20	85	57.4	85.0	**27.6**	Yes
	Site Preparation	Dozer	78	20	86	57.4	86.0	**28.6**	Yes
		Backhoe	74	20	82	57.4	82.0	**24.6**	Yes
	Grading	Excavator	77	20	85	57.4	85.0	**27.6**	Yes
		Grader	81	20	89	57.4	89.0	**31.6**	Yes
		Dozer	78	20	86	57.4	86.0	**28.6**	Yes
		Scraper	80	20	88	57.4	88.0	**30.6**	Yes
		Front End Loader	75	20	83	57.4	83.0	**25.6**	Yes
		Backhoe	74	20	82	57.4	82.0	**24.6**	Yes
	Building Construction	Crane	73	20	81	57.4	81.0	**23.6**	Yes
		Vibratory Pile Driver	94	70	91	57.4	91.1	**33.7**	Yes
		Man Lift	68	70	65	57.4	65.8	8.4	No
		Generator	78	70	75	57.4	75.1	**17.7**	Yes
		Backhoe	74	70	71	57.4	71.3	**13.9**	Yes
		Pumps	78	70	75	57.4	75.1	**17.7**	Yes
		Welder/Torch	70	70	67	57.4	67.5	**10.1**	Yes
	Paving	Paver	74	20	82	57.4	82.0	**24.6**	Yes
		Compactor (ground)	76	20	84	57.4	84.0	**26.6**	Yes
		Roller	73	20	81	57.4	81.0	**23.6**	Yes
	Architectural Coating	Compressor (air)	74	70	71	57.4	71.3	**13.9**	Yes
Westlake Villas	Demolition	Concrete Saw	83	140	74	56.6	74.1	**17.5**	Yes
		Dozer	78	140	69	56.6	69.3	**12.7**	Yes

Receptor	Phase	Equipment	Leq at 50 feet (dB) [a]	Distance (ft) [b]	Construction Equipment Noise Level (dB Leq)	Existing Ambient Noise Level (dB Leq)	With Project Construction Noise Level (dB Leq)	Project Construction Related Noise Increase (dB)	Significant Increase?
Multifamily Residences, 575 Hampshire Road		Excavator	77	140	68	56.6	68.4	**11.8**	Yes
	Site Preparation	Dozer	78	140	69	56.6	69.3	**12.7**	Yes
		Backhoe	74	140	65	56.6	65.7	9.1	No
	Grading	Excavator	77	140	68	56.6	68.4	**11.8**	Yes
		Grader	81	140	72	56.6	72.2	**15.6**	Yes
		Dozer	78	140	69	56.6	69.3	**12.7**	Yes
		Scraper	80	140	71	56.6	71.2	**14.6**	Yes
		Front End Loader	75	140	66	56.6	66.5	9.9	No
		Backhoe	74	140	65	56.6	65.7	9.1	No
	Building Construction	Crane	73	160	63	56.6	63.8	7.2	No
		Vibratory Pile Driver	94	160	84	56.6	83.9	**27.3**	Yes
		Man Lift	68	160	58	56.6	60.3	3.7	No
		Generator	78	160	68	56.6	68.2	**11.6**	Yes
		Backhoe	74	160	64	56.6	64.7	8.1	No
		Pumps	78	160	68	56.6	68.2	**11.6**	Yes
		Welder/Torch	70	160	60	56.6	61.6	5.0	No
	Paving	Paver	74	140	65	56.6	65.6	9.0	No
		Compactor (ground)	76	140	67	56.6	67.4	**10.8**	Yes
		Roller	73	140	64	56.6	64.8	8.2	No
	Architectural Coating	Compressor (air)	74	160	64	56.6	64.7	8.1	No

Source: Envicom Corporation, January 31, 2022 and Federal Highway Administration, Roadway Construction Noise Model.
[a] Noise levels are for individual equipment pieces. Each piece of equipment would operate at a distance from other equipment.
[b] Distance from the edge of a given construction activity to the sensitive receptor building.
Note: Numbers in bold exceed significance thresholds.

Based on the noise levels in Table 6-2, construction activity noise levels at the Little Dreamers Early Childhood preschool would be up to 93 dB Leq when vibratory pile driving occurs at the project boundary. The building would be expected to have an exterior-to-interior noise reduction of 12 dB with windows open and 24 dB with windows closed, assuming typical warm climate construction.[7] Therefore, interior noise levels at the nearest noise-sensitive receptor would reach up to 81 dB Leq with windows open and 69 dB Leq with windows closed. All other nearby noise-sensitive receptors would experience lower construction noise levels because they are further away from the construction activity. In addition to the receptors shown on Table 6-2, construction activity noise levels would also be audible at more distant sensitive receptors in the project vicinity. The modeled existing traffic noise levels which are discussed later in the report, were used to estimate existing noise levels at these receptors, considering distance attenuation from the roadways. **Table 6-3, Maximum Construction Equipment Noise Levels at Additional Sensitive Receptors** shows the maximum noise levels and noise level increases in these areas when the loudest piece of equipment, the vibratory pile driver operates at the nearest edge of construction activity for the building construction phase.

[7] U.S. Environmental Protection Agency, Protective Noise Levels: Condensed Version of EPA Levels Document, November 1978.

Table 6-3
Maximum Construction Equipment Noise Levels at Additional Sensitive Receptors

Receptor	Equipment	Leq at 50 feet (dB) [a]	Distance (ft) [b]	Reduction of Construction Noise from Intervening Building Rows [c]	Construction Equipment Noise Level (dB Leq)	Existing Ambient Noise Level (dB Leq) [d]	With Project Construction Noise Level (dB Leq)	Project Construction-Related Noise Increase (dB)	Significant Increase?
Single Family Residences on Fairview Road, west of Foothill Drive and on Fairview Fire Road	Vibratory Pile Driver	94	445	6.0	69.0	61.0	69.6	8.6	No
Single Family Residences on Foothill Drive, North of Fairview Road	Vibratory Pile Driver	94	380	4.5	71.9	62.6	72.4	9.8	No
Single Family Residences at the Cul-de-sac of Coral Ridge Court	Vibratory Pile Driver	94	650	4.5	67.2	56.1	67.5	**11.4**	Yes
The Meadows at Westlake Village Multifamily Residences, 603 Hampshire Road	Vibratory Pile Driver	94	580	7.5	65.2	57.2	65.8	8.6	No

Source: Envicom Corporation, January 31, 2022 and Federal Highway Administration, Roadway Construction Noise Model.

[a] Noise levels are for individual equipment pieces. Each piece of equipment would operate at a distance from other equipment.

[b] Distance from the edge of a given construction activity to the sensitive receptors.

[c] Construction noise level reduction from building rows in between the construction activity and receptors were estimated based on FTA guidance, which suggests a 4.5 dB reduction for the first row of intervening buildings and an additional 1.5 dB reduction for each subsequent row, up to a maximum of 10 dB (Federal Transit Administration, Office of Planning and Environment, Transit Noise and Vibration Impact Assessment Manual, September 2018).

[d] Existing ambient noise levels are based on modeled traffic noise levels (which are discussed later in the report), for the dominant noise source in each location, with appropriate distance attenuation. It is assumed that 101 Freeway would be the dominant noise source for the receptors in this table, except for The Meadows at Westlake Village Multifamily Residences, where the dominant source would be traffic on Hampshire Road.

Note: Numbers in bold exceed significance thresholds.

