4.11 NOISE

4.11.1 INTRODUCTION

This section describes the existing noise setting of the project site, identifies associated regulatory requirements, evaluates potential impacts, and identifies mitigation measures related to implementation of the proposed SDSU New Student Housing Project (project). Information used throughout this chapter is primarily based on the Noise Technical Report for the proposed project, prepared by Dudek, and is included as Appendix J to this EIR.

4.11.2 METHODOLOGY

Ambient noise measurements were conducted to quantify the existing daytime noise environment at five sites (described in Section 3.1), which represents key potential sensitive receptors or sensitive land uses within the project area. Noise and vibration levels resulting from the proposed construction activities have been obtained from reports prepared by the Federal Transit Administration (2006), the California Department of Transportation (Caltrans 2013), and field data from files. The assumptions regarding hours of construction activities, construction equipment, duration of construction activities, etc., are based on information provided by SDSU. Construction noise levels were estimated using the Federal Highway Administration's (FHWA) Roadway Construction Noise Model (RCNM) (FHWA 2008). The noise impact assessment utilized criteria established in the City of San Diego General Plan Noise Element (City of San Diego 2008) and Noise Ordinance (City of San Diego 2010). The noise level associated with selected roadways was determined based on ambient noise measurements and using the FHWA's Traffic Noise Model (TNM) version 2.5 Traffic Noise Prediction Model (FHWA 2004).

4.11.2.1 NOISE CONCEPTS

The following is a brief discussion of noise terminology and fundamental noise concepts.

Sound, Noise, and Acoustics

Sound is a mechanical wave or vibration that travels through the air or another medium, entailing a process that consists of three components: the source, the path, and the receiver. All three components must be present for sound to exist and be perceived. Without a source to produce sound, there is no sound. Likewise, without a medium to

transmit sound pressure waves, there is no sound. Finally, sound must be received; a hearing organ, sensor, or object must be present to perceive, register, or be affected by sound or noise. In most situations, there are many different sound sources, paths, and receptors rather than just one of each. Acoustics is the field of science that deals with the production, propagation, reception, effects, and control of sound. Noise is defined as sound that is loud, unpleasant, unexpected, or undesired.

Sound Pressure Levels and Decibels

The amplitude of a sound determines its loudness. Loudness of sound increases with increasing amplitude. Sound pressure amplitude is measured in units of micro-Newton per square meter, also called micro-Pascal. One micro-Pascal is approximately one-hundred billionths (0.00000000001) of normal atmospheric pressure. The pressure of a very loud sound may be 200 million micro-Pascals, or 10 million times the pressure of the weakest audible sound. Because expressing sound levels in terms of micro-Pascal would be very cumbersome, sound pressure level in logarithmic units is used instead to describe the ratio of actual sound pressures to a reference pressure squared. These units are called Bels. To provide a finer resolution, a Bel is subdivided into 10 decibels, abbreviated dB.

A-Weighted Sound Level

Sound pressure level alone is not a reliable indicator of loudness. The frequency, or pitch, of a sound also has a substantial effect on how humans will respond. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness or human response is determined by the characteristics of the human ear.

Human hearing is limited not only in the range of audible frequencies but also in the way it perceives the sound in that range. In general, the healthy human ear is most sensitive to sounds between 1,000 Hertz (Hz) and 5,000 Hz, and it perceives a sound within that range as more intense than a sound of higher or lower frequency with the same magnitude. To approximate the frequency response of the human ear, a series of sound level adjustments is usually applied to the sound measured by a sound level meter. The adjustments (referred to as a weighting network) are frequency-dependent.

The A-scale weighting network approximates the frequency response of the average healthy ear when listening to most ordinary sounds. When people make judgments of the relative loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. Other weighting networks have been devised to address high noise

levels or other special situations (e.g., B-scale, C-scale, D-scale), but these scales are rarely used in conjunction with most environmental noise. Noise levels are typically reported in terms of A-weighted sound levels. All sound levels discussed in this report are A-weighted (dBA). Examples of typical noise levels for common indoor and outdoor activities are depicted in **Table 4.11-1**.

Table 4.11-1
Typical Sound Levels in the Environment and Industry

Common Outdoor Activities	Noise Level (dB)	Common Indoor Activities
	110	Rock Band
Jet Fly-over at 300 meters (1,000 feet)	100	
Gas Lawn Mower at 1 meter (3 feet)	90	
Diesel Truck at 15 meters (50 feet), at 80 kilometers/hour (50 miles/hour)	80	Food Blender at 1 meter (3 feet) Garbage Disposal at 1 meter (3 feet)
Noisy Urban Area, Daytime Gas Lawn Mower at 30 meters (100 feet)	70	Vacuum Cleaner at 3 meters (10 feet)
Commercial Area Heavy Traffic at 90 meters (300 feet)	60	Normal Speech at 1 meter (3 feet)
Quiet Urban Daytime	50	Large Business Office Dishwasher Next Room
Quiet Urban Nighttime	40	Theater, Large Conference Room (Background)
Quiet Suburban Nighttime	30	Library
Quiet Rural Nighttime	20	Bedroom at Night, Concert Hall (Background)
	10	Broadcast/Recording Studio
Lowest Threshold of Human Hearing	0	Lowest Threshold of Human Hearing

Source: Caltrans 2011.

Human Responses to Changes in Noise Levels

Under controlled conditions in an acoustics laboratory, the trained, healthy human ear is able to discern changes in sound levels of 1 dB when exposed to steady, single-frequency signals in the mid-frequency range. Outside such controlled conditions, the trained ear can detect changes of 2 dB in normal environmental noise. It is widely accepted that the average healthy ear, however, can barely perceive noise level changes of 3 dB. A change of 5 dB is readily perceptible, and a change of 10 dB is perceived as twice or half as loud. A doubling of sound energy results in a 3 dB increase in sound, which means that a doubling of sound energy (e.g., doubling the volume of traffic on a road) would result in a barely perceptible change in sound level.

