# Appendix G

Noise and Vibration Impact Analysis

# NOISE AND VIBRATION IMPACT ANALYSIS

**23755 NEWHALL AVENUE APARTMENTS PROJECT**
**SANTA CLARITA, CA**

**Envicom Project # 2022-059-01**

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# 1.0 INTRODUCTION AND PROJECT SUMMARY

## 1.1 Purpose of Study

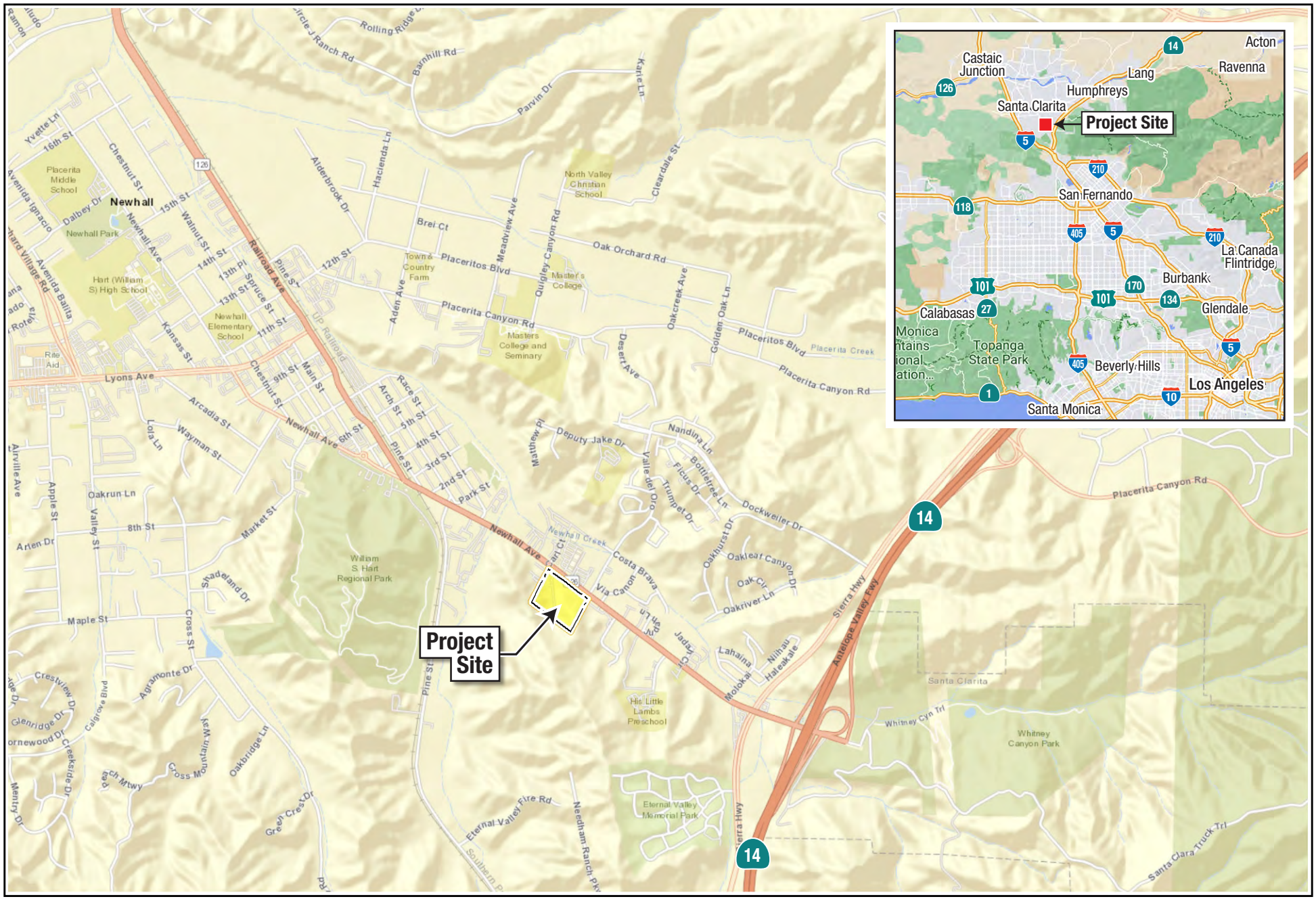
The purpose of this noise study is to analyze and evaluate noise and groundborne vibration impacts during construction and operation of the 23755 Newhall Avenue Apartments project (project) consistent with City of Santa Clarita (City) and California Environmental Quality Act (CEQA) requirements.

## 1.2 Project Summary

The proposed project would re-develop approximately 4.5 acres of the roughly 10-acre property, shown in **Figure 1, Regional Location Map**. The northeastern portion of the site that is located adjacent to Newhall Avenue is currently developed with a 8,578-square foot commercial structure, and paved areas. Recent uses on the site have included an automotive service/oil change facility and a used car sales lot. Two temporary modular/trailer mounted offices associated with the used car lot are also located on the site. The southwestern portion of the project site is currently generally vacant. Existing land uses adjacent to the project site consist of a convalescent home facility to the northwest, commercial/retail uses to the north, multifamily residential uses and commercial/retail uses to the east, undeveloped land planned for development of a business park, and single-family residences to the south. The project site is zoned MX-C (Mixed Use – Corridor).[1]

The project would construct a mixed-use residential and retail development on the subject property with a total of 106 units, including 70 apartments and 36 townhome units, distributed throughout the development area, and approximately 4,000 sf of retail as shown in **Figure 2, Conceptual Site Plan**. Parking spaces would also be provided within the site, including private garages within each of the townhome units, a parking garage level beneath the residential levels of the apartment building, and uncovered parking lot spaces for guests and customers of the commercial uses. Recreation amenities including a swimming pool and open space areas would be provided onsite. Access would be provided by two driveways from Newhall Avenue. Grading activities during construction would require approximately 25,000 to 50,000 cubic yards (cy) of soil to be exported from the project site.

[1] City of Santa Clarita, Zoning Map, November 2016, accessed on August 26, 2021 at https://www.santa-clarita.com/home/showdocument?id=6970.




Source: ESRI, World Street Map, 2021.



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# Regional Location Map

FEET 0 1,000 2,000

FIGURE 1


Aerial Source: Google Earth Pro, Feb. 28, 2021. Map Source: Alliance Land Planning & Engineering Inc., Oct. 28, 2022.



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# Conceptual Site Plan

FEET 0 75 150

FIGURE 2

# 2.0 NOISE AND VIBRATION FUNDAMENTALS

The following introduces fundamental definitions and concepts used to qualify and quantify noise and vibration used throughout this study.

## 2.1 Noise Characteristics

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 to describe the perceived "loudness" of an ambient sound level. The 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 keeps sound intensity numbers convenient and manageable. Generally, an increase of 3 dB is accepted as the minimum increase that is barely perceptible by humans outside of controlled laboratory conditions, while an increase of 5 dB is a readily perceptible increase and a 10 dB increase is perceived as twice as loud.[2] The ear is not equally sensitive to all sound frequencies within the spectrum, so sound pressure levels at maximum human sensitivity are factored more heavily into sound descriptions in a process called "A-weighting," written as dB(A). Subsequent references to decibels in this study written as "dB" should be understood as A-weighted.

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, additional dB increments are added to 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.