The City Municipal Code does not specify a numerical limit on construction noise, unless it occurs from 7:00 p.m. to 7:00 a.m., or at any time on a Sunday. As nighttime construction is not anticipated, project construction would comply with TOMC Section 8-11.01 and TOMC Section 4-3.804(a). In the absence of City thresholds for substantial temporary noise increases, this analysis uses a threshold of a 10 dB increase above ambient noise levels, which humans perceive as a doubling of noise levels. As Table 6-2 shows, project construction equipment during all construction phases would increase noise levels at the nearest sensitive receptors by 10 dB or more, which humans perceive as a doubling of loudness. Therefore, a significant temporary construction-related noise impact would occur. A temporary construction noise barrier would not be effective for some of the receptors because the Early Childhood facility and the residences west of the project site on Foothill Drive are elevated approximately 30 feet to 40 feet above the project site, and therefore a feasible construction noise barrier would not be tall enough to block line of sight from the project construction equipment to these receptors. The single-family residences at the cul-de-sac of Coral Ridge Court are also substantially elevated above the project site. In addition, the magnitude of the project's temporary construction noise levels relative to the ambient levels is such that even a maximally-effective noise barrier would not feasibly reduce project construction-related noise increases to below the 10 dB increase threshold during the whole constriction period. As such, construction noise impacts would be significant and unavoidable at these receptors.

A temporary construction noise barrier would, however, provide a benefit to the Westlake Villas multifamily residences to the south, which are similar in elevation to the project site, and the Windsor Terrace of Westlake Village convalescent home, which is approximately five feet above the project site. Therefore, a temporary construction barrier would be placed along the southern edge of the project site facing the Westlake Villas multifamily residences at 575 Hampshire Road and along the northwestern edge of the project site facing the Windsor Terrace of Westlake Village convalescent home at 250 Fairview Road as Mitigation Measure **NOI-1**, discussed below.

Mitigation Measure

NOI-1: Temporary construction barriers along the southern edge of the project site facing the Westlake Villas multifamily residences at 575 Hampshire Road and along the northwestern edge of the project facing the Windsor Terrace of Westlake Village convalescent home at 250 Fairview Road shall be in place during the Project construction (including demolition, grading, and site preparation), when heavy construction equipment is used, excluding areas where gaps in the barrier are necessary for access. The barrier shall be least 12 feet in height above the project site existing grade level and constructed of a material with a Sound Transmission Class (STC) rating of at least STC-31 (such as acoustic panels or sound barrier products) or a transmission loss of at least 21 decibels (dB) at 500 hertz (such as 3/4-inch plywood), which would provide an insertion loss (net barrier reduction) of up to 11 dB at the convalescent home and multifamily residences.

However, even with NOI-1, project construction noise increases in ambient noise levels would be greater than 10 dB at the Westlake Villas multifamily residences to the south when pile driving occurs during the building construction phase and at the Windsor Terrace of Westlake Village convalescent home during the demolition, site preparation, grading, building construction, and paving phases of construction, as shown on **Table 6-4, Mitigated Construction Equipment Noise Levels**. Therefore, construction noise impacts after mitigation would be significant and unavoidable at these receptors.

Table 6-4
Mitigated Construction Equipment Noise Levels

	Phase	Equipment	Construction Equipment Noise Level (dB Leq) [a]	Barrier Reduction (dB Leq) [b]	Mitigated Construction Equipment Noise Level (dB Leq)	Existing Ambient Noise Level (dB)	Mitigated With Project Construction Noise Level (dB Leq)	Mitigated Project Construction Related Noise Increase (dB)	Significant Increase?
Windsor Terrace of Westlake Village Convalescent Home	Demolition	Concrete Saw	91	10	81.0	57.4	81.0	**23.6**	Yes
		Dozer	86	10	76.0	57.4	76.0	**18.6**	Yes
		Excavator	85	10	75.0	57.4	75.1	**17.7**	Yes
	Site Preparation	Dozer	86	10	76.0	57.4	76.0	**18.6**	Yes
		Backhoe	82	10	72.0	57.4	72.1	**14.7**	Yes
	Grading	Excavator	85	10	75.0	57.4	75.1	**17.7**	Yes
		Grader	89	10	79.0	57.4	79.0	**21.6**	Yes
		Dozer	86	10	76.0	57.4	76.0	**18.6**	Yes
		Scraper	88	10	78.0	57.4	78.0	**20.6**	Yes
		Front End Loader	83	10	73.0	57.4	73.1	**15.7**	Yes
		Backhoe	82	10	72.0	57.4	72.1	**14.7**	Yes
	Building Construction	Crane	81	10	71.0	57.4	71.2	**13.8**	Yes
		Vibratory Pile Driver	91	10	81.1	57.4	81.1	**23.7**	Yes
		Man Lift	65	10	55.8	57.4	59.7	2.3	No
		Generator	75	10	65.1	57.4	65.8	8.4	No
		Backhoe	71	10	61.3	57.4	62.8	5.4	No
		Pumps	75	10	65.1	57.4	65.8	8.4	No
		Welder/Torch	67	10	57.5	57.4	60.5	3.1	No
	Paving	Paver	82	10	72.0	57.4	72.1	**14.7**	Yes
		Compactor (ground)	84	10	74.0	57.4	74.1	**16.7**	Yes
		Roller	81	10	71.0	57.4	71.2	**13.8**	Yes
	Architectural Coating	Compressor (air)	71	10	61.3	57.4	62.8	5.4	No
	Demolition	Concrete Saw	74	11	63.1	56.6	64.0	7.4	No
		Dozer	69	11	58.3	56.6	60.6	4.0	No

	Phase	Equipment	Construction Equipment Noise Level (dB Leq) [a]	Barrier Reduction (dB Leq) [b]	Mitigated Construction Equipment Noise Level (dB Leq)	Existing Ambient Noise Level (dB)	Mitigated With Project Construction Noise Level (dB Leq)	Mitigated Project Construction Related Noise Increase (dB)	Significant Increase?
Westlake Villas Multifamily Residences, 575 Hampshire Road		Excavator	68	11	57.4	56.6	60.0	3.4	No
	Site Preparation	Dozer	69	11	58.3	56.6	60.6	4.0	No
		Backhoe	65	11	54.7	56.6	58.7	2.1	No
	Grading	Excavator	68	11	57.4	56.6	60.0	3.4	No
		Grader	72	11	61.2	56.6	62.5	5.9	No
		Dozer	69	11	58.3	56.6	60.6	4.0	No
		Scraper	71	11	60.2	56.6	61.8	5.2	No
		Front End Loader	66	11	55.5	56.6	59.1	2.5	No
		Backhoe	65	11	54.7	56.6	58.7	2.1	No
	Building Construction	Crane	63	11	52.8	56.6	58.1	1.5	No
		Vibratory Pile Driver	84	11	72.9	56.6	73.0	**16.4**	Yes
		Man Lift	58	11	49.3	56.6	57.3	0.7	No
		Generator	68	11	57.2	56.6	59.9	3.3	No
		Backhoe	64	11	53.7	56.6	58.4	1.8	No
		Pumps	68	11	57.2	56.6	59.9	3.3	No
		Welder/Torch	60	11	50.6	56.6	57.6	1.0	No
	Paving	Paver	65	11	54.6	56.6	58.7	2.1	No
		Compactor (ground)	67	11	56.4	56.6	59.5	2.9	No
		Roller	64	11	53.8	56.6	58.4	1.8	No
	Architectural Coating	Compressor (air)	64	11	53.7	56.6	58.4	1.8	No

Source: Envicom Corporation, January 31, 2022 and Federal Highway Administration, Roadway Construction Noise Model.