Noise Descriptors

Additional units of measure have also been developed to evaluate the long-term characteristics of sound. The equivalent sound level (L_{eq}) is also referred to as the time-average sound level. It is the equivalent steady-state sound level which in a stated period of time would contain the same acoustical energy as the time-varying sound level during the same time period. The 1-hour A-weighted equivalent sound level, L_{eq} (h), is the energy average of the A-weighted sound levels occurring during a 1-hour period and is the basis for the City of San Diego Noise Ordinance criteria.

People are generally more sensitive and annoyed by noise occurring during the evening and nighttime hours. Thus, another noise descriptor used in community noise assessments, the Community Noise Equivalent Level (CNEL), was introduced. The CNEL scale represents a time-weighted 24-hour average noise level based on the A-weighted sound level. The CNEL accounts for the increased noise sensitivity during the evening hours (7:00 p.m. to 10 p.m.) and nighttime hours (10:00 p.m. to 7:00 a.m.) by adding 5 dB and 10 dB, respectively, to the average sound levels occurring during the nighttime hours.

Sound Propagation

Sound propagation (i.e., the passage of sound from a noise source to a receiver) is influenced by several factors. These factors include geometric spreading, ground absorption, and atmospheric effects, as well as shielding by natural and/or man-made features. Sound levels are attenuated at a rate of approximately 6 dB per doubling of distance from an outdoor point source due to the geometric spreading of the sound waves. Additional sound attenuation can result from man-made features such as intervening walls and buildings, as well as natural features such as hills and dense woods. Atmospheric conditions such as humidity, temperature, and wind gradients can temporarily either increase or decrease sound levels. In general, the greater the distance the receiver is from the source, the greater the potential for variation in sound levels due to atmospheric effects.

4.11.3 EXISTING CONDITIONS

The primary noise source in the project area is traffic along Remington Road and 55th Street. Traffic noise from I-8, located approximately 1,500 feet north of the project site, is also generally audible but is not the primary contributor to the noise environment. Noise is also generated by students and people at various events on campus. The site is not located in relative close proximity to any airports. The closest airport is Montgomery Field, approximately 4 miles northwest of the site. The campus is subject to occasional overflights by

helicopters and commercial and general aviation aircraft. However, the campus is not located within the 60 dB CNEL noise contour of any airport and is not subject to aircraft noise in excess of regulatory limits.

4.11.3.1 EXISTING ENVIRONMENTAL SETTING

Noise measurements were conducted in and around the project site to determine the existing noise levels. The measurements were made using a calibrated Rion NL-52 integrating sound-level meter, which meets the current American National Standards Institute standard for a Type 1 precision sound-level meter. The sound level meter was positioned at a height of approximately 5 feet above ground on a tripod, and the measurement microphone was covered with a windscreen.

The noise measurements were conducted on January 16, 2017. The noise measurement locations are depicted as Sites R1 through R5 in **Figure 4.11-1**. These sites were selected to provide samples of typical ambient noise levels at existing and future representative noise-sensitive land uses in the project vicinity. The measured average noise level (L_{eq}) ranged from 50 dBA at Site R2 to 66 dBA at Site R3. The measured average noise levels and the concurrent traffic volumes along the roads are summarized in **Table 4.11-2**. The complete noise data files are provided in Appendix A. The existing noise level is approximately 70 dB CNEL at Site R3 along Remington Road, adjacent to the project site. It should be noted that noise measurements do not have to be made during peak traffic hours to determine the CNEL. Short-term noise measurements can be correlated to the CNEL by normalizing the traffic counts observed during the noise measurements.

Table 4.11-2
Measured Noise Level and Traffic Volumes

Site	Description	Date Time	L_{eq} [1] (dBA)	CNEL[2] (dBA)	Cars	MT [3]	HT [4]	MC [5]
R1	5433 Hewlett Drive, approximately 30 feet to the centerline of Hewlett Drive	1/16/17 10:38 a.m. to 10:48 a.m.	51	55	2	0	0	0
R2	5312 Remington Road, approximately 115 feet to centerline of Remington Road	1/16/17 10:22 a.m. to 10:32 a.m.	50	54	N/A	N/A	N/A	N/A
R3	Chapultepec Convenience Store approximately 40 feet to centerline of Remington Road	1/16/17 10:56 a.m. to 11:06 a.m.	66	70	18	1	0	0

Table 4.11-2
Measured Noise Level and Traffic Volumes

Site	Description	Date Time	L_{eq} [1] (dBA)	CNEL[2] (dBA)	Cars	MT [3]	HT [4]	MC [5]
R4	5420 55th Street, approximately 130 feet to centerline of 55th Street	1/16/17 11:12 a.m. to 11:22 p.m.	51	55	N/A	N/A	N/A	N/A
R5	5335 Remington Road, Approximately 50 feet to centerline of Remington Road	1/16/17 10:08 a.m. to 10:18 a.m.	61	65	25	0	0	0

Notes:

1 Equivalent Continuous Sound Level (Time-Average Sound Level)

2 Community Noise Equivalent Level– Estimated based upon short-term noise measurement

3 Medium Trucks

4 Heavy Trucks

5 Motorcycles

4.11.4 RELEVANT PLANS, POLICIES, AND ORDINANCES

The Noise Control Act of 1972, 42 U.S.C. 4901 et seq., recognized the role of the federal government in dealing with major commercial noise sources, which require uniform treatment. Since Congress has the authority to regulate interstate and foreign commerce, regulation of noise generated by such commerce also falls under congressional authority. The federal government specifically preempts local control of noise from aircraft, railroads, and interstate highways. The U.S. Environmental Protection Agency has identified acceptable noise levels for various land uses to protect the public, with an adequate margin of safety, and has established noise emission standards for interstate commerce.