## 2.2 Vibration Characteristics

As described in the California Department of Transportation (Caltrans) Transportation and Construction Vibration Guidance Manual, the operation of construction equipment generates ground-borne vibration. Vehicles traveling on roadways can also be a source of such vibration. If its amplitudes are high enough, ground vibration has the potential to damage structures, cause cosmetic damage (e.g., crack plaster), or disrupt the operation of vibration-sensitive equipment such as electron microscopes. Ground vibration and ground-borne noise can also be a source of annoyance to individuals who live or work close to vibration-generating activities. Pile driving, demolition activity, blasting, and crack-and-seat operations are the primary sources of vibration.

Vehicles, including heavy trucks traveling on a highway, rarely generate vibration amplitudes high enough to cause structural or cosmetic damage. However, there have been cases in which heavy trucks traveling over potholes or other discontinuities in pavement have caused vibration high enough to result in complaints from nearby residents. These types of issues typically can be resolved by smoothing the roadway surface.

[2] California Department of Transportation, Division of Environmental Analysis, Technical Noise Supplement to the Traffic Noise Analysis Protocol, September 2013.

In describing vibration in the ground and in structures, the motion of a particle (i.e., a point in or on the ground or structure) is used. The concepts of particle displacement, velocity, and acceleration are used to describe how the ground or structure responds to excitation. Displacement is rarely used to describe ground and structure borne vibration because most transducers used to measure vibration directly measure velocity or acceleration, not displacement. Accordingly, vibratory motion is commonly described by identifying the peak particle velocity (PPV). PPV is the maximum instantaneous positive or negative peak of the vibration signal. PPV is generally accepted as the most appropriate descriptor for evaluating the potential for building damage.

# 3.0 REGULATORY SETTING

## 3.1 Federal Standards

*Federal Transit Administration*

The Federal Transit Administration Noise and Vibration Impact Assessment report may be used to calculate PPV at a given distance. When construction equipment travels over unpaved surfaces or engages in soil movement, construction activities generate ground-borne vibration. The effects of ground-borne vibration include discernible movement of building floors, rattling of windows, shaking of items on shelves or hanging on walls, and rumbling sounds. Vibration-related problems occur due to resonances in the structural components of a building because structures amplify groundborne vibration. In essence, the room surfaces act like a loudspeaker causing groundborne noise. The soft sedimentary ground conditions of much of southern California dampen ground borne vibration over a relatively short distance. Because vibration is typically not an issue, few local jurisdictions have adopted regulatory standards specifically pertaining to groundborne vibration. Nonetheless, for the assessment of impacts, Federal and state transportation agencies have provided different thresholds for measuring and assessing groundborne vibration in terms of human response and structural protection.

## 3.2 State Standards

*California Government Code*

California Government Code Section 65302(f) requires each city and county in the state to prepare and adopt a comprehensive long-range general plan for its physical development, with Section 65302(g) requiring a noise element to be included in the General Plan. The Noise Element must:

1) Identify and appraise noise problems in the community
2) Recognize Office of Noise Control guidelines
3) Analyze and quantify current and projected noise levels

Accordingly, the City has prepared a General Plan and Noise Element addressed in the context of local standards discussed in subsection 3.3, Local Standards.

*California Department of Transportation*

Although there are no officially adopted regulatory standards for the point at which ground-borne vibration levels could cause structural damage, Caltrans provides guidelines found in **Table 3-1, Structural Vibration Damage Criteria**. Vibration thresholds have been adopted for major public works construction projects, but these relate mostly to structural protection (cracking foundations or stucco). PPV is often used in monitoring blasting vibration because PPV is related to the stresses experienced by structures.

**Table 3-1**
**Structural Vibration Damage Criteria**

| 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, September 2013.
[1] Transient 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.

As shown in Table 3-1, the criterion for structural vibration damage for new residential structures is 0.5 PPV in/sec for intermittent sources such as impact or vibratory pile drivers, pogo-stick compactors, and vibratory compaction equipment. Based on the type of adjacent buildings and the type of equipment expected to be used in construction, a structural damage criterion of 0.5 PPV in/sec for new residential structures for intermittent sources is the standard used in this analysis.

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 3-2, Human Response to Groundborne Vibration Criteria**.

**Table 3-2**
**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: California Department of Transportation, Transportation and Construction Vibration Guidance Manual, 2013.
[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 3-2, human responses to 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 continuous 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.

## 3.3 Local Standards

*City of Santa Clarita General Plan Noise Element – Compatibility Guidelines*

The Noise Element of the City General Plan establishes a program for integrating noise analysis into the land use planning process, a tool for urban planners to use for maintaining land use compatibility with existing and projected noise levels. The Noise Element identifies existing noise conditions within the planning area and estimates future noise impacts resulting from projected growth allowed under the General Plan. The Noise Element identifies noise-sensitive land uses and noise sources and defines areas of noise impact to develop programs to ensure residents are protected from excessive noise. The City evaluates proposals with respect to the Noise Element to ensure noise impacts are reduced through land use planning and project design. Implementation of the programs and policies of the Noise Element reduces or avoids current and future impacts to protect the health, safety, and welfare of the community. The Land Use Element includes the Mixed Use (MX) designation which offers "a diverse range of complementary land uses, in appropriate locations throughout the planning area that are served by public transit and in proximity to supportive uses and services." The General Plan land use designation for the project site is Mixed Use – Corridor (MX-C).

For land use planning, avoidance is a basic strategy to minimize the adverse noise impacts on new uses by spatially separating sensitive uses from areas subject to high levels of noise. Noise sensitive receptors such as schools, hospitals, childcare, senior care, churches, and residential uses should be located outside of any area anticipated to exceed acceptable noise levels as defined by the Noise and Land Use Compatibility Guidelines, or should be protected from noise through sound attenuation measures. Attenuation measures may include architectural design features, like roof parapets and shielding, to reduce operational noise or sound walls to reduce the operational noise of high-volume roadways. The City has adopted the State of California General Plan guidelines prepared by the Governor's Office of Planning and Research for acceptable noise levels for various land use categories in a modified form. The modifications made by the City eliminate overlap between categories in the table to make the guidelines easier for applicants and decision-makers to interpret and apply in planning. These City-adopted guidelines from the Noise Element are provided in **Table 3-3, Land Use Compatibility Guidelines**.

**Table 3-3**
**Land Use Compatibility Guidelines**

| Land Use | Guidelines (dBA CNEL) | | | |
|---|---|---|---|---|
| | **Normally Acceptable [a]** | **Conditionally Acceptable [b]** | **Normally Unacceptable [c]** | **Clearly Unacceptable [d]** |
| Residential<br>Low Density Single-Family, Duplex, Mobile Homes | 50 – 60 | 60 – 70 | 70 – 75 | above 75 |
| Residential<br>Multi-Family Homes | 50 – 60 | 60 – 70 | 70 – 75 | above 75 |
| Transient Lodging<br>Motels, Hotels | 50 – 60 | 60 – 70 | 70 – 80 | above 80 |
| Schools, Libraries, Churches, Hospitals, Nursing Homes | 50 – 60 | 60 – 70 | 70 – 80 | above 80 |
| Auditoriums, Concert Halls, Amphitheaters | - | 50 – 65 | - | above 65 |
| Sports Arena, Outdoor Spectator Sports | - | 50 - 75 | - | above 75 |

| Land Use | Guidelines (dBA CNEL) | | | |
|---|---|---|---|---|
| | **Normally Acceptable [a]** | **Conditionally Acceptable [b]** | **Normally Unacceptable [c]** | **Clearly Unacceptable [d]** |
| Playgrounds, Neighborhood Parks | 50 - 65 | - | 65 - 75 | above 75 |
| Golf Courses, Riding Stables, Water Recreation, Cemeteries | 50 - 75 | - | 70 - 80 | above 80 |
| Office Buildings, Business and Professional Commercial | 50 - 70 | 70 - 75 | above 75 | - |
| Industrial, Manufacturing, Utilities, Agriculture | 50 - 75 | 75 – 80 | above 80 | - |

[a] Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normally conventional construction without any special noise insulation requirements.