[a] Noise levels are for individual equipment pieces. Each piece of equipment would operate at a distance from other equipment.

[b] Insertion loss (net barrier reduction) from a 12-foot-tall barrier using equations from U.S. Department of Transportation, Federal Transit Administration, Office of Planning and Environment, Transit Noise and Vibration Impact Assessment Manual, FTA Report No. 0123, September 2018.

Note: Numbers in bold exceed significance thresholds.

In addition to MM NOI-1, the mitigation measures **NOI-2 through NOI-9** shall be implemented to further reduce construction noise or address community response to the construction noise. While some of these mitigation measures would further reduce noise levels, the level of noise reduction form those measures cannot be quantitatively predicated in an accurate manner and temporary construction impacts would remain significant and unavoidable.

NOI-2: Power construction equipment (including combustion engines), fixed or mobile, shall be equipped with state-of-the-art noise shielding and muffling devices (consistent with manufacturers' standards). All equipment shall be properly maintained to assure that no additional noise, due to worn or improperly maintained parts, would be generated.

NOI-3: To the extent feasible, grading and construction contractors shall use rubber-tired equipment rather than metal-tracked equipment.

NOI-4: To the extent feasible, the use of on-site electrical power shall be preferred to the use of stationary construction equipment such as generators or air compressors. If stationary construction equipment would be used on site for more than one hour in a day, such equipment shall be placed as far as possible from off-site sensitive receptors. Stationary construction equipment shall also be shielded by either noise blankets or by temporary noise barriers at least three feet taller and six feet wider than the noise source, to the extent feasible.

NOI-5: Construction staging and delivery areas shall be located as far as feasible from existing residences and shall be scheduled to take place from the mid-morning and mid-afternoon to take advantage of times when residential zones are less susceptible to annoyance from outside noise, to the extent feasible.

NOI-6: Project applicant shall post a notice at the construction site. The notice shall contain information on the type of project, anticipated duration of construction activity, and provide a phone number where people can register questions or complaints. The notice shall be posted no later than 72 hours prior to the planned activity, where feasible.

NOI-7: Based on areas of construction noise impacts, the Little Dreamers Early Childhood preschool, the Windsor Terrace of Westlake Village convalescent home, the single family residences and multifamily communities to the west (along Foothill Drive, south of Fairview Road), the Westlake Villas apartment community to the south, and the five first-row single-family residences on the cul-de-sac of Coral Ridge Court to the south shall be informed of the anticipated start date, duration, noise impact, and other pertinent information prior to the construction of the project. Notification shall also include a phone number where people can register questions or complaints. Notification shall also be delivered no later than 72 hours prior to the planned activity, where feasible.

NOI-8: An on-site construction manager shall be responsible for responding to local complaints about construction noise. All notices that are sent to sensitive receptors identified in MM NOI-7 and all signs posted at the construction site shall list the telephone number for the on-site construction manager.

NOI-9: Construction supervisors shall be informed of project-specific noise requirements, noise issues for sensitive land uses adjacent to and near the project construction Site, and/or equipment operations to ensure compliance with the required regulations and best practices.

Operation

Traffic Noise

Upon completion, project-generated vehicle trips would cause an incremental increase in traffic noise levels on local streets throughout the project area. Doubling the number of noise sources would produce a 3 dB increase in the noise level. Therefore, a doubling of traffic volumes would generally be required to result in a 3 dB increase in noise, which considered the level at which a noise level increase is readily perceptible in an outdoor environment. As Table 3-2 shows, project operations would have a significant impact on noise levels if the cumulative with project noise level causes, 1) an increase of 3 dB or more above existing ambient noise levels to or within 55-60 dB CNEL, 2) an increase of 1.5 dB or more above existing ambient noise levels to or within 60-70 dB CNEL, or 3) an increase of 1.0 dB or more above existing ambient noise to greater than 70 dB CNEL.

The draft Traffic Impact Analysis for the project and email communication provided traffic volumes on local roadways under existing conditions and the existing conditions plus project, buildout year (including cumulative projects), and buildout year plus project (including cumulative projects) scenarios.[8],[9] The PM peak-hour turn volumes from the Traffic Impact Analysis were tabulated into roadway segment volumes and multiplied by 10 to estimate Average Daily Trips (ADT) from peak hour trips. Existing ADT on the 101 Freeway (US 101) was obtained from Caltrans[10] and with project ADT was obtained by using the applicable project turn volumes from the project Traffic Impact Analysis. CNEL noise levels at a distance of 50 feet from the centerline of the outermost travel lane were modelled using the FHWA Highway Traffic Noise prediction model (FHWA RD-77-108) with the California Vehicle Noise emission levels (CalVeNo). Using these assumptions, **Table 6-5, Existing Year Traffic Noise Levels**, shows that traffic noise would increase 1.3 dB CNEL (to 55.5 dB CNEL) on Foothill Drive west of Hampshire Road, increase 0.5 dB CNEL or less (to 65 dB – 68.6 dB CNEL) on Hampshire Road, and increase 0.1 dB CNEL or less (to 51.2 dB CNEL to 80.1 dB CNEL) on all other roadway segments. These noise level increases would be below the City's noise thresholds which are a 3 dB or greater increase to 55 dB – 60 dB CNEL, a 1.5 dB or greater increase to 60 dB – 70 dB CNEL, or a 1 dB or greater increase to more than 70 dB CNEL. In addition, noise level increases of less than 3 dB would not be perceptible to the human ear in an outdoor environment and noise level increases of less than 1 dB would also not be perceptible to the human ear even in a controlled laboratory setting. Therefore, project-level traffic noise impacts would be less than significant.

[8] Iteris, Inc., Thousand Oaks Ranch Traffic Impact Analysis: Draft Report, January 11, 2022.
[9] Iteris, Inc., Email Communication, January 27, 2022.
[10] Caltrans, Traffic Census Program, Traffic Volumes: Annual Average Daily Traffic (AADT), accessed on January 17, 2022 at https://dot.ca.gov/-/media/dot-media/programs/traffic-operations/documents/census/aadt/2020-traffic-volumes.xlsx.

Table 6-5
Existing Year Traffic Noise Levels

Roadway Segment	Existing ADT [(a)]	Existing Traffic Noise Level (dB CNEL) [b]	Existing Plus Project ADT	Existing Plus Project Traffic Noise Level (dB CNEL) [b]	Existing Year Project-Related Traffic Noise Increase (dB CNEL)	Significance Threshold (dB) [c]	Significant Increase?
Conejo School Road, north of Thousand Oaks Boulevard	4,297	59.5	4,437	59.6	0.1	3.0	No
Conejo School Road, south of Thousand Oaks Boulevard	4,991	60.8	5,131	60.9	0.1	1.5	No
Hampshire Road, from Thousand Oaks Boulevard to US-101 NB Ramps	20,384	66.9	20,774	67.0	0.1	1.5	No
Hampshire Road, from US-101 NB Ramps to US-101 SB Ramps	20,517	66.0	21,807	66.3	0.3	1.5	No
Hampshire Road, from US-101 SB Ramps to Willow Lane	21,516	66.2	23,756	66.7	0.5	1.5	No
Hampshire Road, from Willow Lane to Foothill Drive	21,247	68.2	23,482	68.6	0.4	1.5	No
Hampshire Road, south of Foothill Drive	18,488	67.6	18,748	67.6	0.0	1.5	No
Hampshire Road, north of Westlake Boulevard	10,058	64.9	10,318	65.0	0.1	1.5	No
Agoura Road, south of Westlake Boulevard	15,505	68.4	15,635	68.5	0.1	1.5	No
Skyline Drive, north of Thousand Oaks Boulevard	4,807	58.9	4,937	59.0	0.1	3.0	No
Thousand Oaks Boulevard, west of Conejo School Road	14,539	64.5	14,679	64.6	0.1	1.5	No
Thousand Oaks Boulevard, from Conejo School Road to Skyline Drive	15,526	64.8	15,661	64.8	0.0	1.5	No
Thousand Oaks Boulevard, from Skyline Drive to Hampshire Road	20,083	65.6	20,343	65.6	0.0	1.5	No
Thousand Oaks Boulevard, east of Hampshire Road	18,825	65.3	18,955	65.3	0.0	1.5	No
Willow Lane, west of Hampshire Road	572	53.4	584	53.5	0.1	None	No