The Department of Housing and Urban Development standards define day-night average sound levels (L_{dn}) below 65 dBA outdoors as acceptable for residential areas. Outdoor levels up to 75 dBA L_{dn} may be made acceptable through the use of insulation in buildings. (See 24 CFR Regulations, Part 51.)

State

The pertinent State of California noise regulations are contained in the California Code of Regulations. Title 24, Noise Insulation Standards, establishes the acceptable interior environmental noise level (45 dBA L_{dn}) for multifamily dwellings (the regulation may be

extended by local legislative action to include single-family dwellings). Section 1207 of Title 24 also requires that an interior acoustical study demonstrating that interior noise levels due to exterior sources will be less than or equal to 45 CNEL be performed for affected multifamily structures that are exposed to exterior noise levels in excess of 60 CNEL.

Government Code Section 65300 requires local land use planning jurisdictions to prepare a general plan. Pursuant to Government Code Section 65302, subdivision (f), the Noise Element is a mandatory component of the general plan. It may include general community noise guidelines developed by the California Department of Health Services and specific planning guidelines for noise/land use compatibility developed by the local jurisdiction. The state noise compatibility guidelines also recommend that the local jurisdiction should consider adopting a local noise control ordinance. The California Department of Health Services has developed guidelines (1987) for community noise acceptability for use by local agencies. Selected relevant levels are as follows (L_{dn}/DNL may be considered approximately equivalent to CNEL):

- CNEL below 60 dBA—normally acceptable for low-density residential use;
- CNEL of 55 to 70 dBA—conditionally acceptable for low-density residential use;
- CNEL below 65 dBA—normally acceptable for high-density residential use;
- CNEL of 60 to 70 dBA—conditionally acceptable for high-density residential use, transient lodging, churches, educational and medical facilities; and
- CNEL below 70 dBA—normally acceptable for playgrounds and neighborhood parks.

"Normally acceptable" is defined as satisfactory for the specified land use, assuming that normal conventional construction is used in buildings. "Conditionally acceptable" may require some additional noise attenuation or special study. Under most of these land use categories, overlapping ranges of acceptability and unacceptability are presented, leaving some ambiguity in areas where noise levels fall within the overlapping range.

The State of California additionally regulates the noise emission levels of licensed motor vehicles traveling on public thoroughfares, sets noise emission limits for certain off-road vehicles and watercraft, and sets required sound levels for light-rail transit vehicle warning signals. The extensive state regulations pertaining to worker noise exposure are, for the most part, applicable only to the construction phase of any project (e.g., the California Occupational Safety and Health Administration (Cal-OSHA) Occupational Noise Exposure Regulations [8 CCR, General Industrial Safety Orders, Article 105, Control of Noise Exposure, Section 5095, et

seq.]) or workers in a central plant and/or a maintenance facility or involved in the use of landscape maintenance equipment or heavy machinery.

Local

The proposed project is located on the SDSU campus, which is located in the City of San Diego (City), and would have the potential to impact off-campus noise-sensitive land uses in the City. Although the California State University system, as a state agency, is not subject to local plans, policies, and guidelines related to noise, for the limited purpose of this analysis, relevant guidance from the City is utilized in assessing impacts. The following are excerpts from the City's General Plan Noise Element and Municipal Code Noise Ordinance.

City of San Diego General Plan Noise Element

The City's General Plan Noise Element identifies compatible exterior noise levels for various land use types (City of San Diego 2008). The maximum allowable noise exposure varies depending on the land use. The maximum acceptable exterior noise level for residential uses and other noise-sensitive uses (including kindergarten through grade 12 schools, libraries, hospitals, day care facilities, hotels, motels) is 65 dB CNEL. Exterior noise levels are considered compatible up to 75 dB CNEL at higher education institutions. New single-family and multifamily residences also are required to meet an interior noise level of 45 dB CNEL within habitable rooms. (This is consistent with the State of California's adoption of 45 dB CNEL as the maximum acceptable interior environmental noise level for new attached residential facilities (e.g., dormitories, multifamily homes, hotels).)

City of San Diego Municipal Code 59.5.0401 (Noise Ordinance), Sound Level Limits

The City of San Diego Noise Abatement and Control Ordinance (Municipal Code Section 59.5.0101 et seq.) (Noise Ordinance) provides controls for excessive and annoying noise from sources such as refuse vehicles, parking lot sweepers, watercraft, animals, leaf blowers, alarms, loud music, and construction activities.

It shall be unlawful for any person to cause noise by any means to the extent that the 1-hour average sound level exceeds the applicable limit given in **Table 4.11-3, Applicable Limits**, at any location in the City of San Diego on or beyond the boundaries of the property on which the noise is produced. The noise subject to these limits is that part of the total noise at the specified location that is due solely to the action of said person.