[b] Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

[c] Normally Unacceptable: New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design. Sound walls, window upgrades, and site design modifications may be needed to achieve City standards.

[d] Clearly Unacceptable: New construction or development should generally not be undertaken.

Source: City of Santa Clarita General Plan Noise Element, Exhibit N-8: Noise and Land Use Compatibility Guidelines, June 2010.

*City of Santa Clarita General Plan Noise Element – Goals, Objectives, and Policies*

The following goals, objectives, and policies from the City's Noise Element apply to the proposed project.

**Goal N 1**: A healthy and safe noise environment for Santa Clarita Valley residents, employees, and visitors.

**Objective N 1.1**: Protect the health and safety of the residents of the Santa Clarita Valley by the elimination, mitigation, and prevention of significant existing and future noise levels.

**Policy N 1.1.1**: Use the Noise and Land Use Compatibility Guidelines contained on Exhibit N-8, which are consistent with State guidelines, as a policy basis for decisions on land use and development proposals related to noise.

**Policy N 1.1.2**: Continue to implement the adopted Noise Ordinance and other applicable code provisions, consistent with state and federal standards, which establish noise impact thresholds for noise abatement and attenuation, to reduce potential health hazards associated with high noise levels.

**Policy N 1.1.3**: Include consideration of potential noise impacts in land use planning and development review decisions.

**Policy N 1.1.4**: Control noise sources adjacent to residential, recreational, and community facilities, and those land uses classified as noise sensitive.

**Goal N 2**: Protect residents and sensitive receptors from traffic-generated noise.

**Objective N 2.1**: Prevent and mitigate adverse effects of noise generated from traffic on arterial streets and highways through implementing noise reduction standards and programs.

**Policy N 2.1.1**: Encourage owners of existing noise-sensitive uses, and require owners of proposed noise sensitive land uses, to construct sound barriers to protect users from significant noise levels, where feasible and appropriate.

**Policy N 2.1.2**: Encourage the use of noise absorbing barriers, where appropriate.

**Goal N 3**: Protect residential neighborhoods from excessive noise.

**Objective N 3.1**: Prevent and mitigate significant noise levels in residential neighborhoods.

**Policy N 3.1.1**: Require that developers of new single-family and multi-family residential neighborhoods in areas where the ambient noise level exceed 60 CNEL provide mitigation measures for the new residences to reduce interior noise levels to 45 CNEL, based on future traffic and railroad noise levels.

**Policy N 3.1.2**: Require that developers of new single-family and multi-family residential neighborhoods in areas where the projected noise levels exceed 65 CNEL provide mitigation measures (which may include noise barriers, setbacks, and site design) for new residences to reduce outdoor noise levels to 65 CNEL, based on future traffic conditions. This requirement would apply to rear yard areas for single-family developments and to private open space and common recreational and open space areas for multi-family developments.

**Policy N 3.1.3**: Through enforcement of the applicable Noise Ordinance, protect residential neighborhoods from noise generated by machinery or activities that produce significant discernable noise exceeding recommended levels for residential uses.

**Policy N 3.1.4**: Require that those responsible for construction activities develop techniques to mitigate or minimize the noise impacts on residences and adopt standards that regulate noise from construction activities that occur in or near residential neighborhoods.

**Policy N 3.1.9**: Implement a buyer and renter notification program for new residential developments where appropriate, to educate and inform potential buyers and renters of the sources of noise in the area and/or new sources of noise that may occur in the future. As determined by the reviewing authority, notification may be appropriate in the following areas:

c. Within 200 feet of commercial uses in mixed-use developments, potential buyers and renters should receive notice that the commercial uses within the mixed-use developments may generate noise in excess of levels typically found in residential areas, that the commercial uses may change over time, and the associated noise levels and frequency of noise events may change along with the use.

*City of Santa Clarita Noise Ordinance*

The City Noise Ordinance (Ord. 89-29, 1/23/90) provides exterior noise standards within the City. The following portions of the City Noise Ordinance apply to the project. Section 11.44.020 of the Noise Ordinance in in the Santa Clarita Municipal Code (SCMC) defines "Day" as the period from 7:00 a.m. to 9:00 p.m. and "Night" as the period from 9:00 p.m. to 7:00 a.m. for the purposes of the Noise Ordinance. Section 11.44.040 of the SCMC Noise Ordinance specifies the following limits that apply to the analysis of operational noise of the project:

> A. It shall be unlawful for any person within the City to produce or cause or allow to be produced noise which is received on property occupied by another person within the designated region, in excess of the following levels, except as expressly provided otherwise herein:

| Region | Time | Sound Level (dB) |
|---|---|---|
| Residential zone | Day | 65 |
| Residential zone | Night | 55 |
| Commercial and manufacturing | Day | 80 |
| Commercial and manufacturing | Night | 70 |

> At the boundary line between a residential property and a commercial and manufacturing property, the noise level of the quieter zone shall be used.
>
> B. Corrections to Noise Limits. The numerical limits given in subsection (A) of this section shall be adjusted by the following corrections, where the following noise conditions exist:

| Noise Condition | Correction (in dB) |
|---|---|
| (1) Repetitive impulsive noise | -5 |
| (2) Steady whine, screech or hum | -5 |
| | |
| The following corrections apply to daytime only: | |
| (3) Noise occurring more than 5 but less than 15 minutes per hour | +5 |
| (4) Noise occurring more than 1 but less than 5 minutes per hour | +10 |
| (5) Noise occurring less than 1 minute per hour | +20 |

The SCMC Noise Ordinance (Section 11.44.070) specifies the following noise limits that apply to the analysis of operational noise impacts of the project:

> Any noise level from the use or operation of any machinery, equipment, pump, fan, air conditioning apparatus, refrigerating equipment, motor vehicle, or other mechanical or electrical device, or in repairing or rebuilding any motor vehicle, which exceeds the noise limits set forth in Section 11.44.040 at any property line, or, if a condominium or rental units, within any condominium unit or rental unit within the complex, shall be a violation of this chapter.

Section 11.44.080 of the Noise Ordinance in the SCMC - Special Noise Sources – Construction and Building – specifies the following limits for construction and building noise in particular as a special noise source.

> No person shall engage in any construction work which requires a building permit from the City on sites within three hundred (300) feet of a residentially zoned property except between the hours of seven a.m. to seven p.m., Monday through Friday, and eight a.m. to six p.m. on Saturday. Further, no work shall be performed on the following public holidays: New Year's Day, Independence Day, Thanksgiving, Christmas, Memorial Day, and Labor Day.

Emergency work as defined in Section 11.44.020(D) is permitted at all times. The Department of Community Development may issue a permit for work to be done "after hours;" provided that containment of construction noises is provided.

