5.11 Noise

5.11 NOISE

The purpose of this section is to evaluate noise source impacts on-site and to surrounding land uses as a result of implementation of the Project. This section evaluates short-term construction-related impacts, as well as future buildout conditions. Mitigation measures are also recommended to avoid or lessen the Project's noise impacts. Information in this section is based on the *City of Azusa General Plan* (General Plan) and the *City of Azusa Municipal and Development Code* (Municipal Code).

For the purposes of mobile source noise modeling and contour distribution, traffic information contained in the *California Grand Villages at Azusa Greens* (Traffic Impact Analysis), prepared by Linscott Law & Greenspan and dated February 6, 2018, was used; refer to Appendix 11.8, *Traffic Impact Analysis*.

Noise measurement and traffic noise modeling data can be found in the *Noise Study Report: California Grand Villages at Azusa Greens* (Noise Study), prepared by A/E Tech LLC, dated April 2018; refer to Appendix 11.10, *Noise Study*.

5.11.1 EXISTING SETTING

NOISE SCALES AND DEFINITIONS

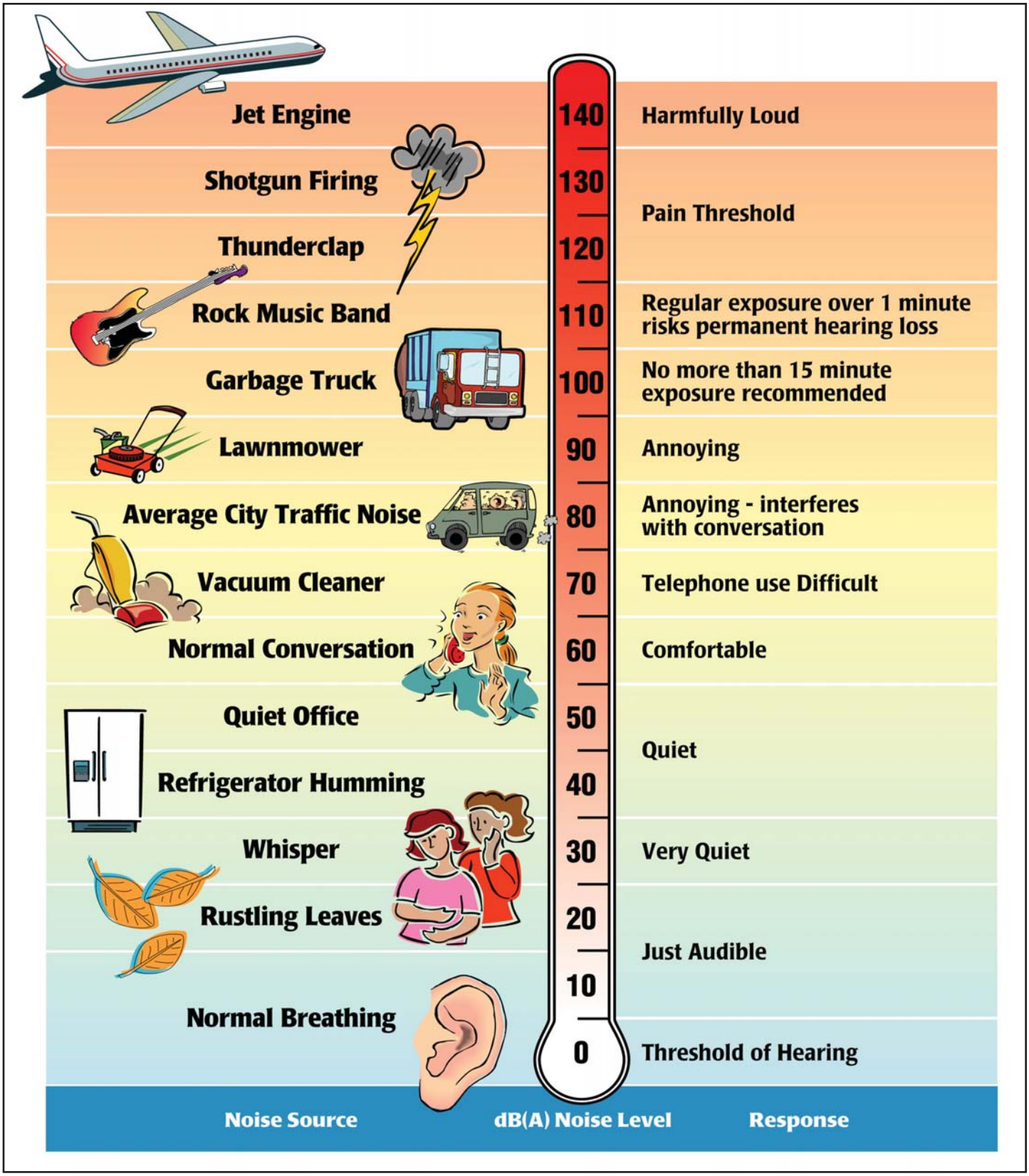
Sound is described in terms of the loudness (amplitude) of the sound and frequency (pitch) of the sound. The standard unit of measurement of the loudness of sound is the decibel (dB). Since the human ear is not equally sensitive to sound at all frequencies, a special frequency-dependent rating scale has been devised to relate noise to human sensitivity. The A-weighted decibel scale (dBA) performs this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear.

Decibels are based on the logarithmic scale. The logarithmic scale compresses the wide range in sound pressure levels to a more usable range of numbers in a manner similar to the Richter scale used to measure earthquakes. In terms of human response to noise, a sound 10 dBA higher than another is judged to be twice as loud, and 20 dBA higher four times as loud, and so forth. Everyday sounds normally range from 30 dBA (very quiet) to 100 dBA (very loud). Examples of various sound levels in different environments are illustrated on Exhibit 5.11-1, *Common Environmental Noise Levels*.

Many methods have been developed for evaluating community noise to account for, among other things:

- The variation of noise levels over time;
- The influence of periodic individual loud events; and
- The community response to changes in the community noise environment.

Numerous methods have been developed to measure sound over a period of time; refer to Table 5.11-1, *Noise Descriptors*.



Source: Environmental Protection Agency, *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* (EPA/ONAC 550/9-74-004), March 1974.

Common Environmental Noise Levels

Table 5.11-1
Noise Descriptors

Term	Definition
Decibel (dB)	The unit for measuring the volume of sound equal to 10 times the logarithm (base 10) of the ratio of the pressure of a measured sound to a reference pressure (20 micropascals).
A-Weighted Decibel (dBA)	A sound measurement scale that adjusts the pressure of individual frequencies according to human sensitivities. The scale accounts for the fact that the region of highest sensitivity for the human ear is between 2,000 and 4,000 cycles per second (hertz).
Equivalent Sound Level (L_{eq})	The sound level containing the same total energy as a time varying signal over a given time period. The L_{eq} is the value that expresses the time averaged total energy of a fluctuating sound level.
Maximum Sound Level (L_{max})	The highest individual sound level (dBA) occurring over a given time period.
Minimum Sound Level (L_{min})	The lowest individual sound level (dBA) occurring over a given time period.
Community Noise Equivalent Level (CNEL)	A rating of community noise exposure to all sources of sound that differentiates between daytime, evening, and nighttime noise exposure. These adjustments are +5 dBA for the evening, 7:00 p.m. to 10:00 p.m., and +10 dBA for the night, 10:00 p.m. to 7:00 a.m.
Day/Night Average (L_{dn})	The L_{dn} is a measure of the 24-hour average noise level at a given location. It was adopted by the U.S. Environmental Protection Agency (EPA) for developing criteria for the evaluation of community noise exposure. It is based on a measure of the average noise level over a given time period called the L_{eq}. The L_{dn} is calculated by averaging the L_{eq}'s for each hour of the day at a given location after penalizing the "sleeping hours" (defined as 10:00 p.m. to 7:00 a.m.) by 10 dBA to account for the increased sensitivity of people to noises that occur at night.
Exceedance Level (L_n)	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% (L_{01}, L_{10}, L_{50}, L_{90}, respectively) of the time during the measurement period.

Source: Cyril M. Harris, Handbook of Noise Control, 1979.

HEALTH EFFECTS OF NOISE

Human response to sound is highly individualized. Annoyance is the most common issue regarding community noise. However, many factors influence people's response to noise. The factors can include the character of the noise, the variability of the sound level, the presence of tones or impulses, and the time of day of the occurrence. Additionally, non-acoustical factors, such as the person's opinion of the noise source, the ability to adapt to the noise, the attitude towards the source and those associated with it, and the predictability of the noise, all influence people's response. As such, response to noise varies widely from one person to another and with any particular noise, individual responses range from "not annoyed" to "highly annoyed."