Roadway Segment	Existing ADT [(a)]	Existing Traffic Noise Level (dB CNEL) [b]	Existing Plus Project ADT	Existing Plus Project Traffic Noise Level (dB CNEL) [b]	Existing Year Project-Related Traffic Noise Increase (dB CNEL)	Significance Threshold (dB) [c]	Significant Increase?
Willow Lane, east of Hampshire Road	640	49.5	640	49.5	0.0	None	No
Foothill Drive, west of Hampshire Road	1,855	54.2	2,505	55.5	1.3	3.0	No
Foothill Drive, east of Hampshire Road	944	51.2	944	51.2	0.0	None	No
Westlake Blvd, west of Hampshire Road	22,091	63.9	22,221	63.9	0.0	1.5	No
Westlake Blvd, east of Hampshire Road	19,335	67.8	19,335	67.8	0.0	1.5	No
US-101, North of Hampshire Road	171,000	80.1	172,100	80.1	0.0	1.0	No
US-101, South of Hampshire Road	156,000	79.7	156,630	79.7	0.0	1.0	No

[(a)] Iteris, Inc., Thousand Oaks Ranch Traffic Impact Analysis: Draft Report, January 11, 2022.
[(b)] CNEL noise levels at a distance of 50 feet from the centerline of the outermost travel lane, modelled in FHWA RD-77-108.
[(c)] Based on the City's noise thresholds shown on Table 3-2, a significant impact may result if the change in noise levels to a noise-sensitive land use is 3.0 dB CNEL or greater at a noise-sensitive land use where with project noise level would be 55 dB CNEL – 60 dB CNEL, if the noise increase would be 1.5 dB CNEL or greater at a noise-sensitive land use where the with project noise level would be 60 dB CNEL – 70 dB CNEL, or the noise increase would be 1.0 dB CNEL or greater at a noise-sensitive land use where the with project noise level would be greater than 70 dB CNEL.

Table 6-6, Cumulative Traffic Noise Levels, shows the existing year traffic noise level, existing plus project traffic noise level, the project-related traffic noise increase, the buildout year traffic noise level, and the cumulative traffic noise increase. As Table 6-6 shows, the cumulative traffic noise increase would be 1.4 dB or less to 55.5 dB CNEL or less on Foothill Drive and the cumulative traffic noise increase on all other roadway segments would be 0.8 dB or less to levels ranging from 49.5 dB CNEL to 80.1 dB CNEL. These noise level increases would be below the City's noise thresholds of a 3 dB increase to 55 dB – 60 dB CNEL, a 1.5 dB increase to 60 dB – 70 dB CNEL, or a 1 dB increase to more than 70 dB CNEL. In addition, noise level increases of less than 3 dB would not be perceptible to the human ear in an outdoor environment and noise level increases of less than 1 dB would not be perceptible to the human ear even in a controlled laboratory setting. Therefore, cumulative traffic noise impacts would be less than significant.

Table 6-6
Cumulative Traffic Noise Levels

Roadway Segment	Existing ADT [a]	Existing Traffic Noise Level (dB CNEL) [b]	Existing Plus Project ADT	Existing Plus Project Traffic Noise Level (dB CNEL) [b]	Maximum Project-Related Traffic Noise Increase (dB CNEL)	Buildout Year WP ADT	Buildout Year WP Noise Level (dB CNEL) [b]	Cumulative Increase (dB CNEL) [c]	Cumulative Impact Threshold [d]	Cumulatively Significant Increase?
Conejo School Road, north of Thousand Oaks Boulevard	4,297	59.5	4,437	59.6	0.1	4,437	59.6	0.1	3.0	No
Conejo School Road, south of Thousand Oaks Boulevard	4,991	60.8	5,131	60.9	0.1	6,032	61.6	0.8	1.5	No
Hampshire Road, from Thousand Oaks Boulevard to US-101 NB Ramps	20,384	66.9	20,774	67.0	0.1	21,329	67.1	0.2	1.5	No
Hampshire Road, from US-101 NB Ramps to US-101 SB Ramps	20,517	66.0	21,807	66.3	0.3	22,198	66.4	0.4	1.5	No
Hampshire Road, from US-101 SB Ramps to Willow Lane	21,516	66.2	23,756	66.7	0.5	24,034	66.7	0.5	1.5	No
Hampshire Road, from Willow Lane to Foothill Drive	21,247	68.2	23,482	68.6	0.4	23,761	68.6	0.4	1.5	No
Hampshire Road, south of Foothill Drive	18,488	67.6	18,748	67.6	0.0	18,952	67.7	0.1	1.5	No
Hampshire Road, north of Westlake Boulevard	10,058	64.9	10,318	65.0	0.1	10,318	65.0	0.1	1.5	No
Agoura Road, south of Westlake Boulevard	15,505	68.4	15,635	68.5	0.1	15,635	68.5	0.1	1.5	No
Skyline Drive, north of Thousand Oaks Boulevard	4,807	58.9	4,937	59.0	0.1	4,937	59.0	0.1	3.0	No
Thousand Oaks Boulevard, west of Conejo School Road	14,539	64.5	14,679	64.6	0.1	16,061	65.0	0.5	1.5	No
Thousand Oaks Boulevard, from Conejo School Road to Skyline Drive	15,526	64.8	15,661	64.8	0.0	16,771	65.1	0.3	1.5	No
Thousand Oaks Boulevard, from Skyline Drive to Hampshire Road	20,083	65.6	20,343	65.6	0.0	21,456	65.8	0.2	1.5	No
Thousand Oaks Boulevard, east of Hampshire Road	18,825	65.3	18,955	65.3	0.0	20,059	65.5	0.2	1.5	No
Willow Lane, west of Hampshire Road	572	53.4	584	53.5	0.1	584	53.5	0.1	None	No
Willow Lane, east of Hampshire Road	640	49.5	640	49.5	0.0	640	49.5	0.0	None	No
Foothill Drive, west of Hampshire Road	1,855	54.2	2,505	55.5	1.3	2,580	55.6	1.4	3.0	No