# 4.0 EXISTING CONDITIONS

## 4.1 Existing Ambient Noise Levels

Based on the City's General Plan Noise Element, most the project site is located outside the 60 dBA CNEL existing and future projected roadway noise contours associated with Newhall Avenue, while some of the project site may be within the 70 dBA CNEL roadway noise contours.[3] The Noise Element describes noise levels of 60 dB CNEL or below as "Normally Acceptable" for residential multi-family homes and noise levels of 70 dB CNEL or below as "Conditionally Acceptable". The project would consist of conventional construction with heating ventilation and cooling (HVAC) systems which is normally sufficient for a proposed land use in a conditionally acceptable zone, according to the City's Noise and Land Use Compatibility Guidelines.

To obtain existing ambient noise levels at the project site, Envicom Corporation measured ambient noise levels on Thursday, September 2, 2021, in 20-minute intervals at four locations on the project site and in the vicinity as shown on **Figure 3, Noise Measurement Locations**. **Table 4-1, Ambient Noise Measurements**, shows the ambient noise levels measured at these locations. Existing sources of noise in the project vicinity include traffic on Newhall Avenue.

**Table 4-1**
**Ambient Noise Measurements**

| Number | Location | Time | dBA Leq[1] | Primary Noise Sources |
|---|---|---|---|---|
| M1 | Village Apartments. In front of first floor apartments at 23705 Newhall Avenue. | 1:16 p.m. – 1:36 p.m. | 69.4 | Traffic on Newhall Avenue. |
| M2 | Northwestern corner of project site. | 10:24 a.m. – 10:44 a.m. | 68.7 | Traffic on Newhall Avenue. |
| M3 | Eastern corner of project site. | 11:04 a.m. – 11:24 a.m. | 68.1 | Traffic on Newhall Avenue. |
| M4 | Southern corner of project site. | 12:27 p.m. – 12:43 p.m.[2] | 45.4 | Distant traffic on Newhall Avenue and aircraft. Some distant grading activity at adjacent property. |

Source: Envicom Corporation, field visit September 2, 2021. Measured using a Larson Davis LxT Sound Level Meter meeting the American National Standards Institute (ANSI) Type 1 standard.
[1] Leq is the average noise level equivalent to the energy content of the time period.
[2] The measurement was shortened in order to exclude bulldozer activity, which had resumed at the edge of the adjacent property.

As shown in Table 4-1, measured ambient noise levels range from 45.4 to 69.4 dBA Leq. Therefore, noise levels of 45.4 to 69.4 Leq will be used as the existing ambient noise levels for the purpose of this study.

## 4.2 Existing Vibration Levels

Traffic on roadways in the project vicinity, including heavy trucks, are unlikely to generate substantial levels of groundbourne vibration due to the smooth condition of the pavement on surface streets in the project vicinity.

[3] City of Santa Clarita General Plan, Noise Element, June 2011, Exhibits N-6, Existing Roadway Noise Contours, and N-7, Future Roadway Noise Contours.


Aerial Source: Google Earth Pro, Feb. 28, 2021. Map Source: Oakes Architects Inc., June 11, 2021.



# Noise Measurement Locations

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FIGURE 3

# 5.0 THRESHOLDS OF SIGNIFICANCE

This chapter presents thresholds of significance for noise from the State 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:

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

b): Generation of excessive groundborne vibration or groundborne noise levels?

c): For a project located within the vicinity of a private airstrip or an airport land use plan, or where such 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

## Methodology

The following impact analysis evaluates the noise and groundborne vibration impacts resulting from both construction and operation of the proposed project. Expected construction noise levels are based on reference noise levels for construction equipment provided in the Federal Highway Administration (FHWA) Construction Noise Handbook. Expected operational noise levels are based on reference measurements for comparable HVAC units. Groundborne vibration impacts are based on guidance in the FTA Transit Noise and Vibration Impact Assessment Manual. The analysis then considers whether these impacts would exceed thresholds of significance and provides measures to reduce these impacts where warranted.

## 6.1 Temporary or Permanent Increase in Ambient Noise Levels

Temporary increases in ambient noise levels would be due to the use of equipment during construction of 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

The FHWA Construction Noise Handbook contains a national database of construction equipment noise levels. The FHWA uses these reference noise levels in the Roadway Construction Noise Model (RCNM). **Table 6-1, Construction Equipment Noise Levels,** identifies highest (Lmax) noise levels associated with the quantity and type of construction equipment expected to be used in project construction. 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. The RCNM also provides an acoustical usage factor (U.F.) which estimates the fraction of time each piece of equipment is operating at full power during construction. The acoustical 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.

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 piece of construction equipment that could generate the highest noise level is a concrete saw, which would generate a maximum noise level of 90 dBA Lmax at 50 ft and an average noise level of 83 dBA Leq at 50 ft. Construction would proceed in phases such as demolition, grading, building construction (including installation of modular structures and remodeling of existing structures), 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**

| Construction Phase and Duration (Working Days) | Quantity and Equipment Type [1] | Lmax at 50 feet (dBA) [2, 3] | Usage Factor (U.F.) [4] | Leq at 50 feet (dBA) |
|---|---|---|---|---|
| Demolition (25 days) | 1 Dozer | 82 | 40 | 78 |
| | 3 Excavators | 81 | 40 | 77 |
| | 1 Concrete/Industrial Saw | 90 | 20 | 83 |
| | 1 Loader | 80 | 40 | 76 |
| Site Preparation (Grubbing and Stump removal) (20 days) | 1 Dozer | 82 | 40 | 78 |
| | 1 Tractor/Loader/Backhoe | 79 | 40 | 75 |
| Grading (including soil import) (45 days) | 1 Excavator | 81 | 40 | 77 |
| | 1 Grader | 85 | 40 | 81 |
| | 1 Dozer | 82 | 40 | 78 |
| | 3 Tractor/Loader/Backhoe | 79 | 40 | 75 |
| | 1 Off-Highway Truck | 74 | 40 | 70 |
| | 1 Loader | 79 | 40 | 75 |
| Building Construction (320 days) | 3 Tractor/Loader/Backhoes | 79 | 40 | 75 |
| | 3 Forklifts | 75 | 20 | 68 |
| | 1 Generator Set | 81 | 50 | 78 |
| | 1 Welder | 74 | 40 | 70 |
| Paving (35 days) | 1 Paver | 77 | 50 | 74 |
| | 2 Paving equipment | 83 | 20 | 76 |
| | 2 Cement and Mortar Mixers | 80 | 20 | 73 |
| | 2 Rollers | 80 | 20 | 73 |
| | 1 Tractor/Loader/Backhoe | 79 | 40 | 75 |
| Architectural Coating (painting) (35 days) | 1 Air Compressor | 78 | 40 | 74 |

[1] Construction Equipment List estimated based on Envicom Corporation, Air Quality and Greenhouse Gas Impact Analysis: 23755 Newhall Avenue Apartments Project, April 2022, updated November 11, 2022.
[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 percentage of time equipment is operating at full power.

Construction proceeds in phases such as demolition, site preparation, grading, and vertical construction of the building. Each phase involves the use of different types of construction equipment. As shown in Table 6-1, the construction equipment that could generate the highest noise level is the concrete saw during the demolition phase that would produce an average noise level of 83 dBA Leq.