The effects of noise are often only transitory, but adverse effects can be cumulative with prolonged or repeated exposure. The effects of noise on the community can be organized into six broad categories:

- Noise-Induced Hearing Loss;
- Interference with Communication;
- Effects of Noise on Sleep;
- Effects on Performance and Behavior;
- Extra-Auditory Health Effects; and
- Annoyance.

According to the United States Public Health Service, nearly ten million of the estimated 21 million Americans with hearing impairments owe their losses to noise exposure. Noise can mask important sounds and disrupt communication between individuals in a variety of settings. This process can cause anything from a slight irritation to a serious safety hazard, depending on the circumstance. Noise can disrupt face-to-face communication and telephone communication, and the enjoyment of music and television in the home. It can also disrupt effective communication between teachers and pupils in schools and can cause fatigue and vocal strain in those who need to communicate in spite of the noise.

Interference with communication has proved to be one of the most important components of noise-related annoyance. Noise-induced sleep interference is one of the critical components of community annoyance. Sound level, frequency distribution, duration, repetition, and variability can make it difficult to fall asleep and may cause momentary shifts in the natural sleep pattern, or level of sleep. It can produce short-term adverse effects on mood changes and job performance, with the possibility of more serious effects on health if it continues over long periods. Noise can cause adverse effects on task performance and behavior at work, and non-occupational and social settings. These effects are the subject of some controversy, since the presence and degree of effects depends on a variety of intervening variables. Most research in this area has focused mainly on occupational settings, where noise levels must be sufficiently high and the task sufficiently complex for effects on performance to occur.

Annoyance can be viewed as the expression of negative feelings resulting from interference with activities, as well as the disruption of one's peace of mind and the enjoyment of one's environment. Field evaluations of community annoyance are useful for predicting the consequences of planned actions involving highways, airports, road traffic, railroads, or other noise sources. The consequences of noise-induced annoyance are privately held dissatisfaction, publicly expressed complaints to authorities, and potential adverse health effects, as discussed above. In a study conducted by the United States Department of Transportation, the effects of annoyance to the community were quantified. In areas where noise levels were consistently above 60 dBA CNEL, approximately nine percent of the community is highly annoyed. When levels exceed 65 dBA CNEL, that percentage rises to 15 percent. Although evidence for the various effects of noise have differing levels of certainty, it is clear that noise can affect human health. Most of the effects are, to a varying degree, stress related.

GROUND-BORNE VIBRATION

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. The peak particle velocity (PPV) or the root mean square (RMS) velocity is usually used to describe vibration amplitudes. PPV is defined as the maximum instantaneous peak or vibration signal, while RMS is defined as the square root of the average of the squared amplitude of the signal. PPV is typically used for evaluating potential building damage, whereas RMS is typically more suitable for evaluating human response. Typically, ground-borne vibration, generated by man-made activities, attenuates rapidly with distance from the source

of vibration. Man-made vibration issues are therefore usually confined to short distances (i.e., 500 feet or less) from the source.

Both construction and operation of development projects can generate ground-borne vibration. In general, demolition of structures preceding construction generates the highest vibrations. Construction equipment such as vibratory compactors or rollers, pile drivers, and pavement breakers can generate perceptible vibration during construction activities. Heavy trucks can also generate ground-borne vibrations that vary depending on vehicle type, weight, and pavement conditions.

SENSITIVE RECEPTORS

Human response to noise varies widely depending on the type of noise, time of day, and sensitivity of the receptor. The effects of noise on humans can range from temporary or permanent hearing loss to mild stress and annoyance due to such things as speech interference and sleep deprivation. Prolonged stress, regardless of the cause, is known to contribute to a variety of health disorders. Noise, or the lack thereof, is a factor in the aesthetic perception of some settings, particularly those with religious or cultural significance. Certain land uses are particularly sensitive to noise, including schools, hospitals, rest homes, long-term medical and mental care facilities, and parks and recreation areas. Residential areas are also considered noise sensitive, especially during the nighttime hours. The Site vicinity is predominantly an industrial/business park area. The following receptors were identified as sensitive receptors in vicinity of the Site:

- The proposed Site is surrounded by adjacent residential receptors to the north and east.
- The closest school is Hodge Elementary School, located approximately 0.50-mile to the east, on West 11th Street.
- The closest child-care center is S.A.J Child Care and Preschool, located approximately 0.3-mile to the east, on West Sierra Madre Avenue.
- The closest assisted living facility is Silverado Sierra Vista Memory Care Community - Assisted Living Facility, located approximately one mile to the northeast, on West Sierra Madre Avenue.
- The closest hospital is the Casa Colina Hospital, located approximately two miles southeast of the proposed Project, on East Alosta Avenue in Azusa.

AMBIENT NOISE MEASUREMENTS

To quantify existing ambient noise levels in the Site vicinity, A/E Tech LLC conducted noise measurements on October 21, October 22, June 14, and June 15, 2016; refer to Table 5.11-2, *24-Hour Ambient Noise Level Measurements*, Table 5.11-3, *Short-Term Noise Level Measurements,* and Exhibit 5.11-2, *Noise Measurement Locations*. The noise measurement sites were representative of typical existing noise exposure within and immediately adjacent to the Site. Each measurement was positioned as close to the nearest sensitive receiver locations to assess the existing ambient hourly noise levels surrounding the Site. The 24-hour measurement at site LT1 was taken between October 21 and 22, 2016, and the 24-hour measurements at LT-2 and LT-3 were conducted between June 14 and 15, 2016. Short-term measurements were taken on October 21, 2016, June 13, 2016, and June 14, 2016; refer to Table 5.11-3.

Table 5.11-2
24-Hour Ambient Noise Level Measurements

Location Number[1]	Date	Description	L_{eq} (dBA)		CNEL
			Daytime[2]	Nighttime[2]	
LT-1	October 21-22, 2016	At the Center of the Site.	60.3	52.9	58.3
LT-2	June 14-15, 2016	This 24-hour noise monitoring site is located near the south side of the Site, across from Lagunitas Brewery and North Todd Avenue.	57.1	57.8	59.8
LT-3	June 14-15, 2016	Within the Azusa Greens Golf Course at the south fence line of the Rain Bird Corporation building.	59.7	60.6	61.6

Notes:
1 See Exhibit 5.11-2 for the noise level measurement locations.
2 Daytime = 7:00 a.m. to 10:00 p.m.; Nighttime = 10:00 p.m. to 7:00 a.m.
Source: A/E Tech LLC; *Noise Study Report: California Grand Villages at Azusa Greens,* April 2018, refer to Appendix 11.10.

Table 5.11-3
Short-Term Noise Level Measurements

Site No.	Location[1]	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	Date	Time
ST1	Azusa Greens Golf Course approximately 90 feet east of the North Todd Avenue centerline, across from the Lagunitas Brewery.	57.8 57.9	46.4 49.6	68.5 69.1	6/14/16	11:19 a.m. 11:29 a.m.
ST2	Near the east fence line of the Azusa Greens Golf Course.	61.0	54.2	80.6	10/21/16	1:46 p.m.
ST3	Azusa Greens Golf Course approximately 75 feet south of the Sierra Madre Avenue centerline.	61.8 61.0	40.7 42.5	80.6 80.2	10/21/16	3:48 p.m. 4:07 p.m.
ST4	In front of 1123 West Sierra Madre Avenue.	63.2 65.5	44.1 49.7	74.5 76.2	6/13/16	2:05 p.m. 5:53 p.m.
ST5	The setback of residential structures between 953 and 955 Sierra Madre Avenue.	62.2 61.9	42.2 43.1	78.6 78.1	6/14/16	9:59 a.m. 10:14 a.m.
ST6	In front of the southwest corner unit of the Le Med Apartment Homes located at 950 Sierra Madre Avenue.	47.4 52.2	42.6 48.7	55.8 59.6	6/13/16	2:28 p.m. 6:15 p.m.
ST7	The interior of the Sierra Village condominiums (900 West Sierra Madre Avenue) at an open area between Units 165 and 174.	48.7	38.2	71.2	6/13/16	3:02 p.m.
ST8	West of the condominium located at the very southwest corner of the Sierra Village condominiums (Unit 186).	67.1	46.2	92.6	6/13/16	3:54 p.m.
ST9	East of Vernon Avenue, in front of the single-family home at 1020 North Vernon Avenue.	64.7	46.5	83.2	6/13/16	3:31 p.m.