Roadway Segment	Existing ADT [a]	Existing Traffic Noise Level (dB CNEL) [b]	Existing Plus Project ADT	Existing Plus Project Traffic Noise Level (dB CNEL) [b]	Maximum Project-Related Traffic Noise Increase (dB CNEL)	Buildout Year WP ADT	Buildout Year WP Noise Level (dB CNEL) [b]	Cumulative Increase (dB CNEL) [c]	Cumulative Impact Threshold [d]	Cumulatively Significant Increase?
Foothill Drive, east of Hampshire Road	944	51.2	944	51.2	0.0	944	51.2	0.0	None	No
Westlake Boulevard, west of Hampshire Road	22,091	63.9	22,221	63.9	0.0	22,231	63.9	0.0	1.5	No
Westlake Boulevard, east of Hampshire Road	19,335	67.8	19,335	67.8	0.0	19,345	67.8	0.0	1.5	No
US-101, North of Hampshire Road	171,000	80.1	172,100	80.1	0.0	172,100	80.1	0.0	1.0	No
US-101, South of Hampshire Road	156,000	79.7	156,630	79.7	0.0	156,630	79.7	0.0	1.0	No

(a) Iteris, Inc., Thousand Oaks Ranch Traffic Impact Analysis: Draft Report, January 11, 2022 and Iteris, Inc., Email Communication, January 27, 2022.
(b) CNEL noise levels at a distance of 50 feet from the centerline of the outermost travel lane, modelled in FHWA RD-77-108.
(c) Buildout Year Plus Project traffic noise level minus Existing Year traffic noise level.
(d) Based on the City's noise thresholds shown on column 2 of Table 3-2, a significant cumulative impact may result if the cumulative noise increase to a noise-sensitive land use is 3.0 dB CNEL or greater at a noise-sensitive land use where the cumulative with project noise level would be 55 dB CNEL – 60 dB CNEL, if the cumulative noise increase would be 1.5 dB CNEL or greater at a noise-sensitive land use where the cumulative with project noise level would be 60 dB CNEL – 70 dB CNEL, or the cumulative noise increase would be 1.0 dB CNEL or greater at a noise-sensitive land use where the cumulative with project noise level would be greater than 70 dB CNEL.

Heating, Ventilation, and Air Conditioning Noise

During operations, the project's rooftop Heating, Ventilation, and Air Conditioning (HVAC) units could potentially be a source of noise affecting existing ambient noise levels in the immediate vicinity. While project plans depict the HVAC units at the center of the roof with mechanical screening, some of the sensitive receptors are elevated by existing topography above the elevations of the proposed rooftop and mechanical screening. Noise levels generated by HVAC units used for similar residential and light commercial uses as the project are typically approximately 66 dB Leq at 3.28 feet (1 meter).

This analysis conservatively evaluates potential noise effects from the nearest buildings to the sensitive receptors in the event that all HVAC units would operate simultaneously, although actual HVAC use would depend on weather conditions, occupancy, and occupant preferences. Noise levels from the project's HVAC at the nearest residences are shown on **Table 6-7, HVAC Noise Levels at Nearest Residences**.

At the closest noise-sensitive land use, the preschool, a combined HVAC noise level of 54.9 dB would result in an increase of 2.4 dB above the ambient noise level of 56.2 dB CNEL at ST-4, resulting in a new noise level of 58.6 dB CNEL.[11] This noise level increase of 2.4 dB would be below the City's threshold of a 3 dB or more increase for areas that experience a noise level of 55 dB CNEL to 60 dB CNEL with the project, which is applicable at this receptor location based on measured existing noise levels. In addition, a noise level of less than 3 dB would not be perceptible to the human ear in an outdoor environment.

Table 6-7
HVAC Noise Levels at Nearest Residences

Receptor	Reference HVAC Noise Level at 3.28 feet (dB)	# of Units	Composite Noise Level (dB Leq)	Average Distance to Receptor (ft)	Distance Attenuation (dB)	Parapet/ Roofline Reduction (dB)	Noise Level (dB Leq)	Noise Level (dB CNEL) [1]
Windsor Terrace of Westlake Village Convalescent Home	66 [a]	5	73.0	99	29.6	8 [b]	35.4	
	66	5	73.0	176	34.6	8	30.4	
	66	5	73.0	184	35.0	8	30.0	
	66	5	73.0	196	35.5	8	29.5	
Total	**--**	**20**	**77.8**	**--**	**--**	**8**	**38.1**	**44.8**
Single Family Residence at 3152 Foothill Drive and Other Single-Family Residences on Foothill Drive, South of Fairview Road	66	5	73.0	257	37.9	0	35.1	
	66	5	73.0	239	37.3	0	35.7	
	66	6	73.8	165	34.1	0	39.7	
	66	6	73.8	189	35.2	0	38.6	
Total	--	**22**	**79.4**	**--**	**--**	**0**	**43.7**	**50.4**

[11] I.e., 10 • log(10^[54.9 dB/10] + 10^[56.2 dB/10]) = 58.6 dB; 58.6 dB – 56.2 dB = 2.4 dB

Receptor	Reference HVAC Noise Level at 3.28 feet (dB)	# of Units	Composite Noise Level (dB Leq)	Average Distance to Receptor (ft)	Distance Attenuation (dB)	Parapet/ Roofline Reduction (dB)	Noise Level (dB Leq)	Noise Level (dB CNEL) [1]
Single Family Residence at 3168 Foothill Drive and The Verona multifamily residences at 3200 Foothill Drive	66	5	73.0	181	34.9	0	38.1	
	66	5	73.0	174	34.5	0	38.5	
	66	5	73.0	197	35.6	0	37.4	
	66	5	73.0	216	36.4	0	36.6	
Total	--	**20**	**79.0**	**--**	**--**	**0**	**43.7**	**50.4**
Little Dreamers Early Childhood Preschool	66	5	73.0	95	29.2	0	43.8	
	66	6	73.8	101	29.8	0	44.0	
	66	6	73.8	169	34.2	0	39.5	
	66	6	73.8	168	34.2	0	39.6	
Total	**--**	**23**	**79.6**	**0**	**--**	**0**	**48.3**	**54.9**
Westlake Villas Apartments	66	6	73.8	191	35.3	8	30.5	
	66	6	73.8	292	39.0	8	26.8	
	66	6	73.8	293	39.0	8	26.7	
Total	**0**	**18**	**78.6**	**--**	**--**	**8**	**33.1**	**39.8**

[1] CNEL was calculated assuming 24 hours of continuous operation.

[a] York, 2019, Technical Guide: Single Package Air Conditioner / Electric Heat 14 Seer – R-410a – 460v - 3 Phase 3 Thru 5 Nominal Tons Models: PCE4*36 THRU 60. The sound power level (Lw) of 74 dB, is equivalent to a sound pressure level of 66 dB Leq at 3.28 feet, assuming half-spherical propagation of sound due to roof mounting.

[b] An 8 dB reduction from the mechanical screening was assumed, based on guidance from the Federal Highway Administration, Roadway Construction Noise Model User's Guide, January 2006.

At the closest residence at 3152 Foothill Drive, a combined HVAC noise level of 50.4 dB CNEL would result in an increase of 0.2 dB above the ambient noise level of 65.1 dB CNEL at ST-2, resulting in a new noise level of 65.3 dB CNEL.[12] This noise level increase of 0.2 dB would be below the City's threshold of a 1.5 dB or more increase for areas that experience a noise level of 65 dB CNEL to 70 dB CNEL with the project, which is applicable to this receptor location based on the with project noise levels. In addition, a noise increase of less than 1 dB would not be perceptible to the human ear, even in controlled laboratory conditions. All other residences and noise-sensitive land uses would experience lower project-related noise increases from HVAC because they are further away. Therefore, a substantial noise increase would not occur, and HVAC noise impacts would be less than significant.