Construction noise levels would be attenuated by distance due to spreading loss. Point sources such as construction equipment attenuate at a rate between 6 dBA for hard sites and 7.5 dBA for soft sites for each doubling of distance from the reference measurement. Soft site attenuation is appropriate given the unpaved ground surfaces in between the project construction noise sources and nearby sensitive receptors. The distances between the project site boundary and the nearest existing sensitive receptors are listed in **Table 6-2, Sensitive Receptors Near the Project Site**, along with the resulting decrease in expected noise levels due to attenuation for distance.

**Table 6-2**
**Sensitive Receptors Near the Project Site**

| Street Address | Direction | Land Use | Distance to Limit of Construction (feet)[1] |
|---|---|---|---|
| 23801 Newhall Ave | Northwest | Santa Clarita Post-Acute Care Center (Convalescent Home) | 45 |
| 23700 Valle Del Oro | Northeast | The Village Apartments (Multi-family Residential) | 130 |
| 23649 Newhall Ave | Southeast | Single Family Residence | 310 |

[1] Distance from the property line of the receptor to the nearest project construction boundary.

As shown in Table 6-2, there is a residentially zoned property within 300 ft of the boundary of construction. The nearest residentially zoned property, the Village Apartments is located at 13700 Vale Del Oro and is zoned Urban Residential (UR3). Therefore, the project would be subject to the allowable hours for construction specified in SCMC Section 11.44.080: seven a.m. to seven p.m., Monday through Friday, and eight a.m. to six p.m. on Saturday. Further, no work in this area shall be performed on the following public holidays: New Year's Day, Independence Day, Thanksgiving, Christmas, Memorial Day, and Labor Day. Other sensitive receptors in the area include the single-family residences to the southeast, the nearest of which is at 23649 Newhall Avenue and is zoned as UR3, and Santa Clarita Post-Acute Care Center, a convalescent home zoned as MX-C.

The following gives the average hourly noise level at nearest sensitive receptors from demolition or grading activity (the loudest phases) from the two loudest pieces of equipment operating at the approximate center of the proposed construction activity for that phase, using the previously discussed RCNM equation. **Table 6-3, Outdoor Construction Noise Levels at Nearest Sensitive Receptors,** provides the expected outdoor construction noise levels at these receptors. Demolition activity would be limited to the locations of the existing buildings and pavement on the site, near Newhall Avenue. Grading activity could occur throughout the limits of disturbance.

**Table 6-3**
**Outdoor Construction Noise Levels at Nearest Sensitive Receptors**

| Sensitive Receptor | Phase | Hourly Leq at 50 ft (dBA) | Distance (ft) [1] | Hourly Leq after Distance Attenuation (dBA) | Existing Ambient Noise Level (dBA) | Temporary Ambient Noise Level During Construction (dBA Leq) | Temporary Noise Increase (dBA Leq) |
|---|---|---|---|---|---|---|---|
| Santa Clarita Post-Acute Care Center (Convalescent Home) | Demolition | 84.2 | 340 | 63.4 | 68.7 | 69.8 | 1.1 |
| | Grading | 82.8 | 440 | 59.2 | 68.7 | 69.2 | 0.5 |
| The Village Apartments (Multi-family Residential) | Demolition | 84.2 | 380 | 62.2 | 69.4 | 70.2 | 0.8 |
| | Grading | 82.8 | 510 | 57.6 | 69.4 | 69.7 | 0.3 |
| Single Family Residence | Demolition | 84.2 | 780 | 54.4 | 45.4 | 54.9 | 9.5 |
| | Grading | 82.8 | 590 | 56.0 | 45.4 | 56.4 | 11.0 |

[1] Distance from approximate center of construction activity for a given phase. Demolition activity would be limited to the locations of the existing buildings and pavement on the site, near Newhall Avenue. Grading activity would occur throughout the limits of disturbance.

As shown in Table 6-3, typical construction noise levels would be 63.4 dBA Leq at the exterior of the adjacent convalescent home to the northwest of the project during the demolition phase and 59.2 dBA Leq during the grading phase. At the Village Apartments to the northeast, the second-closest sensitive receptor location, typical exterior noise levels would be 62.2 dBA Leq during the demolition phase and 57.6 dBA Leq during the grading phase. At the single-family residences to the southeast, the third-closest receptor location, typical exterior noise levels would be 54.4 dBA Leq during the demolition phase and 56.0 dBA Leq. All other sensitive receptors would experience lower construction noise levels because they are further away from the noise source, so more distance attenuation would further reduce the noise. The City does not have a numerical threshold for construction noise, but regulates construction noise by setting the allowable hours for construction in the vicinity of residential land uses. Therefore, compliance with the City's Noise Ordinance would ensure the project would not exceed the hours specified, thereby reducing construction noise impacts to a less than significant level.

In addition, as shown in Table 6-3, the typical construction noise levels would result in a temporary noise increase of approximately 1.1 dBA above existing daytime ambient noise levels (shown in measurement M2) at the nearest sensitive receptor, the adjacent convalescent home to the northwest of the project. This temporary daytime noise level increase that would occur during the demolition phase (approximately 25 days) is less than 3 dBA, and as such average noise levels would not typically be perceptibly louder than existing noise levels. At the second-closest sensitive receptor, the apartments to the northeast, the typical construction noise levels would result in a temporary noise increase of approximately 0.8 dBA above existing daytime ambient noise levels (shown in measurement M1) at the nearest sensitive receptor. This increase that would occur during the demolition phase (approximately 25 days) of less than 3 dBA would not typically be perceptibly louder than existing noise levels.[4] At the third-closest sensitive receptor, the single-family residences to the southeast, the construction noise levels would result in a temporary ambient noise level of 56.4 dBA Leq, which would be a temporary noise increase of approximately 11.0 dBA above existing daytime ambient noise levels (shown in measurement M4) at that receptor. This temporary daytime noise level increase that would occur during the grading phase (approximately 45 days) is less than 15 dBA, which would be perceived as less than tripling existing noise levels.[5] However, the temporary daytime ambient noise level of 56.4 dBA Leq at this receptor due to project construction activities would be within the 50-60 dBA CNEL "normally acceptable" land use compatibility guidelines (Table 3-3) for residential uses and below the 65 dBA Leq daytime residential noise standard from the SCMC. Although construction noise is not regulated by these standards, temporary noise levels which do not exceed the standards would not be excessive. These temporary noise increases would only be experienced within daytime hours during the phases of construction with the loudest noise effects (demolition and grading) which would occur for a combined duration of 70 days. Temporary noise increases at these nearest sensitive receptors would be lower for the remainder of the 410-day total duration of project construction activities. Temporary noise increases at all other sensitive receptors in the vicinity would be even lower due to additional distance attenuation that would reduce the noise levels at those locations because they are farther from the project site. Therefore, project construction would not result in substantial temporary noise levels at sensitive receptors.

[4] California Department of Transportation, Division of Environmental Analysis, Technical Noise Supplement to the Traffic Noise Analysis Protocol, September 2013.

[5] California Department of Transportation, Division of Environmental Analysis, Technical Noise Supplement to the Traffic Noise Analysis Protocol, September 2013.