Notes:
1 See Exhibit 5.11-2 for the noise level measurement locations.
Source: A/E Tech LLC; *Noise Study Report: California Grand Villages at Azusa Greens,* April 2018, refer to Appendix 11.10.

Source: CGVA Partners, *California Grand Villages at Azusa Greens Noise Study Report*, April 2018.

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ENVIRONMENTAL IMPACT REPORT
CALIFORNIA GRAND VILLAGE PROJECT

Noise Measurement Locations

Exhibit 5.11-2

MOBILE SOURCES

To assess future traffic noise exposure along area roadways, traffic noise models were developed using the Federal Highway Administration (FHWA) Traffic Noise Model (TNM) version 2.5 computer program. TNM is the latest analytical method developed for roadway traffic noise prediction. The model is based upon reference energy emission levels for automobiles, medium trucks (2 axles), heavy trucks (3 or more axles), buses and motorcycles, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, atmospheric conditions, and the acoustical characteristics of the site. TNM was developed to predict hourly L_{eq} values for free-flowing and interrupted-flow traffic conditions.

To validate the use of TNM in accurately predicting traffic noise levels, existing traffic noise measurements and traffic counts were conducted concurrently at a number of locations along North Todd Avenue and West Sierra Madre Avenue, and the traffic count data were used in the model to compare the calculated noise levels in the model to measured noise levels obtained in the field. The results of such comparisons indicate that the model can be used for accurate prediction of noise levels in the general Project area.

Traffic data used in the noise model were developed from the Traffic Impact Analysis. Consistent with the Traffic Impact Analysis, traffic noise level changes are evaluated by comparing traffic noise levels under the Existing and 2022 Background conditions to those under the Existing Plus Project and 2022 Background Plus Project conditions.

During noise measurements at each location, concurrent traffic counts on each respective roadway were also conducted. The results of the traffic noise level measurements and concurrent traffic counts are summarized in Table 5.11-4, *Measured Traffic Noise Levels (dBA) and Traffic Counts*.

Table 5.11-4
Measured Traffic Noise Levels (dBA) and Traffic Counts

Site	Date	Start Time	Measured Sound Level			Hourly Traffic Counts							
			L_{eq}	L_{min}	L_{max}	A	MT	HT	MC	A	MT	HT	MC
Along North Todd Avenue						Southbound				Northbound			
ST1	6/14/2016	11:19 a.m.	57.8	46.4	68.5	294	6	0	0	216	6	0	0
		11:29 a.m.	57.9	49.6	69.1	234	0	6	0	132	12	0	0
Along West Sierra Madre Avenue						Westbound				Eastbound			
ST3	10/21/2016	3:48 p.m.	61.8	40.7	80.6	176	8	0	0	480	8	0	4
		4:07 p.m.	61.0	42.5	80.2	180	0	0	0	636	4	0	0
ST5	6/14/2016	9:59 a.m.	62.2	42.2	78.6	300	8	4	0	176	0	0	0
		10:14 a.m.	61.9	43.1	78.1	328	0	0	0	184	4	0	0

Notes:
A = Automobiles; MT = Medium Trucks; HT = Heavy Trucks; MC = Motorcycle

Source: A/E Tech LLC; *Noise Study Report: California Grand Villages at Azusa Greens,* April 2018, refer to Appendix 11.10.

Existing roadway geometry and number of vehicles counted during the noise measurement periods were entered into the noise model for each location. Table 5.11-5, *Comparison of Measured and Modeled Traffic Noise Levels (dBA)* is a summary of noise levels obtained during the traffic noise measurements and their comparison to levels predicted by the TNM.

Table 5.11-5
Comparison of Measured and Modeled Traffic Noise Levels (dBA)

Measurement Location	Measured L_{eq}	Modeled L_{eq}	Difference
ST1	57.8	59.3	+1.5
	57.9	58.8	+0.9
ST3	61.8	61.8	0.0
	61.0	62.3	+1.3
ST5	62.2	62.7	+0.5
	61.9	62.2	+0.3

Source: A/E Tech LLC; *Noise Study Report: California Grand Villages at Azusa Greens,* April 2018, refer to Appendix 11.10.

The last column of Table 5.11-5 depicts the differences between the measured and modeled noise levels. At all three traffic noise measurement locations, the difference between measured and modeled noise levels are within 1.5 dBA, which indicates close agreement between the two levels. This close agreement verifies the accuracy of the TNM in predicting traffic noise levels in areas near the roadway.

STATIONARY NOISE SOURCES

The Site vicinity consists of industrial, residential, recreational, and open space uses. The primary sources of stationary noise in the Site vicinity are urban-related activities (e.g., heating, ventilation, and air conditioning units, parking areas, and conversations). The noise associated with these sources may represent a single-event or a continuous occurrence.

5.11.2 REGULATORY SETTING

This section summarizes the laws, ordinances, regulations, and standards that are applicable to the Project. Regulatory requirements related to environmental noise are typically promulgated at the local level. However, Federal and State agencies provide standards and guidelines to the local jurisdictions.

FEDERAL LEVEL

Federal Transit Administration

The City does not identify specific vibration standards for temporary construction, and therefore, the Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Standards* are utilized in this analysis. The *Transit Noise and Vibration Impact Assessment* identifies the vibration level thresholds for potential building damage due to construction activities. The lowest threshold identified in the FTA criteria is a PPV of 0.12 inch/second for historic, sensitive buildings.

STATE LEVEL

California Government Code

California Government Code Section 65302(f) mandates that the legislative body of each county, town, and city adopt a noise element as part of their comprehensive general plan. The local noise element must recognize the land use compatibility guidelines established by the State Department of Health Services, as shown in Table 5.11-6, *Land Use Compatibility for Community Noise Environments*. The guidelines rank noise land use compatibility in terms of "normally acceptable," "conditionally acceptable," "normally unacceptable," and "clearly unacceptable" noise levels for various land use types. Single-family homes are "normally acceptable" in exterior noise environments up to 60 CNEL and "conditionally acceptable" up to 70 CNEL. Multiple-family residential uses are "normally acceptable" up to 65 CNEL and "conditionally acceptable" up to 70 CNEL. Schools, libraries, and churches are "normally acceptable" up to 70 CNEL, as are office buildings and business, commercial, and professional uses.

Table 5.11-6
Land Use Compatibility for Community Noise Environments

Land Use Category	Community Noise Exposure (L_{dn} or CNEL, dBA)			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential – Low Density, Single-Family, Duplex, Mobile Homes	50 – 60	55 – 70	70 – 75	75 – 85
Residential – Multiple Family	50 – 65	60 – 70	70 – 75	70 – 85
Transient Lodging - Motel, Hotels	50 – 65	60 – 70	70 – 80	80 – 85
Schools, Libraries, Churches, Hospitals, Nursing Homes	50 – 70	60 – 70	70 – 80	80 – 85
Auditoriums, Concert Halls, Amphitheaters	NA	50 – 70	NA	65 – 85
Sports Arenas, Outdoor Spectator Sports	NA	50 – 75	NA	70 – 85
Playgrounds, Neighborhood Parks	50 – 70	NA	67.5 – 75	72.5 – 85
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50 – 70	NA	70 – 80	80 – 85
Office Buildings, Business Commercial and Professional	50 – 70	67.5 – 77.5	75 – 85	NA
Industrial, Manufacturing, Utilities, Agriculture	50 – 75	70 – 80	75 – 85	NA

Notes: NA = Not Applicable; L_{dn} = Day/Night Average; CNEL = community noise equivalent level; dBA = A-weighted decibels

Normally Acceptable - Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

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.

Normally Unacceptable - New Construction or development should 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.

Clearly Unacceptable – New construction or development should generally not be undertaken.

Source: Office of Planning and Research, California, *General Plan Guidelines*, October 2003.

Green Building Standards Code

The State's 2016 Green Building Standards Code contains mandatory measures for non-residential building construction in Section 5.507 on Environmental Comfort. These noise standards are applied to new construction in California for controlling interior noise levels resulting from exterior noise sources. The regulations specify that acoustical studies must be prepared when non-residential structures are developed in areas where the exterior noise levels exceed 65 dBA CNEL, such as within a noise contour of an airport, freeway, railroad, and other areas where noise contours are not readily available. If the development falls within the 65 dBA CNEL noise contour of an airport or freeway, the combined sound transmission class (STC) rating of the wall and roof-ceiling assemblies must be at least 50. For those developments in areas where noise contours are not readily available, and the noise level exceeds 65 dBA L_{eq} for any hour of operation, a wall and roof-ceiling combined STC rating of 45, and exterior windows with a minimum STC rating of 40 are required.