Table 4.11-3
Applicable Limits

Land Use	Time of Day	One-Hour Average Sound Level (dB)
Single-family residential	7 a.m. to 7 p.m.	50
	7 p.m. to 10 p.m.	45
	10 p.m. to 7 a.m.	40
Multifamily residential (up to a maximum density of 1/2,000)	7 a.m. to 7 p.m.	55
	7 p.m. to 10 p.m.	50
	10 p.m. to 7 a.m.	45
All other residential	7 a.m. to 7 p.m.	60
	7 p.m. to 10 p.m.	55
	10 p.m. to 7 a.m.	50
Commercial	7 a.m. to 7 p.m.	65
	7 p.m. to 10 p.m.	60
	10 p.m. to 7 a.m.	60
Industrial or agricultural	Any time	75

dB = decibels

City of San Diego Municipal Code 59.5.0404 (Noise Ordinance), Construction Noise

A. It shall be unlawful for any person, between the hours of 7:00 p.m. of any day and 7:00 a.m. of the following day, or on legal holidays as specified in Section 21.04 of the San Diego Municipal Code, with exception of Columbus Day and Washington's Birthday, or on Sundays, to erect, construct, demolish, excavate for, alter or repair any building or structure in such a manner as to create disturbing, excessive or offensive noise unless a permit has been applied for and granted beforehand by the Noise Abatement and Control Administrator. In granting such permit, the Administrator shall consider whether the construction noise in the vicinity of the proposed work site would be less objectionable at night than during the daytime because of different population densities or different neighboring activities; whether obstruction and interference with traffic particularly on streets of major importance, would be less objectionable at night than during the daytime; whether the type of work to be performed emits noises at such a low level as to not cause significant disturbances in the vicinity of the work site; the character and nature of the neighborhood of the proposed work site; whether great economic hardship would occur if the work were spread over a longer time; whether proposed night work is in the general public interest; and he shall prescribe such conditions, working times, types of construction equipment to be used, and permissible noise levels as he deems to be required in the public interest.

B. Except as provided in subsection C. hereof, it shall be unlawful for any person, including the City of San Diego, to conduct any construction activity so as to cause, at or beyond the property lines of any property zoned residential, an average sound level greater than 75 decibels during the 12-hour period from 7:00 a.m. to 7:00 p.m.

C. The provisions of subsection B. of this section shall not apply to construction equipment used in connection with emergency work, provided the Administrator is notified within 48 hours after commencement of work.

4.11.5 THRESHOLDS OF SIGNIFICANCE

The following significance criteria included in Appendix G of the California Environmental Quality Act (CEQA) Guidelines (14 CCR 15000 et seq.) assist in determining the significance of a noise impact. Impacts would result if the project would:

1. Result in the exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.
2. Result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.
3. Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.
4. Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.
5. Be 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, and if so, the project would expose people residing or working in the project area to excessive noise levels.
6. Be within the vicinity of a private airstrip, and if so, the project would expose people residing or working in the project area to excessive noise levels.

As indicated in Significance Threshold 1, the City's General Plan and Noise Ordinance (outlined in **Section 3.2.3** above), were utilized to develop the following project-specific thresholds of significance:

- ***Traffic:*** A significant noise impact would result if the project would increase the existing noise level by 3 dB or more in areas where the existing noise level exceeds 65 dB CNEL.

A significant noise impact would result if the project would exceed the City's General Plan 65 dB CNEL exterior noise criteria at an outdoor use area of proposed residential uses. A significant noise impact would result if the project would exceed the state's interior 45 dB CNEL for multifamily dwelling units.

- ***Stationary Uses:*** A significant noise impact would result if the stationary equipment generates noise levels exceeding the City's noise ordinance criteria, set forth in **Table 4.11-3**, above.
- ***Temporary Construction Noise:*** A significant noise impact would result if temporary construction noise levels exceed 75 dB for 12 hours within a 24-hour period at or beyond the property lines of any property zoned residential.

4.11.6 IMPACTS ANALYSIS

Following issuance of the Notice of Preparation (NOP) for the proposed projects, CSU/SDSU received comment letters from public and private entities related to noise impacts. These comment letters were concerning an increase in noise pollution levels from the proposed project on the serene canyon environment and adjacent noise receptors. The analysis presented below addresses each of these topics.

Would the project result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Construction/Temporary Impacts

Construction activities would primarily occur during the City's allowable hours of operation. Any nighttime construction work would be limited to such things as utility tie-in work, which could otherwise result in disruption of service during regular daytime hours. Utility tie-in activities would not create substantial levels of noise. Construction would involve several phases including demolition, grading, building construction, landscaping, and architectural coating. Construction equipment would include standard equipment such as graders, scrapers, backhoes, loaders, cranes, dozers, water trucks, jackhammers, portable generators and air-compressors, and miscellaneous trucks. The construction contractor may mobilize more than one crew. Each area would be in a different location and would affect different receptors.

The noise levels generated by construction equipment would vary greatly depending upon factors such as the type and specific model of the equipment, the operation being performed

and the condition of the equipment. The average sound level of the construction activity also depends upon the amount of time that the equipment operates and the intensity of the construction during the time period.

The range of maximum noise levels for various types of construction equipment at a distance of 50 feet is depicted in **Table 4.11-4**. The noise values represent maximum noise generation, or full-power operation of the equipment. As an example, a loader and two dozers, all operating at full power and relatively close together, would generate a maximum sound level of approximately 90 dBA at 50 feet from their operation. As the distance between equipment increases, and/or the separation of areas with simultaneous construction activity increases, dispersion and distance attenuation reduce the effects of separate noise sources added together. In addition, typical operating cycles may involve 2 minutes of full-power operation, followed by 3 or 4 minutes at lower levels. The average noise level during construction activities is generally lower, since maximum noise generation may only occur up to 50% of the time.

Table 4.11-4
Maximum Construction Equipment Noise Generation Levels

Equipment	Maximum Sound Level (dBA) 50 Feet from Source
Air compressor	81
Backhoe	80
Compactor	82
Concrete mixer	85
Concrete pump	82
Concrete vibrator	76
Crane, derrick	88
Crane, mobile	83
Dozer	85
Generator	81
Grader	85
Impact wrench	85
Jackhammer	88
Loader	85
Paver	89
Pneumatic tool	85
Pump	76
Roller	74
Saw	76
Truck	88

Source: FTA 2006.