## Operation

*Heating, Ventilation, and Air Conditioning Units*

The project would introduce stationary noise sources such as HVAC units, which are required to comply with City Noise Ordinance standards limiting the level of noise received on property occupied by another person. Although actual HVAC use would depend on weather conditions and tenant occupancy, this analysis considers potential noise impacts from simultaneous operation of all roof-mounted HVAC units at the nearest buildings to each of the off-site sensitive receptors. The following formula includes the conversion of decibels from logarithmic units to linear units for addition of the decibels and calculation of the increase in ambient noise.

$$L = 10 \bullet log_{10}(\sum_{i=1}^{n} 10^{Li/10})$$

Where:

*L = composite noise level*
*n = number of individual noise levels being summed*
*$L_i$ = individual noise level*

The distance attenuation for the use of the proposed HVAC units was calculated using the preceding formula to calculate noise level ($L_2$) in dB at distance ($r_2$) based on a reference noise level ($L_1$) at a reference distance ($r_1$). The noise levels provided in **Table 6-4, HVAC Noise Levels**, were based on the HVAC units from the nearest project building(s) to a given receptor with reference noise levels ($L_1$) of 68 dB Leq for a residential HVAC unit and a reference noise level of 71 dB Leq for a commercial HVAC unit at a distance of 3.28 ft ($r_1$) from the source.

**Table 6-4**
**HVAC Noise Levels**

| Receptor (Direction) | Reference HVAC Noise Level at 3.28 feet (dBA) | Quantity | Composite Noise Level (dBA Leq) | Distance to Receptor (ft)[1] | Distance Attenuation (dBA) | Parapet/ Roofline Reduction (dBA) | Noise Level (dBA Leq) |
|---|---|---|---|---|---|---|---|
| Santa Clarita Post-Acute Care Center (Northwest | 68 [2] | 7 | 76.5 | 88 | 28.6 | 8 [3] | 39.8 |
| | 68 | 7 | 76.5 | 114 | 30.8 | 8 | 37.7 |
| | 68 | 7 | 76.5 | 137 | 32.4 | 8 | 36.0 |
| | 68 | 7 | 76.5 | 163 | 33.9 | 8 | 34.5 |
| | 68 | 7 | 76.5 | 187 | 35.1 | 8 | 33.4 |
| | **Total** | **35** | **83.4** | | | | **43.9** |
| The Village Apartments (Northeast) | 71 [4] | 2 | 74.0 | 270 | 38.3 | 0 | 35.7 |
| | 68 | 1 | 68.0 | 310 | 39.5 | 8 [3] | 20.5 |
| | 68 | 1 | 68.0 | 315 | 39.7 | 8 | 20.3 |
| | 68 | 1 | 68.0 | 320 | 39.8 | 8 | 20.2 |
| | 68 | 1 | 68.0 | 330 | 40.1 | 8 | 19.9 |
| | **Total** | **6** | **77.0** | | | | **36.2** |
| Single Family Residences (Southeast) | 68 | 1 | 68.0 | 456 | 42.7 | 0 | 25.1 |
| | 68 | 1 | 68.0 | 471 | 43.0 | 0 | 24.9 |
| | 68 | 1 | 68.0 | 486 | 43.2 | 0 | 24.6 |
| | **Total** | **3** | **72.8** | | | | **29.6** |

| Receptor (Direction) | Reference HVAC Noise Level at 3.28 feet (dBA) | Quantity | Composite Noise Level (dBA Leq) | Distance to Receptor (ft)[1] | Distance Attenuation (dBA) | Parapet/ Roofline Reduction (dBA) | Noise Level (dBA Leq) |
|---|---|---|---|---|---|---|---|

[1] Diagonal distance, accounting for height differences between the project building rooftop and off-site ground floor receptors.
[2] York International Corporation, Technical Guide for R-410A ZE/XN SERIES 3 - 6 TON 60 Hertz. Accessed at https://www.york.com/-/media/york/for-your-workplace-rooftop-units/5190086ytge0718.pdf?la=en on December 27, 2019. Specifications for York Model XN036 3-Ton packaged heating and cooling unit. The sound power level (Lw) of 76 dBA, is equivalent to a sound pressure level of 68 dBA Leq at 3.28 feet, assuming half-spherical propagation of sound due to roof mounting.
[3] 8 dB reduction from the roofline and parapet based on guidance for a source that is completely shielded with a solid barrier from Federal Highway Administration, Roadway Construction Noise Model User's Guide, January 2006.
[4] Bryant Corporation, Product Data for 582K/559K Legacy Line™ Single Packaged Rooftop 3 to 6 Nominal Tons, 2019. Accessed at https://resource.carrierenterprise.com/is/content/Watscocom/bryant_582k_ss?_ga=2.110205829.1819755953.1615939562-853331211.1615939562 on April 15, 2022. Specifications for 559K 06 5-Ton packaged heating and cooling unit. The specified sound power level (Lw) of 79 dBA is equivalent to a sound pressure level of 71 dBA Leq at 1 meter (3.28 feet), assuming a half-spherical propagation of sound due to roof mounting.

As shown in Table 6-4, the estimated noise level from the HVAC units at the nearest building to the property line of the nearest sensitive receptor would be 43.9 dB Leq. The noise level from these HVAC units of 43.9 dB Leq would not exceed the daytime noise standard of 65 dB and nighttime noise standard of 55 dB for residential zones specified by SCMC Section 11.44.040. In addition, this noise level would not increase the ambient noise level above the measured noise level of 68.7 dB Leq at the northwestern property boundary based on the previously provided formula for the addition of decibels.[6] Table 6-4 also shows that noise levels from the project's HVAC at the property line of the multifamily residences to the northeast would be 36.2 dB Leq, which would not exceed the daytime noise standard of 65 dB and nighttime noise standard of 55 dB for residential zones. This noise level would not increase the ambient noise level above the measured noise level of 69.4 dB Leq at these residences based on the previously provided formula for the addition of decibels.[7] Finally, Table 6-4 shows that noise levels from the project's HVAC at the property line of the nearest of the single family residences to the southeast would be 29.6 dB Leq, which would not exceed the daytime noise standard of 65 dB and nighttime noise standard of 55 dB for residential zones. This noise level would not increase the ambient noise level above the measured noise level of 45.4 dB Leq near these residences based on the previously provided formula for the addition of decibels.[8] Therefore, noise impacts from the project's HVAC would be less than significant.

*Traffic Noise*

Upon building occupancy during project operations, project-generated vehicle trips would normally cause an incremental increase in noise levels on local streets in the vicinity. When considering the combined effects of operational noise sources, noise levels cannot be added by arithmetic means because decibels are expressed in logarithmic units. Doubling the noise source would produce only a 3 dB increase in the noise level.[9] Therefore, a doubling of traffic volume is required to result in a 3 dB increase in noise, the point at which changes are barely perceptible to the human ear.[10] The project transportation consultant, Hirsch/Green Transportation Consulting, Inc., produced a Traffic Impact Analysis Report, which provided

[6] 10*log(10^[43.9 dBA/10]+10^[68.7 dBA/10]) = 68.7 dBA; 68.7 dBA – 68.7 dBA = 0.0 dBA
[7] 10*log(10^[36.2 dBA/10]+10^[69.4 dBA/10]) = 69.4 dBA; 69.4 dBA – 69.4 dBA = 0.0 dBA
[8] 10*log(10^[29.6 dBA/10]+10^[45.4 dBA/10]) = 45.4 dBA; 45.4 dBA – 45.4 dBA = 0.0 dBA
[9] Federal Highway Administration, Highway Traffic Noise Analysis and Abatement Policy and Guidance, https://www.fhwa.dot.gov/environMent/noise/regulations_and_guidance/polguide/polguide02.cfm (accessed January 31, 2020).
[10] California Department of Transportation, Division of Environmental Analysis, Technical Noise Supplement to the Traffic Noise Analysis Protocol, September 2013, page 2.15.