LOCAL LEVEL

City of Azusa

AZUSA GENERAL PLAN NOISE CRITERIA

General Plan Chapter 5, *Natural Environment*, includes a Noise Section that identifies noise compatibility criteria consistent with the Governor's Office of Planning and Research. The goal of the Noise Section is to maintain community noise levels that meet health guidelines and allow for a high quality of life. The guidelines included in the Noise Section consider land use compatibility and identify exterior noise level compatibility criteria for transportation related noise. General Plan Table N-1, *Land Use Compatibility for Community Noise Environments*, which is detailed in Table 5.11-6, provides the City with a planning tool to gauge the compatibility of land uses relative to existing and future exterior noise levels.

The City's Land Use Compatibility for Community Noise Environments criteria are detailed above in Table 5.11-6. As shown, noise-sensitive land uses such as residential uses are normally acceptable with exterior noise levels below 65 dBA CNEL and conditionally acceptable with noise levels approaching 70 dBA CNEL. Multi-family residential, such as the Project, are conditionally acceptable with exterior noise levels between 50 to 65 dBA CNEL and normally unacceptable with exterior noise levels above 75 dBA CNEL. For the purposes of this analysis, multi-family land uses are considered normally acceptable land use with exterior noise levels below 65 dBA CNEL.

AZUSA MUNICIPAL CODE

Municipal Code Section 88.31.020 Table 3-4, *Noise Standards for Short-Duration Events Near Residential Areas*, identifies the exterior noise level standards for noise-sensitive receiving land uses in the City. For noise-sensitive residential uses, the daytime (7:00 a.m. to 10:00 p.m.) exterior noise level limit is 50 dBA L_{eq} and 70 dBA L_{max}, and 45 dBA L_{eq} and 65 dBA L_{max} during the nighttime hours (10:00 p.m. to 7:00 p.m.).

5.11.3 IMPACT THRESHOLDS AND SIGNIFICANCE CRITERIA

Appendix G, of the *CEQA Guidelines* contains analysis guidelines related to the assessment of noise impacts. These guidelines have been utilized as thresholds of significance for this analysis. As stated in Appendix G, a project would create a significant environmental impact if it would:

a) Expose persons to, or generate, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies (refer to Impact Statement N-1);

b) Expose persons to or generate excessive ground borne vibration or ground borne noise levels (refer to Impact Statement N-2);

c) Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project (refer to Impact Statements N-3 and N-4);

d) Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project (refer to Impact Statement N-1);

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels (refer to Section 8.0, *Effects Found Not To Be Significant*); and/or

f) For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels (refer to Section 8.0).

Based on these standards, the effects of the Project have been categorized as either a "less than significant impact" or a "potentially significant impact." Mitigation measures are recommended for potentially significant impacts. If a potentially significant impact cannot be reduced to a less than significant level through the application of mitigation, it is categorized as a significant and unavoidable impact.

OPERATIONAL AND CONSTRUCTION NOISE STANDARDS

For determination of significance of noise impacts in a given environment, noise level changes brought about by a specific project (or set of projects) are often evaluated in the context of preexisting noise conditions in that environment and the type of land use affected. For quieter existing noise environments, as opposed to already noisy environments, long-term project-induced noise level changes are allowed to be higher before the project causes a significant impact. Noise level changes most frequently utilized for determination of significance of long-term impacts at noise-sensitive locations range from 10 dBA for quiet rural areas, to 3 dBA to 5 dBA for urban areas with noisier settings, to even 1.5 dBA for locations exposed to higher noise levels, such as homes within the 65 dBA L_{dn} contour of an airport.[1] For residential land uses, changes in noise levels are often evaluated

[1] Federal Interagency Committee on Noise, *Federal Agency Review of Selected Airport Noise Analysis Issues*, August 1992.

in terms of 24-hour average noise metrics (i.e., CNEL or L_{dn}). Thresholds similar to these are already adopted by federal agencies (such as Federal Transit Administration and Federal Aviation Administration), and state and local jurisdictions.

Although the City has not specifically adopted such thresholds, CEQA requires that a noise study adequately assess noise level increases caused by a project for determination of its impacts on the environment.

Although the term "substantial increase" is not explicitly defined by CEQA, a reasonable threshold can be formulated based on an increase required to be audible by most individuals. The human ear can detect changes in sound levels of approximately 3 dBA under normal, controlled conditions. A change of 5 dBA is noticeable to most people in an exterior environment. Changes of between 1 to 3 dBA may be noticeable under quiet background conditions.

In short, if project-related increase in noise levels results in overall noise levels exceeding the goal of the General Plan for the land use (i.e., 65 dBA CNEL for residential land uses), the project would cause a significant impact. Also, based on human perception of changes in noise levels, an increase of 3 dBA in CNEL or more could be deemed to constitute a "significant increase." Similarly, under peak-hour traffic conditions, a 3 dBA increase in hourly L_{eq} may be used as a threshold of significance. Furthermore, for construction noise, because of its temporary nature and daytime occurrence, a noise level change of 10 dBA (i.e., perceived doubling of audible sound) would be a reasonable significance threshold to apply. The thresholds of significance outlined in this section would apply to frequently-used exterior areas of noise- sensitive land uses where increases in noise would directly affect people.

VIBRATION STANDARDS

As sated above, the City does not identify specific vibration standards for temporary construction, and therefore, the FTA's *Transit Noise and Vibration Impact Assessment Standards* are utilized in this analysis. The lowest threshold identified in the FTA criteria is a PPV of 0.12 inch/second for historic, sensitive buildings. For the purposes of this analysis, the building damage threshold of 0.12 inch/second is used to assess the potential impacts due to Project construction at surrounding uses.

NOISE IMPACT CRITERIA

Table 5.11-7, *Significance Criteria Summary*, shows the significance criteria for noise impacts as a direct result of the proposed Project.

Table 5.11-7
Significance Criteria Summary

Analysis	Receiving Land Use	Jurisdiction	Condition(s)	Significance Criteria	
				Daytime	Nighttime
Off-Site	Noise-Sensitive	Azusa	If ambient is < 60 dBA CNEL	≥ 5 dBA CNEL project increase	
			If ambient is 60 – 65 dBA CNEL	≥ 3 dBA CNEL project increase	
			If ambient is > 65 dBA CNEL	≥ 1.5 dBA CNEL project increase	
	Non-Noise-Sensitive		If ambient is < 70 dBA CNEL	≥ 5 dBA CNEL project increase	
			If ambient is > 70 dBA CNEL	≥ 3 dBA CNEL project increase	
		Azusa	If ambient is < 60 dBA L_{eq}	≥ 5 dBA L_{eq} project increase	
			If ambient is 60 – 65 dBA L_{eq}	≥ 3 dBA L_{eq} project increase	
			If ambient is > 65 dBA L_{eq}	≥ 1.5 dBA L_{eq} project increase	
Construction	Noise-Sensitive	Azusa	Permitted between7:00 a.m. to 6:00 p.m. Monday through Saturday; unless otherwise allowed through conditions of approval.[1]		
		Azusa	Noise Level Threshold[2]	10 dBA L_{eq} Increase Above Ambient	

N/A = Not applicable; no nighttime construction activity is permitted, so no nighttime construction noise level limits are identified; PPV = peak particle velocity.

Daytime and Nighttime Hours by Jurisdiction:
Azusa: Daytime = 7:00 a.m. to 10:00 p.m.; Nighttime = 10:00 p.m. to 7:00 a.m.

Notes:
1 City of Azusa Municipal Code, Section 88.31.020(C)(3) (Appendix 3.1).

Source: A/E Tech LLC; *Noise Study Report: California Grand Villages at Azusa Greens,* April 2018, refer to Appendix 11.10.

5.11.4 IMPACTS AND MITIGATION MEASURES

SHORT-TERM CONSTRUCTION NOISE IMPACTS

N-1 Would Project construction result in significant temporary noise impacts to nearby noise sensitive receivers?