The nearest off-site existing residences to the project site are located west of the project site along Hewlett Drive, approximately 80 feet away, and northeast of the project site along 55th Street, approximately 100 feet away. The FHWA RCNM (FHWA 2008) was used to estimate construction noise levels at these noise-sensitive land uses. Although the model was funded and promulgated by the FHWA, the RCNM is often used for non-roadway projects, because the same types of construction equipment used for roadway projects are also used for other project types. Input variables for the RCNM consist of the receiver/land use types, the equipment type and number of each (e.g., two graders, a loader, a tractor), the duty cycle for each piece of equipment (e.g., percentage of hours the equipment typically works per day), and the distance from the noise-sensitive receiver. No topographical or structural shielding was assumed in the modeling. The RCNM has default duty-cycle values for the various pieces of equipment, which were derived from an extensive study of typical construction and demolition activity patterns. Those default duty-cycle values were used for this noise analysis.

The noise levels from proposed construction activities (with a typical number of equipment operating on the site) are summarized in **Table 4.11-5**. The complete set of RCNM input and output data is provided in Appendix B. As shown, during Phase I (construction of Residence Halls 1 and 2 and the Food Service Facility), noise levels would range from approximately 71 to 78 dBA L_{eq} when construction would take place within 100 feet of the nearest noise-sensitive land uses (residences located along 55th Street, to the northeast). More typical noise levels during Phase I would range from approximately 65 to 75 dBA L_{eq}. The quietest phase of construction would be hardscape and landscape work, and the loudest would be grading work.

During Phase II (construction of Residence Hall 4), noise levels would range from approximately 66 to 73 dBA L_{eq} when construction would take place within 200 feet of the nearest noise-sensitive land uses (residences to the west, along Remington Road and Hewlett Drive). More typical noise levels during Phase II would range from approximately 63 to 71 dBA L_{eq}. The quietest phase of construction would be architectural coating, and the loudest would be grading.

During Phase III (construction of Residence Hall 3), noise levels would range from approximately 73 to 72 dBA L_{eq} when construction would take place within 80 feet of the nearest noise-sensitive land uses (residences to the west, along Hewlett Drive). More typically, noise levels during Phase III would range from approximately 65 to 74 dBA L_{eq}. The quietest phase of construction would be architectural coating, and the loudest would be grading.

Table 4.11-5
Modeled Construction Noise Levels by Phase (dBA L_{eq})

Project Phase	Construction Phase	Nearest Source - Receiver Noise Level	Typical Source - Receiver Noise Level
Phase I		*100 feet*	*225 feet*
	Demolition	74	68
	Grading	78	75
	Building Construction 1	73	70
	Building Construction 2	73	67
	Building Construction 3	73	72
	Architectural Coating	72	67
	Hardscape/Landscape	71	65
	Maximum Noise Levels	78	75
Phase II		*200 feet*	*300 feet*
	Grading	73	71
	Building Construction 1	69	68
	Building Construction 2	69	67
	Building Construction 3	71	70
	Trenching	67	63
	Architectural Coating	66	63
	Hardscape/Landscape	71	68
	Maximum Noise Levels	73	71
Phase III		*80 feet*	*270 feet*
	Grading	79	74
	Building Construction 1	75	69
	Building Construction 2	72	65
	Building Construction 3	76	73
	Trenching	75	73
	Architectural Coating	73	65
	Hardscape/Landscape	76	73
	Maximum Noise Levels	79	74

At the residences located west of Residence Hall 3, and northeast of Residence Halls 1 and 2, the noise levels are predicted to exceed, by up to 4 dB, the City's 75 dB temporary construction noise level criterion when construction activities are nearest the noise-sensitive land uses (during grading). Therefore, construction activities at the site would result in short-term noise impacts at adjacent noise sensitive land uses. In order to mitigate for impacts, mitigation is provided (see Mitigation Measure **MM-NOI-1** in **Section 6**, Mitigation Measures).

With implementation of **MM-NOI-1**, construction noise impacts would be **less than significant**. No additional mitigation is required for the proposed construction activities.

Operational/Permanent Impacts

Off-Site Traffic Noise

The project would ultimately generate a net traffic volume increase. The majority of the traffic would be along 55th Street and Montezuma Road (LLG 2017). Using the FHWA's TNM noise model (FHWA 2004), the existing (year 2016) with project noise level increase associated with the additional traffic volume was calculated. The results are summarized in **Table 4.11-6**. As shown in Table 6, the additional traffic associated with the project would increase the noise along the adjacent roads by 1 dB CNEL or less. Thus, the additional project-generated traffic volume along the roads would not substantially increase the ambient noise level. The TNM input and output data files are provided in Appendix C of Appendix J.

Table 4.11-6
Off-Site Traffic Noise Level Increase

1. Street Segment	2. Existing ADT	3. Existing plus Total Project	4. CNEL Increase [1] (dB)	5. Year 2035 ADT	6. CNEL Increase [2] (dB)	7. Year 2035 with Project ADT	8. CNEL Increase [3] (dB)
Montezuma Road							
Collwood Blvd to 55th St.	28,950	30,748	<1	41,100	2	42,898	<1
Robelini Drive to Smilax Road	32,570	33,201	<1	39,120	1	39,751	<1
East of College Ave.	21,500	21,784	1	25,660	1	25,944	<1
Remington Road							
East of 55th St.	3,110	3,268	<1	7,680	4	7,838	<1
55th Street							
Remington Road. to Hardy Ave.	11,470	13,899	1	15,930	1	18,359	1
Hardy Ave. to Montezuma Road.	18,110	20,539	<1	22,250	1	24,679	<1
College Avenue							
Canyon Crest Dr. to Zura Way	35,850	35,850	<1	67,000	3	67,000	<1
Zura Way to Montezuma Road.	29,790	29,790	<1	38,020	1	38,020	<1
South of Montezuma Road.	27,500	27,847	<1	33,470	1	33,817	<1

Notes: ADT = average daily traffic

[1] Existing versus Existing plus project

[2] Existing versus Year 2035 without project

[3] Year 2035 without project versus Year 2035 with project

As shown in Table 6, the long-term (year 2035) without project traffic noise level increase would range up to 4 dB CNEL along portions of Remington Road. With the project, the long-term CNEL increase would be essentially the same as without the project. Therefore, the noise level increase associated with project's long-term cumulative traffic volume is **less than significant**.