a.m. and p.m. peak hour volumes for intersections in the project vicinity for the Existing (2021) and Future (2023) baseline scenarios.[11] For the purposes of the following analysis of traffic noise, the peak hour turn volumes were tabulated into segment volumes and converted into average daily trips (ADT) for the purpose of evaluating 24-hour CNEL. To obtain ADT from peak hour volumes, the p.m. peak hour volumes were multiplied by 10, based on a common adjustment used in traffic forecasting which assumes that peak hour volumes represent approximately 10 percent of daily traffic volumes on these roadways. The p.m. peak hour volumes were selected for the calculation of ADT because they were generally greater than the a.m. peak hour volumes. The number of proposed units has slightly increased since the preparation of the project traffic report, thus the project traffic volumes on nearby roadway segments were calculated based on revised trip generation calculations and the trip distribution percentages from the original project traffic report.[12] Traffic noise levels were modeled based on ADT using the FHWA RD-77-108 model[13] using the California-specific vehicle noise (CALVENO) curves,[14] as shown in **Appendix A, FHWA RD-77-108 Traffic Noise Model**.

**Table 6-5, Existing Year Traffic Noise Increase**, shows the existing year (2021) Project-related traffic noise increase and **Table 6-6, Future Year Traffic Noise Increase** shows the future year (2023) Project-related traffic noise increase. Addition of 758 daily trips by the project in the existing year (2021) and future (2023) year on Newhall Avenue would result in a change of 0.1 dBA CNEL or less in traffic noise levels in both the existing and future year. The cumulative increase in traffic noise levels (Future Year 2023 With Project compared to existing Without Project) would be 0.3 dBA CNEL or less. Therefore, the project would not substantially increase traffic noise levels.

**Table 6-5**
**Existing Year Traffic Noise Increase**

| Roadway Segment | Existing (2021) ADT | Existing Noise (dBA CNEL) [1] | Existing (2021) With Project ADT | Existing With Project Noise (dBA CNEL) [1] | Existing Project-Related Noise Increase (dBA CNEL) |
|---|---|---|---|---|---|
| Newhall Ave west of Carl Ct | 34,690 | 67.7 | 34,880 | 67.7 | 0.0 |
| Newhall Ave from Carl Ct to Valle Del Oro | 34,990 | 67.8 | 35,748 | 67.9 | 0.1 |
| Newhall Ave east of Valle Del Oro | 32,680 | 67.5 | 33,249 | 67.5 | 0.0 |

Source: Envicom Corporation, November 2022 based on Federal Highway Administration, FHWA Highway Traffic Noise Prediction Model, January 1, 1978.
Traffic Data Source: Hirsch/Green Transportation Consulting, Inc., Traffic Impact Analysis Report, Proposed 100-Unit Residential Apartment Development, 23755 Newhall Avenue Santa Clarita, California, April 2021 and Hirsch/Green Transportation Consulting, Inc., Revised Traffic Study Trip Generation Calculations October 26, 2022.
[1] CNEL noise levels at a distance of 50 feet from the center of the outermost travel lane, modelled in FHWA RD-77-108.

[11] Hirsch/Green Transportation Consulting, Inc., Traffic Impact Analysis Report, Proposed 100-Unit Residential Apartment Development, 23755 Newhall Avenue Santa Clarita, California April 2021.
[12] Hirsch/Green Transportation Consulting, Inc., Revised Traffic Study Trip Generation Calculations October 26, 2022.
[13] Federal Highway Administration, FHWA Highway Traffic Noise Prediction Model, January 1, 1978.
[14] Hendriks, Rudolf W., California Vehicle Noise Emission Levels, 1985.

**Table 6-6**
**Future Year Traffic Noise Increase**

| Roadway Segment | Future Year Without Project (2023) ADT | Future Year Without Project (2023) Noise (dBA CNEL) [1] | Future Year With Project (2023) ADT | Future Year With Project (2023) Noise (dBA CNEL) [1] | Future Year Project-Related Noise Increase (dBA CNEL) | Cumulative Noise Increase (dBA CNEL) |
|---|---|---|---|---|---|---|
| Newhall Ave west of Carl Ct | 36,800 | 68.0 | 36,990 | 68.0 | 0.0 | 0.3 |
| Newhall Ave from Carl Ct to Valle Del Oro | 37,120 | 68.0 | 37,878 | 68.1 | 0.1 | 0.3 |
| Newhall Ave east of Valle Del Oro | 34,680 | 67.7 | 35,249 | 67.8 | 0.1 | 0.3 |

Source: Envicom Corporation, November 2022 based on Federal Highway Administration, FHWA Highway Traffic Noise Prediction Model, January 1, 1978.
Traffic Data Source: Hirsch/Green Transportation Consulting, Inc., Traffic Impact Analysis Report, Proposed 100-Unit Residential Apartment Development, 23755 Newhall Avenue Santa Clarita, California, April 2021 and Hirsch/Green Transportation Consulting, Inc., Revised Traffic Study Trip Generation Calculations October 26, 2022.
[1] CNEL noise levels at a distance of 50 feet from the center of the outermost travel lane, modelled in FHWA RD-77-108.

## 6.2 Groundborne Vibration

### Construction

Construction generates groundborne vibration when heavy equipment travels over unpaved surfaces or engages in soil movement; however, the ground surface dampens groundborne vibration over a short distance. The reference vibration levels at 25 feet between the source and receptor shown in **Table 6-7, Estimated Groundborne Vibration Levels During Construction**, from the Federal Transit Administration Noise and Vibration Impact Assessment Manual, may be used in the following formula to calculate PPV at a given distance.

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

Where:

*$PPV_{distance}$ = the peak particle velocity (PPV) in inches/second (in/sec) of the equipment adjusted for distance*
*$PPV_{ref}$ = the reference vibration level in PPV in/sec at 25 feet, and*
*D = distance between equipment and receptor.*

The predicted vibration levels generated by various types of construction equipment in terms of PPV in inches/second (in/sec) are given in Table 6-7, Estimated Groundborne Vibration Levels During Construction.

**Table 6-7**
**Estimated Groundborne Vibration Levels During Construction**

| Construction Equipment | Reference Vibration Levels at 25 ft | Vibration Levels at Nearest Residential Structures | | Vibration Damage Impact Assessment | | Human Response Assessment | |
|---|---|---|---|---|---|---|---|
| | PPV in/sec at 25 ft | Distance (ft)[1] | PPV in/sec | Vibration Damage Threshold (PPV) in/sec | Exceedance? | Human Response Threshold (PPV) in/sec | Exceedance? |
| Vibratory Roller | 0.21 | 45 | 0.087 | 0.5 | No | 0.1 | No |
| Large Bulldozer | 0.089 | 45 | 0.037 | 0.5 | No | 0.1 | No |
| Loaded Trucks | 0.076 | 45 | 0.031 | 0.5 | No | 0.1 | No |

Data Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, September 2018.
[1] Distance is from the nearest structure to the project construction boundary.