Impact Analysis: The Project is anticipated to be completed in three phases. Phase 1 would include the golf course reconfiguration prior to the grading for the Senior Village to maintain an 18-hole golf course. Phase 2 would consist of site preparation, grading, and installation of underground utilities for the Senior Village. Phase 3 would include the development of the Senior Village and associated parking structure.

Table 5.11-8, *Reference Construction Equipment Noise Levels,* indicates the anticipated noise levels of construction equipment at a distance of 50 feet. Noise levels generated by heavy construction equipment can range from approximately 68 dBA to more than 80 dBA when measured at 50 feet. However, these noise levels diminish with distance from the construction site at a rate of 6 dBA per doubling of distance. For example, a noise level of 80 dBA measured at 50 feet from the noise source to the receiver would be reduced to 74 dBA at 100 feet from the source to the receiver and would be further reduced to 68 dBA at 200 feet from the source to the receiver.

Table 5.11-8
Reference Construction Equipment Noise Levels

Equipment Type	Actual L_{max} at 50 Feet (dBA)
Backhoe	78
Bulldozer	82
Compactor	82
Compressor	78
Concrete Mixer	79
Concrete Pump	81
Crane, Mobile	81
Dump Truck	76
Excavator	81
Generator	81
Loader	79
Pavement Breaker	90
Paver	77
Pump	81
Roller	80
Tractor	84
Flatbed Truck	74
Welder	74

Source: Federal Highway Administration, 2006.

To evaluate whether the Project would generate potentially significant short-term noise levels at off-site sensitive receiver locations, a construction-related noise level increase threshold of 10 dBA L_{eq} over ambient conditions is used as an acceptable threshold for construction noise at the nearby sensitive receiver locations. Table 5.11-9, *Comparison of Estimated Construction to Existing Noise Levels (L_{eq}, dBA) Golf Course Reconfiguration – Rough Grading Phase*, is a summary of the estimated noise levels generated by rough grading of the golf course. Table 5.11-9 also shows the existing background sound levels at each receiver location and summarizes the expected increase in hourly L_{eq} resulting from golf course construction activities.

Table 5.11-9
Comparison of Estimated Construction to Existing Noise Levels (L_{eq}, dBA)
Golf Course Reconfiguration – Rough Grading Phase

Receiver Location	Construction L_{eq}	Existing L_{eq}	Combined Construction + Background L_{eq}	Estimated Increase over Existing L_{eq}	Threshold Exceeded?
Golf Course Rough Grading					
C1	52	64	64	-0-	No
C2	42	64	64	-0-	No
C3	42	62	62	-0-	No
C4	68	50	68	**+18**	**Yes**
C5	43	49	50	+1	No
C6	62	67	68	+1	No

Source: A/E Tech LLC; *Noise Study Report: California Grand Villages at Azusa Greens,* April 2018, refer to Appendix 11.10.

As shown by the results in Table 5.11-9, noise level increases due to rough grading activities within the golf course would generate significant increases in noise levels at exterior areas of the existing apartments along the north side of the golf course (represented by C4). However, with implementation of Mitigation Measure NOI-1, this construction L_{eq} would be reduced by 8 to 12 dBA L_{eq} and therefore would not exceed the construction threshold. Additionally, sound levels generated during other construction phases within the golf course are expected to be more sporadic and much less intensive than those during the rough grading phase.

Table 5.11-10, *Comparison of Estimated Senior Village Construction Noise Levels to Existing Noise Levels (L_{eq}, dBA)*, is a summary of the estimated noise levels generated during construction activities (including off-site improvements) for the California Grand Villages (Phases 1 and 2). Table 5.11-10 shows the highest construction noise levels would generate temporary, short-term noise level increases above ambient conditions of up to 10 dBA L_{eq} at the exterior of existing residences along the north side of Sierra Madre Avenue closest to the Site (represented by receiver C1). However, such increases are considered to be less than significant given the fact that the front sides of these residential uses are typically not used as outdoor activity areas. Per Table 5.11-10, the construction noise level increase significance threshold would not be exceeded. Thus, Project-generated construction noise would result in a less than significant impact at all nearby sensitive receiver locations.

Table 5.11-10
Comparison of Estimated Senior Village Construction Noise Levels to Existing Noise Levels (L_{eq}, dBA)

Receiver Location	Construction L_{eq}	Existing L_{eq}	Combined Construction + Background L_{eq}	Estimated Increase over Existing L_{eq}	Threshold Exceeded?
Project Site Demolition					
C1	74	64	74	+10	No
C2	62	64	66	+2	No
C3	43	62	62	-0-	No
C4	40	50	50	-0-	No
C5	37	49	49	-0-	No
C6	37	67	67	-0-	No
Project Site Preparation					
C1	59	64	65	+1	No
C2	53	64	64	-0-	No
C3	34	62	62	-0-	No
C4	32	50	50	-0-	No
C5	28	49	49	-0-	No
C6	28	67	67	-0-	No
Project Site Grading/Excavation[1]					
C1	71	64	72	+8	No
C2	63	64	67	+3	No
C3	58	62	63	+1	No
C4	40	50	50	-0-	No
C5	37	49	49	-0-	No
C6	37	67	67	-0-	No

Notes:
1. Modeled noise levels include the construction of a new 8-inch sewer line connection from the Senior Village to an existing 12-inch sewer line in North Todd Avenue.

Source: A/E Tech LLC; *Noise Study Report: California Grand Villages at Azusa Greens,* April 2018, refer to Appendix 11.10.

CONSTRUCTION TRAFFIC NOISE

One contributing factor to noise level changes during construction of the Project is temporary use of area roadways by employee vehicles and construction trucks utilized for hauling materials to and away from the Site. To quantify such traffic noise effects, exact volumes of trucks and employee vehicles during each stage of Project construction were obtained from the Traffic Impact Analysis. Peak hour traffic conditions during the a.m. were modeled in TNM based on existing (2016) traffic data, and effects of Project construction traffic during the demolition, grading/excavation, and building construction stages were evaluated; refer to Appendix 11.8 and Appendix 11.10.

Table 5.11-11, *Existing (2016) Background A.M. Peak Hour Traffic Noise Levels Compared to Background-Plus-Construction Traffic Noise Levels (L_{eq}, dBA) at 100 Feet from Roadway Centerline*, summarizes the findings of the construction traffic noise evaluation. As seen in Table 5.11-11, construction traffic would result in traffic noise level increases of only up to 0.2 dBA along the roadways near the Site during a.m. peak hour. Peak hour noise levels during the p.m. would be affected in a similar manner. Such increases would not be perceptible to noise-sensitive uses along area roadways. A less than significant impact would occur in this regard.

Table 5.11-11
Existing (2016) Background A.M. Peak Hour Traffic Noise Levels Compared to Background-Plus-Construction Traffic Noise Levels (L_{eq}, dBA) at 100 Feet from Roadway Centerline

Roadway Segment	Existing	Demolition	Increase	Grading/ Excavation	Increase	Buildings	Increase
10th Street, West of Vernon Avenue							
North of 10th Street	51.1	51.2	0.1	51.3	0.2	51.2	0.1
South of 10th Street	51.6	51.7	0.1	51.7	0.1	51.7	0.1
North Todd Avenue, Foothill Boulevard to 10th Street							
West of North Todd Avenue	64.5	64.5	0.0	64.5	0.0	64.5	0.0
East of North Todd Avenue	63.6	63.7	0.1	63.6	0.0	63.7	0.1
North Todd Avenue, 10th Street to West Sierra Madre Avenue							
West of North Todd Avenue	63.6	63.8	0.2	63.7	0.1	63.8	0.2
East of North Todd Avenue	62.6	62.8	0.2	62.7	0.1	62.8	0.2

Source: A/E Tech LLC; *Noise Study Report: California Grand Villages at Azusa Greens,* April 2018, refer to Appendix 11.10.

As discussed above, short-term construction noise impacts generated by the Project would be less than significant with mitigation incorporated. Additionally, best management practices related to construction noise reduction would be implemented as detailed in SCA NOI-1 through SCA NOI-3, which would further reduce Project-related construction noise levels. Overall, compliance with Municipal Code Section 88.31.020(C)(3), SCA NOI-1 through SCA NOI-3, and Mitigation Measure NOI-1 would reduce the Project's construction impacts to a less than significant level.