On-Site Traffic Noise

The proposed project would include noise-sensitive uses (i.e., residential student apartments) that would be exposed to traffic noise. The potential traffic noise impacts to each residential building were evaluated using the TNM model and the Year 2035 plus project traffic volumes (LLG 2017). The resulting noise levels at the building facades are summarized in **Table 4.11-7** and discussed below.

Table 4.11-7
On-Site Traffic Noise Levels (dBA CNEL)

Receiver Location	Floors 1–2	Floors 3–4	Floors 5–6	Floors 7–9	Floors 10–12	Floors 13–14
Residence Hall 4, front west side	**61**	**61**	60	60	60	60
Residence Hall 4, west side	58	58	58	58	58	58
Residence Hall 4, front	60	59	59	59	59	59
Residence Hall 4, front east side	59	59	59	59	59	59
Food Service Building, front west side	**62**	**62**	n/a	n/a	n/a	n/a
Food Service Building, front east side	**62**	**62**	n/a	n/a	n/a	n/a
Residence Hall 1, front west side	**62**	**62**	**61**	n/a	n/a	n/a
Residence Hall 1, front east side	**62**	**61**	**61**	n/a	n/a	n/a
Residence Hall 2, front west side	**62**	**62**	**61**	n/a	n/a	n/a
Residence Hall 2, front east side	**64**	**63**	**63**	n/a	n/a	n/a
Residence Hall 2, east side	**62**	**62**	**62**	n/a	n/a	n/a
Residence Hall 2, 2nd row front east side	60	60	60	n/a	n/a	n/a
Residence Hall 2, 2nd row east side	**63**	**63**	**63**	n/a	n/a	n/a
Residence Hall 1, 2nd row front east side	37	40	41	n/a	n/a	n/a
Residence Hall 1, 2nd row east side	45	47	47	n/a	n/a	n/a
Residence Hall 1, 2nd row front	45	45	48	n/a	n/a	n/a
Residence Hall 3, front west side	44	48	48	48	n/a	n/a
Residence Hall 3, front east side	43	46	46	46	n/a	n/a
Residence Hall 3, 2nd row front west side	37	42	43	43	n/a	n/a
Residence Hall 3, 2nd row front east side	16	17	19	22	n/a	n/a
Residence Hall 3, 2nd row east side	16	16	18	18	n/a	n/a
Residence Hall 3, 3rd row front	33	39	39	39	n/a	n/a

Table 4.11-7
On-Site Traffic Noise Levels (dBA CNEL)

Receiver Location	Floors 1–2	Floors 3–4	Floors 5–6	Floors 7–9	Floors 10–12	Floors 13–14
Residence Hall 3, 4th row front	34	40	40	41	n/a	n/a
Residence Hall 3, 4th row east side	38	43	43	43	n/a	n/a

Notes:
Bold = Exceeds 60 dBA CNEL. Interior noise levels in habitable rooms may exceed the 45 dBA CNEL noise standard (not applicable to Food Service Hall).
n/a – not applicable, this floor would not exist at this location.

As shown in **Table 4.11-7**, on-site traffic noise levels from Remington Road are predicted to range from 63 dBA CNEL at the food service and Residence Hall facades nearest Remington Road and 55th Street to as low as 16 dBA CNEL at residence hall locations that would be substantially shielded from traffic noise by the tall intervening buildings. Exterior noise levels would not exceed 65 dBA CNEL at any of the modeled locations; therefore, the exterior noise impact would be **less than significant**.

With respect to interior noise levels, proposed Residence Halls 1, 2 and 4 and the Food Service Building would be exposed to noise levels greater than 60 dB CNEL. Habitable rooms fronting on Remington Road at floors 1-4 of Residence Hall 4, and fronting on Remington Road and 55th Street at floors 1-6 of Residence Halls 1 and 2, could be exposed to interior noise levels greater than 45 dB CNEL. In summary, the proposed project may 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 (i.e., State of California Code of Regulations, Title 24); this is a **potentially significant impact**.

Mitigation Measure **MM-NOI-2** is provided in Section 6. With implementation of **MM-NOI-2**, potential on-site traffic noise impacts would be **less than significant.**

Outdoor Mechanical Equipment

Outdoor mechanical equipment such as heating, ventilation and air conditioning ("HVAC") equipment could be mounted on roofs or at the ground level of the buildings. The noise levels generated by this equipment would vary, but typically range from approximately 45 to 55 dB at a distance of 50 feet. Existing land uses located adjacent to the proposed buildings could be exposed to HVAC equipment noise in excess of local noise standards. Additionally, emergency generators are anticipated to be installed as part of each phase in the event that emergency

power is needed. Although the noise from operation of these generators during an emergency is exempt from local noise standards, the routine testing of the generators (estimated to occur for approximately 15 minutes twice per month) would be subject to the local noise standard. The details (emergency generator model, location, etc.) have not yet been determined. Thus, there is a potential that the outdoor mechanical equipment noise level would expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance; this is a **potentially significant impact**.