Parking

The project would generate operational noise from parking, primarily in the form of intermittent noise levels from occasional events such as door slams. These intermittent noise levels would be similar to existing parking noise at surrounding multifamily residences, and commercial land uses, and on-street parking areas and to the historical use of the project site as a shopping center. In addition, the parking for the commercial uses and the proposed apartments would be enclosed by the structure of the building, which would reduce noise levels. Therefore, permanent increases in ambient noise levels related to on-site operational sources would be less than significant.

[12] I.e., 10 • log(10^[50.4 dB/10] + 10^[65.1 dB/10]) = 65.3 dB; 65.3 dB – 65.1 dB = 0.2 dB

Loading/Unloading and Garbage Pickup

The project would generate operational noise from truck loading and unloading for deliveries to the proposed commercial uses and garbage pickup for the commercial and residential uses. Truck deliveries for the proposed commercial uses and garbage pickup for the proposed commercial and apartment uses would be shielded by the structure of the project buildings, which would reduce noise levels at sensitive receptors to the north, south, and west. The occasional intermittent noise levels from garbage pickup at the proposed townhouses would be similar to existing garbage truck noise from surrounding land uses and would also be shielded by topography and/or retaining walls. In addition, traffic noise is the predominant noise source in the surrounding environment and intermittent higher noise levels would not substantially affect average noise levels. Therefore, permanent increases in ambient noise levels related to on-site truck loading and unloading and garbage pickup would be less than significant.

Landscape Maintenance Equipment

Project operations would include the use of powered landscaping equipment such as lawn mowers, backpack blowers, lawn edgers, and riding mowers. Contractors would reasonably be expected to conduct routine landscape maintenance during daytime hours, therefore avoiding the period when such powered equipment noise is restricted between 9:00 p.m. and 7:00 a.m. required by TOMC Section 5-21.02. As landscape maintenance noise would be regulated by the TOMC, landscape maintenance noise-related permanent increases in ambient noise levels would be less than significant.

Composite Operational Noise Levels

The various operational noise sources from the project may operate at the same time. The noise levels at the nearest noise sensitive receptors are shown on **Table 6-8, Composite Operational Noise Levels**. To calculate composite operational noise levels, the existing ambient noise levels were logarithmically added with noise levels from the project's HVAC from Table 6-7, and the cumulative traffic noise increase from Table 6-6 was then arithmetically added. As shown on Table 6-8, the resulting composite operational noise levels would be 57.8 dB CNEL at the Little Dreamers Early Childhood Preschool, where noise levels would increase by 1.6 dB. This noise level increase would not exceed the City threshold of a 3.0 dB or greater increase to 55 dB – 60 dB CNEL. In addition, a noise level increase of less than 3 dB would not be perceptible to the human ear in an outdoor environment. At the residential receptors, composite operational noise levels would be 65.1 dB – 65.5 dB CNEL and the noise level increases would be 0.4 dB or less. This noise increase would not exceed the City threshold of a 1.5 dB or greater increase to 60 dB – 70 dB CNEL. Additionally, noise level increases of less than 1 dB would not be perceptible to the human ear even in a controlled laboratory setting. Therefore, the project would have a less than significant impact related to permanent increases in ambient noise levels.

Table 6-8
Composite Operational Noise Levels

Receptor	Ambient Noise Level (dB CNEL)	HVAC Noise Level (dB CNEL)	Project Traffic Noise Increase (dB CNEL)	Composite Noise Level (dB CNEL)	Composite Project Increase (dB CNEL)	Threshold (dB) [b]	Significant Increase?
Windsor Terrace of Westlake Village Convalescent Home	65.2	50.4	0.0 [a]	65.3	0.1	1.5	No
Single Family Residence at 3152 Foothill Drive and Other Single-Family Residences on Foothill Drive, South of Fairview Road	65.1	50.4	0.0	65.2	0.1	1.5	No
Single Family Residence at 3168 Foothill Drive and The Verona multifamily residences at 3200 Foothill Drive	65.1	54.9	0.0	65.5	0.4	1.5	No
Little Dreamers Early Childhood Preschool	56.2	44.8	1.3	57.8	1.6	3.0	No
Westlake Villas Apartments	65.1	39.8	0.0	65.1	0.0	1.5	No

[a] While the project would increase noise levels on Foothill Drive, west of Hampshire Road, it is assumed that noise levels further west of the project driveway would not increase, because the project vehicle trips would travel east to the major intersection of Hampshire Road and Foothill Drive.

[b] Based on the City's noise thresholds shown on Table 3-2, a significant impact may result if the change in noise levels to a noise-sensitive land use is 3.0 dB CNEL or greater at a noise-sensitive land use where with project noise level would be 55 dB CNEL – 60 dB CNEL, if the noise increase would be 1.5 dB CNEL or greater at a noise-sensitive land use where the with project noise level would be 60 dB CNEL – 70 dB CNEL, or the noise increase would be 1.0 dB CNEL or greater at a noise-sensitive land use where the with project noise level would be greater than 70 dB CNEL.

Related projects would have a cumulative effect of traffic noise levels, as previously discussed. However, as the closest related project is approximately 1,000 ft to the southeast, non-traffic related operational noise sources such as HVAC from related projects would not be simultaneously audible at the sensitive receptors in the vicinity of the project site. **Table 6-9, Cumulative Composite Operational Noise Levels**, accounts for cumulative traffic noise to show cumulative composite operational noise levels. As shown on Table 6-9, the resulting cumulative composite operational noise levels would be 57.8 dB CNEL at the Little Dreamers Early Childhood Preschool, where noise levels would increase by 1.7 dB. This noise level increase would not exceed the City threshold of a 3.0 dB or greater increase to 55 dB – 60 dB. In addition, a noise level increase of less than 3 dB would not be perceptible to the human ear in an outdoor environment. At the residential receptors, cumulative composite operational noise levels would be 65.1 dB – 65.5 dB CNEL and the noise level increases would be 0.4 dB or less. This noise increase would not exceed the City threshold of a 1.5 dB or greater increase to 60 dB – 70 dB CNEL. Additionally, noise level increases of less than 1 dB would not be perceptible to the human ear even in a controlled laboratory setting. Therefore, the project would have a less than significant cumulative impact related to permanent increases in ambient noise levels.

Table 6-9
Cumulative Operational Noise Levels

Receptor	Ambient Noise Level (dB CNEL)	HVAC Noise Level (dB CNEL)	Cumulative Traffic Noise Increase (dB CNEL)	Composite Noise Level (dB CNEL)	Composite Project Increase (dB CNEL)	Threshold (dB) [b]	Significant Increase?
Windsor Terrace of Westlake Village Convalescent Home	65.2	50.4	0.0 [a]	65.3	0.1	1.5	No
Single Family Residence at 3152 Foothill Drive and Other Single-Family Residences on Foothill Drive, South of Fairview Road	65.1	50.4	0.0	65.2	0.1	1.5	No
Single Family Residence at 3168 Foothill Drive and The Verona multifamily residences at 3200 Foothill Drive	65.1	54.9	0.0	65.5	0.4	1.5	No
Little Dreamers Early Childhood Preschool	56.2	44.8	1.4	57.9	1.7	3.0	No
Westlake Villas Apartments	65.1	39.8	0.0	65.1	0.0	1.5	No

[a] While the project would increase noise levels on Foothill Drive, west of Hampshire Road, it is assumed that noise levels west of the project driveway would not increase, because the project vehicle trips would travel east to the major intersection of Hampshire Road and Foothill Drive.