Standard Conditions of Approval:

SCA NOI-1 Prior to approval of grading plans and/or issuance of building permits, plans shall include a note indicating that noise-generating Project construction activities shall only occur between the hours of 7:00 a.m. to 6:00 p.m. Monday through Saturday, unless otherwise allowed through conditions of approval (City of Azusa Municipal Code Section 88.31.020[C][3]). The Project construction supervisor shall ensure compliance with the note and the City shall conduct periodic inspection at its discretion.

SCA NOI-2 During all Site construction, the construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturers' standards. The construction contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receptors nearest the Site.

SCA NOI-3 The construction contractor shall locate equipment staging in areas that would create the greatest distance between construction-related noise sources and noise-sensitive receivers nearest the Site during all Project construction (i.e., to the center).

Mitigation Measures:

NOI-1 Grading plans and specifications shall include a temporary noise barrier as shown on Noise Study Figure 4, *Construction Noise Analysis Locations and Mitigation*, to mitigate construction noise impacts on the Le Med Apartments. The temporary construction noise barrier shall be a minimum height of 12 feet high and be maintained during grading and heavy equipment operations. The barriers shall be solid from the ground to the top of the barrier and have a weight of at least 2.5 pounds per square foot, which is equivalent to 0.75-inch thick plywood, or provide equivalent noise reduction, such as noise blankets. The barrier design shall optimize the following requirements: (1) the barrier shall be located to maximize the interruption of line of sight between the equipment and the receptor; (2) the length of the barrier shall be selected to block the line of sight between the construction area and the receptors; (3) the barrier shall be located as close as feasible to the receptor or as close as feasible to the construction area.

Level of Significance: Less Than Significant Impact With Mitigation Incorporated.

VIBRATION IMPACTS

N-2 Would Project implementation result in significant vibration impacts to nearby sensitive receptors?

Impact Analysis: Project construction can generate varying degrees of groundborne vibration, depending on the construction procedure and the construction equipment used. Operation of construction equipment generates vibrations that spread through the ground and diminish in amplitude with distance from the source. The effect on buildings located in the vicinity of the construction site often varies depending on soil type, ground strata, and construction characteristics of the receiver building(s). The results from vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibration at moderate levels, to slight

damage at the highest levels. Groundborne vibrations from construction activities rarely reach levels that damage structures.

The FTA has published standard vibration velocities for construction equipment operations. In general, the FTA architectural damage criterion for continuous vibrations (i.e., 0.2 inch/second) appears to be conservative even for sustained pile driving. Pile driving levels often exceed 0.2 inch/second at distances of 50 feet, and 0.5 inch/second at 25 feet without any apparent damage to buildings.

The closest sensitive receptors to the Senior Village construction area are residential uses to north (over 82 feet away) along West Sierra Madre Avenue. These uses would not be within close enough proximity to grading activities to be subjected to substantial ground-borne vibration. The grading activities for the Senior Village are separated from residential buildings by Sierra Madre Avenue and additional front yard setbacks, which include vertical separation. However, the closest structure during grading would be approximately 70 feet to the east. Table 5.11-12, *Typical Vibration Levels for Construction Equipment*, shows that at 70 feet the peak source of construction vibration velocity levels would be 0.0448 inch/second PPV, which is below the FTA vibration standard of 0.12 inch/second PPV at all receiver locations.

Table 5.11-12
Vibration Source Levels for Construction Equipment

Equipment	PPV (inch/second) at 70 feet
Small bulldozer	0.0006
Jackhammer	0.0075
Loaded Trucks	0.0162
Large bulldozer	0.0190
Vibratory Roller	0.0448

Notes:
1. PPV = peak particle velocity
2. Calculated using the following formula:

   $PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$

   where: PPV (equip) = the peak particle velocity in in/sec of the equipment adjusted for the distance
   PPV (ref) = the reference vibration level in in/sec from Table 12-2 of the FTA *Transit Noise and Vibration Impact Assessment Guidelines*
3. D = the distance from the equipment to the receiver

Source: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Guidelines*, Table 12-2, May 2006.

The golf course reconfiguration would also have no potential for ground-borne vibration because of the size of the equipment. Reconfiguring the golf course does not require scrapers and dozers. Instead, it would be done with light equipment such as front loaders. Therefore, there is no potential for vibration impacts on the surrounding apartment complexes as part of the golf course reconfiguration.

Further, construction at the Site would be restricted to daytime hours consistent with Municipal Code Section 88.31.020(C)(3) (7:00 a.m. to 6:00 p.m. Monday through Saturday; unless otherwise allowed through conditions of approval), thereby eliminating potential vibration impact during the sensitive nighttime hours.

Therefore, proposed construction activities associated with the Project would not expose sensitive receptors to excessive groundborne vibration levels. Vibration impacts associated with construction would be less than significant and no mitigation measures are required.

Standard Conditions of Approval: No standard conditions of approval are applicable.

Mitigation Measures: No mitigation measures are required.

Level of Significance: Less Than Significant Impact.

LONG-TERM (MOBILE) NOISE IMPACTS

N-3 Would traffic generated by the Project significantly contribute to existing traffic noise in the area or exceed established noise standards?

Impact Analysis: Potential long-term noise effects of the Project on noise-sensitive uses in the Site vicinity would be due to changes in vehicular traffic volumes on the local roadways. This analysis quantifies noise effects of traffic on local roadways due to the Project by comparing the existing and forecast future (2022) traffic noise levels along area roadways without the Project to those with the Project.

The Project would incrementally change traffic volumes on the local roadway system during both peak traffic hours and on a daily basis. Future changes in traffic noise exposure due to changes in vehicle trips due to the Project were evaluated using existing (2016) and forecast future (2022) peak-hour and average daily traffic (ADT) volumes on local roadways with and without the Project.

Peak-hour traffic volumes for the a.m. and p.m. during existing (2016) conditions without the Project and with the Project were obtained from the Traffic Impact Analysis. Vehicle composition data, including breakdown of automobiles, medium trucks (2-axle), heavy trucks (3 or more axles), and motorcycles were derived from the traffic counts of North Todd Avenue and West Sierra Madre Avenue obtained during the field noise measurement survey.

The traffic data were utilized in the FHWA TNM version 2.5 to evaluate differences in hourly average (L_{eq}) traffic noise levels between the with- and without-Project scenarios under existing conditions. Table 5.11-13, *Comparison of Existing (2016) Peak Hour Traffic Noise Levels With and Without the Project at 100 Feet from Roadway Centerline,* summarizes comparisons of calculated existing peak-hour L_{eq} values between the without-Project (Baseline) and with-Project scenarios at a set distance of 100 feet from the centerline of roadways in the Site Vicinity during a.m. and p.m. peak traffic hours.

From the data in Table 5.11-13, it is apparent that the proposed Project would cause virtually no change in existing peak-hour noise levels (zero to 0.2 dBA) when Project-related traffic is added to existing traffic, which would be below the threshold of 3 dBA. Therefore, Project traffic would not result in noticeable changes in traffic noise at noise-sensitive uses along area roadways during peak traffic hours, and such impacts would not be significant.

Table 5.11-13
Comparison of Existing (2016) Peak Hour Traffic Noise Levels With and Without the Project at 100 Feet from Roadway Centerline