Mitigation Measure **MM-NOI-3** is provided in Section 6. With implementation of **MM-NOI-3**, potential on-site traffic noise impacts would be **less than significant.**

Would the project result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

Construction/Temporary Impacts

Demolition and clearing activities that might expose persons to excessive ground-borne vibration or ground-borne noise have the potential to cause a significant impact. Ground-borne vibration information related to construction/heavy equipment activities has been collected by the California Department of Transportation (Caltrans 2013). Information from Caltrans indicates that transient vibrations (such as from construction activity) with a peak particle velocity of approximately 0.035 inch per second may be characterized as barely perceptible, and vibration levels of 0.24 inch per second may be characterized as distinctly perceptible. The heavier pieces of construction equipment, such as large bulldozers, would have peak particle velocities of up to approximately 0.089 inch/second at a distance of 25 feet (FTA 2006).

Ground-borne vibration is typically attenuated over relatively short distances. At the nearest existing residential use distance to the nearest construction area (approximately 80 feet) and with the anticipated construction equipment, the peak particle velocity would be approximately 0.016 inch/second (FTA 2006). This vibration level would be below the "barely perceptible" threshold of 0.035 inch/second vibration, and well below the threshold for distinctly perceptible of 0.24 inch per second.

The major concern with regards to construction vibration is related to building damage. Construction vibration as a result of the proposed project would not result in structural building damage, which typically occurs at vibration levels of 0.5 inch/second or greater for buildings of reinforced-concrete, steel, or timber construction. Impacts related to ground-borne vibration would be **less than significant**. No mitigation is required.

Operational/Permanent Impacts

The project would not introduce new sources of groundborne vibration into the project area, nor would the project result in the introduction of new vibration-sensitive receivers in proximity to existing sources of groundborne vibration. Therefore, there would be **no impact**.

Would the project result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

Construction/Temporary Impacts

Construction would be a temporary activity, and therefore would not result in permanent increases in ambient noise levels. Therefore, there would be no impact.

Operational/Permanent Impacts

As addressed previously, the proposed project would result in increased traffic volume along nearby arterial roadways, which would result in a corresponding increase in traffic noise. As shown in **Table 6** (columns 4 and 8), the additional traffic associated with the project would increase the noise along the adjacent roads by 1 dB CNEL or less. The additional project-generated traffic volume along the roads would not substantially increase the ambient noise level. This would be a **less than significant** noise impact.

Would the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

Construction/Temporary Impacts

As shown in **Table 4.11-5**, noise from construction activities as existing noise-sensitive land uses (residences) is estimated to be as high as 78 dBA L_{eq} during Phase I, 73 dBA L_{eq} during Phase II, and 79 dBA L_{eq} during Phase III. This represents a temporary increase in noise levels of approximately 15 to 25 or more dB above measured ambient noise levels, and is considered to be a temporary substantial increase. This impact is considered to be **significant**. Mitigation is provided to reduce this impact (see **MM-NOI-1** in **Section 4.11.5**, Mitigation Measures).

With implementation of **MM-NOI-1**, construction noise impacts would be **less than significant**. No additional mitigation is required for the proposed construction activities.

Operational/Permanent Impacts

Operational noise as addressed previously (i.e., onsite and offsite traffic noise and mechanical noise from HVAC and emergency generators) would be a permanent activity, and therefore would not result in temporary or periodic increases in ambient noise levels.

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, would the project expose people residing or working in the project area to excessive noise levels?

As indicated earlier in **Section 4.11.3**, the site is not located in proximity to any airports. In addition, the proposed project is not located within an airport land use plan, and the nearest airport is Montgomery Field, located approximately 4 miles northwest of the site. The campus is subject to occasional overflights by helicopters and commercial and general aviation aircraft. However, the campus is not located within the 60 dB CNEL noise contour of any airport and is not subject to aircraft noise in excess of regulatory limits. Therefore **no impact** would occur.

For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

The project site is not located in proximity to any private airstrips. Therefore, **no impact** would occur.

Would the project result in a cumulatively considerable impact?

Noise in Excess of Standards

The proposed project and related projects would all be subject to applicable noise standards (descriptions of these standards are provided in **Section 4.11.3**). The proposed project would incorporate mitigation measures as described in **Section 6** to ensure compliance with applicable noise standards. With incorporation of the mitigation measures described in **Section 4.11.5**, the project would not contribute to cumulative exceedances of noise standards, and its incremental effect is **not cumulatively considerable**.

Temporary/Periodic Increases in Ambient Noise Levels

The proposed project would result in temporary noise increases during the construction period, as discussed previously in **Section 4.11.4, Construction/Temporary Impacts**. The proposed project's construction period would have the potential to overlap with the related projects'

construction processes. The nearest related project (and the only one, because of proximity, having a likelihood to result in cumulatively considerable noise impacts in conjunction with the proposed project) is the Alvarado Estates Area Utility Undergrounding Project. Portions of this project would take place just to the west of the proposed project area. The Alvarado Estates Area Utility Undergrounding Project is anticipated to begin in 2017, and linear projects such as this one typically progress at a rate of 100 feet or more per day. Therefore, it is unlikely that the construction of the proposed project (anticipated to commence in 2019) and the Alvarado Estates Area Utility Undergrounding Project would coincide. The remainder of the related projects are located approximately 500 feet or further from the proposed project site, with numerous intervening structures in between. Due to the decrease in noise levels with distance and the presence of physical barriers, the related projects would not combine with the proposed project to produce a cumulative noise effect during construction. Additionally, all projects would comply with the City of San Diego Noise Ordinance to limit noise hours during construction. The mitigation measures as described in **Section 4.11.5**, along with the requirement to comply with the City's Noise Ordinance, would reduce the project's incremental effect, ensuring that impacts **are not cumulatively considerable.**

Vibration

Construction-related vibration from the project was addressed earlier in **Section 4.11.4** (Threshold 2). Other foreseeable projects within the vicinity of the project site would not be close enough to create a combined excessive generation of groundborne vibrations; the nearest such project would be located approximately 500 feet or more from the project site. Therefore, cumulative impacts associated with excessive groundborne vibrations would be **less than significant**.