[b] Based on the City's noise thresholds shown on Table 3-2, a significant cumulative impact may result if the cumulative noise increase to a noise-sensitive land use is 3.0 dB CNEL or greater at a noise-sensitive land use where the cumulative with project noise level would be 55 dB CNEL – 60 dB CNEL, if the cumulative noise increase would be 1.5 dB CNEL or greater at a noise-sensitive land use where the cumulative with project noise level would be 60 dB CNEL – 70 dB CNEL, or the cumulative noise increase would be 1.0 dB CNEL or greater at a noise-sensitive land use where the cumulative with project noise level would be greater than 70 dB CNEL.

6.2 Excessive Groundborne Vibration Impacts

Construction

Construction generates groundborne vibration when heavy equipment travels over unpaved surfaces or engages in soil movement; however, the ground surface dampens ground-borne vibration over a relatively short distance. The reference vibration levels at 25 feet between the source and receptor from the FTA Noise and Vibration Impact Assessment Manual may be used in the following formulas to calculate PPV in/sec for other distances.[13]

[13] Federal Transit Administration, Office of Planning and Environment, Transit Noise and Vibration Impact Assessment Manual, September 2018.

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

Where:

$PPV_{equipment}$ = peak particle velocity (PPV) in inches/second of the equipment adjusted for distance
PPV_{ref} = reference vibration level (PPV) in inches/second at 25 feet
D = distance from the equipment to the receiver
D = distance from the equipment to the receiver

The predicted vibration levels generated by construction equipment and potential associated impacts are provided in terms of PPV in/sec at the nearest structure in **Table 6-10, Groundborne Vibration from Project Construction Equipment at Nearest Structures**. The applicable criteria for potential vibration damage are 0.5 PPV in/sec for modern industrial/commercial buildings and new residential structures and 0.3 PPV in/sec for older residential structures. The ages of buildings were obtained from the Thousand Oaks Online Map, which showed that the single family residence at 3168 Foothill Drive was built in 2015 and the single family residence at 3152 Foothill Drive was built in 1952.[14] The applicable criterion for human response to intermittent or frequent vibration is 0.1 PPV in/sec for strong perceptibility.

The greatest vibration levels would be generated by vibratory/sonic pile driving equipment during building construction, which would generate vibration levels of 0.170 PPV in/sec at 25 feet. The off-site structure nearest to the project boundary is the All Eyecare Optometry medical office approximately 10 feet north of the project boundary and 25 feet north of the nearest proposed structure, where pile installation could occur. Vibration levels at this nearest structure would be below the applicable structural damage criteria for modern industrial/commercial buildings of 0.5 PPV in/sec, and therefore no vibration damage impact would occur, as shown on Table 6-10. The nearest newer residential structure, the single-family residence at 3168 Foothill Drive, would experience maximum vibration levels of 0.012 PPV in/sec, which are far below the applicable structural damage criteria for newer residential structures of 0.5 PPV in/sec, and therefore no vibration damage impact would occur, as shown on Table 6-10. The nearest older residential structure, the single-family residence at 3152 Foothill Drive, would experience maximum vibration levels of 0.012 PPV in/sec, which are far below the applicable structural damage criteria for older residential structures of 0.3 PPV in/sec, and therefore no vibration damage impact would occur, as shown on Table 6-10. All other structures for each category would experience lower vibration levels as they are further away. Therefore, vibration damage would not occur and structural damage potential from project construction vibration would be less than significant.

[14] City of Thousand Oaks, Thousand Oaks Online Map, accessed on October 25, 2021, at http://map.toaks.org/Html5Viewer/Index.html?Viewer=public.

Table 6-10
Groundborne Vibration from Project Construction Equipment at Nearest Structures

Receptor	Construction Equipment	Reference Vibration Levels at 25 ft	Attenuated Vibration Levels at Nearest Residence		Vibration Damage Impact Assessment		Vibration Annoyance Impact Assessment	
		PPV in/sec at 25 ft [1]	Distance (ft)	PPV in/sec	Potential Damage Threshold (PPV in/sec)	Exceed-ance?	Potential Annoyance Threshold (PPV in/sec) [2]	Exceed-ance?
Little Dreamers Early Childhood Preschool (South)	Pile Driver (sonic)	0.170	75 [a]	0.033	0.5	No	0.1	No
	Loaded Trucks	0.076	25 [b]	0.076	0.5	No	0.1	No
	Large Bulldozer	0.089	15 [c]	0.191	0.5	No	**0.1**	Yes
Windsor Terrace of Westlake Village Convalescent Home (North)	Pile Driver (sonic)	0.170	70	0.036	0.5	No	0.1	No
	Loaded Trucks	0.076	25	0.076	0.5	No	0.1	No
	Large Bulldozer	0.089	20	0.124	0.5	No	**0.1**	Yes
Single Family Residence at 3168 Foothill Drive (West)	Pile Driver (sonic)	0.170	150	0.012	0.5	No	0.1	No
	Loaded Trucks	0.076	95	0.010	0.5	No	0.1	No
	Large Bulldozer	0.089	95	0.012	0.5	No	0.1	No
Single Family Residence at 3152 Foothill Drive (West)	Pile Driver (sonic)	0.170	150	0.012	0.3	No	0.1	No
	Loaded Trucks	0.076	120	0.007	0.3	No	0.1	No
	Large Bulldozer	0.089	120	0.008	0.3	No	0.1	No
Multi-Family Residences (South)	Pile Driver (sonic)	0.170	160	0.010	0.5	No	0.1	No
	Loaded Trucks	0.076	140	0.006	0.5	No	0.1	No
	Large Bulldozer	0.089	140	0.007	0.5	No	0.1	No
All Eyecare Optometry (North)	Pile Driver (sonic)	0.170	25	0.170	0.5	No	**0.1**	Yes
	Loaded Trucks	0.076	25	0.076	0.5	No	0.1	No
	Large Bulldozer	0.089	10	0.352	0.5	No	**0.1**	Yes

Source: Calculations from Envicom Corporation, October 2021 based on Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, September 2018.

[1] Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, September 2018.

[2] Caltrans, Transportation and Construction Vibration Guidance Manual, April 2020.

[a] It is assumed that the distance between the proposed building footprints and the off-site structures would be the minimum distance for vibratory/sonic piledriving activity.

[b] It is anticipated that loaded trucks traveling on unpaved surfaces would not operate within 25 feet of off-site structures because they would not have to travel immediately adjacent to the site boundary.

[c] It is assumed that the distance between the limits of grading activity and the off-site structures would be the minimum distance for large bulldozers.

Note: Numbers in bold exceed significance thresholds.

However, vibration levels from vibratory/sonic pile driving and large bulldozers at All Eyecare Optometry, would be above the levels that would be strongly perceptible (i.e., 0.1 PPV, in/sec) and vibration annoyance and potential activity interference could therefore occur, as Table 6-10 shows. Vibration levels from vibratory pile driving would not exceed levels that would be strongly perceptible (i.e., 0.1 PPV, in/sec) at other receptors due to the greater distance from the proposed buildings. In addition, as Table 6-10 also shows, vibration levels at the Little Dreamers Early Childhood preschool and the Windsor Terrace of Westlake Village convalescent home would be strongly perceptible when large bulldozers operate close to the construction boundary and vibration annoyance could occur. Mitigation Measure **NOI-10** would reduce

vibration levels below those that would be strongly perceptible and could cause vibration annoyance to occur. Therefore, project construction would result in less than significant groundborne vibration levels below after mitigation.