Roadway Segment	A.M. Peak Hour L_{eq}, dBA			P.M. Peak Hour L_{eq}, dBA			Threshold Exceeded?[2]
	Without Project	With Project	Difference	Without Project	With Project	Difference	
Sierra Madre Avenue, Todd Avenue to Vernon Avenue							
North of Sierra Madre Avenue	63.6	63.6	0.0	61.2	61.3	0.1	No
South of Sierra Madre Avenue	62.0	62.0	0.0	62.1	62.2	0.1	No
Sierra Madre Avenue, East of Vernon Avenue							
North of Sierra Madre Avenue	63.4	63.4	0.0	61.3	61.4	0.1	No
South of Sierra Madre Avenue	61.6	61.7	0.1	62.1	62.2	0.1	No
10th Street, West of Vernon Avenue							
North of 10th Street	51.1	51.1	0.0	50.4	50.5	0.1	No
South of 10th Street	51.6	51.6	0.0	51.1	51.1	0.0	No
Todd Avenue, Foothill Boulevard to 10th Street							
West of Todd Avenue	64.5	64.6	0.1	62.5	62.7	0.2	No
East of Todd Avenue	63.6	63.7	0.1	62.8	63.0	0.2	No
Todd Avenue, 10th Street to Sierra Madre Avenue							
West of Todd Avenue	63.6	63.7	0.1	61.6	61.7	0.1	No
East of Todd Avenue	62.6	62.7	0.1	62.1	62.2	0.1	No
Vernon Avenue, 10th Street to Sierra Madre Avenue							
West of Vernon Avenue	56.2	56.2	0.0	54.7	54.7	0.0	No
East of Vernon Avenue	55.7	55.7	0.0	55.2	55.2	0.0	No
Vernon Avenue, Foothill Boulevard to 10th Street							
West of Vernon Avenue	58.6	58.6	0.0	57.1	57.1	0.0	No
East of Vernon Avenue	58.3	58.3	0.0	56.9	56.9	0.0	No
Foothill Boulevard, West of Irwindale Avenue							
North of Foothill Boulevard	68.6	68.6	0.0	67.6	67.7	0.1	No
South of Foothill Boulevard	67.3	67.4	0.1	68.7	68.7	0.0	No
Foothill Boulevard, Irwindale Avenue to Todd Avenue							
North of Foothill Boulevard	69.4	69.4	0.0	68.6	68.7	0.1	No
South of Foothill Boulevard	68.4	68.4	0.0	69.3	69.4	0.1	No
Foothill Boulevard, Todd Avenue to Vernon Avenue							
North of Foothill Boulevard	66.0	66.0	0.0	66.3	66.3	0.0	No
South of Foothill Boulevard	65.1	65.2	0.1	66.8	66.8	0.0	No
Foothill Boulevard, East of Vernon Avenue							
North of Foothill Boulevard	65.2	65.2	0.0	65.1	65.2	0.1	No
South of Foothill Boulevard	64.7	64.8	0.1	66.2	66.2	0.0	No
Irwindale Avenue, South of Foothill Boulevard							
West of Irwindale Avenue	56.0	56.0	0.0	56.9	56.9	0.0	No
East of Irwindale Avenue	67.9	67.9	0.0	68.2	68.2	0.0	No

Source: A/E Tech LLC; *Noise Study Report: California Grand Villages at Azusa Greens,* April 2018, refer to Appendix 11.10.

In addition, future opening year (2022) with- and without-Project peak-hour traffic data were utilized in TNM to compare the traffic noise levels between these two scenarios. Table 5.11-14, *Comparison of Opening Year (2022) Peak Hour Traffic Noise Levels With and Without the Project at 100 Feet from Roadway Centerline*, summarizes comparisons of calculated 2022 peak-hour L_{eq} values between the without-Project and with-Project scenarios at a set distance of 100 feet from the centerline of roadways in the Site Vicinity during a.m. and p.m. peak traffic hours.

Table 5.11-14
Comparison of Opening Year (2022) Peak Hour Traffic Noise Levels With and Without the Project at 100 Feet from Roadway Centerline

Roadway Segment	A.M. Peak Hour Leq, dBA			P.M. Peak Hour Leq, dBA			Threshold Exceeded?[2]
	Without Project	With Project	Difference	Without Project	With Project	Difference	
Sierra Madre Avenue, Todd Avenue to Vernon Avenue							
North of Sierra Madre Avenue	64.2	64.3	0.1	62.0	62.1	0.1	No
South of Sierra Madre Avenue	62.6	62.7	0.1	62.9	63.0	0.1	No
Sierra Madre Avenue, East of Vernon Avenue							
North of Sierra Madre Avenue	64.0	64.1	0.1	62.0	62.1	0.1	No
South of Sierra Madre Avenue	62.3	62.3	0.0	62.9	63.0	0.1	No
10th Street, West of Vernon Avenue							
North of 10th Street	52.7	52.8	0.1	51.9	52.0	0.1	No
South of 10th Street	52.8	52.8	0.0	52.6	52.7	0.1	No
Todd Avenue, Foothill Boulevard to 10th Street							
West of Todd Avenue	66.0	66.1	0.1	65.1	65.2	0.1	No
East of Todd Avenue	65.6	65.6	0.0	64.9	65.0	0.1	No
Todd Avenue, 10th Street to Sierra Madre Avenue							
West of Todd Avenue	64.6	64.6	0.0	63.1	63.2	0.1	No
East of Todd Avenue	63.7	63.8	0.1	63.4	63.4	0.0	No
Vernon Avenue, 10th Street to Sierra Madre Avenue							
West of Vernon Avenue	56.6	56.6	0.0	55.4	55.4	0.0	No
East of Vernon Avenue	56.1	56.1	0.0	55.8	55.9	0.1	No
Vernon Avenue, Foothill Boulevard to 10th Street							
West of Vernon Avenue	59.4	59.4	0.0	58.2	58.2	0.0	No
East of Vernon Avenue	59.2	59.2	0.0	57.8	57.9	0.1	No
Foothill Boulevard, West of Irwindale Avenue							
North of Foothill Boulevard	69.5	69.6	0.1	68.9	68.9	0.0	No
South of Foothill Boulevard	68.5	68.5	0.0	69.7	69.7	0.0	No
Foothill Boulevard, Irwindale Avenue to Todd Avenue							
North of Foothill Boulevard	70.5	70.5	0.0	70.1	70.2	0.1	No
South of Foothill Boulevard	69.9	69.9	0.0	70.6	70.6	0.0	No
Foothill Boulevard, Todd Avenue to Vernon Avenue							
North of Foothill Boulevard	67.4	67.5	0.1	67.7	67.8	0.1	No
South of Foothill Boulevard	66.7	66.7	0.0	68.1	68.1	0.0	No
Foothill Boulevard, East of Vernon Avenue							
North of Foothill Boulevard	66.9	66.9	0.0	66.9	66.9	0.0	No
South of Foothill Boulevard	66.4	66.5	0.1	67.8	67.8	0.0	No
Irwindale Avenue, South of Foothill Boulevard							
West of Irwindale Avenue	56.7	56.8	0.1	57.9	57.9	0.0	No
East of Irwindale Avenue	69.0	69.0	0.0	69.0	69.0	0.0	No

Source: A/E Tech LLC; *Noise Study Report: California Grand Villages at Azusa Greens,* April 2018, refer to Appendix 11.10.

From the data in Table 5.11-14, it is apparent that the proposed Project would cause virtually no change in existing peak-hour noise levels (zero to 0.1 dBA) in its opening year when Project-related traffic is added to background traffic, which would be below the threshold of 3 dBA. Therefore, Project traffic would not result in significant changes in traffic noise at noise-sensitive uses along area roadways during peak traffic hours in 2022.

Table 5.11-15, *Comparison of 2022 CNEL Values With and Without Cumulative Projects Plus Project at 100 Feet from Roadway Centerline*, summarizes comparisons of estimated CNEL values under 2022 baseline traffic conditions to those under 2022 traffic with conditions with the addition of cumulative projects and the Project. On a daily basis, cumulative traffic noise level increases in terms of CNEL would be 0.7 dBA along North Todd Avenue and 0.3 dBA along 10th Street, which would be below the threshold of 3 dBA and would not be noticeable. Therefore, such increases in CNEL would be less than significant.

Table 5.11-15
Comparison of 2022 CNEL Values
With and Without Cumulative Projects Plus Project at 100 Feet from Roadway Centerline

Roadway Segment	CNEL, dBA		
	2022 Baseline	2022 Baseline +Cumulative + Project	Difference
North Todd Avenue., North of 10th Street	65.1	65.8	0.7
North Todd Avenue., South of 10th Street	65.8	66.5	0.7
10th Street., East of North Todd Avenue	52.0	52.3	0.3

Source: A/E Tech LLC; *Noise Study Report: California Grand Villages at Azusa Greens,* April 2018, refer to Appendix 11.10.

Standard Conditions of Approval: No standard conditions of approval are applicable.

Mitigation Measures: No mitigation measures are required.

Level of Significance: Less Than Significant Impact.

LONG-TERM (STATIONARY) NOISE IMPACTS

N-4 Would the Project result in a significant increase in long-term operational stationary ambient noise levels?

Impact Analysis:

PROJECT OPERATIONAL NOISE LEVELS

The Project would consist of the development of the Senior Village and reconfiguration of the existing golf course. Stationary noise sources associated with the proposed Project would include mechanical equipment and outdoor activity areas.

Typically, mechanical equipment noise is 55 dBA at 50 feet from the source. Since the nearest residential uses to the Site are the existing residents located approximately 100 feet to the north, the Heating Ventilation and Air Conditioning (HVAC) units would be greater than 50 feet away. Thus, the nearest residents would not be directly exposed to substantial noise from on-site mechanical equipment and the HVAC noise levels would be below the City's 60 dBA noise standard for residential land uses. Impacts in this regard would be less than significant.