Permanent Increase in Ambient Noise Levels

Stationary Sources. Long-term operational noise would result from operations of the proposed project, such as noise from permanent on-site noise sources (e.g., HVAC equipment and emergency generators), as addressed in Outdoor Mechanical Equipment, above. A cumulative impact could result if noise produced during operation of the proposed project were to combine with noise produced from the operations of the related projects to create a cumulatively significant permanent increase in ambient noise levels. The nearest related projects with a potential permanent noise increase are located approximately 500 feet or more away, and therefore, cumulative noise impacts would not occur. Furthermore, the proposed project's operations and those of the related projects would be designed consistent with the City's Noise Control Ordinance, which limits the exterior noise levels at noise-sensitive land uses.

Implementation of mitigation measure **MM-NOI-3** would ensure that the proposed project would comply with state and local noise standards. Similarly, the related projects would be required to comply with these standards. Compliance with the City's Noise Control Ordinance would reduce the proposed project's operational noise so that its incremental effect is **not cumulatively considerable**.

Off-Site Traffic Noise

The proposed project and the related projects would generate off-site traffic noise. When calculating future traffic impacts, the traffic consultant included traffic from the related projects in the future (Year 2035) traffic volumes. Recent pending and approved projects in the City were included in the traffic model. Thus, the future traffic results with and without the proposed project already account for the cumulative impacts from the list of related projects contributing to traffic increases. Since the noise impacts are generated directly from the traffic analysis results, the 2035 Without Project Noise Level and 2035 With Project Noise Levels described herein already reflect cumulative impacts. As described herein, the noise level increases associated with both of these scenarios (2035 Without Project and 2035 With Project) would generate a noise level increase of 1 dBA or less (rounded to whole numbers) along the studied roadways in the vicinity of the project site. As such, increases would be below the significance threshold of 3 dBA. With or without the proposed project, traffic noise would not be substantially increased in the project vicinity. As such, the incremental effect of the proposed project on off-site traffic noise is **not cumulatively considerable.**

4.11.7 MITIGATION MEASURES

The following Mitigation Measures would reduce the potential for noise impacts by ensuring that construction and operation of the proposed project are carried out in a manner which reduces noise to the extent practicable and in compliance with applicable noise standards. Implementation of the following mitigation measure(s) would reduce impacts to a **less-than-significant level.**

MM-NOI-1 Prior to initiation of campus construction, San Diego State University (SDSU) shall approve a construction noise mitigation program to include the following:

- Construction equipment shall be properly outfitted and maintained with all feasible noise-reduction devices to minimize construction-generated noise.

- Stationary noise sources such as generators shall be located as far as feasible from noise-sensitive land uses.
- Laydown and construction vehicle staging areas shall be located away from noise-sensitive land uses if feasible.
- All academic, administrative, and residential areas that will be subject to construction noise shall be informed of construction activities at least 1 week before the start of each construction project.
- All construction projects pursuant to the proposed project shall be required to implement the above measures for control of construction noise.

MM-NOI-2 Prior to construction of Residence Halls 1, 2, and 4, SDSU, or its designee, shall conduct an interior noise study to demonstrate and ensure that, following construction, the interior noise level for all habitable rooms fronting on Remington Road and 55th Street is mitigated to 45 decibels (dB) Community Noise Equivalent Level (CNEL) or less. It is anticipated that compliance with the applicable standard shall be achieved by implementation of various noise abatement strategies, such as sound-rated windows and air-conditioning or mechanical ventilation.

MM-NOI-3 During the planning and design phase, SDSU, or its designee, shall prepare mechanical equipment plans, which shall implement best engineering practices, and shall consider the placement of noise-generating equipment and shielding when installing stationary noise sources, including heating, ventilating, and air conditioning (HVAC) systems. In addition, SDSU, or its designee, shall prepare an acoustical evaluation of the mechanical equipment plans to ensure, that outdoor mechanical equipment noise will not exceed the City of San Diego's Noise Ordinance standards for commercial and residential uses at adjacent properties. The acoustical evaluation shall identify all noise-generating equipment and predict noise levels from all identified equipment at the applicable property lines. Where predicted noise levels would exceed those levels deemed acceptable as established by the City's noise ordinance standards, the acoustical evaluation shall identify Mitigation Measures shown to effectively reduce noise levels to comply with the City's noise ordinance standards. It is anticipated that compliance with the applicable standards shall be achieved by the implementation measures such as selecting quieter types of equipment, constructing rooftop equipment screen

walls/parapets or locating the equipment within the interior portion of the sites, in order to ensure compliance with the noise ordinance. All such Mitigation Measures identified by the acoustical evaluation shall be implemented by the SDSU or its designee prior to building occupancy.

4.11.8 LEVEL OF SIGNIFICANCE AFTER MITIGATION

With implementation of the above Mitigation Measures, any potentially significant noise-related impacts would be reduced to **less-than-significant levels.**

4.11.9 REFERENCES

Caltrans (California Department of Transportation). 2011. Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Projects. Caltrans, Division of Environmental Analysis. May 2011.

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LLG (Linscott, Law & Greenspan, Engineers). 2017. *Transportation Impact Analysis, SDSU Student Housing*. February 16, 2017.

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SDSU
New Student Housing Project EIR

San Diego State University

Figure 4.11-1
Noise Measurement Locations

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