Mitigation Measure

NOI-10 Construction Equipment Vibration Restrictions

- **Prior Notification**: As the All Eyecare Optometry medical office building could potentially experience temporary construction-related and intermittently "strongly perceptible" vibration from vibratory/sonic pile driving activity occurring within 36 feet of the building, the developer shall give prior notice to that facility of any such activity within that distance.
- **Equipment Usage**: Vibratory/sonic pile driving activity within 36 feet of All Eyecare Optometry shall be scheduled during times outside of its hours of operation. Large bulldozers or similar equipment shall not operate within 24 feet of Little Dreamers Early Childhood Preschool building, the Windsor Terrace of Westlake Village convalescent home, or the All Eyecare Optometry medical office building, with smaller equipment substituted within this distance.

Operation

After construction is complete and the proposed residential and commercial uses are in use, project operations would be similar to surrounding uses and would not include any sources of substantial groundborne vibration. Therefore, groundborne vibration from project operations would be further below applicable thresholds.

6.3 Airport Noise Impacts

A project located within two miles of a public airport or public use airport may result in a significant impact if a project would expose people residing or working in the project area to excessive noise levels. The nearest airport to the project site is Camarillo Airport, located approximately 14 miles to the west. Therefore, the project would not result in the exposure of residents or those working in the project area to excessive noise levels from a private airstrip or public airport.

7.0 CONCLUSIONS

7.1 Noise Impacts

Construction noise impacts would be significant and unavoidable after mitigation due to the level of temporary increase above existing ambient noise levels and the lack of feasible mitigation measures for some noise-sensitive receptors. The following mitigation measure would be required.

Mitigation Measure

NOI-1: Temporary construction noise barriers along the southern edge of the project site facing the Westlake Villas multifamily residences at 575 Hampshire Road and along the northwestern edge of the project facing the Windsor Terrace of Westlake Village convalescent home at 250 Fairview Road shall be in place during the Project construction (including demolition, grading, and site preparation), when heavy construction equipment is used, excluding areas where gaps in the barrier are necessary for access. The barrier shall be least 12 feet in height above the project site existing grade level and constructed of a material with a Sound Transmission Class (STC) rating of at least STC-31 (such as acoustic panels or sound barrier products) or a transmission loss of at least 21 decibels (dB) at 500 hertz (such as 3/4-inch plywood) which would provide an insertion loss (net barrier reduction) of up to 11 dB at the convalescent home and multifamily residences.

NOI-2: Power construction equipment (including combustion engines), fixed or mobile, shall be equipped with state-of-the-art noise shielding and muffling devices (consistent with manufacturers' standards). All equipment shall be properly maintained to assure that no additional noise, due to worn or improperly maintained parts, would be generated.

NOI-3: To the extent feasible, grading and construction contractors shall use rubber-tired equipment rather than metal-tracked equipment.

NOI-4: To the extent feasible, the use of on-site electrical power shall be preferred to the use of stationary construction equipment such as generators or air compressors. If stationary construction equipment would be used on site for more than one hour in a day, such equipment shall be placed as far as possible from off-site sensitive receptors. Stationary construction equipment shall also be shielded by either noise blankets temporary noise barriers at least three feet taller and six feet wider than the noise source, to the extent feasible.

NOI-5: Construction staging and delivery areas shall be located as far as feasible from existing residences and shall be scheduled to take place from the mid-morning and mid-afternoon to take advantage of times when residential zones are less susceptible to annoyance from outside noise, to the extent feasible.

NOI-6: Project applicant shall post a notice at the construction site. The notice shall contain information on the type of project, anticipated duration of construction activity, and provide a phone number where people can register questions or complaints. The notice shall be posted no later than 72 hours prior to the planned activity, where feasible.

NOI-7 Based on areas of construction noise impacts, the Little Dreamers Early Childhood preschool, the Windsor Terrace of Westlake Village convalescent home, the single family residences and

multifamily communities to the west (along Foothill Drive, south of Fairview Road), the Westlake Villas apartment community to the south, and the five first-row single-family residences on the cul-de-sac of Coral Ridge Court to the south shall be informed of the anticipated start date, duration, noise impact, and other pertinent information prior to the construction of the project. Notification shall also include a phone number where people can register questions or complaints. Notification shall also be delivered no later than 72 hours prior to the planned activity, where feasible.

NOI-8: An on-site construction manager shall be responsible for responding to local complaints about construction noise. All notices that are sent to the sensitive receptors identified in MM NOI-7 and all signs posted at the construction site shall list the telephone number for the on-site construction manager.

NOI-9: Construction supervisors shall be informed of project-specific noise requirements, noise issues for sensitive land uses adjacent to and near the project construction Site, and/or equipment operations to ensure compliance with the required regulations and best practices.

In addition, the following construction noise requirements from the Thousand Oaks Municipal Code would be applicable to the proposed project:

- In compliance with the Thousand Oaks Municipal Code Section 8-11.01, construction of the proposed project (including demolition and grading) would be restricted to between the hours 7:00 a.m. and 7:00 p.m. on Monday through Saturday.
- In compliance with the Thousand Oaks Municipal Code Section Sec. 4-3.804(a) construction vehicles propelled by an internal combustion engine on private property would be required to have state-approved spark arrestors or a noise-muffling device approved by the state.

Operational noise impacts from parking; loading/unloading and garbage pickup; and HVAC would be less than significant, and no mitigation measures would be required.

Operational noise impacts from landscaping equipment would be less than significant through regulatory compliance and no mitigation measures would be required. The following powered equipment noise requirements from the Thousand Oaks Municipal Code would be applicable to the proposed project:

- In compliance with the Thousand Oaks Municipal Code Section 5-21.02 the use of powered landscaping equipment would be restricted to between the hours of 7:00 a.m. and 9:00 p.m. within any residential zone or within any commercial zone which can be heard from any inhabited real property in a residential zone.

Operational traffic noise impacts from the project would be less than significant, and no mitigation measures would be required. Operational composite noise impacts would be less than significant, and no mitigation measures would be required.

Cumulative traffic noise impacts would be less than significant, and no mitigation measures would be required. Cumulative composite operational noise impacts would be less than significant, and no mitigation measures would be required.

7.2 Vibration Impacts

Construction vibration and operational vibration impacts would be less than significant with the following measure to reduce vibration.

Mitigation Measure

NOI-10 Construction Equipment Vibration Restrictions

- **Prior Notification**: As the All Eyecare Optometry medical office building could potentially experience temporary construction-related and intermittently "strongly perceptible" vibration from vibratory/sonic pile driving activity occurring within 36 feet of the building, the developer shall give prior notice to that facility of any such activity within that distance.

- **Equipment Usage**: Vibratory/sonic pile driving activity within 36 feet of All Eyecare Optometry shall be scheduled during times outside of its hours of operation. Large bulldozers or similar equipment shall not operate within 24 feet of Little Dreamers Early Childhood Preschool building, the Windsor Terrace of Westlake Village convalescent home, or the All Eyecare Optometry medical office building, with smaller equipment substituted within this distance.

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9.0 PREPARERS

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Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 02/04/2022
Case Description: Construction

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Reference Distance	Residential	65.0	60.0	55.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	50.0	0.0
Front End Loader	No	40		79.1	50.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	81.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	81.7	79.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A