Vibration levels at the nearest off-site structure, the Santa Clarita Post-Acute Care Center convalescent home, would be far 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 6-7. All other structures would experience lower vibration levels as they are further away. In addition, vibration levels would be below those that would be strongly perceptible (0.1 PPV in/sec) and vibration annoyance would therefore not occur, as Table 6-7 also shows. All other sensitive land uses would experience lower vibration levels as they are further away. Therefore, project construction would result in groundborne vibration levels below the applicable thresholds of significance for construction vibration.

### Operation

After construction is complete, and the proposed buildings are occupied, 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

A project located within two miles of a public airport or public use airport may result in a significant impact if a project would the project expose people residing or working in the area to excessive noise levels. The project site is not located within two miles of a public airport or public use airport. The nearest airport to the project site is Whiteman Airport (approximately 9.2 miles to the southeast). The site does not fall into the airport's land use plan area, Influence Areas, or 65 dBA CNEL contours.[15] Therefore, the project would not result in the exposure of residents or those working in the project area to excessive noise levels.

[15] Los Angeles County Airport Land Use Commission, Whiteman Airport, Master Plan, 2010. Accessed on August 27, 2021 at http://planning.lacounty.gov/assets/upl/project/aluc_whiteman-plan.pdf.

# 7.0 CONCLUSIONS

## 7.1 Noise

Project impacts from operational noise would be below applicable standards and no measures would be required to reduce impacts. As the site is located within 300 feet of a residential zone, compliance with the following requirement specified in SCMC Section 11.44.080 would ensure temporary construction noise would not exceed applicable standards established in the Noise Ordinance.

> As required by the City Noise Ordinance (Santa Clarita Municipal Code Section 11.44.080 – Special Noise Sources Construction and Building), no person shall engage in any construction work which requires a building permit from the City on sites within three hundred (300) feet of a residentially zoned property except between the hours of seven a.m. to seven p.m., Monday through Friday, and eight a.m. to six p.m. on Saturday. Further, no work shall be performed on the following public holidays: New Year's Day, Independence Day, Thanksgiving, Christmas, Memorial Day, and Labor Day.

## 7.2 Groundborne Vibration

Construction and operational groundborne vibration impacts would be below applicable standards for structural damage and human responses to groundborne vibration.

# 8.0 REFERENCES

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# APPENDIX A
# FHWA RD-77-108 Traffic Noise Model

# 23755 Newhall Avenue
# Noise and Vibration Impact Analysis
## Appendix A: FHWA RD-77-108 Traffic Noise Prediction Model

| Scenario | Roadway | ADT | Speed (mph) | # of Lanes | Median Width (ft) | Distance from Centerline (ft) | Distance from Center of Nearest Travel Lane (ft) | Hard/ Soft Site | Average Leq (1hour) by Time (dB) | | | CNEL (dB) | Distance (ft) from Centerline to Noise Contours | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Day | Evening | Night | | 70 dB CNEL | 65 dB CNEL | 63 dB CNEL | 60 dB CNEL |
| Existing | Newhall Ave west of Carl Ct | 34,690 | 40 | 6 | 12 | 86 | 50 | Soft | 66.3 | 64.5 | 58.5 | **67.7** | 61 | 131 | 178 | 281 |
| Existing | Newhall Ave from Carl Ct to Valle Del Oro | 34,990 | 40 | 6 | 12 | 86 | 50 | Soft | 66.4 | 64.6 | 58.5 | **67.8** | 61 | 131 | 179 | 283 |
| Existing | Newhall Ave east of Valle Del Oro | 32,680 | 40 | 6 | 12 | 86 | 50 | Soft | 66.1 | 64.3 | 58.2 | **67.5** | 58 | 126 | 171 | 270 |
| Existing WP | Newhall Ave west of Carl Ct | 34,880 | 40 | 6 | 12 | 86 | 50 | Soft | 66.3 | 64.6 | 58.5 | **67.7** | 61 | 131 | 178 | 282 |
| Existing WP | Newhall Ave from Carl Ct to Valle Del Oro | 35,748 | 40 | 6 | 12 | 86 | 50 | Soft | 66.5 | 64.7 | 58.6 | **67.9** | 62 | 133 | 181 | 287 |
| Existing WP | Newhall Ave east of Valle Del Oro | 33,249 | 40 | 6 | 12 | 86 | 50 | Soft | 66.1 | 64.4 | 58.3 | **67.5** | 59 | 127 | 173 | 274 |
| Future | Newhall Ave west of Carl Ct | 36,800 | 40 | 6 | 12 | 86 | 50 | Soft | 66.6 | 64.8 | 58.8 | **68.0** | 63 | 136 | 185 | 293 |
| Future | Newhall Ave from Carl Ct to Valle Del Oro | 37,120 | 40 | 6 | 12 | 86 | 50 | Soft | 66.6 | 64.8 | 58.8 | **68.0** | 63 | 137 | 186 | 294 |
| Future | Newhall Ave east of Valle Del Oro | 34,680 | 40 | 6 | 12 | 86 | 50 | Soft | 66.3 | 64.5 | 58.5 | **67.7** | 61 | 131 | 178 | 281 |
| Future WP | Newhall Ave west of Carl Ct | 36,990 | 40 | 6 | 12 | 86 | 50 | Soft | 66.6 | 64.8 | 58.8 | **68.0** | 63 | 136 | 185 | 294 |
| Future WP | Newhall Ave from Carl Ct to Valle Del Oro | 37,878 | 40 | 6 | 12 | 86 | 50 | Soft | 66.7 | 64.9 | 58.9 | **68.1** | 64 | 139 | 188 | 298 |
| Future WP | Newhall Ave east of Valle Del Oro | 35,249 | 40 | 6 | 12 | 86 | 50 | Soft | 66.4 | 64.6 | 58.6 | **67.8** | 61 | 132 | 179 | 284 |

Source: Envicom Corporation, November 2022 based on Federal Highway Administration, FHWA Highway Traffic Noise Prediction Model, January 1, 1978.
Traffic Data Source: Hirsch/Green Transportation Consulting, Inc., Traffic Impact Analysis Report, Proposed 100-Unit Residential Apartment Development, 23755 Newhall Avenue Santa Clarita, California, April 2021 and Envicom Corporation, Air Quality and Greenhouse Gas Impact Analysis: 23755 Newhall Avenue Apartments Project. Santa Clarita, CA, April 2022, updated November 11, 2022. Hirsch/Green Transportation Consulting, Inc., Revised Traffic Study Trip Generation Calculations October 28, 2022.

WP = With Project, ADT = Average Daily Traffic, mph = miles per hour, ft = feet, dB = decibel, CNEL = Community Equivalent Noise Level

**Vehicle Class Fleet Mix and Time Distribution: Local Roadways**

| Vehicle Class | Vehicle Class % at Time | | | Vehicle Class % of Total Vehicles |
|---|---|---|---|---|
| | Day | Evening | Night | |
| Automobile | 75.51% | 12.57% | 9.34% | 97.42% |
| Medium Truck | 1.56% | 0.09% | 0.19% | 1.84% |
| Heavy Truck | 0.64% | 0.02% | 0.08% | 0.74% |

Source: City of Santa Clarita, Final Program EIR for the City of Santa Clarita's Proposed One Valley One Vision General Plan 2010, May 2011, Appendix 3.18: Draft City of Santa Clarita General Plan Noise Element.