The Project includes amenities and open space areas for residents and guests; refer to Section 3.0, *Project Description*. These areas have the potential to be accessed by groups of people intermittently for frequent dining, outdoor events, parties, etc. Noise generated by groups of people (i.e., crowds) is dependent on several factors including vocal effort, impulsiveness, and the random orientation of the crowd members. According to *Prediction of Crowd Noise* (M.J. Hayne, November 2006), crowd noise would be approximately 62 dBA at one meter from the source.[2] Noise has a decay rate due to distance attenuation, which is calculated based on the Inverse Square Law. Based upon the Inverse Square Law, sound levels decrease by 6 dBA for each doubling of distance from the source.[3] As a result, crowd noise at the nearest receptor 100 feet away from the Site would be 32.3 dBA, which would not exceed the City's noise standards and be below observed noise levels near the Site. As such, the introduction of the Project operational noise would not introduce an intrusive noise source over existing conditions. Thus, a less than significant impact would occur in this regard.

Standard Conditions of Approval: No standard conditions of approval are applicable.

Mitigation Measures: No mitigation measures are required.

Level of Significance: Less Than Significant Impact.

5.11.5 CUMULATIVE IMPACTS

Table 4-1, *Cumulative Projects List*, identifies the related projects and other possible development in the area determined as having the potential to interact with the Project to the extent that a significant cumulative effect may occur. The following discussions are included per topic area to determine whether a significant cumulative effect would occur.

SHORT-TERM CONSTRUCTION NOISE IMPACTS

- **Would Project construction result in cumulatively significant short-term noise impacts to nearby noise sensitive receivers?**

Impact Analysis: Construction activities associated with the Project and cumulative projects may overlap, resulting in construction noise in the area. However, cumulative construction noise impacts would affect only the areas immediately adjacent to the Site. The closest cumulative project is the Colorama Project (Canyon City Business Center), located at the northwest corner of North Todd Avenue and Sierra Madre Avenue; the next closest cumulative project (the Tenth Street Center Industrial Business Park located west of North Todd Avenue, north of Union Pacific railroad tracks) has already been constructed. Cumulatively significant noise would generally occur when construction activities on either project site occurs in close proximity (e.g., closest to North Todd Avenue on either side of the roadway for either project) in a way that concentrates noise. The nearest sensitive receptors to the Canyon City Business Center and proposed Project are residential uses located to the northeast of the North Todd Avenue and West Sierra Madre Avenue intersection. These receptors could be exposed to increased noise levels during the simultaneous construction of the Canyon City Business

[2] Crowd noise is estimated at 60 dBA at one meter (3.28 feet) away for raised normal speaking. This noise level would have a +5 dBA adjustment for the impulsiveness of the noise source, and a -3 dBA adjustment for the random orientation of the crowd members. Therefore, crowd noise would be approximately 62 dBA at one meter from the source.

[3] Cyril M. Harris, *Noise Control in Buildings*, 1994.

Center and proposed Project. However, the specific construction phasing/timing and precise location(s) of construction activities, staging equipment, grading areas, etc., at the Canyon City Business Center site are unknown at this time. Therefore, it would be speculative to quantify cumulative construction noise levels at nearby receptors.

As discussed above, the Project's short-term construction noise impacts would be reduced to a less than significant level with implementation of SCA NOI-1 through NOI-3 and Mitigation Measure NOI-1. Therefore, the Project's contribution to cumulative noise impacts would not be cumulatively considerable. In addition, construction activities at the Canyon City Business Center site would be required to comply with the City's allowable construction hours and mitigate their respective construction noise impacts, as required. Therefore, a less than significant impact would occur in this regard.

Standard Conditions of Approval: Refer to SCA NOI-1 through SCA NOI-3.

Mitigation Measures: Refer to Mitigation Measure NOI-1.

Level of Significance: Less Than Significant Impact With Mitigation Incorporated.

VIBRATION IMPACTS

- **Would Project implementation result in cumulatively significant vibration impacts to nearby sensitive receptors?**

Impact Analysis: As stated above, construction activities associated with the Project and the Canyon City Business Center project may overlap. Although construction of these two projects may occur at the same time, cumulatively significant construction vibration would only occur when construction activities at the sites occur in close vicinity of one another in a way that concentrates the vibration. The further construction activities occur from one another on each respective project site, the quicker the vibration dissipates by the time it reaches a sensitive receptor. Because heavy construction equipment moves around a project site and would only occur for limited durations, average vibration levels at nearby structures would diminish rapidly with increasing distance between structures. The closest sensitive receptors to the Senior Village construction area are residential uses to north (over 82 feet away) along West Sierra Madre Avenue. These uses would not be within close enough proximity to grading activities to be subjected to substantial ground-borne vibration. In addition, groundborne vibration generated at the Site during construction would not be in exceedance of the FTA threshold of 0.12 inch/second PPV, and long-term vibration impacts from operations at the Site would be less than significant. Further, the Canyon City Business Center project would be required to comply with the Municipal Code limitations on allowable hours of construction and mitigate their respective construction vibration impacts, as required. Therefore, the Project's contribution to cumulative vibration impacts would not be cumulatively considerable. A less than significant impact would occur in this regard.

Standard Conditions of Approval: No standard conditions of approval are applicable.

Mitigation Measures: No mitigation measures are required.

Level of Significance: Less Than Significant Impact.

LONG-TERM (MOBILE) NOISE IMPACTS

- **Would traffic generated by the Project cause cumulatively considerable traffic noise in the area or exceed established noise standards?**

Impact Analysis: The cumulative mobile noise analysis is conducted in a two-step process. First, the combined effects from both the Project and other projects are compared. Second, for combined effects that are determined to be cumulatively significant, the Project's incremental effects then are analyzed. The Project's contribution to a cumulative traffic noise increase would be considered significant when the combined effect exceeds perception level (i.e., auditory level increase) threshold. The combined effect compares the "Cumulative with Project" condition to "Existing" conditions. This comparison accounts for the traffic noise increase from the Project generated in combination with traffic generated by projects in the cumulative projects list.

As summarized in Table 5.11-15, the incremental change in noise level between the "Without Cumulative Projects" and "With Cumulative Projects" scenarios would not exceed the significance threshold and long-term mobile noise impacts would be less than significant. Given that the combined effects of both the Project and future cumulative projects would not result in significant impacts, the Project generated mobile noise impacts would not be significantly cumulatively considerable. Overall, the Project, in combination with cumulative background mobile noise levels, would result in a less than significant cumulative impact.

Standard Conditions of Approval: No standard conditions of approval are applicable.

Mitigation Measures: No mitigation measures are required.

Level of Significance: Less Than Significant Impact.

LONG-TERM (STATIONARY) NOISE IMPACTS

- **Would the Project cause a cumulatively considerable increase in long-term operational stationary ambient noise levels?**

Impact Analysis: The closest cumulative projects to the Site are the Canyon City Business center, located at the northwest corner of North Todd Avenue and Sierra Madre Avenue, and the 10th Street Center Industrial Business Park, located west of North Todd Avenue/north of Union Pacific railroad tracks. Although related cumulative projects have been identified within the Site vicinity, the noise generated by stationary equipment on-site cannot be quantified due to the speculative nature of conceptual nature of each development. Further, the two cumulative projects and proposed Project are separated by North Todd Avenue; therefore, any noise generated by on-site stationary noise equipment would be largely masked by traffic noise along North Todd Avenue and would dissipate rapidly with distance. In addition, due to intervening buildings, structures, walls, etc., the combined effect of stationary noise from the two cumulative projects and proposed Project would be minimal.

As noted above, the Project would not result in significant long-term operational noise impacts. Thus, the Project and identified cumulative projects are not anticipated to result in cumulatively considerable impacts and the Project would not cumulatively contribute to significant long-term operational noise impacts. Each cumulative project would require separate discretionary approval and CEQA

assessment, which would address potential noise impacts and identify necessary attenuation measures, where appropriate. Therefore, a less than significant impact would occur in this regard.

Standard Conditions of Approval: No standard conditions of approval are applicable.

Mitigation Measures: No mitigation measures are required.

Level of Significance: Less Than Significant Impact.

5.11.6 SIGNIFICANT UNAVOIDABLE IMPACTS

No unavoidable significant impacts related to noise have been identified following compliance with the applicable Federal, State, and local regulatory requirements and standard conditions of approval.

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